

eighth chapter takes up the general partial differential equation of the first order by two methods. First the emphasis is laid on the geometrical methods of Lagrange and Monge, which are made to serve as an introduction to the analytical method of Cauchy given in the second part. Partial differential equations of higher orders are not discussed in this edition.

Zermelo's chapter on the calculus of variations in the second edition has been replaced by a shorter chapter with practically the same content. The notation has been changed to conform to the notation of the more recent articles and treatises. There is no treatment of sufficient conditions, merely a discussion of Euler's equations for the simplest problem of the calculus of variations, with some extensions to isoperimetric problems and problems in three variables. The subject matter is illustrated by the usual examples, the catenary, brachistochrone, etc. We note that in this edition, "Die Eulersche Differentialgleichung" replaces "Die Lagrangesche Differentialgleichung," a result probably of Professor Bolza's championship of Euler's claim to priority.

Harnack's appendix on the integration of partial differential equations and the few pages of "Bemerkungen" have been omitted in this edition.

As a third volume in a course in calculus, intended for students in their first three semesters, the present volume will be found rather advanced, notwithstanding the footnotes pointing out paragraphs and chapters which may be omitted. Scientifically, however, the new edition is a vast improvement over the old. The arrangement of the subject matter, the clearness of the language, the precise statement of definition and theorem, the copious index, and the typography place this work among the best reference text-books on differential equations in German or English.

A. R. CRATHORNE.

*Kreis und Kugel in senkrechter Projektion, für den Unterricht und zum Selbststudium.* Von Dr. OTTO RICHTER. Leipzig und Berlin, Teubner, 1908. x + 187 pp., with 147 figures.

THE author's aim as set forth in the preface is to furnish a supplement to the numerous elementary treatises on descriptive geometry. He proposes to give general solutions of certain fundamental problems which are studied for special cases only in books on descriptive geometry, and to give the student a