

period the Institute has been anxiously looking forward to the time when public opinion should be sufficiently awakened to the vast importance and utility of such an institution.

It is confidently believed that the time has now arrived, in which enlightened legislation, on a subject so deeply interesting to the community at large, and to the mining, manufacturing, and agricultural population of our own state in particular, will be sustained by acclamation, from one extremity of the commonwealth to the other.

There has, probably, never been any public measure pressed upon the attention of our legislature, which has met with more cordial and unanimous approval, from men of all parties and all conditions in society. The conviction being universally entertained, that the claims of the productive classes of the community, upon legislative munificence, are strong and imperative.

The Committee on the Chesnut Street Hall, have effected some further sales of the loan during the year; but have not yet disposed of a sufficient amount to warrant them in carrying into effect the improvements necessary to fit the building for the purposes of the Institute. The property at the present time yields an income beyond the interest on its cost, and there is no reason to doubt that it will continue equally productive until more auspicious times shall enable them to complete the intended alterations, and thus increase the accommodations of the Institute to the extent which its large list of members requires.

During the past year the Institute has elected 183 new members. 93 have been lost by resignation, and 23 by death. Increase during the year 72. Whole number of members 2078.

The following named gentlemen have become life members: Messrs. J. J. Barras, Thos. Earp, Davis Henderson, Jno. K. Kane, Wm. McIlvaine, Israel Morris, Wm. S. Otis, Solomon W. Roberts, Return Sheble, Thos. S. Stewart and Jos. Saxton.

JOHN STRUTHERS, *Chairman.*

WILLIAM HAMILTON, *Actuary.*

Report on Prof. Morse's Electro-Magnetic Telegraph.

THE COMMITTEE ON SCIENCE AND THE ARTS constituted by the Franklin Institute of the State of Pennsylvania, for the promotion of the Mechanic Arts, to whom was referred for examination, an Electro Magnetic Telegraph invented by Professor F. B. Morse, of the city of New York, REPORT,

That this instrument was exhibited to them in the Hall of the Institute, and every opportunity given by Mr. Morse and his associate Mr. Alfred Vail, to examine it carefully, and to judge of its operation; and they now present the following as the result of their observations.

The instrument may be briefly described as follows:

1st. There is a galvanic battery of sixty pairs of plates, seven by eight and a half inches each, arranged according to the very convenient plan devised by Prof. Hare, and set in action by a solution of sulphate of copper.

2d. The poles of this battery can be connected, at pleasure, with a circuit of copper wire, which, in the experiments we witnessed, was ten miles in length. The greater part of the wire was wound round two cylinders, and the coils insulated from one another, by being covered with cotton thread.

3d. In the middle of this circuit of wire,—that is at what was considered

virtually a distance of five miles from the battery, was the *register*. In this there is an electro-magnet, made of a bar of soft iron bent in the form of a horse-shoe, and surrounded by coils of the wire which forms the circuit. The *keeper* of this magnet is at the short arm of a bent lever, at the end of the longer arm of which is a fountain-pen. When the keeper is drawn against the magnet, the pen comes in contact with a roll of paper wound around a cylinder, and makes a mark with ink upon this paper. While the telegraph is in operation, the cylinder which carries the paper, is made to revolve slowly upon its axis, by an apparatus like the kitchen jack, and is at the same time moved forward so that the pen is constantly in contact with the paper would describe a spiral or helix upon its surface.

4th. Near the battery, at one of the stations, there is an interruption in the circuit, the ends of the separated wire entering into two cups, near to each other, containing mercury. Now if a small piece of bent wire be introduced, with an end in each cup, the circuit will be completed, the electro-magnet at the other station will be set in action, the keeper will be drawn against it, and the pen will make a mark upon the revolving paper. On the other hand, when the bent wire is removed from the cups, the circuit will be interrupted, the electro-magnet will instantly cease to act, the keeper will, by its weight, recede a small distance from the magnet, the other end of the lever will rise and lift the pen from the paper, and the marking will cease.

5th. The successive connexions and interruptions of the circuit, are executed by means of an ingenious contrivance for depressing the arch of copper wire into the cups of mercury, and raising it out of them. This apparatus could not be described intelligibly without a figure; but its action was simple, and very satisfactory.

