in numbers containing about one hundred and fifty pages each, and extending to sixteen numbers, which will make eight volumes of three hundred pages each, at $3 a volume. The cost of the *original* work to subscribers in this country will be about $187; of the translation, (which is of course without the plates,) about $24. Speaking of the French edition, the translator says: "The high price is of course dependent on the matchless plates, but independent of these it remains a *chef d'œuvre:* The descriptions are simple, accurate, and exceedingly perfect. The student is able to distinguish at once the object of his research; and however delightful it may be to possess the illustrations he can do without them." We trust the publisher and the translator may both be gratified, and Conchological science advanced, by a list of subscribers to this important work sufficiently extensive to warrant the undertaking. The first number contains the genera *Buccinum*, (of which one hundred and one species are described,) Dolium, Tornatella, Pyramidella, Thracia, and Harpa. The mechanical execution of the work is very superior, and worthy of the reputation of the city from which it emanates.

SCIENTIFIC INTELLIGENCE.

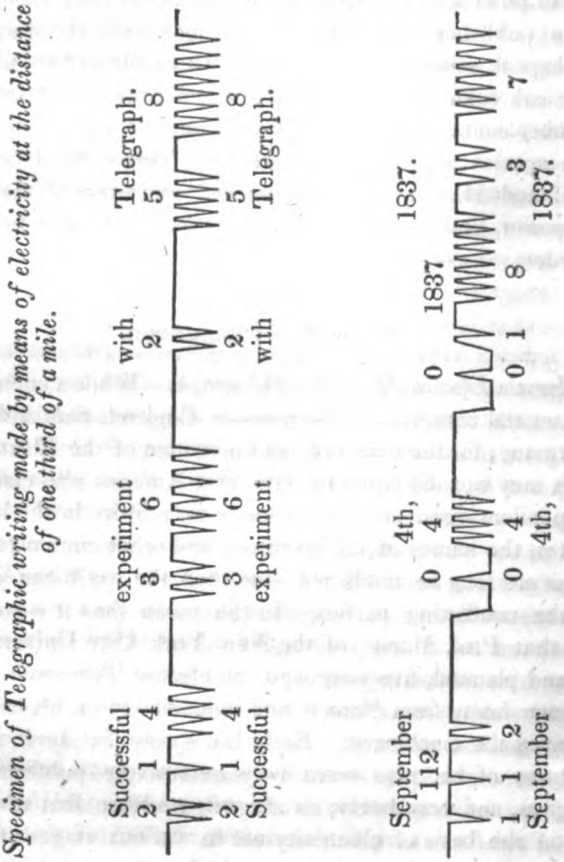
1. *Morse's Electro-Magnetic Telegraph.*—While a contest is waging in several countries of Europe—in England, Scotland, France and Germany, for the discovery and invention of the Electric Telegraph, it may not be amiss to state, that America also claims to be an independent discoverer and claimant for priority in the invention. The dates, the names of the inventors, and other circumstances will doubtless ere long be published, and then the world can judge between the conflicting parties. In the mean time it is well ascertained, that Prof. Morse, of the New York City University, conceived and planned, five years ago, an electric Telegraph, while on his passage home from France, and immediately on his landing, he commenced the machinery. Early last spring, *in April*, the general features of his plan were very extensively published in the newspapers, and very lately, *in August*, we learn that several telegraphs on the basis of electricity are in various stages of progress in Europe.

The distinguishing features of Prof. Morse's telegraph are a *Register*, which permanently records in characters easily legible the

fullest communication, and the use of but *one wire* as a conductor; although for greater convenience of communicating at all times, and of having a whole circuit at command from each extremity of the line he will use four wires.

On Sept. 2d, Prof. Morse tried an experiment with a circuit of copper wire one thousand seven hundred feet in length, and of the minimum size of No. 18 wire. The record of the Register was sufficiently perfect to demonstrate the practicability of the plan. On the 4th of September some slight changes were made in the machinery, when the Register recorded perfectly the following signs:

Specimen of Telegraphic writing made by means of electricity at the distance of one third of a mile.



The *words* in the diagram were the intelligence transmitted.

The *numbers*, (in this instance arbitrary,) are the numbers of the words in a Telegraphic dictionary.

