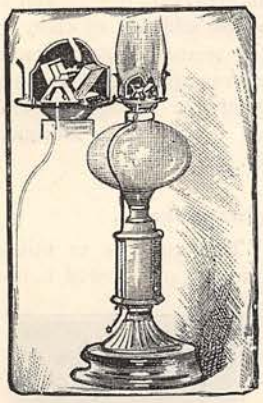
THE GATHERER.

A Lamp-Extinguisher.

The illustration accompanying this note shows a simple means of extinguishing a lamp-light. With the finer qualities of oil especially, it is sometimes a dangerous operation to put out the light by blowing down the chimney; nor is it convenient to handle and remove a hot chimney prior to extinguishing the light; and blowing from the foot is not always successful. The appliance under notice meets, apparently satisfactorily, these difficulties, is effective and cheap. Two extinguishing plates, hinged under the cap and near the wick-tube, are furnished with arms which project outwards through oblique slots in a case connected with a wire, which extends downwards along the side of the lamp and its stand. The wire is supplied with a handle or knob, by means of which it may be pulled down so as to cause the two extinguishing plates to close on the wick-tube and thus put out the light. A spring surrounding part of the wire restores the different parts of the apparatus to their normal condition.



Utilising Diatoms.

A new use has been found for the silicious earth known to be the remains of countless millions of diatoms. According to the Royal Microscopical Society's proceedings, it is now used for making silicates of soda and potash. Diatoms are added to the alkali and chalk: the silica dissolves and the liquid is decanted and concentrated. It can be used for the manufacture of porcelain and cement. Porous plates can also be made of it, which serve to dry crystals by absorbing the water from them. Steeped in petroleum these plates serve as fire-kindlers without consuming themselves. Mixed with a twentieth part of clay, the material makes bricks which float on water. The best diatomaceous earth is the "Kieselguhr" of Hanover, which serves for the preparation of dynamite. It absorbs three or four times its weight of nitro-glycerine. It may also be employed as tooth-powder.

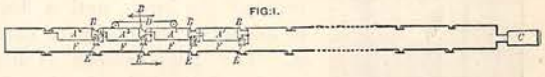
A New Mess-Tin.

An ingenious little mess-tin, which affords the soldier a good hot meal in a few minutes with little trouble, has been devised by Colonel Silver. At the recent Brighton review the inventor provided each of the men of his regiment—the 4th Battalion Essex—with a tin containing ragout, and as this could be warmed up by lighting wicks inside the tin, a warm meal was prepared in fifteen minutes. The cap of the tin is the lamp, and contains spirits of wine and wicks, which are drawn through holes in the metal. On opening the tin the cap is removed and the wicks lighted; the makeshift lamp is placed below the bottom of the tin, between stone supports, and the meal cooks.

Electric Telpherage.

"Telpherage" is the name given by Dr. Fleeming Jenkin, F.R.S., Professor of Civil Engineering in Edinburgh University, to a system of transporting vehicles containing goods and passengers to a distance by the electric current, independently of any control exercised by the vehicles themselves. His idea is to employ strained metal cables, which will serve the double purpose of sustaining the load and conveying the electric current to electric motors attached to the trucks which hold it. The trucks or cars supporting the load run along the cable on wheels, and the load is suspended below the cable. The current is supplied to the line by a stationary dynamo at one end.

