The Pasteur Treatment in Barcelona.

The municipal authorities of Barcelona, as we announced last year, have established a municipal microbiological laboratory, mainly with the view of enabling persons bitten by rabid animals to obtain the advantages of Pasteur's method of treatment. To the post of director of the laboratory Dr. Jaime Ferran, whose name is well known as having proposed and carried out a system of anti-cholera inoculations, was appointed, and he has been assisted by Drs. Pauli, Commenge, and Lluch. A report of the work done from May 10 to December 10, 1887, has just been published in *La Independencia Medica*. Altogether eighty-five persons have been subjected to the treatment. Of these, twenty-five had been bitten by animals that were certainly rabid, fifteen by those which had been pronounced rabid by medical men or veterinary surgeons, and thirty-seven by animals which were believed to be rabid, but whose condition could not be verified by professional men. The remaining eight persons had not been bitten at all, but submitted to the process in order to prove its harmlessness. The duration of the treatment was more than three months in forty-three of the cases, more than forty days in sixty-three, and less than that in twenty-two cases. Not a single case, either of those who had been bitten or of those who had not, proved fatal. The wounds were caused by seventy-two dogs, two cats, and two mules. Two of them were not bites, but dissection wounds with instruments tainted with the virus of rabies. At first Dr. Ferran carried out the inoculations of his rabbits according to Pasteur's method—*i. e.*, by trephining. Recently, however, he has adopted a new, and, as he believes, an improved, plan—viz., the injection of a single drop of the emulsion of the medulla containing the virus into the anterior chamber of the rabbit's eye. This produces exactly the same effects in about the same time as the trephining method.—*Lancet.*

Workshop Management.

The selecting of foremen is one of the most difficult duties that can confront owners of manufacturing establishments. It is generally found that the man who is the most capable artisan, and well up in all matters relating to his trade, is entirely void of the force of character and power to command others which are essential features in a good foreman, while the man who possesses the latter qualifications is often a very inferior worker. We have heard of a manager of a great establishment, says the editor of the *Iron and Steel Trades Journal*, who appointed an artisan to be foreman, owing to having observed that he was always moving hurriedly between the workshop and the store. The appointment elicited the fact that the new foreman, being a poor worker, had been content to "run the messages" for the other workmen, and his alertness while on the trot between the workshop and the stores had led the principal manager to fancy that he was an exceptionally earnest, faithful, and capable servant, and worthy of promotion. It is also well known that a large percentage of workmen spend their evenings doubtfully, and are never fit for their duties till a good part of the working day is spent. It is only in the large establishments this is possible, but the evil prevails wider than most employers and directors fancy is possible. We have inquired very closely into this point, and regret that we must admit that a great deal of unnecessary laxness obtains in our workshops, and cheap foremen are generally without backbone and worthless. Those who superintend should be superior to those under them in every respect, know how every job should be done, and how every man in the works is employing his time.

IN New York the law makes it a misdemeanor for a keeper of a boarding house or restaurant to abuse the confidence of his patrons by substituting butterine or oleomargarine for true butter. It will be in order next for Michigan to protect her industries by prohibiting the use of salt produced by evaporating the waters of an ocean into which thousands of tons of sewage are daily poured. There is nothing like a paternal government.

EDISON'S NEW SYSTEM OF TELEGRAPHY.

We illustrate herewith a system of telegraphy recently introduced by Mr. Thomas A. Edison, and known as the phonoplex system. It is operated by an induced current, and may be used successfully upon lines 100 miles or less in length. It finds its principal use in connection with the ordinary Morse lines. The current used in operating the system has no effect whatever upon the instruments of the Morse system, neither does the current used in the Morse system interfere with the phonoplex apparatus. It may also be used in connection with duplex and quadruplex wires, thus enabling a long stretch of wire to be utilized in connection with intermediate stations.

