

**A POPULAR SKETCH OF
ELECTRO-MAGNETISM,
OR ELECTRO-DYNAMICS**

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A Popular Sketch of Electro-Magnetism, or Electro-Dynamics by Francis Watkins

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FRANCIS WATKINS

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A POPULAR SKETCH

OF

ELECTRO-MAGNETISM.

A
POPULAR SKETCH
OF
ELECTRO-MAGNETISM,
OR
ELECTRO-DYNAMICS.

WITH NUMEROUS WOODCUTS OF THE MOST APPROVED APPARATUS FOR ILLUSTRATING
THE PRINCIPAL PHENOMENA OF THE SCIENCE,

AND

Outlines of the Parent Sciences
OF
ELECTRICITY AND MAGNETISM.

BY THE LATE
FRANCIS WATKINS.



Second Edition, Revised and Corrected.

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PREFACE

TO

THE FIRST EDITION.

THE following pages are intended to convey to the reader a plain, clear, and concise account of the most important phenomena of the science of Electro-magnetism, or Electrodynamics; a science which ever since its discovery has engaged the attention of many eminently learned and scientific men in every civilized state.

This science is of great importance to the philosopher and to the world; as it will probably lead to a more intimate, if not a perfect knowledge of Electricity and Magnetism, and thus be the means of ascertaining that Electricity and Magnetism are either distinct and separate principles, or that they are one and the same principle differently modified.

Several valuable papers on the subject, by Mr. Faraday, of the Royal Institution, have been published in the *Quarterly Journal of Science, Literature, and Art*; and in the *Annals of Philosophy*. The subject has been treated of in an Appendix to Mr. Barlow's *Essay on Magnetic Attractions*; and there is also an article in the *Encyclopedia Metropolitana* on this subject. No distinct work on Electro-magnetism had appeared in England until Professor Cumming published a translation of M. J. F. Démonferrand's *Manuel d'Electricité Dynamique*. But as many persons may wish

to be acquainted with the subject who, from not being familiar with mathematical expressions and formulæ, would have difficulty in perusing Professor Cumming's work, this Popular Sketch has been compiled; and to assist the same class of inquirers, and in the hope of spreading over a wider field a more general knowledge of the parent sciences, Electricity and Magnetism, an outline of these sciences has been carefully traced.

PREFACE

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THE SECOND EDITION.

IN the year 1828, the late Mr. Francis Watkins published his work entitled *A Popular Sketch of Electro-dynamics*. The important discoveries of Oërsted, Ampère, Davy, Arago, Faraday, and others were then known only to the few; hence the appearance of such a work, gathering together the isolated facts scattered over the philosophical journals of the period, was not only of great interest, but of much practical value.

Twenty-eight years have elapsed since that work first appeared, during which period many of the views then entertained have undergone an important change: new facts have been discovered, new instruments invented, and old ones improved and simplified. But this is not the only change which has occurred; for then but few of the master-minds of the age were engaged in the investigation of this novel and intricate branch of physical science, while now to every one of that date we number thousands at the present time.

When the treatise of Mr. Watkins was first published, the only existing work in the language was the translation, by Professor Cumming, of M. Demonferrand's *Manuel d'Electricité Dynamique*—a work of great value, but of too technical a character for popular information. Numerous other works have since appeared in which this subject forms a part,

and none of greater value than the important *Experimental Researches* of Dr. Faraday, in three volumes: nevertheless, but few books have been written solely on this subject of a popular nature. With this feeling, Messrs. Elliott, the successors of the late firm of Watkins and Hill, have determined upon issuing a new edition of the book of 1828. The Editor's task has been one of no little difficulty; for, while being most anxious to retain as much of the original as would be consistent with the advanced state of the science, yet the multitude of new facts, instruments, and applications have made it necessary to introduce so much new matter, that it makes it a new work rather than a new edition. Nothing of an experimental nature that could interest the reader has been omitted; while the additions, it is hoped, will be found both useful and interesting to the tyro in this branch of that extensive range of phenomena now included under the head of Electricity.

G. H. B.

London, September, 1856.