SHORTER NOTICES

Grundbegriffe und Grundprobleme der Korrelationstheorie. By A. A. Tschu-
prow. Leipzig-Berlin, Teubner, 1925. v+153 pp.

This book presents in extended form a series of lectures given in the
insurance seminar of the University of Christiania. The main purpose of
the book is to give a unified treatment of correlation theory with special
reference to the fundamental conceptions and logical foundations of the
theory. It seems to be very properly held that the treatment of the logical
foundations of the method of correlation has not kept pace with the wide
range of applications. The exposition does not proceed from the standpoint
of the analysis of numerical data, but from the standpoint of a priori
probability. The theory of correlation is regarded as an organic part of
the theory of probability. The treatment seems fairly well described as an
idealization of the somewhat empirical concepts of the English school of
statisticians by a sharper formulation of definitions and underlying con-
cepts.

Much is made of an expressive phraseology involving the concepts of
chance variable and stochastic connection. A chance variable of order k
is defined as a variable which takes any one of k values with assigned pro-
babilities. For example, the number that will be thrown with a die in a
single throw is a chance variable. When x is assigned, and y is a correspond-
ing chance variable which takes values with definite probabilities, there is
said to be a stochastic connection between x and y. For example, if in
throwing two dice, the first gives a value $x=3$, then the corresponding
total y for the two dice is $y=4$, 5, 6, 7, 8, or 9, and there is a stochastic
connection between the chance variables x and y. Much is made of the
conception of stochastic dependence as distinguished from the more
familiar conception of the functional dependence of two variables. In
fact, the recognition of a clear distinction between the conceptions of
stochastic connection and functional dependence constitutes a first step in
following the exposition in this book.

The explanation of the stochastic connection of y with x follows the
regression method, and calls for a complete characterization of the theo-
retical array (das bedingte Verteilungsgesetz) of y's for any assigned x.
While this conception is quite an advance over the early Pearson concept
that y is correlated with x when the mean values of the theoretical arrays
of y's are not constant but are functions of x, the author has hardly given
adequate credit to Pearson for a much more general view of correlation
given in DRAPERS' COMPANY RESEARCH MEMOIRS, Biometric Series II
(1905), p. 9. In this more general view we may say that whenever any
characteristic of the theoretical arrays of y's changes from one assigned
value of x to another, there is a stochastic dependence.

For the characterization of arrays, it is assumed that moments and pro-
duct moments will serve to determine the necessary parameters for a com-
plete characterization of arrays.

One of the most important parts of the book is concerned with esti-
mating 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 con-
sist chiefly in the addition of a few diagrams and articles, and in the cor-
rection of errors of statement. A new chapter, XXI, deals with applica-
tions 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 evalua-
tion 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 supple-
mentary 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 observa-
tions 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 rep-
resentation, 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 re-
quirements of the mathematician have been especially kept in mind during
the preparation of the text. No knowledge of trigonometry is presupposed