

had put forward as an alternative to the two-factor theory of Prof. Spearman. From the first page to the last the treatment is remarkably lucid, suggestive, and impartial.

Prof. Thomson claims that his book is written primarily for the reader "with little or no mathematical knowledge beyond what is ordinarily imparted in the secondary school". Nevertheless, even the professional psychologist and statistician will welcome the compendium of formulæ and proofs brought together in the mathematical appendix, and throughout the book will find new light continually shed on old problems. In common with most recent contributors to the subject, Prof. Thomson believes that these problems are best solved by matrix algebra; and, in their abstract form, the solutions reached are, as

a matter of fact, often strikingly similar to results independently obtained by quantum physicists. But, as the present reviewer has more than once pointed out, although these methods were originally developed for the analysis of the results of psychological testing, they would be almost equally applicable to the solution of analogous problems in many other fields—in physiology, biology, sociology, medicine, economics, agriculture and, indeed, in almost any science where causal factors are numerous and inextricably interlinked. The book must at once take its place as one of the most important publications of the year in the field of education and psychology; at the same time it should be of great interest to all who are engaged on statistical research, no matter what their special sphere.

C. B.

TABLES FOR STATISTICIANS

Statistical Tables for Biological Agricultural and Medical Research

By Prof. R. A. Fisher and F. Yates. Pp. viii+90. (London and Edinburgh: Oliver and Boyd, 1938.) 12s. 6d. net.

MODERN statistical analysis, particularly that relating to the production of adequate and exact tests of significance, owes much to the painstaking researches of R. A. Fisher, whose text-book, "Statistical Methods for Research Workers", has gone through a number of editions since it was first published in 1925. Not the least valuable feature of this work is the collection of tables, which have proved so indispensable to the statistical worker of to-day that they have been repeatedly referred to, and in certain cases reprinted, through the generosity of author and publisher. The desirability of having them separately published has been felt in many quarters, and in the volume now before us we have a work in which the tables of Fisher's book have been not only reprinted but also amplified, and many other tables have been added. While not a complete manual of statistical tables, available for all purposes (it is not, for example, very easy to fit a normal curve from the tables provided), the book is a very useful collection, and should be the indispensable companion of every statistician.

The first set of tables consists of those from Fisher's book, considerably extended (especially as to the z -table and its accompanying "variance ratio"), and with two new tables. The second set consists of tables of probits and angular transformations, found useful in medical research. We

then come to a section of non-numerical tables, lists of Latin squares, and combinatorial solutions required for the design of balanced incomplete blocks—a set of tables which should be very useful to the agricultural experimenter. Following this are tables of a more miscellaneous character, including an interesting and useful new table of orthogonal polynomials, which should much simplify the calculations in problems of fitting curves. Finally, to complete the set, we have tables of logarithms, including natural logarithms up to 100, squares, square roots, etc., and tables of certain trigonometric functions. The last is a new table of random numbers.

As an example of mathematical table construction the work is excellent. The printing, spacing and presentation, and the large flat page, are according to the best canons. Where interpolation is necessary, the tables are adequate for the purpose, and the methods to be used are stated. In the case of standard tables, with mean differences, there is the interesting innovation of providing mean differences for half the interval only, thus teaching the user to subtract as well as add, and making for greater accuracy in the final result. The introduction, as is to be expected, has points of originality and interest, and is in itself a worthy piece of mathematical research. While some readers may be disappointed by not having standard uses of the standard tables illustrated, they will on the other hand welcome new statistical tests there described, together with suggested new uses of old tables, and the ways of using effectively the new tables.

J. WISHART.