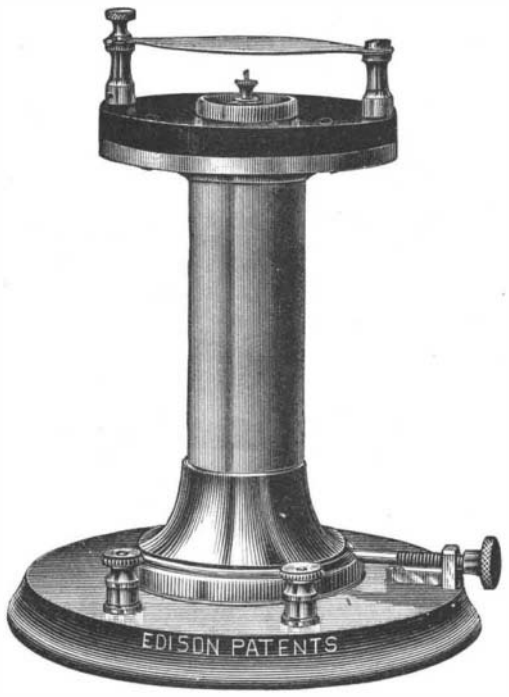


Fig. 1.—THE PHONE.

The equipment of an office consists of a key, a transmitter, magnetic coil, small resistance box, and the phone, two condensers, two cells of gravity battery, and four of electropoion, the whole requiring no more space than an ordinary Morse instrument.

The phone (shown in Fig. 1) consists of a hollow column of brass resting upon a wooden base inclosing magnets. At the lower end of the column is a rack and pinion by which the magnets can be adjusted. At the top of the column, in a suitable cell, is arranged the diaphragm, to the center of which is attached a screw-threaded pin provided with an adjusting nut and binder at the top. A split hardened steel ring, which is apertured transversely, is received upon the pin and rests upon the diaphragm. When a momentary current is sent through the coils of the magnets, the diaphragm is drawn down, throwing the ring violently against the top nuts, producing a sharp, loud click.

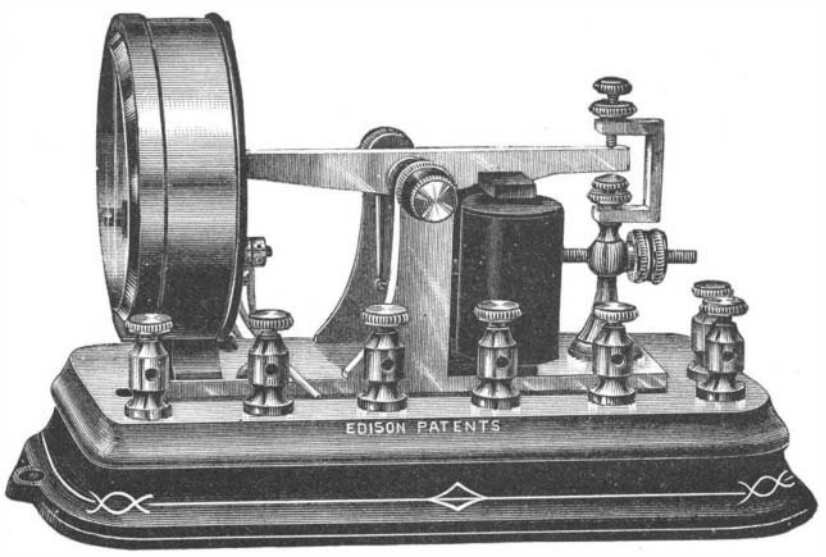


Fig. 2.—THE TRANSMITTER.

The transmitter (shown in Fig. 2) is interposed between the key and the magnetic coil. The key operates the magnet of the transmitter, and the arm of the transmitter is arranged to control the electrical contacts, as shown in Fig. 6.

Fig. 3 represents the small magnetic coil which is used to produce the induced current, by which the phones upon the line are operated.

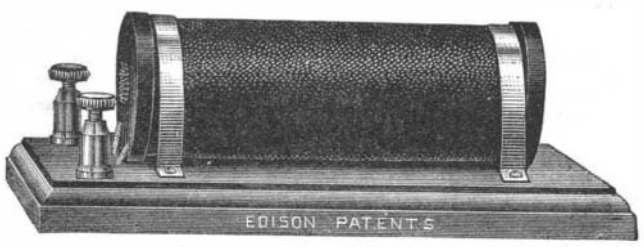


Fig. 3.—THE MAGNETIC COIL.