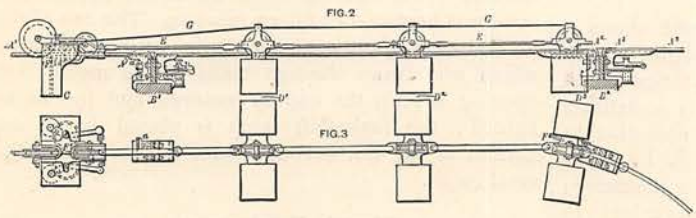
Fig. 1 shows the arrangement proposed. Here A_1, A_2, A_3, A_4 are separate sections of an insulated metal cable, and B, B, B, B are "bridge-pieces" which establish metallic connection throughout the series of insulated sections, so that wherever there is no train on the line the sections are coupled together and form part of the electric circuit. At one end of the line C, there is a stationary dynamo supplying a constant current to the circuit despite the variations of resistance caused by more or less trains upon the line. A train on the line between sections A_2 and A_1 is indicated at D; and the length of this train is such that it always spans at least one of the junctions between two sections. The train, as it enters on a new section, removes the bridge-piece B, which connects this section with that in rear, and thus compels the current, in order to maintain its circuit, to flow through a connecting wire or conductor, G (Fig. 2), on the train, in which one or more electric motors are connected. These motors, therefore, operate and serve to turn the wheels by proper gearing, thus propelling the train. Before the end of a train leaves the preceding section it replaces the bridge-piece so as to keep up the continuity of the circuit, but not before another bridge in advance has been opened. The



current can in this way pass in series through any number of trains on the line and propel them all.

The telpherage line is shown in fuller detail in Figs. 2 and 3, which are an elevation of it. Here A_1, A_2, A_3 are the sections of a single wire rope or rail supported

above the ground by insulating supports B_1, B_2. In general two lines of cable will be used, but a single line will serve some purposes. A train of three cars, D_1, D_2, D_3, is shown passing over the line between



sections A_1 and A_2. Every support, such as B_1, is provided with a switch lever, *a*, which in its normal position establishes electrical connection between the sections A_2, A_2, and A_1, A_1, the lever then bearing against a piece of metal which is in electrical connection with one section, while the lever itself is, through its axis, in connection with the other. The first vehicle of each train is fitted with a cam, F, so arranged as to catch each lever as it passes, and throw it over into a position such that electric communication between A_1, A_2 is severed, and at the same time a portion of the main current is diverted, through the lever and the new contact, which it now makes, into an auxiliary telegraph wire. The train consists of an electric locomotive, C, and three cars, D_1, D_2, D_3, connected together by light coupling rods, E, E. On the leading vehicle or locomotive is the cam F, which pushes aside the levers *a*, and the cam F_2, on the last vehicle, restores every switch lever to its normal position. The invention promises to be useful for conveying goods or passengers through cities, for it can be erected along thoroughfares, and as a constant succession of vehicles can be transported, it might convey a regular stream of passengers.

A New Miners' Lamp.

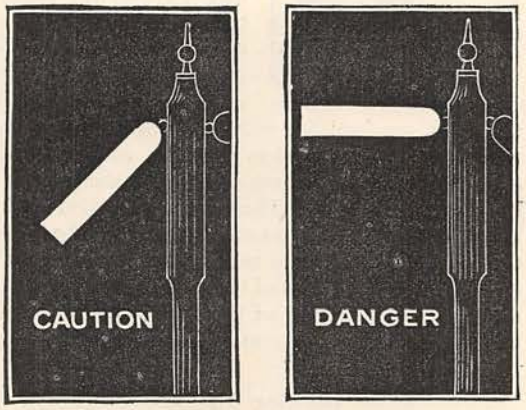
MM. Mangin and Leroyer have devised an electric incandescent lamp for mines, by which all danger of explosion from breaking the lamp is avoided. One form of the lamp is shown in the accompanying illustration. The essential feature is that the lamp globe is immersed in a lantern of pure distilled water, which if the lamp broke would effectually destroy the chances of explosion. Two binding screws serve to convey the current to the lamp, and a hook is added to the cover to carry it. The lamp shown is also employed to light the interior of transparent balloons for signalling purposes: the current being cut off at will to make the flashing signals.

Silvering by Glycerine.

