The Electric Telegraph.

"It is dangerous to dance on fabrications."

The New York Presbyterian copies a long article on the Electric Telegraph, from the New York Evening Post, which is a real curiosity in its way, distinguished for plagiarism and a want of correct information. The article is taken from the Edinburgh Review, and the names of places changed, so as to make it an acceptable dish for the American palate. It would answer very well, only that there are some substances mixed with it, of so indigestable a character to the epicure of science, that we must point them out to the unwary. As the article is copied from a British work, it describes the British Telegraph, and had it not been palmed off for the American, all would have been well; but let us correct the errors. It says:—

"Our first concern is with the source of electricity, which in telegraph lines is generally the voltaic battery. A voltaic battery, in its simplest form, consists of a plate of copper and a plate of zinc, arranged side by side, without touching each other, in a vessel, containing diluted sulphuric acid. An iron wire, coated with zinc to keep it from rusting, is attached to the copper plate of the battery, and then stretched the entire distance to which the communications are to be sent, say from New York to New Orleans, and suppose the battery at New York. The wire is supported by wooden posts, and insulated, i. e., passed through rings of glass, or porcelain, which are non-conducting substances, attached to the posts to prevent the electricity being carried off into the earth, by means of the moisture which might be contained in the wood, so that there is no choice left but to proceed in the direction of the wire."

The above is quite correct in describing the way to connect the machines, only it should have mentioned that copper, instead of zinced iron wire, was generally employed; but here comes the beau ideal of plagiarism:—

"At New-Orleans, the wire is placed in connection with the signal apparatus, and then is brought back to New-York, through separate glass or porcelain tubes, as before, and finally terminates at the detached zinc plate of the battery.

There are many kinds of signal apparatus in use; among the most convenient are the step by step, which is worked by a pedal like a pianoforte key, and the dial plate.

As the dial plate is the one most in use, we will describe it. It is formed of a dial, similar to a compass box, but instead of being fixed in a horizontal position, it is placed vertically.—Two magnetic needles are suspended on a pivot, in the centre of the dial plate, the north pole of one needle is placed opposite the south pole of the other, and the needles are balanced, so as to remain in a vertical position when the telegraph wire is at rest—that is to say, when no current of electric fluid is passing through it. One of these dials would be hung at New-Orleans, and the telegraph wire would be coiled several times round its case. The wires are provided, near their ends at New-York, with two moveable pieces, which are arranged in such a manner as to be detached from the copper and zinc plates in the battery, at the pleasure of the operator, or they may be changed so as to bring either end of the wire in contact with either of the plates of the battery.

As the current of electricity passes through the wire round the casing of the dial, it will deflect the needles from a vertical position to a position right and left across the dial plate, but when one of the moveable detached pieces, at the station at New-York, is taken away, the circuit will be broken, and the needle will resume its former vertical position; and when the connection is changed, that is to say, when the end of the wire which was formerly in connection with the copper plate, is brought into connection with the zinc plate and the other end to the copper, the direction of the current will be changed, and the needles will again stand right and left across the dial plate, but the end which formerly pointed to the right, will now point to the left. Now it is understood by the rule of the managers of the telegreph, that one move to the right shall mean one letter, say R, and two moves shall mean I, one more to the left shall mean G, and two moves T; we have then the word RIGHT."

Now no such telegraph as that described here, is used in the United States. The words "New York and New Orleans" are changed from "London and Edinburgh," in the article of the Edinburgh Review. The Signal Telegraph described is that of Cooke & Wheatstone's, in Britan. But let us hear more of this sublime worthy-of-a-copyright article:—

"One of the latest improvements in the telegraph has been, to use the moisture of the earth as a conducting medium for completing the circuit. We will imagine the wire, after being coiled round the dial case at New-Orleans, to be broken off, and the end inserted in the ground, and a piece of wire from the zinc plate of the battery at New-York, to be also led into the ground; the electricity, after passing along the wire from the copper plate of the battery, and travelling round the dial at New-Orleans, and deflecting the needle, will return through the earth to the wire plate at New-York. We have only described the transmission of messages in one direction, as the answers from New-Orleans are sent by exactly the same operations, a battery being there also in connection with the telegraph wire, which is made to act on a dial at New-York; and the wires are so arranged, that when the operator at one end turns his needle in any position, the needle of the other dial at the opposite end will assume a corresponding ne."

