THE CENTURY SCIENCE SERIES. JAMES CLERK MAXWELL AND MODERN PHYSICS

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R. T. GLAZEBROOK

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J. Clerk Maxwell

(From a Photograph of the Picture by G. Lowes Dickinson, Esq., in the Hall of Trinity College, Cambridge.)

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JAMES CLERK MAXWELL

AND MODERN PHYSICS

BY

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PREFACE.

THE task of giving some account of Maxwell's work —of describing the share that he has taken in the advance of Physical Science during the latter half of this nineteenth century—has proved no light labour. The problems which he attacked are of such magnitude and complexity, that the attempt to explain them and their importance, satisfactorily, without the aid of symbols, is almost foredoomed to failure. However, the attempt has been made, in the belief that there are many who, though they cannot follow the mathematical analysis of Maxwell's work, have sufficient general knowledge of physical ideas and principles to make an account of Maxwell and of the development of the truths that he discovered, subjects of intelligent interest.

Maxwell's life was written in 1882 by two of those who were most intimately connected with him, Professor Lewis Campbell and Dr. Garnett. Many of the biographical details of the earlier part of this book are taken from their work. My thanks are due to

them and to their publishers, Messrs. Macmillan, for permission to use any of the letters which appear in their biography. I trust that my brief account may be sufficient to induce many to read Professor Campbell's "Life and Letters," with a view of learning more of the inner thoughts of one who has left so strong an imprint on all he undertook, and was so deeply loved by all who knew him.

R. T. G.

Cambridge,
December, 1895.

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JAMES CLERK MAXWELL

AND MODERN PHYSICS.

CHAPTER I.

EARLY LIFE.

"ONE who has enriched the inheritance left by Newton and has consolidated the work of Faraday —one who impelled the mind of Cambridge to a fresh course of real investigation—has clearly earned his place in human memory." It was thus that Professor Lewis Campbell and Mr. Garnett began in 1882 their life of James Clerk Maxwell. The years which have passed, since that date, have all tended to strengthen the belief in the greatness of Maxwell's work and in the fertility of his genius, which has inspired the labours of those who, not in Cambridge only, but throughout the world, have aided in developing the seeds sown by him. My object in the following pages will be to give some very brief account of his life and writings, in a form which may, I hope, enable many to realise what Physical Science owes to one who was to me a most kind friend as well as a revered master.

The Clerks of Penicuik, from whom Clerk Maxwell was descended, were a distinguished family. Sir John Clerk, the great-great-grandfather of Clerk Maxwell,

was a Baron of the Exchequer in Scotland from 1707 to 1755; he was also one of the Commissioners of the Union, and was in many ways an accomplished scholar. His second son George married a first cousin, Dorothea Maxwell, the heiress of Middlebie in Dumfriesshire, and took the name of Maxwell. By the death of his elder brother James in 1782 George Clerk Maxwell succeeded to the baronetcy and the property of Penicuik. Before this time he had become involved in mining and manufacturing speculations, and most of the Middlebie property had been sold to pay his debts.

The property of Sir George Clerk Maxwell descended in 1798 to his two grandsons, Sir George Clerk and Mr. John Clerk Maxwell. It had been arranged that the younger of the two was to take the remains of the Middlebie property and to assume with it the name of Maxwell. Sir George Clerk was member for Midlothian, and held office under Sir Robert Peel. John Clerk Maxwell was the father of James Clerk Maxwell, the subject of this sketch.*

John Clerk Maxwell lived with his widowed mother in Edinburgh until her death in 1824. He was a lawyer, and from time to time did some little business in the courts. At the same time he maintained an interest in scientific pursuits, especially those of a practical nature. Professor Campbell tells us of an endeavour to devise a bellows which would give a continuous draught of air. In 1831 he

* A full biographical account of the Clerk and Maxwell families is given in a note by Miss Isabella Clerk in the "Life of James Clerk Maxwell," and from this the above brief statement has been taken.