WILEY

The Mathematical Theory of Probabilities and Its Application to Frequency Curves and Statistical Methods. Volume I. Mathematical Probabilities and Homograde Statistics by Arne Fisher; William Bonyng

Review by: M. G.

Journal of the Royal Statistical Society, Vol. 79, No. 4 (Jul., 1916), pp. 521-523

Published by: [Wiley](#) for the [Royal Statistical Society](#)

Stable URL: <http://www.jstor.org/stable/2341006>

Accessed: 28/06/2014 15:54

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at <http://www.jstor.org/page/info/about/policies/terms.jsp>

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.

Wiley and Royal Statistical Society are collaborating with JSTOR to digitize, preserve and extend access to *Journal of the Royal Statistical Society*.

<http://www.jstor.org>

REVIEWS OF STATISTICAL AND ECONOMIC BOOKS.

CONTENTS :

	PAGE		PAGE
1.— <i>Fisher (Arne)</i> . Mathematical Theory of Probabilities and its Application to Frequency Curves and Statistical Methods	521	7.— <i>Hoffman (Frederick L.)</i> . Mortality from Cancer Throughout the World.....	535
2.—The Declining Birth-Rate, its Causes and Effects	523	8.— <i>Jackman (W. T.)</i> . Development of Transportation in Modern England. 2 Vols.....	536
3.— <i>Thompson (Warren S.)</i> . Population : a Study in Malthusianism	526	9.— <i>Weld (L. D. H.)</i> . The Marketing of Farm Products	538
4.— <i>Smart (William)</i> . Second Thoughts of an Economist.....	528	10.— <i>Benn (Ernest J. P.)</i> . Trade as a Science.....	540
5.— <i>Einaudi (Luigi)</i> . Corso di Scienza della Finanza.....	531	11.— <i>Pratt (E. A.)</i> . Rise of Rail Power in War and Conquest, 1833-1914	541
6.— <i>Melrose (C. J.)</i> . The Data of Economics	533	12.— <i>Babson (Roger W.)</i> . Future of South America. (Illustrated)	542
		13.— <i>Other New Publications</i>	543

1.—*The Mathematical Theory of Probabilities and Its Application to Frequency Curves and Statistical Methods*. By Arne Fisher, F.S.S. Translated and edited from the Author's original Danish notes, with the assistance of William Bonyng, B.A. Volume I. *Mathematical Probabilities and Homograde Statistics*. xx + 171 pp., 8vo. New York : The Macmillan Co., 1915. Price 8s. 6d. net.

Mr. Arne Fisher's object in preparing the treatise of which the first volume lies before us was to place in the hands of students a textbook of mathematical statistics which should include an account of researches published in several European languages, and not fully described in English works, as well as an estimate of the contributions made to statistical science by English and American authors. The present volume contains a discussion of some of the simpler problems in what may be called classical probability with applications of the results to homograde statistics or what we more usually term statistics of attributes.

The first five chapters follow well-worn lines and do not call for special comment. In the sixth the author examines Bayes' theorem and its applications, a discussion which is fuller than any to be found in current textbooks but by no means exhaustive. Mr. Fisher need not have devoted a page and a half to a criticism of the phrase "inverse probability"; nobody capable of understanding Bayes' investigation is at all likely to be misled by the term any more than was De Morgan himself. Upon the whole we agree with Mr. Fisher's conclusions respecting the theorem, but we should need much space

to define our exact measure of agreement. We may, however, remark that the real value of Bayes' principle seems to us to reside in its application to the study of consistency, that is to say to the problem of determining whether two or more samples can properly be regarded as having been derived from one and the same "universe." This aspect of the matter has not engaged Mr. Fisher's attention.

In Chapters seven to nine, Mr. Fisher considers the so-called Law of Large Numbers and various well-known consequences; novelties, so far as English textbooks are concerned, being the use of the method of mathematical expectation in proving the fundamental theorems and the introduction of certain results due to Tchebycheff. Both these novelties are welcome; we agree with the comments of Dr. Anderson, of Petrograd, in a recent issue of *Biometrika*, as to the neglect of mathematical expectation by most English statisticians, while Tchebycheff's work, although familiar to readers of Czuber's textbook, cannot be too well known.