Glass mirrors are now silvered by the reducing action of glycerine on the salts of silver. The process is the discovery of Professor Palmieri. When into an ammoniacal solution of nitrate of silver a little caustic potash is poured, and a few drops of glycerine are added, the reduction begins, and is accelerated by the addition of ether or alcohol to the mixture. A moderate heat and darkness are said to increase the brilliancy of the precipitate, and darkness also favours the adhesion of the deposit to the mirror.

Illuminated Railway Signals.

Messrs. Cleminson and Tuer propose to utilise semaphore signals by night instead of coloured lamps



in railway signalling, by making the semaphore arms of glass, boxed in, and internally illuminating them. Electricity can of course be supplied for this purpose. The figures show how the arms would appear, and the arms would be visible as bands of light as far as a lantern-eye.

Silk Ornamentation made Easy.

The tendency now-a-days is to save time and trouble in all directions. Formerly it was the duty, if not the delight, of our respected ancestresses to make samplers and to embroider silks and satins in a painfully elaborate manner, not unfrequently with far from satisfactory results. In this useful department—namely, the decoration of various textile fabrics, paper, terra-cotta articles, &c.—the maxim that "time is money" has been illustrated by a simple and ingenious process of what has been, not very happily, called "Silk Ornaments." These are decorative designs of varied complexity, which may be applied either as they are or in combination to the different classes of materials above enumerated. The method of application is as follows:—Heat a small iron to the heat required for ironing, then take the ornament and damp it at the back with a moderately wet sponge or

paint-brush. This having been done, the face of the design must be placed upon the article which is to be ornamented, and—a thin sheet of paper or a piece of damp muslin having been laid over it—pressed with the hot iron. The paper must then be removed, when it will be found that the decoration will have been transferred. "Silk Ornaments" ready for use are now extensively sold, thus reducing the trouble of decoration to a minimum. We have seen a terra-cotta plate ornamented in a highly effective way by this simple process.

New Fire Protectives.

The new model theatre of Brünn is fitted with electrical apparatus devised by Mr. Haviland for use in the event of fire. By means of an electro-magnet, through which a current of electricity passes, the incombustible curtain between the stage and auditorium is allowed to fall; the valves of water-pipes are opened and discharge water copiously on different parts of the building; extra doors are opened and ventilators are closed. All these actions are started by an electric key-board with five corresponding press-buttons, each labelled with its duty. A sixth push-button performs all the operations at once. This key can also be worked automatically by means of a combustible wick or fusible metal attachment. Thus when the fusible metal melts, a press-weight could be liberated so as to close the circuit. Steam has recently been utilised in Berlin for extinguishing fires at a pen factory. Into the drying room for the wooden handles were brought three steam-pipes of an alloy of lead and tin, which would quickly melt on fire breaking out. Such was the case recently, but the escaping steam saved the premises by saturating the walls with damp.

While upon this subject we may mention the new fire-ladder truck introduced into the London Fire Brigade, and employed at the recent great fire in Paternoster Square. This long ladder, which we illustrate, is made telescopic so as to serve for the highest houses, is carried on a long horizontal truck through the streets, and at the site of the fire is hoisted to a vertical position by means of jack-screws worked by four men. When brought into a perpendicular position the ladder can be directed to any position on a roof or wall, as it turns on a revolving platform. The length of the ladder now used is eighty feet, and it is stated that without the help of this ladder to enable the firemen to ply the hose into the heart of the burning buildings, the recent fire would not have been extinguished for many hours.

The Electric Light in Surgery.

The electric light has recently been utilised in an examination of the liver by Dr. T. Oliver, of Newcastle-on-Tyne. An incision was made, and the interior of the cyst lighted up by a miniature Swan electric lamp, enclosed in a silver-plated brass tube, glazed at the end, inserted into the wound. The tube was 9½ inches long and $\frac{11}{16}$ inch internal diameter. It was smeared with carbolised oil before being used, and the doctor recommends that carbolised glycerine should be used in place of glass in future operations of the like kind. The lamp was lighted after the tube was inserted, and the interior of the cavity could be plainly seen, together with the sign of disease. The Swan lamp used was the size of a bean, and gave a light of two or three candles. It was fed by two or three Grove cells, and kept cool by water circulating round the glass bulb in narrow glass tubes.

