Sammlung von Aufgaben zur Anwendung der Differential- und Integralrechnung. Von FRIEDRICH DINGELDEY. Erster Teil: *Differentialrechnung.* Leipzig and Berlin, Teubner, 1910. (Sammlung Teubner, Band XXXII, 1). vi+202 pp.

THIS volume, the first of two covering the field of the calculus, contains a collection of 580 exercises illustrating the application of the differential calculus to the problems of geometry, physics, and engineering. The author is warranted in making the assumption that in the collections made heretofore the problems in the three fields have been too much isolated; and, working with the conviction that they should be united in one volume, he has arranged in the present book a most excellent combination of such geometric problems as might interest the physicist and engineer, together with physical and technical applications of the differential calculus which ought to appeal to the students of pure mathematics.

The book contains not only the exercises to be solved, but also all necessary explanations, indicated steps in the solutions of some of the problems, and answers to all. At the beginning of each chapter is given a statement of the principles of the calculus to be used, which is more than a collection of rules to be applied arbitrarily, and which falls short of a treatise on the theory. The specific purpose of the book is to supplement, not to furnish, the theory of the calculus. Numerous references to mathematical journals and published texts should inspire a further investigation on the part of the student into the problems proposed. Since it is intended that the book be used in connection with a first course in the calculus presented by lectures, there is necessarily quite a list of drill exercises included in the twenty chapters, covering the usual subjects discussed in a thorough first course in the differential calculus. However, the problems, for the most part, are of a type above furnishing mere drill in applying principles and possess mathematical interest of their own, while many may be called classics in the study of the calculus. These are well suited for, and could be used to great advantage in connection with a second course in that subject. A systematic study of the various steps in the solutions of these exercises would be of the greatest benefit to the student, and would exhibit clearly the many fields of mathematics entered in the study of the calculus. A glance at the index reveals such terms as absolute convergence, Bernoulli's numbers, Wronskian and functional determinants,

Hessian curves, least squares, line coordinates, potential, and the like, all of which when used are accompanied by explanations of their nature sufficient for the purpose of the problems.

While the author in the preface would give the impression that the fields of geometry, physics, and engineering are equally represented in the collection, yet even a casual glance reveals that the geometric side of the calculus is emphasized more than the other two, and an abundance of interesting geometric properties of curves and surfaces is brought out. Problems involving numerical calculations and the use of tables are brought in frequently, a procedure calling for definite results, and well worth while.

Instructors of the calculus will find in the collection much material to supplement any course given where new problems are welcome; while authors of text-books on the subject might easily receive many valuable suggestions from a perusal of its pages.

The volume is in every way typographically, both in print and figures, up to the high standard of the Sammlung Teubner; in its specific field it fills a practical need, and because of the excellence of the first part the volume on the integral calculus is eagerly awaited.

ERNEST W. PONZER.

Differential and Integral Calculus. By PROFESSOR DANIEL A. MURRAY. New York, Longmans, Green and Company, 1908. xviii + 491 pp.

THE aim of the author of this text-book has been (to quote from the preface) "to describe and emphasize the fundamental principles of the subject in such a way that, as much as may reasonably be expected, they may be clearly understood, firmly grasped, and intelligently applied by young students"; and again, "the aim has been to write a book that will be found helpful by those who begin the study of calculus without the guidance and aid of a teacher." This is by no means a simple undertaking in view of the inherent and essential difficulties of the subject. The notion of a limit is fundamental; and while students readily acquire more or less vague ideas on this subject, it seems to be difficult for most of them to get a clear and accurate conception of it. This difficulty must be squarely faced; fundamental definitions and principles must be set forth in language that is accurate and therefore necessarily technical.