"We are indebted to the experiments of scientific men of all countries for the great efficiency of the present telegraphs: among these may be mentioned Morse, Wheatstone and Bain; and it is extremely probable that in our generation, the means of printing the communications as they are transmitted will be discovered. Already it is possible to make marks upon paper, which operation may be considered as the first step towards the great desideratum."

The improvement spoken of, in making the earth form part of the circuit, was the discovery of a Frenchman named *Ampere*, and was made more than fourteen years ago. Bain made a like discovery in 1842, and Alfred Vail in 1844; and the single circuit has always been employed in the United States, and is not Wheatstone's invention. Let us explain this: On all our telegraphs two wires at least are used, but two wires are not necessary to send a message from New York to Orleans, one will do,—but in order to send and return messages, two must be used. It is a very strange thing that messages cannot be sent until the circuit is closed, that is, a current of electricity must be flowing from the positive to the negative pole. For example, here at New York is the battery to send a message to New Orleans; well it has two electric poles, a positive one at the zinc plate and a negative one at the copper or platinum: these two poles must be connected together, or no current will flow along the wire. The discovery alluded to tells us that the earth forms part of this connection, it answers the part of a wire. It is strange—passing strange, but true, that the earth—not a wire—forms part of the circuit, to unite the two poles, and the current from the positive pole at New York will flow on the wire to Philadelphia, then it comes through the earth back to the negative pole at New York—quick as the lightning it darts through mountains and over rivers; reminding one of the old nursery ballad—

"I had a little sister that came from the sky,
She climbed up the mountains high, high, high,
She waded the waters deep, deep, deep."

This is a most wonderful phenomenon:—many have tried to explain it, but have befogged the subject greatly.

There are three different kinds of Telegraphs employed in the United States, viz., Morse's, House's, and Bain's. Not one like that described above. Nay, instead of the above being correct, when it says, "that already it is possible to make marks on paper," every American Telegraph does this. Morse's, the oldest Telegraph of all, marks on the paper, and leaves a mechanical impression on it.

Morse's Telegraph may be thus described:—There is a metal pen at New Orleans, fixed on a pivot like a walking beam. When one end is drawn down, the other end flies up, and having a steel point on it, it marks a strip of paper, running along a roller, which is drawn along between other two rollers. Now, by letting the other end of this pen come up, the steel point drops, and then it is thrown up again, leaving a space between the two marks on the paper. Now, as the paper is always moving, and as the point is held to it for a longer or shorter time, marks are made of dots, spaces and dashes—thus . for E, and — for L, and .—. for F, and thus by a combination of dots, spaces and dashes, the whole alphabet is formed, and these letters made into words, and the words into sentences—compose the message. An "Electro Magnet" is used on Morse's Telegraph, to operate the walking beam pen. This, by breaking and closing the circuit by some non-conducting substance (a key made of ivory or dry wood) at New York, writes the messages in Boston. Morse is the inventor of the "Electro Magnet" Telegraph, a very different thing from the Signalling Telegraph, and much better.

So far from the above being correct about *printing* communications, why, House's Telegraph does print all its messages in plain Roman letters. The operator at New York plays upon his machine, like a lady at her piano, and at Boston a little arm is seen revolving round and round, singing click, clack, click, and printing, in black letters, R, O, Y, A, L, E, H, O, U, S, E, on a strip of paper. On Morse's Telegraph the messages have to be re-written by a penman into plain English. The messages by House's Telegraph are sent to the printer, and set up, to use a homely phrase, "right off the reel."

Bain's Telegraph also prints, but makes marks of a chemical nature, in character nearly like that of the Morse Telegraph, but no "Electro Magnet" is used. By breaking and closing the circuit at New York, the pen which is in contact with chemically prepared paper at Phila., makes blue marks on the paper, and these blue marks make the message. There is one part of this invention which is a curiosity in its way. That is, he writes the message first, on a strip of paper, by perforating it with small holes, for the dashes and the dots, and by making this, in a very ingenious manner, break and close the circuit, he can send a message of 1000 letters in one minute, to any place. When there is time to prepare messages, this is a grand way to transmit them rapidly. This invention embraces the idea of printing a pattern of calico in Philadelphia by breaking and closing the circuit in New York,—a most wonderful thing indeed.

We have thus explained the operation of the three Telegraphs that are now in use in America, and every person can see how very different they are from the Signalling one mentioned above. Oh what blunders we see the learned commit for want of learning. It is a very dangerous thing for our papers to make home out of foreign scientific articles. We regret to see such things as the above done. If it had exhibited a Spartan ingenuity in the abstraction of the article, we might have overlooked the act, but the ignorance displayed of the subject, easily led *us* to detect the imposition.