A New Egg-Beater.

Appliances for humble household purposes are apt to be lost sight of among the magnificent achievements of the explorers and inventors in the sphere of electricity. In their way, however, those smaller designs call for notice here as well as the more important—the minnows must be looked after as well as the tritons. For example, an egg-beater of unpretentious look and simple in its operation has not long since been patented. It consists of two portions. One is a tin tube about twelve inches long, the bottom of which takes the form, bottle-wise, of an injected cone; the other is a stout wire terminating in a perforated cap, which loosely fits over the cone. The eggs that are to be beaten (of course minus their

shells) having been put into the tube, the wire ramrod is then worked vigorously up and down for a few moments, when they will be found "whipped" into a light froth. The appliance, needless to say, will be found a serviceable adjunct to the stock of culinary appliances.

Electric Boiler-Alarms.

The idea of preventing boilers from becoming crusted inside by the use of a current of electricity has been applied by Messrs. Field and Thomson, and the current otherwise utilised to ring an alarm-bell and tell when the water-level has got low. The arrangement employed is shown in Fig. 1, where H K is an alarm-bell consisting of an electro-magnet H, and a bell K. This bell is so constructed as to remain silent when a current flows through the magnet, and ring when this current is stopped. The current used is supplied by a battery or a dynamo, the positive pole of which is connected to the iron shell of the boiler, and the negative pole, C, is insulated from the boiler and enters it by a packing-box shown. A float, G, on the water carries a metal arm, F, insulated at L, and making contact by rubbing with the lower part, E, of the negative pole C. Thus the circuit of the battery is completed through the water, and the metal stem C, and the bell is silent. When, however, the water-level falls below a settled point, the contact is broken, and the current stopped. The bell then rings and notifies the fact. Of course it is also intended that the current shall keep the boiler free of incrustation; but perhaps this is a doubtful point. It is more certain that it will prevent the water from becoming free of air by superheating, and thus lending itself to sudden explosion by instantaneous generation of steam.

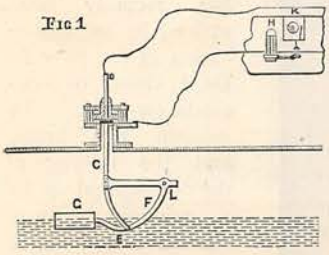


FIG 1.

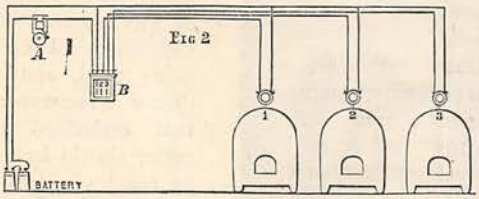


FIG 2.

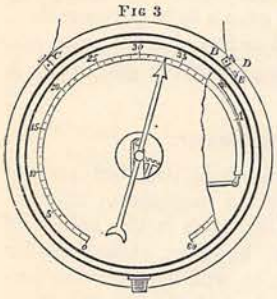
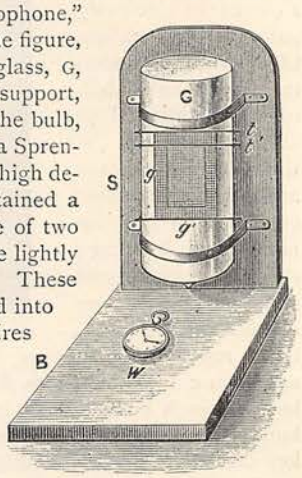


FIG 3.