The *points* are the markings of the Register, each point being marked every time the electric fluid passes.

The Register marks but one kind of mark, to wit, (V). This can be varied two ways. By intervals thus (V VV VVV) signifying one, two, three, &c., and by reversing thus (Λ); examples of both these varieties are seen in the diagram.

The single numbers are separated by *short*, and the whole numbers by *long intervals*.

To illustrate by the diagram, the word "successful" is first found in the dictionary, and its telegraphic number 214 is set up in a species of type prepared for the purpose, and so of the other words. The types then operate upon the machinery and serve to regulate the times and intervals of the passages of electricity. Each passage of the fluid causes a pencil at the extremity of the wire to mark the points as in the diagram.

To read the marks; count the points at the bottom of each line. It will be perceived that two points come first, separated by a *short* interval from the next point. Set 2 beneath it. Then comes one point likewise separated by a *short* interval. Set 1 beneath it. Then come four points. Set 4 beneath it. But the interval in this case is a *long* interval, consequently the three numbers comprise the whole number 214.

So proceed with the rest until the numbers are all set down. Then by referring to the Telegraphic Dictionary, the words corresponding to the numbers are found, and the communication read. Thus it will be seen that by means of the changes upon *ten* characters, all words can be transmitted. But there are *two points* reversed in the lower line. These are the *eleventh* character, placed before a number to signify that it is to be read as a *number*, and not as the representative of a word.

Since the 4th of September, one thousand feet more of wire No. 23 have been added, making in all two thousand seven hundred feet—more than half a mile of a reduced size of wire; the Register still recorded accurately.

Arrangements have been made for establishing a circuit of several miles, and for constructing new and accurate machinery. Prof. Gale, of the New York City University is engaged with Prof. Morse in making some interesting experiments connected with this invention, and to test the effect of length of wire on the magnetizing influence of voltaic electricity.

2. *Notice of a Revolving Electro-Magnetic Instrument, by* Dr. Benjamin Rush McConnell.*

Mauch Chunk, Pennsylvania, June 25, 1837.

Prof. Silliman.—*Dear Sir*—Up to this date, I had entertained the hope of having ready for the ensuing number of the "Journal of Science," a digested series of "electro-magnetic experiments," the results of some inquiry involving something of novelty at least, if not of much interest. The pressure of professional duty, however, as colliery surgeon, and the physical character of my district, (which you are personally familiar with,) have hitherto prevented me. I now take advantage of a leisure hour, which after all may be too late for your next number, to place on record the subjoined facts, about which I confess I feel anxious. I have,—and have had for nearly a twelvemonth,—in operation, an *electro-magnetic engine*, of a construction and upon a principle essentially different from any thing hitherto announced. In the course of a series of galvanic experiments, which for several years past have assisted to beguile the intervals of professional labor, my attention was drawn to the mutual action of *rectilineal* and *circular* currents, as a highly promising source of motive agency for practical purposes. After innumerable failures, I eventually succeeded in constructing a machine which may be fairly pronounced *perfect* upon the *actual scale* of its construction; its value upon a *working scale* remains to be proved. The general arrangement of my machine is not unlike the philosophical toy, invented, I believe, by Mr. Sturgeon, of London, as long since as 1828 or 9, of two copper discs, one at either end of a common shaft, revolving each in its own trough of mercury, between the poles of two horse shoe magnets. Such is my machine in general, with the addition of a band or cog-wheel on the center of the same shaft, intermediate between the discs, which revolve between the poles of electro-magnets, without the intervention of a fluid medium of any kind as a part of the circuit; the mode of accomplishing this constitutes the peculiarity of my claim, and you, sir, are competent to appreciate its novelty and its value. My electro-magnets are *hollow*, (another new feature,) and have been made with nearly equivalent results of bar iron, of tinned iron, and of copper.

* *Remark.*—This letter was too late for the July No. of the Journal. We had hoped to give a figure of Dr. McConnell's machine, but have received no reply to an application for that purpose.—Ed.

