# A PRACTICAL INTRODUCTION TO MEDICAL ELECTRICITY

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TO

# MEDICAL ELECTRICITY

BY

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WITH EIGHTY-NINE ILLUSTRATIONS AND PLATES OF THE MOTOR POINTS

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# PREFACE.

THIS is a new book rather than the second edition of an old one; I have found it necessary not only to add much new material, but to rewrite the greater part of what I allowed to remain. The list of instruments which in the first edition gave the impression of an illustrated catalogue, and occupied much space uselessly, has been considerably reduced so as to keep the book within reasonable limits.

I still insist upon *measurements of current strength* as the essential condition of a rational application of electricity to medicine. It is gratifying to me that the proposition I first made in 1878 of adopting the milliweber, now called milliampere, as the electro-therapeutical unit, has received the sanction of the special committee of the International Congress of Electricians. Absolute galvanometers are becoming very generally used on the Continent, especially in France and Germany.

Of equal importance with an accurate knowledge of the actual electrical quantities we are using, is a clear understanding of the *distribution* of those quantities among the tissues we wish to influence.

This electrical distribution, or diffusion, depends largely upon the extent of the surface through which the current is introduced into the body; I therefore propose the adoption of Prof. Erb's set of *standard electrodes* so as to fix once for all the meaning of the terms "small," "large," etc., hitherto applied to them in a loose manner. The second factor of current diffusion being the relative *position* of the electrodes on the body, I have laid more emphasis

upon this topic, supplementing my previous diagrams with the excellent figures borrowed from the author just mentioned.

The chapter on electrophysiology will be found to be new both as to matter and form. It embodies the results of observations made on man, which are presented in the shape of experiments or exercises, the repetition of which the student will find the shortest way of acquiring a complete mastery over the manipulations necessary for the practice of diagnosis and treatment by electricity.

The subject of electrodiagnosis has undergone no marked development of late. The description of the phenomena of morbid reactions has been merely expanded; but I have insisted much more fully upon the difficulties of electrophysiological experiments on man, for such is the performance of an electrodiagnostic investigation, so that this part of chapter III. may be taken as a continuation of the preceding one.

With reference to electrotherapeutics proper, the reader will observe that the whole chapter on treatment has been written by myself. The special part of it was in the former edition a translation from the French of the corresponding portion of my friend Dr. Onimus' *Guide Pratique*. My views and methods have undergone considerable changes during the past years, and the opportunities I have had of bringing them to the test of practice have been numerous enough to justify me, I hope, in expressing myself with some confidence on this part of the subject.

I trust that in speaking of the curative value of electricity I have been able to keep a happy medium between excessive enthusiasm and premature discouragement. We have still much to learn and to improve with reference to the modes of electrisation in disease. I have endeavoured to give the rationale of the methods, as well as directions for carrying out the several applications of the currents to disease, so that the physician should be able to modify his treatment and adapt it to the peculiarities of the cases which come before him, a task by no means so simple as some appear to think.

Finally I have, after some hesitation, added a paragraph on the electrolysis of tumours intended to rationalise the method and stimulate further researches on the subject, rather than to endorse,

and give a complete account of, the results obtained—or at least stated to have been obtained—in this field of surgical work.

Many new illustrations will be found in the second edition, among which several instructive diagrams (figs. 1—7, 22—25) borrowed from M. Niaudet's *Traité de la Pile*, of which a translation has, I believe, been published by Messrs. Spon. My friend, Prof. Erb, has kindly allowed me to use some diagrams of the Reactions of Degeneration (figs. 79—83), and of the current-diffusion in the human body (figs. 84—88) taken from his great work on *Elektrotherapie* (Volume III. of Ziemssen's series of General Therapeutics) of which I am preparing an English edition for Messrs. Smith, Elder and Co.

I have abstained from giving any bibliographical references, partly for the sake of economising space, partly because the forthcoming treatise by Prof. Erb will contain a very full list of them. For similar reasons, I have not introduced any illustrative cases into the chapter on treatment; my object is to enable the reader to observe and act for himself, rather than to astonish him by narrations of any of the wonderful cures—self administered testimonials—so dear to the specialist. Electricity has now won a recognised place in medicine in spite of the dangerous praises of enthusiasts; but whilst admitting that its therapeutical value must be determined by the empirical results of clinical experience only, I have endeavoured to remain faithful to the strictly scientific modes of thought required by such a physical agent in its study and applications.

One word in conclusion. There are several considerable practical difficulties which will no doubt, at least for some time to come, prevent electricity from becoming really popular with the medical profession. Foremost stands the absence of any theoretical and practical teaching in our schools: it is the object of this little book to supplement this want in some degree. Next comes the question of the apparatus required, which kind is the best, where to obtain it, and how to keep it in working order. We in England are at a decided disadvantage with reference to our supply of electrical instruments. Abroad there is no dearth of professed electri-

cians prepared to supply the requirements of the physician; here the latter has hitherto had to depend upon the surgical instrument maker from whom it is difficult to obtain anything beyond the adopted battery of his predilection. I have felt this want the more acutely that I have been constantly obliged to answer inquiries on this subject, from medical men in trouble.

I am glad therefore to mention here, in addition to Mr. Schoth's name, that of Mr. Thistleton of 1 Old Quebec Street, Oxford Street, who has quite recently announced his intention to devote himself solely to the manufacture of medico-electrical apparatus.

A DE WATTEVILLE.

30 Welbeck Street, W.
*January*, 1884.

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## Chapter I.

## ELECTROPHYSICS.