PRACTICAL LESSONS IN ELECTRO-THERAPEUTICS.

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Magneto Machines.

These machines depend for their action upon the circumstance that when a coil of wire is revolved or otherwise made to move, so as to cut the lines of force within a magnetic field, currents of electricity are set up in that wire. They usually consist of a fairly powerful magnet of the horseshoe pattern, against the poles of which bobbins of fine wire are pivotted in such a way as to revolve rapidly when a handle is turned. The wires on these bobbins have currents of electricity generated in them in proportion to the number of lines of magnetic force which they cut as they revolve. The currents so generated are collected and conducted to the terminals of the machine. They are alternating as regards direction, and like the currents from the secondary of an induction coil, possess high E.M.F. and small Cs.

A few years ago medical magneto machines were very popular, owing to their handiness and cheapness, but for therapeutic purposes they have very little value, and are therefore seldom recommended now. The currents generated are usually jerky and unsteady, so that these machines may rather be reckoned as instruments of torture than as therapeutic aids.

Franklinic or Statical Electricity.

This form of electricity differs largely from those hitherto considered. It is chiefly to be noticed for its high potential and consequent power of overcoming resistance, while the Cs is very small. When a conductor is brought into contact with one of the poles of a frictional or influence machine in operation, it becomes electrically *charged—i.e.*, covered with electricity of high potential. This charge remains so long as the insulation is good enough to prevent its escape; but if the insulation be disturbed and broken down, the charge rushes away by any channel offered. If that channel be an air-space, the charge produces a spark in its passage. A charge of statical electricity is sometimes compared to the energy possessed by a wound-up or compressed spring, the energy being stored up so long as the spring is compressed, but being discharged in one sudden effort directly the spring is released.

The simplest method of generating statical electricity is shown by the following experiment. Take a rod of sealing wax or ebonite (making sure that the surface is clean and dry), and rub it briskly a few times against a piece of dry cloth or fur; a coat sleeve or cloth dress will do very well. Having placed on the table a few scraps of light paper, hold the rod in one hand, and present the freshly rubbed end to the paper scraps. They will at once spring up and attach themselves to the rod. The reason for this is, that the friction has left a charge of negative electricity upon the rod, while the paper scraps being connected to earth through the table, &c., possess a relatively positive charge. When these charges of opposite polarity are brought into proximity to one another, their tendency to combine and their attraction for each other enable them to do a certain amount of work in the act of combination. The scraps of paper being very light are carried upwards against the force of gravity by electric attraction, and the first step in statical electricity —that of attraction—is demonstrated. The paper scraps do not adhere long to the rod, but soon fall back upon the table, because the act of combination of the two charges has brought about neutralization. There being no further electrical attraction, the paper scraps are no longer able to resist the force of gravity.

We thus see that electro-static charges of opposite polarity attract one another. In a very similar manner it may be shown that such charges having the same polarity repel one another, but we do not consider it pertinent to the object of these lessons to go further into the question.

Frictional Machines

may be briefly defined as convenient arrangements for multiplying the electrical action described in the experiment with the rubbed rod.

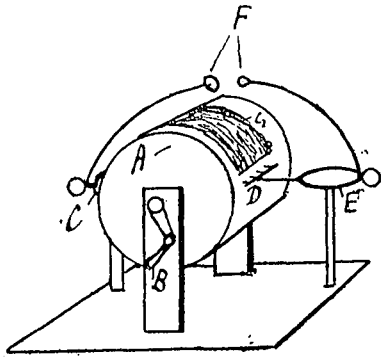

FIG. 29.

One of the simplest forms is the cylinder electrical machine illustrated in Fig. 29. A is a cylinder

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