proof. A complete classification of semi-simple Lie groups is given in this way. Among the other topics discussed are compact Lie groups and groups of continuous transformations.

This book should prove of invaluable aid both to the beginner in the field of topological groups and to the more advanced student. While a number of typographical errors were found, they should not prove confusing to an alert reader.

W. T. PUCKETT, JR.

Statistical Methods. By Paul R. Rider. New York, Wiley, 1939. 9+220 pp.

This book has two aims: first, to serve as a textbook for an elementary course in statistics, and second, to help students with some previous knowledge of statistics to gain an insight into the more modern methods. It proceeds from some preliminary development of the classical theory, through such topics as "Student's" distribution, to the various significance tests associated with the χ^2 and Fisher z distributions. The notation of the calculus is used in a number of the formulas. However, so much emphasis is placed on the practical applications of the theory that the statistical worker who uses the book as a laboratory manual will probably not find the mathematical notation disconcerting, no matter what his previous mathematical training may have been.

The classical theory is presented in Chapters I–IV and the first part of Chapter V. Chapters I and II are concerned with the elementary theory of frequency distributions, and with averages and moments. Chapter III contains a discussion of regression, with an exposition of Fisher's method of handling the normal equations in the case of multiple regression. Chapter IV is on simple and multiple correlation, and deals entirely with the observational theory. In Chapter V we find brief descriptive treatments of such topics as the continuous approximation to the binomial distribution, the normal and Gram-Charlier type A distributions, the significance of the difference between two means and two proportions, the significance of correlation coefficients (tested by means of Fisher's logarithmic transformation); and there is also an introduction to the theory of confidence limits. In Chapter VI, we are introduced to "Student's" t distribution which is then applied to appropriate problems, such as testing the significance of regression coefficients. At the beginning of Chapter VII the χ^2 distribution is described, and there follow the usual applications to homogeneity tests, tests of goodness of fit, and contingency tables. Yate's correction for continuity is explained. Chapter VIII, on analysis of variance and covariance, is perhaps the climax of the book. The Fisher z distribution is presented, and is then applied to significance tests in the theory of linear, curvilinear, and multiple regression, and to the analysis of variance within and among classes of single and paired variates. One of the sections of this chapter contains some interesting and hitherto unpublished results by Churchill Eisenhart on absolute criteria in the theory of regression. The last chapter is concerned with Fisher's theory of experimental design, and deals with such topics as randomized blocks, factorial design, and confounding. The book contains tables of the normal distribution and of t, χ^2, and z, and concludes with a good index.

Proofs are given for most of the formulas until the end of Chapter IV. From there on, except for one or two trivial algebraic manipulations, there are no proofs at all. But it is obviously not the purpose of the author to go into such matters, and the references to the literature in this connection are usually adequate. A much more important mathematical criticism of the book is that it is seriously infected by the tradition of vagueness which vitiates so much of the original work on which it is based. For example, although the book is supposed to be suitable for a first course, definitions throughout are given in extremely sketchy form, usually by means of examples. Then too, in a number of cases, which occur both in the early parts of the book and in the later parts, technical statistical terms are used without any explanation or definition at all, it being the apparent intention of the author that the appropriate explanations should be supplied by a teacher. But there is no consistency in these cases; for instance, the terms "mean" and "standard deviation" are defined for observed and continuous distributions, and are then used in a later section without further explanation in connection with the binomial distribution. Certain less elementary concepts, such as statistical independence and degrees of freedom, are never defined, although used repeatedly; and of course no explanation is ever given as to what is meant by the words "population" or "universe." There are a number of loose statements, such as the following one on page 104: "It may be noted that the denominator of (11) is the expected value of the population variance as estimated from the sample." (Expected value had been used in the technical sense previously in the book; and if this statement happens to mean that the population variance is the expected value of the denominator, then it is simply false.) It is also worth mentioning that in the applications of the z-test to the analysis of variance, nothing is ever said as to whether or how the hypothesis of the z distribution as to independence of the estimates of the variance is satisfied.

But from a less rigorous point of view, there are many features in the book which are commendable. Some of these have already been indicated in our description of the contents; but special mention should be made of the fact that every significant piece of theory is illustrated with an illuminating numerical example, and there is a generous number of good exercises at the end of each chapter.

It is the reviewer's personal opinion that the book would be successful in its first aim (as a classroom text for a first course in statistics) only if it were used to supplement a set of lectures by a skillful teacher. But for the more advanced student of statistics who is not entirely familiar with the methods of Fisher and his followers, the book should prove to be a valuable reference work. Comparison is inevitable in this connection with Fisher's well known text, *Statistical Methods for Research Workers*,[1] for Rider covers somewhat the same theoretical ground and will appeal to much the same group of readers. Although there is something to be said for Fisher's omission of almost all mathematical notation when writing for these readers, it seems to the reviewer that wherever there is overlapping between the two books, Rider definitely excels in organization of material and clarity of presentation. This is not meant to imply that Rider should supplant Fisher in the statistical workers' library. Fisher's book contains a great many valuable suggestions, explanations, and warnings (and also dogmatic assertions) concerning experimental technique which are not to be found in Rider. But as a companion volume, and as a sort of translation of some of the more obscure passages in Fisher's book, Rider should immediately find an important place.

J. H. CURTISS

The Mathematical Theory of Huygens' Principle. By B. B. Baker and E. T. Copson. Oxford, Clarendon Press, 1939. 7+155 pp.

This work is the first of a series of monographs planned by the authors on the mathematics of physics. Each monograph is to be complete in itself and deal with some special topic in the theory of the partial differential equations of mathematical physics not adequately treated in existing books.

The aims of the authors are admirably achieved in the first monograph which deals with the mathematical theory of Huygens' principle in the propagation of sound and light waves. The theme of the

[1] Oliver and Boyd, Edinburgh and London.