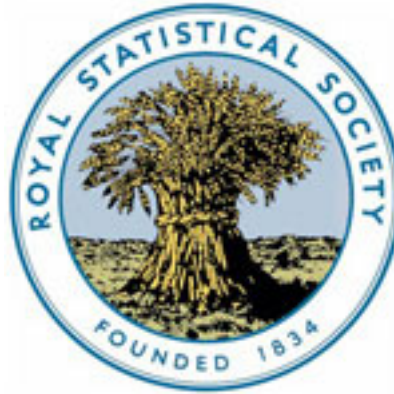


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Theorie und Methoden der Statistik by Al. Kaufmann

Review by: G. U. Y.

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REVIEWS OF STATISTICAL AND ECONOMIC BOOKS.

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1.—*Theorie und Methoden der Statistik*. Von Al. Kaufmann. v + 540 pp., roy. 8vo. Tübingen: J. C. B. Mohr. Price 16 marks.

From the preface by the author, who is Professor of Statistics at the Frauenhochschule and Handelshochschule of St. Petersburg, it appears that this is a translation of his work which originally was published in the Russian language. At the same time the opportunity of translation has been taken to recast and revise some portions of the book, and to introduce more illustrations and examples from fields other than those of Russian practice.

The work is divided into two portions: "The theoretical foundations of the statistical method" and "The practice of social statistics." The first, written, broadly speaking, from the standpoint of Lexis, deals with such matters as the sphere of application of the statistical method, the law of large numbers, the dispersion and stability of statistical series, statistical reasoning and its relation to induction. In the second, the author turns to the practical methods of collecting statistics; the sources of error and the trustworthiness of the data; incomplete or sampling methods; tables, percentages, means, &c., and graphic methods.

In the first part, the author has attempted to give a fairly detailed account of the matters dealt with, comprehensible to the non-mathematical reader. In this somewhat difficult attempt, he has, we think, been fairly successful, but only the non-mathematical reader himself is competent to form a decisive judgment. On some points the explanations as to the conditions assumed seem to the reviewer inadequate. This is notably the case with the theorem respecting the probability of an event, which has succeeded n times without intermission, succeeding at the next trial, and its allies. These are simply stated (pp. 59—60) with a few illustrations, but no hint is given of the method of deduction or the hypotheses on which they are based, and it must be very doubtful how far such half-comprehended statements will be of service. The incidental statement

that the chance of drawing from the pack 13 cards of the same colour is $(\frac{1}{52})^{13}$ needs some emendation as well as explanation (p. 52). On p. 70 the reader may be somewhat confused by finding the "mean error" correctly defined in the text as the square-root of the arithmetic mean of the squares of the deviations, but given in the formula with a $2\sum(\delta^2)$ in the numerator. The same confusion of the term "mittlere Fehler" with the empirical modulus occurs on p. 75. On p. 483, where the definitions are given once more, the nomenclature is again hardly clear. The formula for the mean error is correctly given, but the author a few lines lower remarks that "the mean error (in the form $\sqrt{2\sum(\delta^2)/n}$) in the case of normal dispersion agrees with the modulus." It would surely be clearer to say that the mean error multiplied by $\sqrt{2}$ agrees with the theoretical or combinatorial modulus.

The chief interest of the book to the English reader will lie, we think, in the illustrations of Russian practice in the second part. To some, perhaps, the official use of sampling methods in the author's country will especially appeal (p. 363). Professor Kaufmann himself in 1887-90 had to carry out personally an enquiry into the condition of the peasantry in a district of Siberia. About one-fifth to one-fourth of the villages in each sub-district were subjected to a census, being chosen so as to be as evenly distributed over it as possible: where any portions of a sub-district differed notably in respect, say, of the agricultural conditions, or the occupations, a number of villages were taken in each such portion. The author discusses the admissibility and criterion for the trustworthiness of such "representative" counts, with especial reference to Dr. Bowley's views, and pleads that, owing to the heterogeneity of the aggregate to be observed, the absolute number of the sample is not a sufficient criterion of the trustworthiness, but its proportion to the whole must be taken into account as well. In a sample that is very small relatively to the whole the rarer cases will either not be represented at all or will occur only in very inadequate numbers, and all detail, all the light and shade of the picture, will be lost.

The author's views in reference to mathematical methods are stated with some frequency and emphasised to an extent which seems a little out of place in the text of, as distinct from the Preface or Introduction to, a treatise. That many statisticians are not mathematically expert, and that a book which presupposes very little mathematical knowledge may serve a useful purpose is indisputable. But to attempt, as the author seems to us to attempt, to draw a definite line and to say that methods below that line are non-mathematical and useful, methods above it are "mathematical," of interest only to the mathematician by profession, and of more theoretical than practical value, seems to the reviewer absurd. All statistical methods, *i.e.* methods of handling statistics, are more or less mathematical, and the only question is how far one can go in addressing a given audience. Professor Kaufmann has himself adopted a course hardly consistent with his own expressed views when, in Part I of his book, he has devoted so much space to a mathematical discussion of dispersion, inadequate in so far as he

has compelled himself to assume little mathematical knowledge on the part of his readers, and his views as to the value of English writings do not seem (judging from the references given) to be founded on adequate knowledge.

He ventures to support these views by a quotation from von Bortkewitsch. But von Bortkewitsch neither goes so far as the author, nor does the passage cited have much bearing on the great bulk of recent English work. When Professor Kaufmann says that such methods as those recently developed in this country can only be understood by the "Fachmathematiker," one can only recollect with astonishment the students of social statistics, the medical men and the biologists—hardly Fachmathematiker—who have succeeded in mastering them, and judged their value sufficient to justify the effort.
G.U.Y.

2.—*Die Grundlagen der Schifffahrtsstatistik.* Von Dr. Walther Vogel. (Veröffentlichungen des Instituts für Meereskunde an der Universität Berlin.) x + 154 pp., 8vo. Berlin: Ernst Siegfried, Mittler und Sohn, 1911.

This interesting volume originated with the preparation, for the Museum für Meereskunde at Berlin, of charts showing the development of the German mercantile marine and the movement of shipping at German ports. In order to render these charts, some of which are here reproduced, more intelligible and at the same time to guard, so far as possible, against their misuse, it was thought desirable to prepare a statement as to the bases of shipping statistics, and the result is the volume before us.

It falls into four parts: the first (pp. 1-43) deals with the history of the measurement of ships, and gives a critical account of the various units of measurement; the second (pp. 44-80) provides a description of the materials used in the compilation of shipping statistics and of the modes of collection, and a list of the various national departments concerned therewith, as well as of the "classification" authorities (Bureau Veritas, Lloyds', &c.) which publish such statistics of their own; the third (pp. 81-126) discusses the difficulties in the way of the preparation of satisfactory international comparisons owing to the diversity of systems of measurement and bases of national statistics; and the last part (pp. 127-167) is devoted to a survey (illustrated by the charts above-mentioned and numerous graphs) of the growth of the German mercantile marine and carrying trade from 1874 to 1910. There is a useful short bibliography and, in a slip at the end, a collection of the model forms, &c., in use in Germany.

In the historical sketch there are three points of special interest. One is the manner in which British legislation with respect to the measurement of ships has been accepted as a model by the principal maritime Powers—a fact which led the majority of the Board of Trade Committee of 1906 to regard as altogether undesirable any further change which could not be shown to be absolutely necessary. The principal exceptions are furnished by the administrations of the Suez Canal and the Danube, and by Sweden. A second is the