TORPEDOES OF THE AUSTRIAN NAVY.

At the time of the last Austro-Italian war, in 1866, the Austrian Government made the greatest efforts to put its ports in a state of defense against an attack of the Italian fleet. Torpedoes in large numbers were sunk therein, and all the commandants of these maritime places were ordered to exercise very great vigilance.

The accompanying engraving represents the post of observation, or of firing, where the employes of the military telegraph are stationed.

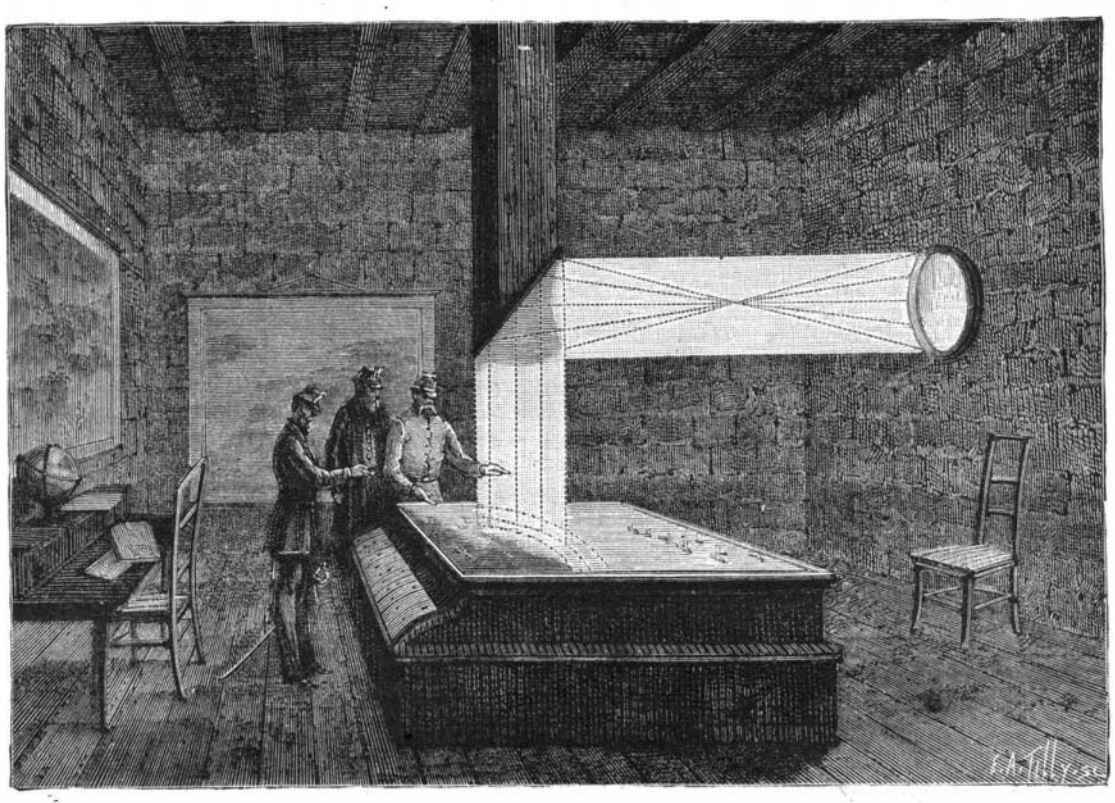
The torpedoes are placed in several concentric lines, quite near each other. They are sunk to a certain depth below the level of the water, and, at the surface, give no signs of their presence. Each of them is connected by wire with the post of observation situated at a sufficiently high point on the coast to allow the port to be seen well. The room, which is quite large, is dark. In the wall there is a lens that faces the port. The luminous rays from the exterior traverse this, become refracted, and pass into a prism, which directs them upon a sheet of ground glass lying horizontally upon a table in the center of the room.

According to the well known laws of optics, an image of the port is formed upon the glass. Black points marked upon this image indicate the exact site of each torpedo, and all these points bear numbers that are reproduced upon the keys of a key board. It is only necessary to press one of the keys with the finger to put the corresponding torpedo in connection with an electric battery, through the intermedium of the wire that connects it with the port, and to cause it to explode.

One employe of the telegraph never takes his eyes off the glass upon which the faithful image of the port is reproduced. No detail, no movement, escapes him. If a ship of the enemy attempts to approach, its image appears upon the glass, and, at the moment it passes over a point indicated upon the latter, a simple touch of the key corresponding thereto causes an explosion, and destroys the vessel.