The magnets I now have in use, are one inch in diameter, one inch and three quarters between the poles, and five inches and a half in length, each wrapped with one hundred and fifty feet of iron (bonnet) wire. My battery is rectangular, and consists of two concentric boxes of sheet copper, with a zinc box included, the whole constituting a square box open in the middle. The exterior box is seven inches square, the zinc seven deep by six and a half in each of its other dimensions, the interior box of copper seven by six; the whole will contain something more than a quart of the acid menstruum, and presents about two-fifths of galvanic surface in the aggregate. The driving or band-wheel is sixteen inches in diameter, (the discs being nine inches each,) the shaft of iron three-eighths of inch thick and five inches long, working in brass bearings. The battery is charged through a cock in the platform, (which is of cherry, one inch thick by twelve square, and is attached to the battery by screw-bolts,) and discharged when necessary to cleanse or replenish, by a cock near the bottom. The whole swung in *gimbals* between two turned posts, communicates motion from the band through the platform and center of the battery to the propelling wheel, on the axle of a small carriage. The driving wheel revolves when not loaded, (sixteen inches diameter) about two hundred times in a minute, traversing upwards of eight hundred feet! and will revolve *seventy times* per minute, carrying a load of forty pounds, through a space of two hundred and eighty feet, in that time, being a performance nearly equal to the power of three men. The entire machine occupies a space of two feet in height by a foot in breadth, and weighs, when charged for service, seventeen pounds. Touching a small *lever* reverses the action of the engine instantaneously; raising another *arrests* its action, or technically, throws it out of gear. Thus, sir, as you will perceive, my engine differs totally from the ingenious arrangement of Messrs. Davenport & Cooke, of whose galvanic machine your April number contained a notice. Justice to myself, without intending to depreciate in any degree the labors of others, requires from me the statement that my engine, *as it stands*, substantially, was in existence *nearly two years since*, the greater part having been made to my order by the mechanics of this village, in the summer of 1835; an improved portion of the moving parts (of finished workmanship) was made in Philadelphia, as long since as January of the present year, by Mr. J. Mason, philosophical instrument-maker, of Greenleaf's court. I may also state, that Professor Hare,

Mr. Isaiah Lukens, Mr. S. V. Merrick, Mr. E. Hazard, and other scientific and personal friends whom I met in society on occasion of a visit to that city at the period above referred to, were cognizant of my experiments and objects many months previous to the public announcement of results of a similar kind from *any other* experimenter. The field of investigation is large, and as yet not much explored, and Mr. Davenport may rest assured, should this notice chance to meet his eye, that no one will rejoice more sincerely than I shall to hear of his onward progress, while I myself hope also to advance in the march of improvement.

3. *Electro-Magnetic Apparatus and Experiments;* by CHARLES G. PAGE, M. D.

Salem, (Mass.) Aug. 23, 1837.

TO PROFESSOR SILLIMAN.

Dear Sir—Since my last communication, I have completed the following pieces of electro-magnetic apparatus, for exhibiting the rotation of conductors by magnets, without the use of mercury. The motory force in such experiments is very feeble, but by the use of solid conductors, as in figures 1 and 2, I attain a more rapid movement than when the wires run in mercury. The discovery alluded to in the article on the electro-magnetic engine, viz. the admissibility of oil between conducting surfaces, I conceive to be of great importance, and will doubtless soon change the whole aspect of electro-magnetic and dynamic apparatus. It supersedes the use of mercury, where freedom of motion and the constant passage of the galvanic current are required.

Fig. 1, represents the ring of De la Rive, mounted for rotation between the poles of a horse-shoe magnet. The ring *a*, is four inches in diameter, and consists of eight turns of copper wire, covered with cotton. Its two ends are brought down at *b*, *b*, and soldered to cylindrical segments of silver. These segments are secured upon, but insulated from the axis. Both are to be reduced in size as much as is consistent with strength, in order to diminish friction. The two conducting wires, connected with a pair of plates by the mercury cups on the stand, are bent into a spiral at *c* and *d*, in order to press them with a slight spring against the segments *b*, *b*. Where the instrument is used, a drop of oil is put on the segments. This is a pleasing experiment; the ring (if highly colored) revolving so

rapidly, gives the appearance of a hollow sphere. Indeed it would be easy to exhibit two or more concentric rings, revolving different ways, and with different degrees of velocity. I believe this is the first instance of the rotation of a conductor, effected by reversing its tangential action.

Fig. 1. Fig. 2.

