

IN THE SAME SERIES.

ON THE STUDY AND DIFFICULTIES OF MATHEMATICS. By AUGUSTUS DE MORGAN. Entirely new edition, with portrait of the author, index, and annotations, bibliographies of modern works on algebra, the philosophy of mathematics, pan-geometry, etc. Pp., 288. Cloth, \$1.25 net (5s.).

LECTURES ON ELEMENTARY MATHEMATICS. By JOSEPH LOUIS LAGRANGE. Translated from the French by *Thomas J. McCormack*. With photogravure portrait of Lagrange, notes, biography, marginal analyses, etc. Only separate edition in French or English. Pages, 172. Cloth, \$1.00 net (5s.).

ELEMENTARY ILLUSTRATIONS OF THE DIFFERENTIAL AND INTEGRAL CALCULUS. By AUGUSTUS DE MORGAN. New reprint edition. With sub-headings, and a brief bibliography of English, French, and German textbooks of the Calculus. Pp., 144. Price, \$1.00 net (5s.).

MATHEMATICAL ESSAYS AND RECREATIONS. By HERMANN SCHUBERT, Professor of Mathematics in the Johanneum, Hamburg, Germany. Translated from the German by *Thomas J. McCormack*. Containing essays on the Notion and Definition of Number, Monism in Arithmetic, On the Nature of Mathematical Knowledge, The Magic Square, The Fourth Dimension, The Squaring of the Circle. Pages, 149. Cuts, 37. Price, Cloth, 75c net (3s. 6d.).

HISTORY OF ELEMENTARY MATHEMATICS. By DR. KARL FINK, late Professor in Tübingen. Translated from the German by Prof. *Wooster Woodruff Beman* and Prof. *David Eugene Smith*. (Nearly Ready.)

THE OPEN COURT PUBLISHING CO.

324 DEARBORN ST., CHICAGO.

A

ELEMENTARY ILLUSTRATIONS

OF THE

DIFFERENTIAL AND INTEGRAL
CALCULUS

BY
AUGUSTUS DE MORGAN

NEW EDITION

CHICAGO
THE OPEN COURT PUBLISHING COMPANY
FOR SALE BY
KEGAN PAUL, TRENCH, TRÜBNER & Co., LTD., LONDON
1899

A

EDITOR'S PREFACE.

THE publication of the present reprint of De Morgan's *Elementary Illustrations of the Differential and Integral Calculus* forms, quite independently of its interest to professional students of mathematics, an integral portion of the general educational plan which the Open Court Publishing Company has been systematically pursuing since its inception,—which is the dissemination among the public at large of sound views of science and of an adequate and correct appreciation of the methods by which truth generally is reached. Of these methods, mathematics, by its simplicity, has always formed the type and ideal, and it is nothing less than imperative that its ways of procedure, both in the discovery of new truth and in the demonstration of the necessity and universality of old truth, should be laid at the foundation of every philosophical education. The greatest achievements in the history of thought—Plato, Descartes, Kant—are associated with the recognition of this principle.

But it is precisely mathematics, and the pure sciences generally, from which the general educated public and independent students have been debarred, and into which they have only rarely attained more than a very meagre insight. The reason of this is twofold. In the first place, the ascendant and consecutive character of mathematical knowledge renders its results absolutely unsusceptible of presentation to persons who are unacquainted with what has gone before, and so necessitates on the part of its devotees a thorough and patient exploration of the field from the very beginning, as distinguished from those sciences which may, so to speak, be begun at the end, and which are consequently cultivated with the greatest zeal. The second reason is that, partly through the exigencies of academic instruction, but mainly through the martinet traditions of antiquity and the influence of mediæval