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FARADIZATION.

BY THE EDITOR.

It is now over thirty years since the discovery by Faraday, that wire insulated by a covering of silk or cotton, and encircling a piece of iron, becomes electric at the moment of bringing a magnet into contact with, or separating it from it; the wire being unconnected with either, and remaining unaffected, but on the movement of the magnet to or away from the iron within it. The currents thus induced, run in opposite directions, that is, the end of the wire which gives positive electricity on the application, shows negative on the removal of the magnet, and *vice versa* with the other extremity of the wire, hence the name "to and fro" currents. They become much more perceptible when the iron is bent, and a horse-shoe magnet employed to touch both ends at the same time, as shown in the margin.

Like currents are produced in the wire when placed around the magnet, and its poles touched with soft iron.

Temporary or electro-magnets evolve similar phenomena.

And voltaic electricity from a pile, or a simple pair of zinc and copper plates, when passed through an insulated coil of wire, also generates at the moments of making and breaking contact, the same to and fro currents in another coil placed over it, or with it on the same spool, although not otherwise connected.

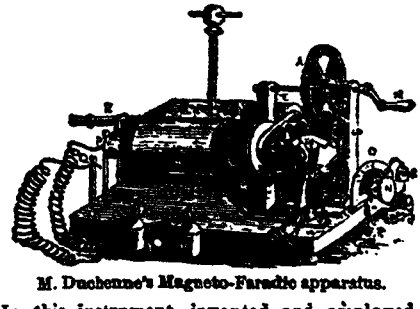
Rheotomes.—It therefore follows that to have continuous induced currents, the contacts and withdrawals of the magnet, or the interruptions in the stream from the voltaic plates, must be numerous and speedy; contrivances for this purpose are called rheotomes (i. e. cut-currents) and have called the ingenuity of scientific men in all parts of the world.

It will hence be observed, that although these sympathetic currents are always produced from spools of insulated wire, yet that there are three modes of inducing them, viz;—the permanent magnet—the electro magnet—and the electric coil, the two latter requiring voltaic electricity.

Dr. Duchenne of Boulogne, who has devoted a great deal of attention to this subject and whose large work, is without doubt the most complete extant, extensively employs these induced currents, and in honour of their discoverer has denominated their application Faradization, which happy application has been at once adopted by the profession at large. When from a permanent magnet, he calls it Magneto-Faradic; and if induced from a battery, Volta-Faradic.

Faradization.—After this explanation it will be seen why by Faradization, is only to be understood the employment of induced or discontinuous electric currents.

Magneto-Electric Machines.—In these the insulated wire is put upon wooden spools, and slipped over the ends of a piece of bent iron, which are turned around in front of a horse-shoe magnet. They are decidedly the cleanest and prettiest instruments for medicinal purposes, and the ones most frequently employed in this country. They come to us from the United States, where they are manufactured cheaply in great numbers, and extensively employed both by medical men and the community at large; and all those, that I have seen, are made to transmit the undivided to and fro currents as generated. The electrodes (or handles), being alternately positive and negative, pass the electricity backwards and forwards through any portion of the body placed between them. In more perfect instruments, however, of which those of the English makers are not excelled in the world, control may be exercised over one of these sets of currents, and a positive and negative electrode be produced at pleasure, thus enabling the operator to pass the stream in any direction desired. This is of great advantage, for a current running with a nerve is much less excitable than an inverse or mixed one.



M. Duchenne's Magneto-Faradic apparatus.

In this instrument, invented and employed by Dr. Duchenne, the spools are placed over the magnets, and contain first, eighty feet of insulated copper wire $\frac{1}{50}$ inch in diameter, over which is wound nearly two thousand feet of another of $\frac{1}{75}$ in. In both of these wires are generated the same to and fro currents, which however vary greatly in character, those from the larger being much more powerful, and from the longer and smaller, more penetrating.

Volta-Electric Apparatus.—Soft iron becomes magnetic when surrounded by an insulated coil of wire through which is passing a stream of voltaic electricity; and an instrument could be made precisely like the one with the horse-shoe magnet, but with a power much greater, depending as it would on the strength of the battery employed. But the turning of a handle is unnecessary with a battery, as, to produce Faradic currents, we have merely to place another coil over the temporary