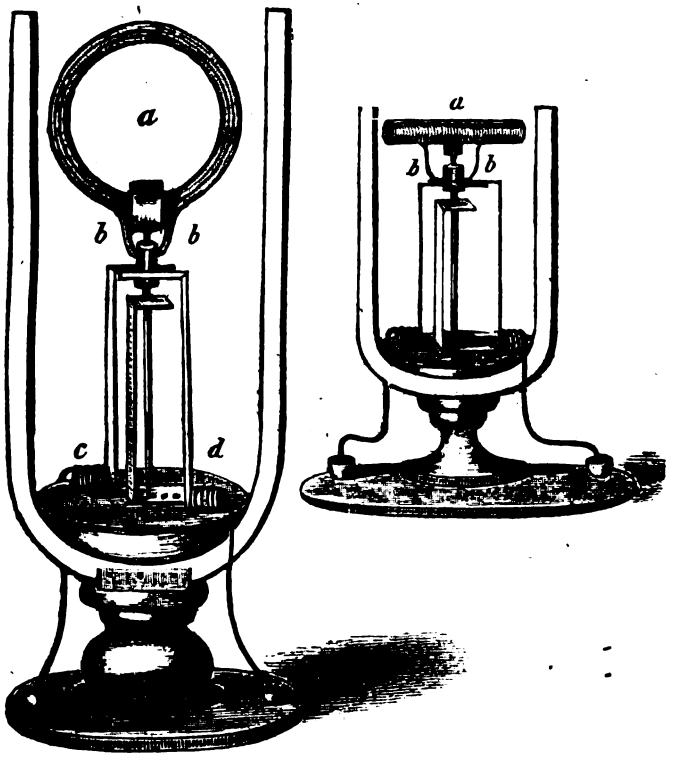


Fig. 2, represents the electro-dynamic cylinder of Ampere, mounted in the same manner as the ring, (fig. 1.) This helix* of wire (called by some the pure voltaic magnet) has its ends bent inward, passing through its axis and brought out at its center, to be soldered to the segments *b*, *b*. The arrangement otherwise is similar to fig. 1. The mode hitherto of exhibiting the magnetic polarity of this cylinder, has been to float it, with a battery, in a large basin of acid and

* The helix is wound on a cylinder of hard wood, loaded with two buttons, one at each end, to give it weight.

water. This inconvenience might have been obviated by mounting the helix as in the figure, and allowing its ends *b*, *b*, to descend into separate mercury cells; but the use of mercury is objectionable, and by adopting the arrangement described, the polarity of the helix is exhibited in a convenient and pleasing manner.

Fig. 3.

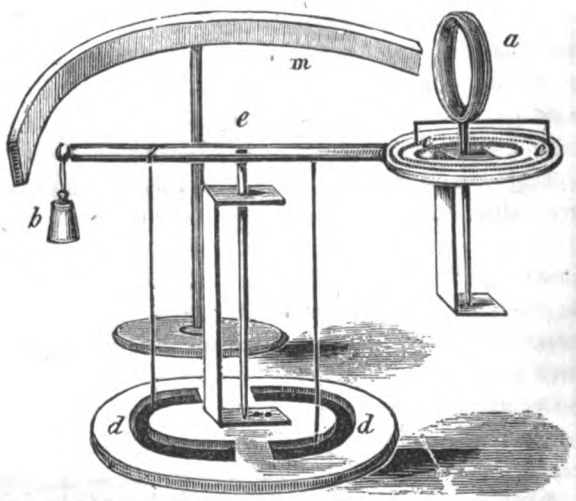


Fig. 3, is a plan for exhibiting the polarity and curious motions of De la Rive's ring, floating in the air instead of acid and water. The great advantage of this construction, and that of fig. 2, is that the ring and helix, and the batteries, may be of any desired size. *a* represents the ring, suspended as in fig. 1. The wire ends descend into concentric mercury cells, *c*, *c*. These separate cells communicate with the battery cells *d*, *d*, by wires passing along the slight lever beam *e*. The ring and cells are balanced by a small weight, *b*. The magnet, *m*, supported by its centre, is bent so as to form an arc of the circle described by the ring. Suppose the ring to be in equilibrium at the neutral point of the magnet, *m*. Reverse the battery wires in the cells *d*, *d*, and the ring starts off from the bar, turns round, presents its other face, and passes on to *m* as before; so that this motion can be produced on a large scale at pleasure, simply by changing the battery wires without disturbing the magnet, as in the floating apparatus. All this can be done with solid conductors, but there being no rapid motion in this experiment, the mercury cells are preferable, from their simplicity.