Arnoldi's alarm for pressure-gauges is designed to tell when engineers allow the pressure of a steam-boiler or a hydraulic press to rise above what their orders permit. Fig. 2 represents three boilers (1, 2, 3) in electric connection with a gong-bell A, and indicator B, which tells the boiler at fault. Fig. 3 shows how the alarm is attached to a Bourdon gauge. A light spring, A, is fastened on the gauge tube, and an insulated binding screw B, provided with the regulating screw D, is attached to the gauge-face as shown. The point of this screw makes and breaks contact with the spring A, upon the expanding tube. The other binding screw, C, may either be fixed there or on the piping of the pressure vessel. Wires from the circuit of the battery and indicator go to the screws, C B. To set the alarm it is only necessary to raise the pressure on the guage to the point which is chosen as the upper limit. The screw, D, is then adjusted to make contact with the spring A, and fixed at that point by the jam-nut E. Whenever the pressure afterwards rises to that point the contact between spring and screw will be made, and the electric circuit being closed, the bell will ring, and the indicator announce the fact.

A Vacuum Microphone.

At a recent meeting of the Society of Telegraph Engineers (on April 26th), Mr. J. Munro, C.E., exhibited a "vacuum microphone," consisting, as shown in the figure, of a vacuum bulb of glass, G, mounted on a wooden support, S, and base-board, B. The bulb, which was exhausted by a Sprengel mercury pump to a high degree of rarefaction, contained a metal microphone made of two pieces of iron wire gauze lightly resting on each other. These pieces of gauze were fixed into the bulb by platinum wires fused through the glass. The gauze plates are shown at g and g', and the ends of the platinum wires, t t', projecting through the glass, serve as terminals for connecting the battery and a telephone in circuit. A watch, W, placed on the base-board serves as the source of sound, and its ticking is heard in a manner remarkably clear and distinct. The apparatus is interesting in a scientific sense, as it demonstrates that the microphone will operate in a vacuum. Practically it would also protect the gauze from rusting. Mr. Munro has also constructed a metal "receiving microphone"—that is to say, a microphone which, like the Bell telephone, receives the sonorous electric current and transforms it into sound. This was also exhibited at the meeting, and is composed of a pile of squares of wire gauze contained between a metal electrode on the one hand and a mica diaphragm, or drum, on the other. When the sonorous current is sent through the pile of wire gauze, the mica plate vibrates by the expansion of the pile, and produces audible effects.



With carbon blocks instead of gauze the effect is more marked, and it is probably due to a repulsion between the microphonic contact points.

Green-bearded Oysters.

Oysters with green beards are usually shunned as poisonous. From analyses of the mud in which they have been found (and which, by-the-by, gave no signs of the presence of a metallic substance), there is reason to believe that the green-gilled aspect, so unpleasantly suggestive of copper, may really be due to the fact that the oysters may have fed upon marine plants or algæ, which imparted the greenish hue to the beard and digestive organs of the bivalve, *the body retaining its natural colour*. Some oysters having been placed in a copper solution were found to assimilate it readily. Its presence was observable by the body acquiring a bluish-green look, while *the beard retained its natural colour*. A coppery oyster is both a nasty and dangerous mouthful, so it behoves all lovers of this mollusc to reject the green-bearded ones as at all events suspicious. We note the foregoing researches because of their giving fair ground for hoping that the green-gilled oysters may, after elaborate and careful investigation of the beds where they are found, come to be pronounced innocuous.

Science on Ben Nevis.

