

THE MEDICAL APPLICATION OF ELECTRICITY

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649645411

The Medical Application of Electricity by William F. Channing

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WILLIAM F. CHANNING

**THE MEDICAL
APPLICATION
OF ELECTRICITY**

THE
MEDICAL APPLICATION
OF
LANE LIBRARY
ELECTRICITY.

BY
WILLIAM F. CHANNING, M. D.

SIXTH AND ENLARGED EDITION



PUBLISHED BY THOMAS HALL,
ELECTRICIAN,
AND MANUFACTURER OF ELECTRO MEDICAL INSTRUMENTS,
No. 13 BROMFIELD STREET,
BOSTON, MASS.

1865.

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THIS treatise is respectfully inscribed to those Members of the Medical Profession who wish to avail themselves in their practice of a principle of nature, which occupies a central position, both in regard to organized and unorganized matter, — which has already accomplished something for medical science, but which is still undeveloped in its most important relations to physiology. The only value claimed for these pages is in their connection with present experience. They are intended simply to facilitate the application of electricity to disease in the existing state of our knowledge, and, if it may be, to aid others, especially American practitioners, in advancing a high department of physiological science.

The instruments here described, and which this book is intended to accompany, are those prepared by MR. THOMAS HALL, successor to DANIEL DAVIS, well known as the earliest manufacturer of electro-magnetic apparatus in this country; to whose liberality in experiment, and ingenuity in construction, the present form of electro-magnetic instruments, of all descriptions, here and elsewhere, is due, probably, more than to any other person.

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MEDICAL APPLICATION
OF
ELECTRICITY

THE introduction of electricity into medical practice has been made the subject, within a few years, of many empirical treatises. Original and valuable sources of information have at the same time been multiplied, and the European journals, after a long interval, are again filled with cases of the successful application of this agent. Professor Wisgrill, in addressing the Medical Association of Vienna,* remarks, that a revolution has now taken place in favor of electricity, which, after its wide celebrity at the commencement of the present century, had fallen into disuse, not from the inefficacy of the means, but from the mode in which they were employed. The object of this work is to present, in a reliable form, the results of experience in this revival of electro-medical application, to arrive at general principles, as far as these can be correctly deduced, and to place the materials

* Brit. and For. Med. Rev. April 1845.

of practice or investigation in the hands of all who look with hope to the development of this principle, now receiving so general attention abroad, which is so fertile in its applications, so immediate and so safe in its operation.

The subject will be divided into the following heads: I. Physiological Relations of Electricity. II. Forms of Medical Electricity. III. Means of Application. IV. General Application to Disease. V. Special Application to Disease. In treating the last division, the effort will be made to give as full a statement as possible of applications heretofore attempted, whether experimental in their character, or established as modes of practice. The propriety of this course will be acknowledged when it is considered that the use of electricity is comparatively recent; that it is acquiring an important place in scientific regard; and that the extent of its agency, standing alone, as it does, in relation to vitality, can hardly be anticipated.

I. — PHYSIOLOGICAL RELATIONS OF ELECTRICITY.

1. THE principle of vitality, in its highest relations, has hitherto escaped analysis. All its functions, however, in the animal system, are performed through the intervention of physical agents, and in strict accordance with the laws of chemical affinity and material force. Thus, though Life stands alone as an immaterial and an organic principle, it has also, distinctly, a material side and relations in which it must be studied like any other branch of natural philosophy. The physical agents by which the animal organization accomplishes its results are of two kinds: first, principles and affinities which are common also to unorganized matter; second, a force which is peculiar to living structures — the special agent or material principle of vitality. This is manifested in two distinct forms — in the nervous system, and in the life of the tissues. In the former, its action may be spoken of as between organized masses; in the latter, between organized atoms. In both cases it is associated with a physical organization, and reacts with other physical agents. Its precise connection with these will now be more especially considered. The following extract from Faraday, on the nature of the nervous influence, treated in connection

with the electrical endowments of the gymnotus,* will serve as a fitting introduction to this subject.

2. "The anatomical relation of the nervous system to the electric organs; the evident exhaustion of the nervous energy during the production of electricity in that organ; the apparently equivalent production of electricity, in proportion to the quantity of the nervous force consumed; the constant direction of the current produced, with its relation to what we may believe to be an equally constant direction of the nervous energy thrown into action at the same time — all induce me to believe that it is not impossible but that, on passing electricity per force through the organ, a reaction back upon the nervous system belonging to it might take place, and that a restoration, to a greater or smaller degree, of that which the animal expends in the act of exciting a current, might, perhaps, be effected. . . . So, perhaps, in these organs, where nature has provided the apparatus by means of which the animal can exert and convert nervous into electric force, we may be able, possessing, in that point of view, a power far beyond that of the fish itself, to reconvert the electric into the nervous force.

3. "With respect to the nature of nervous power, that exertion of it which is conveyed along the nerves to the various organs which they excite into action, is not the direct principle of *life*; and therefore I see no natural reason why we should not be

* Experimental Researches. Series XV. Nov. 1838.