The key (shown in Fig. 4) is constructed so that when the lever is opened or thrown to the right, it closes the circuit around the magnetic coil through the points of the transmitter, and when closed or thrown to the left it opens this battery, and at the same time short-circuits the magnetic coil. This is necessary, as an open circuit electropoion battery of low resistance is used to transmit the signals, and it is desirable to cut out this battery at all times, excepting when signals are to be sent. By this arrangement the manipulation of the key is exactly the same as that of an ordinary Morse key, although the effects are different.

A small resistance box is placed in the circuit in such a way as to receive the current when the circuit of the coil is broken on the up stroke. The current passing through the spools of the resistance box thus produces an audible distinction between the up and down movements of the key as manifested in the phone, the upward movement being distinguished by a light stroke and the down movement by a heavy stroke.

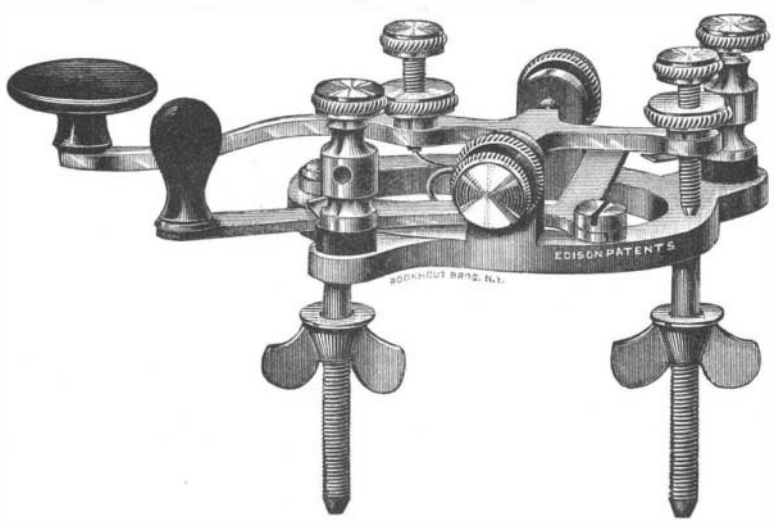


Fig. 4.—THE KEY.

Fig. 5 shows the arrangement at station. ML is the usual Morse line, with Morse relay, A, and ordinary key, B, shunted by condenser, C, to keep the line closed to the induction impulses. At each office where it is desired to operate the phonoplex there are placed in the main line a magnetic coil and a phone. The armature of the transmitter responds to the action of the key, *a*, through the transmitter battery and wires, 1 and 2. These wires, 1 and 2, form a local circuit to excite the coil of the transmitter. The circuit around the magnetic coil, which is used to send the induction impulses to the line, starts at the right hand side of the magnetic coil, thence through coil, battery to post, *b*, on the key, *a*, through which it passes along wire, 3, to the armature of the transmitter. This circuit is completed to the left hand side of the magnetic coil from the transmitter points, C and E, and along wires, 7 and 9 or 8 and 9, depending upon the position of the armature, and whether it is attracted by its magnet or influenced by its spring.

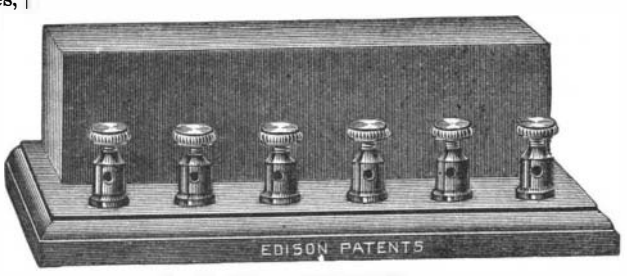


Fig. 5.—THE RESISTANCE BOX.