Mr. Clement Lindley Wragge has now for two summers ascended Ben Nevis every day, to take meteorological observations at five stations on the way, including one at the summit. Accompanied by his trusty dog, he may be seen by the tourist wending his way up or down the Ben in all sorts of weather, keeping his time like the postman, for the observations are taken simultaneously with others at the sea-level, Fort William. The atmospheric pressure (by mercurial barometer); the temperature of the air and evaporation (by wet and dry bulb thermometers); the direction and force of the wind; the kind, quantity, and velocity of the clouds; the rainfall; the maximum and minimum temperatures; the quantity of ozone in the air; the actinism of the sun's rays and of daylight, the temperature of Wragge's Well, and the rain-band, were all noted on the top at various times. The instruments are sheltered in rude huts, or exposed on posts on the rocky tableau of the summit. The success has been such that Mr. Wragge strongly recommends the erection of a permanent observatory there. The arduous task of ascending the Ben every day cannot, of course, be continued indefinitely, and Mr. Wragge has shown the importance of the Ben Nevis observations. Sometimes his pony proved faithless, and Mr. Wragge had to make the best of his way on foot across the peat-hags halfway up. Sometimes he became chilled by the summit mists, after profuse perspiration during the ascent. The rude hut, with its walls full of cracks and crevices through which the wind and snow-drifts whistled, was but a poor shelter, and his hands were often so swollen and numbed that he could hardly take his observations. Usually on the beginning of November the work had to be abandoned, for the Ben in winter is impassable.

The Photophore.

The "electric frontal photophore" exhibited recently to the French Academy of Sciences is a small electric light, which is fastened on the forehead by a strap going round the head after the manner shown in Fig. 2. The photophore is illustrated on a larger scale in Fig. 1, and consists of a small Swan incandescent lamp contained in a hollow metal cylinder between a reflector and a small convex lens, as shown. The source of electricity is a small bichromate battery of M. Trouvé.

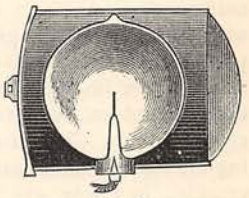


FIG. 1.

FIG. 2.

The instrument is intended for watchmakers and surgeons, to illuminate the mechanism of a watch, or some cavity of the body under examination.

Speaking at a Distance of 1,000 Miles.

A successful trial of the telephone was recently made between between New York and Chicago, a distance of something over 1,000 miles. The success was due to the conductor employed. This consisted of a steel core electrotyped with a thick layer of copper, and was in fact the conductor which we mentioned in a recent number of the GATHERER. The resistance which such a wire offers to the passage of the electric current is only about one-tenth of the resistance of the ordinary telegraph wire, hence 1,000 miles of the new wire are equivalent to 100 of the old. This success on land has led some of the newspaper writers to infer that we shall soon be talking through the submarine cables to America, but until a new kind of cable is devised this is impossible. The *induction* of the sea-water is so

powerful on cables as they are now made, and likely to be made, that the delicate electric waves of speech are completely blurred and run together in their passage through 100 miles of such conductors.

Crackled Glass.

A new kind of glass, which is smooth on one side and rough on the other, is made by spreading over the surface of a plain sheet a thick layer of fusible glass with broken pieces of glass in it. The glass is then put into a muffle furnace and strongly heated. As soon as the fusible glass melts and the glass itself becomes red-hot, it is taken out of the furnace and cooled rapidly. The fused glass then cracks off, leaving the surface underneath beautifully crystalline and crackled, in a way which gives very pretty luminous effects. By protecting the glass from the action of the flux, monograms, crests, arabesques, or other designs may be imparted to the surfaces treated in this manner.

Speed of Smelling.

According to the recent experiments of M. Bearmis, of Nancy, made with various pungent substances, such as ammonia, acetic acid, musk, and so on, the reaction time for smell—that is to say, the time between the excitation of the sense, and the signal of the person that the odour is perceived—is longer than the reaction time for hearing or seeing. It varies considerably for different substances; thus, for ammonia it is $\frac{37}{100}$ of a second, for acetic acid $\frac{46}{100}$, and for mint $\frac{63}{100}$. Musk was tried, but the time could not be definitely measured.

Steel-Iron.

