

In 1834, Gauss and Weber constructed a line of telegraph, containing about 15,000 feet of wire, which was operated by the magneto-electric currents generated in a coil of wire when the latter was moved up or down upon a permanent magnet, around which it was placed. The slow oscillations of a magnetic needle, caused by the passage of the current, and which were observed through a glass, furnished the signals for correspondence. Sir William Thomson has since greatly improved the latter apparatus, and thereby given us the beautifully sensitive mirror galvanometer which bears his name.

In 1837, Steinheil discovered the important fact that the earth would serve as a conductor, thereby saving one wire in forming a circuit: Cooke invented his electro-magnetic semaphore, known as the needle telegraph, in which needles swing upon the face of a dial, just as the vanes of the old semaphores swung on the hill tops: Morse invented his electro-magnetic telegraph, which he put in operation between Baltimore and Washington in 1844: and Page discovered that a musical sound accompanies the disturbance of the magnetic forces of a steel bar, when poised or suspended so as to exhibit acoustic vibrations.

In 1861, Reiss discovered that a vibrating diaphragm could be actuated by the human voice so as to cause the pitch and rhythm of vocal sounds to be transmitted to a distance, and reproduced by electro-magnetism.

In 1872, Stearns perfected a duplex system, whereby two communications could be simultaneously transmitted over one wire; and, in 1874, Edison invented a quadruplex system for the simultaneous transmission of four communications over the same conductor.

In 1874, Gray invented a method of electrical transmission by means of which the intensity of the tones, as well as their pitch