When the lever of key, *a*, is thrown to the left or closed, the coil battery circuit is left open at point, *b*, and the magnetic coil is short-circuited through wires, 9, 8, spring, *e*, of transmitter, transmitter armature, wire No. 3 and wire No. 6 to main line. The coil battery is left open for the reason that it is of very low resistance and depreciates rapidly when left on closed circuit. The magnetic coil is short-circuited when not in use, so as to keep the resistance of the same out of the main line. When the lever of key is thrown to the right and makes contact with point, *b*, it breaks its contact at point, H, throwing the magnetic coil into the main line circuit and closing the circuit of the coil battery around the magnetic coil through transmitter points. This is done when the operator desires to send a message. With the lever in the above position, when the key is depressed, the local circuit being closed, the armature of the transmitter is attracted toward its magnet, thereby breaking contact at spring, *e*, and sending an impulse from the magnetic coil into the line. When the key is released the armature of the transmitter is also released, and the circuit is broken at point, *c*, thus sending another impulse into the line, but through resistance box, *d*. This forms the up stroke in the phone, and the resistance has the effect of making it lighter than the down stroke, so as to enable the operator to distinguish the difference between the two and avoid getting "back stroke." Wires 4 and 5,

leading to points, *f* and *g*, respectively, shunt the phone out of the main line while the home office is working; an insulated point attached to the lower point of the armature of the transmitter permitting the spring, *g*, to make contact with point, *f*, just before the circuit is broken at point, E, when the armature is depressed, and breaking contact again after the circuit has been opened at point, *c*, when the armature is released. The phone at the home office is silenced while the home office is working, for the reason that its responses to local induction impulses are very loud, and if it were permitted to work, some difficulty would be met with when the receiving operator desired to "break." The small condenser, *c*, is placed around the magnetic coil to quicken the impulses and prevent sparking at points, *c* and *e*.

The phonoplex system more than doubles the capacity of a line, as it may be used between any number of intermediate stations, any two of which may carry on telegraphic communication independently of the others and independent of the Morse system.

The cost of maintenance is very light—the only actual outlay required is for the provision of battery material. It is estimated that the cost of operating a single station will not exceed $1.50 per month.

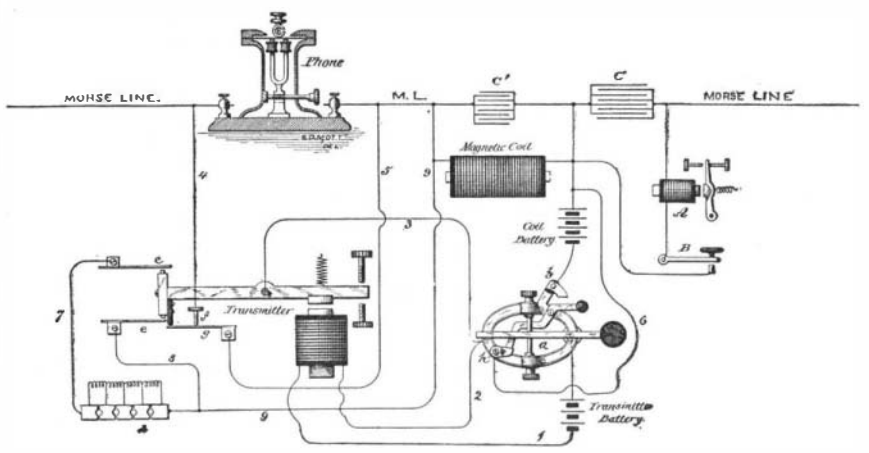


Fig. 6.—THE PHONOPLEX CIRCUIT.

Gaseous Explosions of Platinum.

