

THE APPLICATION OF ELECTRICITY AS A THERAPEUTIC AGENT

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The Application of Electricity as a Therapeutic Agent by J. H. Rae

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BY

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INTRODUCTION.

ORIGINALLY it was not my intention to say anything regarding the philosophy or theory of the application of electricity, but on advice of others I have concluded to add this introduction. Individually I should prefer to adhere to my first resolution, and leave theories and speculations to others; presenting only the mechanical operation, leaving others to form their own opinions as regards the *why* and *wherefore*.

The normal condition of the body is Health.

The abnormal condition, Disease.

In the normal condition the electricities are all equal, having full, natural, dynamic force.

In the abnormal the electricities are unequal; some are dynamic, some latent; obstacles intervene, interrupt, and change the currents.

In the application of mechanical electricity to the body, we must harmonize and assimilate the currents as generated by mechanical and chemical action, with the currents of the system as physically generated, and give such force of currents to the nerve-centres as may be distributed natur-

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ally, and the *finer* or lighter the current used, the more liable are we to meet with success.

The great force and power of *electro-magnetism* consists in its ability to control and regulate the circulation of the blood, its contraction and relaxation of the muscles.

Electricity proper acts chemically upon the blood by increasing the oxygen and expelling impurities from the system; it also acts directly upon tumors, dissolving and removing them; it is also used in cauterizing, and is applied by acupuncture for aneurism, etc.

This work is only intended to give physicians and purchasers of the superinduced batteries an idea of how I use Electricity and Electro-magnetism. It is only *one man's* experience, and I sincerely trust and hope that it may lead to more and closer experiments by physicians. If I succeed in giving the principles of application, so that physicians and others can apply the electrodes correctly, my present end will be gained.

Electricity and Electro-magnetism do not cure; they simply excite the latent or dormant electricity to dynamic action, and nature then performs the cure. If the cure does not innately exist in the system, all the electricity, drugs, medicines, science, talent, and experience in the world cannot make a cure. There must be sufficient vitality or dormant electricity in the system, or all efforts will prove useless.

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MUCH might be said upon the early experiments of Oersted, Ampère, Davy, and others, relative to the action of electricity upon the magnet, and the reciprocal action of the latter upon the former, which led eventually to the construction of the galvanometer, an instrument so sensitive as to detect the presence of electric currents, even in almost all the tissues of the animal body.

These experiments, as well as those made later by Faraday, to whom the discovery of induction belongs, are found in all text-books upon the science of electricity, or the various encyclopedias, and it is not the purpose of the author to enter upon the broad field of electrical science, excepting so far as it treats upon the immediate character of this work,—the application of electricity as a therapeutic agent.

Soon after the study of electricity was commenced, it was sought to make use of it for the cure of certain diseases; and at one time electricity was regarded as a universal panacea, and people had themselves electrified for all kinds of diseases and afflictions.

This theory, however, was, under scientific investigation, speedily exploded, and electro-physiology of the present day is a law becoming well defined and based upon solid principles, which it is the design of this little work to promulgate.

In 1832, after several years of experiment, Faraday succeeded in producing electricity by induction, by finding that when a wire traversed by the electric current is brought suddenly into close proximity with another wire in its normal state, it developed in the latter instantaneously a current of electricity.

This was the first phenomenon of induction. No great effects were immediately produced by Faraday with the induced current, it being perceptible only upon the galvanometer.

The invention of the induction coil founded upon Faraday's great discovery, was made in 1836 by Prof. Page, then a medical student at Salem, Massachusetts. The credit of this invention is, however, erroneously given to Ruhmkorff, an instrument-maker of Paris, who, by dissecting Dr. Page's coil, and improving upon its construction and insulation, produced greater effects. The construction of all machines for the production of induced electricity from

a current generated by a battery, is upon the principle of Dr. Page's coil, and is as follows :

Upon a cylinder of thin wood or pasteboard is wound several turns of coarse insulated wire, and over this a great many turns of very fine insulated wire, and upon the careful winding and perfection of the insulation depends the strength of the machine. When the current from a battery, or the galvanic current as it is sometimes called, is caused to flow through the coarse or primary wire, a current is produced within the outer or induced wire, of the opposite polarity to that flowing in the primary wire. This induced current, however, is of but an instant's duration, and if the primary current is allowed to flow, disappears ; but upon the interruption of the primary current, another current, equally instantaneous but of less strength and in the opposite direction, is produced upon the secondary wire. Thus we produce, by the making and breaking of the primary current, an intensified alternating current of electricity upon the secondary wire, which may be made more intense by placing within the core of the coil a bundle of soft iron wires, which by being magnetized and demagnetized by the primary coil intensify the induced current. By the withdrawal of this rod of wires we are enabled to greatly reduce the effect of the induced current.

These coils are capable of producing but *two* currents of electricity,—the *primary* or *chemical current* of the battery, and the *induced* or *mechanical current* produced by the action of the former. To claim that machines can produce