The Riverside Science Series, Vol. I: A Century of Electricity

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Trieste

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VOLUME I.

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By T. C. MENDENHALL

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SUPERINTENDENT U. S. COAST AND GEODETIC SURVEY

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PREFACE.

A HUNDRED years have elapsed since the experiment of an Italian philosopher inaugurated a new era in physical science. The industrious cultivation of the new electricity from that day to the present has been so fruitful of results, that even the specialist has found difficulty in keeping pace with its development. Within a few years it has found its way into the household, and hundreds of thousands of intelligent people have come to have some personal familiarity with its use. It is believed that this familiarity has not "bred contempt," but rather that it has excited a desire, on the part of many, to know something of the fundamental principles which underlie its numerous applications, and to learn something of the evolution of these principles.

In this belief, the author has endeavored to sketch the growth of the science of electricity, and its principal applications. The book is not a history of the science, nor is it a scientific

treatise; but the author trusts, that, as far as it goes, it is not far wrong in either its history or its science. The use of technical language has been avoided as far as possible; and the effort has been to enable the intelligent reader, unfamiliar with the nomenclature of the science, to understand the more important phases of its development, and to give him such a knowledge of its fundamental principles as will enable him to comprehend the meaning of what he sees in electrical devices, with which he almost daily comes in contact.

It has been assumed that the interest of the reader in the discovery of a principle or fact will not be lessened by a little knowledge of the personality of the discoverer, especially when his name has become a part of the nomenclature of the science. The literature of electricity is now so extensive, that it would be difficult to enumerate the sources from which the writer has drawn in the preparation of this volume. In many instances original memoirs have been consulted, and where direct quotations are made that fact is indicated.

It is with great reluctance that the author consents to add another to the already large number of so-called "popular" books on electricity; but he believes that the treatment of a

subject like this will not necessarily be unscientific or inaccurate because it is couched in language nearly free from technical terms and mathematical formulæ. That it must be less complete and exhaustive goes without saying; but the design of the author, as already intimated, is to present a sketch. Any reader who is so disposed will have no difficulty in finding material for filling in the details with any desired degree of elaboration.

T. C. M.

WASHINGTON, D. C., *May* 16, 1886.

PREFACE TO REVISED EDITION.

I HAVE taken the opportunity afforded by a reissue of this work, as the first in the Riverside Science Series, to add a Postscript, bringing the subject more or less to date, and to make a slight correction in the original text. My attention has been called to two errors only, and it happens that both were copied from original sources. One is in the cut on page 177, showing the skeleton Gramme Armature, in which the wire surrounding the S pole of the field magnet

is coiled in the wrong direction. It was so in the cut from which this was copied, which was not sufficiently scrutinized before its adoption. The proper alteration in the cut is made in the present edition.

The other is of much greater interest, and will be found in the statement of the law of electro-magnetic induction at the foot of page 159. It is here stated that, when an electric current is passed through one of two parallel wires, it causes at first a current in the *same* direction in the other, while the fact is that the direction of the current is opposite to that in the inducing wire. Such an error in the statement of one of the most familiar principles of the science might easily be attributed to a *lapsus calami*, followed by careless proof-reading. In this instance, however, the principle is given, as stated in the text, in Faraday's own words, and, curiously enough, the distinguished discoverer committed the blunder himself, in communicating the result of his magnificent research to his friend Phillips, in a letter dated at Brighton, November 29, 1831; at least, it is so printed in Dr. Bence Jones's "Life of Faraday," from which the statement was copied without a thought as to its correctness.

T. C. M.

WASHINGTON, D. C., *March* 7, 1890.