Steel-iron is a new American product, useful for rails, armour-plates, anvils, fire-proof safes, and so on. It is an intimate union of iron and steel pieces, making one mass. The iron and steel may be side by side, alternate, or one may enclose the other. It is made by dividing a cast-iron mould into two parts by a thin sheet of iron securely fixed in it. The fluid steel as well as the fluid wrought-iron are poured into the double mould, one into each partition, and the separating plate unites them into one by welding. The separator must not be so thin as to burn through and allow the molten masses to combine; and if too thick it does not attain the proper welding heat. The dimensions of the plate are therefore a point of great importance. Parts of machinery and tools subject to great pressure and vibration are best made of this material.

Incombustible Paper.

M. G. Meyer has exhibited to the "Société d'Encouragement" of France an incombustible paper, capable of taking on inks of various shades, and also paintings, and preserving them even in the fire of a gas-flame. A lithograph of a sea-piece was exposed between two glass plates to the action of a fire until the glass fused, and it remained intact. M. Meyer does not state the composition of his new paper, but asbestos enters into it.

Thought-Reading and Willing.

A LETTER TO THE EDITOR.

SIR,—I have been highly interested with the articles on thought-reading that have appeared in your Magazine and elsewhere, and have made a careful examination and study of the best manner in which these phenomena can be attained. As I know there is a strong love of anything that borders upon the supernatural in a great many minds, I have thought that perhaps your readers might be interested with an account of my own experience in these matters.

I have found by experiment that the quickest and most satisfactory manner by which the marvellous results of thought-reading and willing are produced, is for the person operated upon (or medium, as I will designate him) to have his eyes bandaged whilst the operator, or willer, places one or both of his hands upon the forehead of the former. The thoughts of the operator must be entirely concentrated upon the object willed, whilst that of the medium is kept as blank and vacant as possible. I may here observe that the more highly sensitive and nervous the person acted upon, the more satisfactory are the results; while, on the contrary, the willer should be possessed of a very strong determination and concentrativeness of purpose.

The first time I tried the experiment was upon a friend of highly nervous temperament, and as we had failed on several previous occasions when merely sitting opposite and grasping one another's hands (as advocated in your first article), we entered upon this experiment with a great amount of unbelief and incredulity. However, at the expiration of about five minutes I found that a strong nervous thrill came over the person I was acting upon, accompanied with a twitching of the eyebrows and muscles, and a deep heavy breathing as in sleep; then my medium suddenly in a great state of excitement dashed from his seat, nearly overturning me and the tables in his hurry.

But the most startling experiments of all I performed with a younger brother, who is of a very excitable nature. The experiments produced upon him an entirely different result. There was no nervous excitement, no twitching or contraction of the muscles, or trembling of the limbs, but within a few seconds after my hands were placed upon his forehead he reeled to and fro, drew one or two heavy inspirations, and then went off apparently into a kind of mesmeric sleep. It made no difference whether his eyes were bandaged or not, he could see no person or object in the room, and, most strange to say, could hear no voice, although there were several persons in the room speaking in the ordinary tone of conversation: whereas he could hear my voice if only raised in a whisper.

He would readily find articles hidden in the most unaccountable and unlikely places, would take things from one person and place them wherever they were required on others; but the most marvellous part, and which really to all who were present seemed entirely beyond the range of comprehension and bordered very much on the supernatural, was that after touching any article and placing it back again, after turning round and walking some distance with his eyes bandaged and his back turned to the object, if any one touched that object, or even made a move as if inclined to remove it, he would instantly rush back and seize it from their grasp, evincing very pugnacious propensities if the article were retained.

I could mention many other most remarkable experiments, but I think I have quoted enough to prove the miraculous nature of these phenomena, which any person can perform upon another of rather a nervous and sensitive temperament. The speediest manner, as I have said, to accomplish this is to place the hands upon the forehead, but I have obtained the same results with only a strip of copper wire as a communication. I may add that I do not think there is the least danger attending this amusement, although, as I think you stated in your article, with persons of extremely nervous susceptibilities it might be weakening if indulged in to too great an extent.

GEORGE D. DAY.