4. *Davenport's Electro-Magnetic Machine.*—Since the notice of this invention in the April number of this Journal, the proprietors have been engaged in experiments on magnets of different modifications, as well as on the proper distance between the magnetic poles of the circle. The form and arrangement of the magnets have been entirely altered, and the energy of the machine greatly increased. The proprietors have discontinued the use of magnets in the form of segments of a circle and now use them in something like the horse shoe form, changing the poles once in every $3\frac{1}{2}$ inches of the circle. On this arrangement, a machine with a wheel seven inches in diameter, (being but a trifle larger than the one formerly described in this Journal,) elevates ninety pounds one foot per minute, and will perform about twelve hundred revolutions in the same time.

A machine has also been constructed with a motive wheel one foot in diameter, which moves with great energy, but its power has not been tested by the elevation of weights. One of the machines with a motive wheel only seven inches in diameter, has been attached to a turning-lathe, and moves it with astonishing strength, compared with the small size of the propelling engine.

The experiments and improvements hitherto made serve to strengthen the hopes at first entertained in regard to the value and importance of this invention.

The proprietors are now engaged in constructing a machine with a motive wheel of about $2\frac{1}{2}$ feet in diameter, from which they expect to obtain sufficient power to propel a Napier printing press.

For the purpose of raising funds to carry on experiments, &c., a joint stock association has been formed in New York, of which Mr. Edwin Williams, No. 76 Cedar street, is agent. By this arrangement the principal interests of the patent for the United States and Europe, being placed in a stock of 3000 shares, the proprietors offer an opportunity to public spirited individuals to become associated with them in the enterprise, which it is hoped, for the benefit of mankind, may prove successful. A sufficient number of shares, we learn, have been already taken to provide ample funds for experiments on a liberal scale, and the public with interest wait the result.

5. *Pamphlet on Electro-Magnetism.*—A pamphlet of ninety four pages has been published in New York, containing a history of Davenport's invention—notices of it from periodical publications, and

a summary of our knowledge upon the subjects of electricity, galvanism, electro-magnetism, &c. by Mrs. Somerville. If the anticipations of some of the journalists appear extravagant; the summary of Mrs. Somerville, replete as it is with the most interesting and astonishing facts, may well account for the strength of impression produced on the minds of observers by the inexplicable movement of a machine, whirling around with vast rapidity, while there is no obvious cause, and the real cause when pointed out appears so inadequate to the effect.

We rather regret that this interesting application of electro-magnetism is attempted to be sustained by an appeal to the hope of immediate profit. Surely there are not wanting men, and we trust they are numerous, who will cheerfully pay, and, if necessary, cheerfully lose, the comparatively small sums, whose considerable aggregate will carry forward this interesting research, until the ratio and the extent of its power are ascertained; and, if it should prove that the limit is far beyond the demands of practical application, so much the better; but neither the ratio nor the extent can be learned without persevering experiments, the expense of making which and of sustaining all who are concerned in making them, will be, we trust, cheerfully borne by the public.

6. *British Association for the Promotion of Science.*—Extract of a letter to the Editor.

Philadelphia, August 30th, 1837.

My Dear Friend—On the 16th of this month, I sent to the venerable and celebrated Dalton, as chairman of the chemical section of the British Association, a letter, of which I now send you an extract. My motive for publishing this extract in your Journal, is my impression that I owe it to you and others of my scientific countrymen to communicate the facts which I have stated to men of science in the mother country, and that I owe to the latter a more public acknowledgment than I have yet made, of the grateful recollection which I entertain of the kindness with which I was received at their meeting at Bristol. This I am convinced, was intended as a mark of regard, not merely to me as an individual, but to American cultivators of science in general, of whom I was considered as a representative.

The Marquis of Northampton, who presided, stated to me that if there were others of my scientific countrymen present, he wished to