6th. Two systems of signals were exhibited, one representing numbers, the other letters. The numbers consist of nothing more than dots made on the paper, with suitable spaces intervening. Thus would represent 325, and may either indicate this number itself, or a word in a dictionary, prepared for the purpose, to which this number is attached. The alphabetical signals are made up of combinations of dots and of lines of different lengths.

There are several subsidiary parts of this telegraph which the committee have not thought it necessary to mention particularly. Among these is the use of a second electro-magnet at the register, to give warning by the ringing of a bell, and to set in motion the apparatus for turning the cylinder.

The operation of the telegraph, as exhibited to us, was very satisfactory. The power given to the magnet at the register, through a length of wire of ten miles, was abundantly sufficient for the movements required to mark the signals. The communication of this power was instantaneous. The time required to make the signals was as short, at least, as that necessary in the ordinary telegraphs. It appears to the committee, therefore, that the possibility of using telegraphs upon this plan, in actual practice, is not to be doubted; though difficulties may be anticipated which could not be tested by the trials made with the model.

One of these relates to the insulation and protection of the wires, which are to pass over many miles of distance, to form the circuits between the stations. Mr. Morse has proposed several plans,—the last being to cover the wires with cotton thread, then varnish them thickly with gum-elastic, and enclose the whole in leaden tubes. More practical and economical

means will probably be devised; but the fact is not to be concealed that any effectual plan must be very expensive.

Doubts have been raised as to the distance to which the electricity of an ordinary battery can be made efficient; but the committee think that no serious difficulty is to be anticipated as to this point. The experiment with the wire wound in a coil may not, indeed, be deemed conclusive; but one of the members of the committee assisted in an experiment in which a magnet was very sensibly effected by a battery of a single pair through an insulated wire of $2\frac{1}{4}$ miles in length, of which the folds were four inches apart; and when a battery of ten pairs was used, water was freely decomposed. An experiment is said to have been made with success, on the Birmingham and Manchester rail-road, through a circuit of thirty miles in length.

It may be proper to state that the idea of using electro-magnetism for telegraphic purposes has presented itself to several different individuals, and that it may be difficult to settle among them the question of originality.

The celebrated Gauss has a telegraph of this kind in actual operation, for communicating signals between the University at Gottingen and his magnetic observatory in its vicinity. Mr. Wheatstone of London, has been for some time also engaged in experiments on an electro-magnetic telegraph. But the plan of Professor Morse is, so far as the committee are informed, entirely different from any of those devised by other individuals, all of which act by giving different *directions* to magnetic needles, and would therefore require several circuits of wires between all the stations.

In conclusion the committee beg to state their high gratification with the exhibition of Prof. Morse's telegraph, and their hope that means may be given to him to subject it to the test of an actual experiment made between stations at a considerable distance from each other. The advantages which this telegraph would present, if successful, over every kind heretofore used, make it worthy of the patronage of the government. These are, that the stations may be at a distance asunder far exceeding that to which all other telegraphs are limited,—and that the signals may be given at night and in rains, snow, and fogs, when other telegraphs fail.

(By order of the Committee.)

WILLIAM HAMILTON, *Actuary.*

Philadelphia, February 8th, 1838.

Mechanics' Register.

LIST OF AMERICAN PATENTS WHICH ISSUED IN MAY 1837.

With Remarks and Exemplifications by the Editor.

82. For a *Turning Table for rail-roads*; Jeremiah Myers, Attleborough, Bristol county, Massachusetts, May 8.

There is to be a revolving platform constructed much in the usual way, but it is to be placed upon a carriage with rollers running upon a rail over the pit prepared for the turnabout, which pit may be two or three times as long as it is wide, or as the diameter of the turnabout, which may be drawn along it by means of a chain and windlass. The ends of the pit are circular, and the turning table is to be moved round by a pinion taking into teeth on its lower side.

“The invention claimed consists in placing the revolving circular platform, or turning table, upon a carriage moving upon rails; in making an oblong pit by which the locomotive engines or cars may be run off the turning table at right angles from any part of the pit; and from