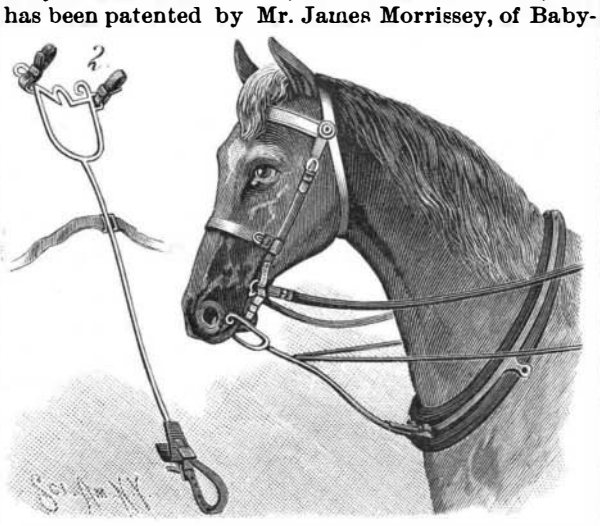
The curious fact was some time ago brought to light, says *Nature*, by Nahrwold, that solid particles are ejected from a platinum wire glowing under the influence of an electric current, and form a metallic incrustation upon the walls of a glass tube by which the wire is surrounded. The cause of the emission of these solid particles of platinum has, however, until recently, remained a complete mystery. In the number of the *Annalen der Physik und Chemie* just received will be found an interesting paper by Dr. Alfred Berliner, who, in the course of a series of experiments upon the occlusion of gases by platinum and palladium, has discovered the source of this singular phenomenon. Thin strips of platinum, before being charged with the gas under experiment, were inclosed in a narrow glass tube, and freed from all occluded gas by being heated to redness, *in vacuo*, by the passage of a constant electric current for several hours. At the expiration of this time the metallic incrustation was invariably found when occluded gas had been evolved. On charging the strips with various quantities of any particular gas, the amount of incrustation formed after the complete expulsion of the gas in each experiment was found to vary in the same proportion. Hence it appears pretty clear that the evolution of gas is necessary for the emission of solid particles. This result is strongly confirmed by the fact that palladium, which has such a remarkable power of occluding gases, produces a similar incrustation much more readily and at a lower temperature. It appears probable that the action is merely mechanical, that we have, in fact, an immense number of microscopic volcanoes or solfataras, evolving the occluded gases with such energy that portions of the crater walls are detached and carried away by main force, like their brethren on the large scale, the scoriæ and lapilli, to distances very considerable in comparison with the size of the vents.

The Effect of Gas upon Paper.

Herr J. Wiesner has sent to *Dingler's Journal* a further communication upon the discoloration of papers by light. He has already shown that papers containing woody fiber rapidly become yellow under the influence of light, owing to oxidation chiefly induced by the more refrangible rays, and that wood pulp papers would naturally be specially liable to discoloration. Gas light is less active than electric light in this respect, owing to the comparative absence of actinic rays from the former. It has lately been declared that gas acts prejudicially upon paper in other ways, and is therefore unsuitable for lighting libraries; and Herr Wiesner has instituted careful experiments with a view to test the truth of these assertions. He had before demonstrated that a wood paper after four months' exposure at a distance of 0·75 meter from an 8 candle power gas flame was not discolored more than by two hours' exposure to direct sunlight. He therefore now exposed wood paper to such other conditions as might be found in badly ventilated rooms lighted by gas. After an exposure of 5,400 hours, during which the temperature was not allowed to rise beyond 21° C. (70° Fahr.), it was found that the gases composing ordinary coal gas, unburnt, whether in their usual state or mixed with a fair proportion of oxygen, were incapable of acting upon the paper. Strips of paper were next placed in a dark room and in a shaded position in a chamber so badly ventilated that the illuminating power of the flame was distinctly diminished; other pieces being at the same time placed in a current of air in glass tubes exposed to the light of the flame. After about 20 weeks, the exposed papers, in common with all the other contents of the chamber, were covered with an equal depth of a light brown sooty deposit, while those in the glass tubes were unaltered. The woody paper alone had the faintest yellow coloration due to the action of the light. The products of combustion of coal gas do not, therefore, discolor or affect paper in any appreciable degree; and thus it follows that gas may be freely used in libraries that are properly warmed and ventilated.

AN IMPROVED BRIDLE BIT.

