

For the characterization of arrays, it is assumed that moments and product moments will serve to determine the necessary parameters for a complete characterization of arrays.

One of the most important parts of the book is concerned with estimating the a priori values of correlation coefficients, correlation ratios, and other statistical constants from the corresponding empirical values. In this part of the work, there is given a careful treatment of the sampling problems involved.

Taken as a whole, the reviewer considers that the book is an important contribution to more critical and rigorous thinking on the methods and theory of correlation.

H. L. RIETZ

The Theory of Measurements. By Lucius Tuttle and John Satterly. London, Longmans, Green and Co., 1925. xii+333 pp. \$4.50.

For readers who are acquainted with the book which has the same title as the one now under review and which was published by Tuttle in the year 1916, the following comments will doubtless be adequate. A page by page comparison showed that Chapters I to XX of the later volume are very nearly the same as the entire text of the original book. The changes consist chiefly in the addition of a few diagrams and articles, and in the correction of errors of statement. A new chapter, XXI, deals with applications to biology. It involves (A) frequency problems and (B) illustrations of the use of graphic analysis and mathematical equations in biological investigations. The last chapter, XXII, is devoted to the practical evaluation of plane areas. It includes interesting paragraphs on the hatchet planimeter. The value of the entire book is enhanced by the addition of nearly 500 examples for solution by the student. The appendix of useful numerical tables is preceded by answers to all the quantitative examples. Satterly's collaboration has improved the text very appreciably and the only adverse criticism worthy of note is that the number of typographical errors is sufficiently large to annoy a particular student.

To readers who have not seen the unrevised text the following supplementary statements may be addressed. The object of the book is to train students to criticise the instruments by which their readings are taken, the accuracy of their observations, and the methods on which their observations are planned and by which they are reduced. The first twenty chapters are devoted to weights and measures, angles and circular functions, significant figures, logarithms, small magnitudes, slide rule, graphic representation, graphic analysis, interpolation and extrapolation, coordinates in three dimensions, accuracy, the principle of coincidence, errors and statistical methods, deviation and dispersion, weighting of observations, rejection criteria, indirect measurements, least squares, systematic and constant errors. The book may be used in connection with courses of mathematics as well as for courses in physics, and for this reason the requirements of the mathematician have been especially kept in mind during the preparation of the text. No knowledge of trigonometry is presupposed

and the course is progressively graded in difficulty. The book in its present form is reliable and up to date.

H. S. UHLER

Proceedings of the First International Congress for Applied Mechanics, edited by B. Biezeno and J. M. Burgers. Delft, 1924. xxii+460 pp.

In September, 1922, a conference of scientists from various countries assembled at Innsbruck to discuss questions of hydrodynamics and aerodynamics. At that meeting the idea originated of trying to call together a larger conference to consider questions ranging over the whole domain of applied mechanics. This congress met during April 1924 in Holland at Delft, the seat of the Dutch Technical University. During the conference it was decided to establish a permanent institution called the International Congress for Applied Mechanics, to assemble every fourth year. To get a difference of phase of two years with the International Congress of Mathematics the next meeting (at Zürich) will be held in the autumn of 1926. General matters were left in charge of an International Congress Committee on which the United States is represented by Professor J. S. Ames of Johns Hopkins.

In arranging for the congress at Delft two days were assigned for general meetings devoted to review lectures on subjects in which considerable advance had been made during the last few years. About a dozen topics were selected and a number of prominent scientists invited to treat them. These lectures, somewhat abridged by the editors, occupy the first 176 pages of the *Proceedings*. The remainder of the volume contains original communications divided into three sections, rational mechanics, theory of elasticity, hydro- and aerodynamics. Any attempt to summarize the contents of the nearly 40 papers in this group could hardly be more than a mention of titles. While a few are concerned with graphical methods or reports of experimental work, most of them contain investigations of a mathematical nature.

H. B. PHILLIPS

Introduction à la Gravifique einsteinienne. By Th. de Donder. MÉMORIAL DES SCIENCES MATHÉMATIQUES, No. 8. Paris, Gauthier-Villas, 1925. 56 pp.

This little pamphlet is the first of a series of three by the same author to be published in the same series of semi-popular expositions. The other two will be entitled *Théorie des Champs Gravifiques* and *Quelques Problèmes de la Gravifique*. In the introductory pamphlet now before us the author first presents an excellent development of the generalized theory of relativity. De Donder then applies the general theory to the task of deriving the restricted theory in a novel and most interesting manner. The effect of this treatment upon my own consciousness was quite as stimulating as was, several years ago, the presentation of the definition of an integral before that of a derivative in Osgood's *Funktionentheorie*. I believe that others may find this book equally stimulating.

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