These torpedoes are sunk to a sufficient depth to allow ships of the portto move around without having anything to fear. It is probable that it was due to a knowledge of the danger that the Italian fleet would have experienced in attacking the Austrian ports, that the latter were protected against all surprise.

Arrangements analogous to those just described are now adopted by most of the navies of Europe.—*La Nature.*



POST OF OBSERVATION CONNECTED WITH THE AUSTRIAN SYSTEM OF TORPEDO DEFENSE.

AN EARLY ELECTRO-MAGNETIC LOCOMOTIVE.

In the interesting account of electro-motors contained in a letter of Prof. Moses G. Farmer to C. W. Field, and published in the SCIENTIFIC AMERICAN SUPPLEMENT of January 17, there is a description of a small electro-magnetic locomotive, constructed in 1851 by Thomas Hall, of Boston, and which operated by an electric current conveyed by the rails, probably the first instance of an electro-locomotor deriving its actuating current from a stationary electric generator. This engine, with a part of its track, is represented in the accompanying cuts; it is owned by E. Dwight Kendall, consulting chemist, of Brooklyn, who purchased it, soon after it was made, of Daniel Davis, Mr. Hall's former employer. Prof. Kendall, who was at that time, as now, a valued contributor to the SCIENTIFIC AMERICAN, occasionally used it in his lectures to illustrate electro-magnetic force.

The current of a battery or small dynamo electric machine is conveyed to the rails, the connections being made as shown in Fig. 1. The rear axle, M (Fig. 2 being an inverted plan view of the locomotive), consists of a central wooden portion which is slotted to receive a standard projecting from a brass plate screwed to the bottom of the car. A bar connects the pivot pin with the shaft carrying the wheel, K, which takes up the current from the rail; the other wheel, being insulated by the wooden portion, has no effect upon the current using the rail it runs upon. Both these wheels are loosely mounted. The current is led from the wheel, K, through pivot, brass standard, and wire, to brass plate, G. The front wheels are rigidly mounted upon an axle, at the center of which is secured a gear wheel. One wheel is insulated from the axle by means of an ivory sleeve, L. The current passes from the rail through the wheel, J, through the axle bearing and wire to a standard provided with a collar formed with an arm to which the lever, A, is fastened. This lever is insulated from the collar arm by a block of wood. Soldered to the rear end of the lever is a wire, one section, D, being always in contact with the plate, G, and the other section, B, being turned and passed under the lever so as to rest in contact with plate, E, which is one of a pair on the bottom of the car at each side of the standard. A wire, C, from the collar is in contact with plate, F. By means of the lever the pieces, B and C, can be brought in contact with either of the plates, E and F. From the free end of the lever a short bar projects downward, so as to be struck and moved to one side or the other by the blocks, H I, which are placed, one at each end of the track, at such an inclination as to move the lever sufficiently to change the plates with which the points, B and C, come in contact.

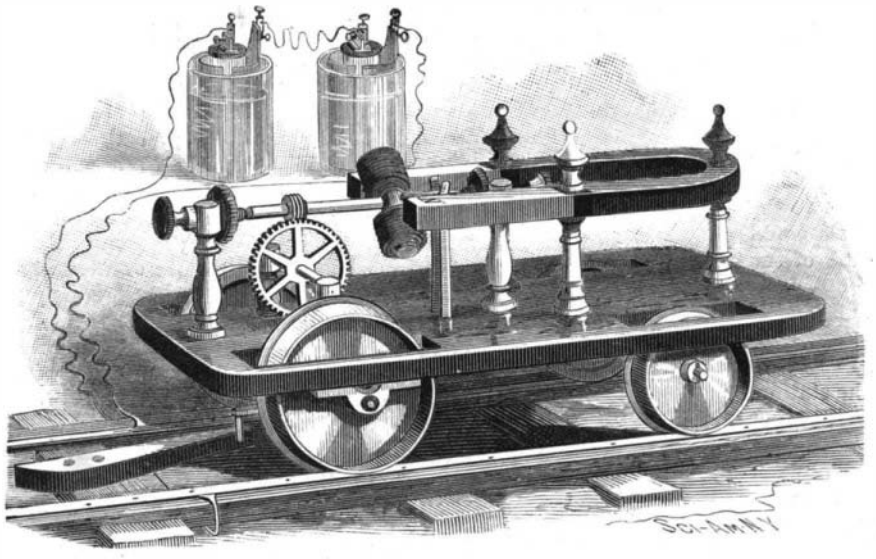


Fig. 1.—ELECTRO-MAGNETIC LOCOMOTIVE.

