

Lie's theory of continuous groups plays such an important part in the elementary problems of the theory of differential equations, and has proved to be such a powerful weapon in the hands of competent mathematicians, that a work on differential equations, of even the most modest scope, appears decidedly incomplete without some account of it. It is to be regretted that Mr. Forsyth has not introduced this theory into his treatise. The introduction of a brief account of Runge's method for numerical integration is a very valuable addition to the third edition. The treatment of the Riccati equation has been modified. The theorem that the cross ratio of any four solutions is constant is demonstrated but not explicitly enunciated, which is much to be regretted. From the point of view of the geometric applications, this is the most important property of the equations of the Riccati type. The theory of total differential equations has been discussed more fully than before, and the treatment on the whole is lucid. The same may be said of the modified treatment adopted by the author for the linear partial differential equations of the first order. A very valuable feature of the book is the list of examples.

E. J. WILCZYNSKI.

*Introduction to Projective Geometry and Its Applications.* By ARNOLD EMCH. New York, John Wiley & Sons, 1905. vii + 267 pp.

To some persons the term projective geometry has come to stand only for that pure science of non-metric relations in space which was founded by von Staudt. To others the original significance of the word, implying an actual projection of one metrical space upon another, still remains essential. The author of this book belongs to the latter class. He starts from metric and descriptive geometry. In the development of the matter treated in the text there is no trace of any kind of purism. Analytic and synthetic methods are everywhere used impartially. The result is a book which will certainly appeal to students of engineering and others who desire to use projective geometry in practical work.

Although there is to be found, especially in the later chapters, much which should interest students of pure mathematics, there are a number of defects which cannot but detract from their enjoyment of the work. These seem to be in a great measure a matter of style. Thus on page 19 we find in italics :