This article is somewhat long, but we trust that the nature of the subject, and the information elicited by our review, will be acceptable, at least we know that much knowledge will be gained by many in reading it.

On Water Wheels,

MESSRS. EDITORS—I humbly believe that there are some errors committed in the communication of J. S., headed "Useful Information about Water Wheels," No. 17, page 131 of this volume. Smeaton has not, to my knowledge, laid down any rules such as J. S. speaks of, for re-action wheels, or other wheels. John Smeaton, in 1752–3, made some very valuable experiments upon under-shot and over-shot wheels, and says, in his paper communicated to the Philosophical Society of London, in 1759, he had put those experiments to a practical test, that he might know whether his deductions would answer in real practice or not. Indeed, he scarcely trusted to theory in any case where he could have an opportunity to investigate it by experiment. The deductions that he made from these experiments (to which J. S. refers) was, that the velocity of the water to the wheel, should be as 5 to 2, on under-shot wheels (not as 3 to 2.) Bossut and Fabre as 5 to 2, agreeing with Smeaton; Ferguson and Parent as 3 to 1; Brewster and Waring, deducing from Smeaton's experiments, as 2 to 1. Others forming conclusions from the same—Evans, &c., as 3 to 2. Smeaton says,—the velocity of the circumference of the over-shot wheel being known, the proper velocity of the water is easily computed by the common rules of hydrostatics.—It is well known that many good mechanics differ some, as to the best velocity of the gravitation wheel. So much were Smeaton's investigations and practical knowledge regarded, that, during many years of his life, he was a constant attendant upon Parliament—his opinions being continually called for.

J. S. gives the rule for the construction of the wheel he speaks of, from which I abstract the following: "then use 1000 lbs. of water per second for each bushel per hour," &c.—nothing relative to fall. Now, according to well known principles of hydrostatics, I consider such a rule to be erroneous; for if 1000 lbs. of water, *only*, is necessary to do what J. S, says it will, in the case of "eight feet five and one-half inches head," more than 1000 lbs. of water is necessary to do the same labor under a head of four feet head; and less than 1000 lbs. of water is necessary to do the same labor under twelve feet head. The quantity of water being the same, the effect is as the square roots of their velocities, or as their pressures. The same neglect of this principle is seen in the case J. S. mentions, of Major Heightley: "it (the wheel) will run until the water runs down some inches below the covering of the wheel; so that the water rises several inches higher than its head, and drives the saw with the *same power* the wheel would at 4½ feet head."

Now, taking the centre of the wheel and measure up for the head, and allowing the wheel to be constructed according to J. S.'s rule, and the saw to make 125 strokes per minute, we shall have the wheel about 29 inches diameter, and that the water has fallen 36 inches, or more, in the case of "Maj. Heightley." It is very remarkable that the wheel should give the same power when the water had fallen 36 inches, or more, as it would "under 4½ feet head." The conclusion is, if J. S. be correct, and his wheel adapted to different falls, which it should be to be useful: that the effect of water is as its quantity, without regard to its velocity; but if the effect is as the pressure, or the square root of the velocity, J. S.'s statement disproves itself, unless there is a co-agent with the water when it has fallen 36 inches or more, to make the power equal to "4½ feet head," or that the water undergoes a strange metamorphosis when it gets down some inches below the covering of the wheel. Facts are stubborn things—they carry with them an evidence, when discovered, that the most sceptical cannot fail to believe. S. L.

Alfred, Me., Jan. 16th, 1850.

GENEVA, N. Y., Jan. 16, 1850.

MESSRS. EDITORS,—I have observed with regret that my plan for explaining my theory requires more space than I had supposed it would, or than you can spare. I will try to condense the remainder.

In order to make my articles more complete and satisfactory, I did intend making more thorough practical experiments than I have yet made. I have a number of models prepared for that purpose, but having too long delayed, the ice will now prevent my having a good opportunity, perhaps for some time, though I hope not more than a few weeks. G. E.

Valuable Paper Rags.

The Cooperstown (N.Y.) Journal says a draft of $900 on Albany Bank, was found in the paper rags at a mill in that place. Accompanying it was the P.O. envelope and way bill. It was addressed to Richfield, and it is supposed that the P. M. at that place accidentally dropped it among the waste paper, which he afterwards sold.

There are 1,131 miles of Telegraphic lines in Canada.