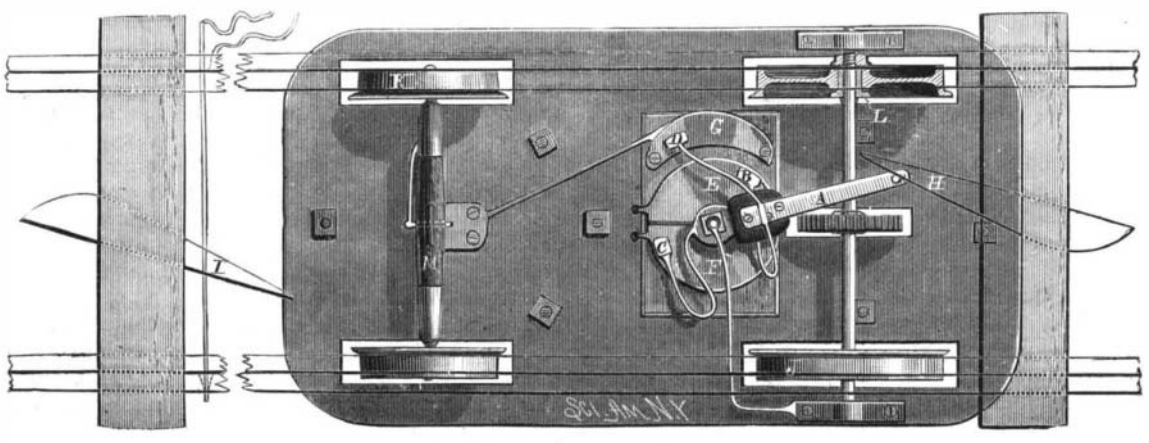


Fig. 2.—INVERTED PLAN VIEW OF ELECTRIC LOCOMOTIVE.

Mounted longitudinally upon the top of the platform is a shaft carrying an electro-magnet, revolving between the poles of a horseshoe magnet, and a worm which meshes with a gear wheel engaging with the wheel on the forward axle. The wires from the magnet lead to two semi-cylindrical pieces at the rear end of the shaft, against which press two springs connected respectively with the plates, E and F. The path the current travels, when the lever is in either of its two positions, to revolve the magnet first in one direction, then in the other, will be understood from what we have said and from the engravings. With the current from two or three Grove or chromic acid cells, the little locomotive exhibits great earnestness of purpose, and runs with respectable speed.

Ancient Chinese Telephones.

At a recent meeting of the Royal Asiatic Society in Shanghai, a paper by Dr. Macgowan was read on the subject of the early use of telephones in China. This paper being very brief, we give it in its entirety:

It detracts nothing from the merit of the ingenious physicists who have conferred on mankind the boon of the telephone, that its principles are familiar to uncivilized peoples, several of whom are in possession of rudimentary telephones. It was, I opine, when the Chinese were in their youth that they constructed the rudimentary instrument a specimen of which I herewith transmit for the Society's museum. It consists of two bamboo cylinders, one and a half to two inches in diameter, and four in length; one end of each is closed by a tympanum of pig bladder, which is perforated for the transmitting string, the string kept in place by being knotted. This rude instrument is styled the "listening tubes," and is employed for amusement as a toy, conveying whispers forty or fifty feet. It is unknown in many parts of the empire, Chih-kiang and Kiangsu being the only provinces (so far as I can ascertain) where the listening tube is employed.

Besides this toy, Chinese ingenuity produced, about a century and a half ago, the "thousand mile speaker." The implement is described as "a roll of copper, likened to a fife, containing an artful device; whispered into and immediately closed, the confined message, however long, may be conveyed to any distance; and thus in a battle secret instructions may be conveniently communicated. It is a contrivance of extraordinary merit." The inventor of the "thousand mile speaker," Chiang Shun-hsin, of Huichou, flourished during the reign of Kang-hsi, A. D. 1662–1772. He wrote on occult science, astronomy, etc. The above account of his invention was taken from his works by the author of a Fuhkien Miscellany. At that time—reign of Kien Lung—there was no longer an instrument of this description in that province. It seems to have perished with the ingenious scientist who contrived it.

Here is a fine opportunity for the organization of a new telephone company, with a legal department to hunt up the lost evidence, and take a whack at the Bell telephone monopoly. Doubtless many heathen Chinee might be found glad to testify they had often used the old telephone in talking from the Great Wall to Pekin, and further if necessary.