A fork bit, adapted for use with the ordinary bit, to cure horses of bad or vicious habits, and to improve the action and style of all horses upon which it is regularly used for a short time, is illustrated herewith, and has been patented by Mr. James Morrissey, of Babylon, Long Island, N. Y. It is made with a fork-like frame, consisting of a rigid metal bar, as shown in Fig. 2, the two prongs passing up outside the horse's jaws, and their ends being turned over to make eyes, the prongs being united by a transverse mouthpiece, the center of which has an upwardly projecting inverted U-shaped portion. Above the center of the metal bar are loops for attaching checks from the girths of the saddle or the traces of the harness, and integral with the outer side of the prongs, opposite the mouthpiece, are similar loops for cheek straps to hold the auxiliary bit loosely in the middle of the mouth. A pad or protecting strap is held in engagement with the inner flattened end of the metal bar, which has slots for retaining the strap by which the device is secured to a harness.



MORRISSEY'S BRIDLE BIT.

DAVIS' "1888" QUILTER.

The Flying Man.

I believe that athletes such as those who first obtained mastery over the problem of the bicycle could very soon learn to float, to ascend, to descend, to ride upward, to soar, and so forth, in a way which would very decisively indicate the possibility of a much fuller mastery over the problem of flight later on. Experiments which have been already made prove decisively that a man's weight can be supported by planes or sails of very moderate extent—not much greater, proportionally, to his body than an eagle's wings—if only there is either rapid motion of advance or a strong current of air against their slightly slanted surface. But these experiments have not yet been so carried on as to show fully what can be done when practice in the art of balancing in the air and in making the adjustments necessary for changing the direction of flight has been sufficiently extended. Yet Mr. Charles Spencer, a teacher of gymnastics in England, was able, after obtaining no greater velocity than would be given by running down a small incline, to sustain flight by the supporting action of wicker wings for a distance of 120 feet. Besnier, indeed, toward the close of the last century, devised a method of supporting the body by pinions, which enabled him, after a sharp run, to fly across a river of considerable width. It is certain that very little is to be gained from the attempts which have been made to direct balloons. The velocity which can be given to a balloon in still air is very small. A very moderate breeze would carry a balloon one way despite all the mechanical attempts to direct it in another, let the balloon be shaped as it may. Moreover, all such attempts are dangerous, for the wind has a great hold on the necessarily large surface of a balloon, and going against the wind would subject the balloon to destructive influences. Whenever man attacks the problem of flight, seeking real advantage from its mastery, he will aim at much more than such mere floating power as the balloon gives—at more, even, than the rapid floating motion, with power of guidance, which may be obtained by the experiments suggested above. There must also be a power of energetic propulsion while still in the air. This might be obtained by suitable adjustments of levers to be worked by a man in actual flight. But while I believe flight to be possible for man in this way, I consider the only kind of flight which is likely to be really useful to men to be that of flying machines propelled, balanced, and directed by some one or other of the natural forces man has brought under his control. That man, who has learned to traverse the land more swiftly by mechanical means than its most actual denizens, and to make the wide seas his highways by similar devices, should be unable to travel in the air, which by natural selection alone has become the home of creatures descended from reptilian forms, is to me unthinkable.—*Richard A. Proctor, in Philadelphia Press.*

AN IMPROVED QUILTER.

Among the many inventions of quilting attachments for sewing machines made by Mr. Henry T. Davis, the accompanying illustration represents what is considered the most perfect of all quilters he has ever introduced. Among the main advantages it possesses over his previous inventions are the cheap price at which it can be manufactured, as some parts are entirely dispensed with which were formerly used, thus making it lighter and very much more simplified, so that any lady can operate it. The lining of the quilt is rolled up on the outside roller, and the top is rolled up on the roller near the needle of the machine. The cotton is placed on the lining, one layer at a time, and, as the quilting is made, every time a line is sewed the operator loosens the outside roller and rolls up on the inside roller, and these operations are repeated until the quilt or comforter is made. By the use of this quilter, which was patented January 31, 1888, all kinds of coat and cloak linings are quilted in a fast and very neat manner. It is a very valuable attachment for family sewing machines, and is made by the Davis Quilting Frame Company. For further information relative to this invention, address Mr. Henry T. Davis, inventor, Nos. 182 and 184 West Houston Street, New York City.

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