The remainder of the volume is devoted to measures of dispersion and practical illustrations. It is this section which is, in our opinion, most open to criticism, although some of our objections to it may be removed in the second volume. It is, however, worth while to record our reasons for dissenting from some of Mr. Fisher's conclusions.

While admitting that English statisticians are not catholic in their sympathies, we do not think their neglect of the criteria of Lexis and Charlier at all blameworthy because, in our opinion, these criteria are of small practical importance. A given example of the statistics of attributes or, if Mr. Fisher prefers the term, homograde statistics, may exhibit a standard deviation equal to, less than or greater than the standard deviation of type $\sqrt{n p q}$. A comparison of this observed standard deviation with the type form, due regard being paid to the dispersion of the standard deviation itself, gives all the information we can obtain without calculating higher moments and the computation of the coefficients of Lexis or Charlier seems to us a work of supererogation. Further, Mr. Fisher's insistence on these criteria may tempt the unwary to suppose that the three schemata, the Bernoulli, Poisson and Lexis series, are an exhaustive enumeration of the "universes" giving rise to various dispersions. As a matter of fact, divergences of the dispersion from the type $\sqrt{n p q}$ can all be resumed under the form $\sqrt{\{n p q [1 + r (n - 1)]\}}$, of which the three series are particular cases. In an introductory note Mr. Frankland claims for Mr. Fisher's book a wider scope than that of Mr. Yule's *Introduction*, while Mr. Fisher himself complains that Mr. Yule "apparently ignores" the criteria of Lexis and Charlier (the truth is that Mr. Yule cites both these authors). Anyone, however, who compares the masterly handling of the problem in Mr. Yule's thirteenth and fourteenth chapters with Mr. Fisher's discussion will have no doubt that the method adopted by Mr. Yule is not only more economical in its use of symbols but far more general than the

Procrustean efforts of the continental authors, as expounded by Mr. Fisher, to reduce everything to one of three "*Urnenschemata*." A very instructive comparison can be drawn between the illustration from the statistics of coal mining accidents discussed on p. 156 of Mr. Fisher's book and Mr. Yule's treatment of precisely similar statistics (Yule *op. cit.* p. 288).

Passing to minor points, we think the wording of par. 66 on p. 106 is unhappy. The mean error of the sum of two observed variables only takes the form given—as is implicit in the proof—if the variables are strictly independent. The statement in the preface that the English schools have mostly limited their investigations to the field of biology is rather misleading. Mr. Fisher modestly apologises for errors of style or grammar and most of us would be very glad to be able to write Danish as well as he writes English; still the linguistic revision might have been carried a shade further with advantage. We hope the chevalier de Méré was only a *habitué* not a *professional* gamester (in which case, by the way, he would not have been so interested in pure chance), and we are surprised to learn that amateur statisticians have a tendency "to poke upon the law of large numbers." *D'Alembert* appears throughout as *D'Alambert*.

These remarks are not to be taken as implying that Mr. Fisher's book is other than a useful contribution to our literature, and we shall look forward with pleasure to the appearance of the second volume. M.G.

2.—*The Declining Birth-rate, its Causes and Effects* (being the Report of and the chief evidence taken by the National Birth-Rate Commission, instituted with official recognition, by the National Council of Public Morals—for the purpose of Race Regeneration—Spiritual, Moral and Physical). xiv. + 450 pp., 8vo. London: Chapman and Hall, Ltd., 1916. Price 10s. 6d. net.

Everyone will agree that the highly complicated questions involved in a steadily declining birth-rate stand in the first rank of contemporary problems and can only be elucidated by the co-ordination of the results of investigation by competent specialists. The qualifications for such a task are undeniably to be found amongst the members of the Commission whose Report is before us. Vital statistics, upon which the inquiry must be based, may be considered safe, if anywhere, in the hands of Doctors Newsholme, Stevenson and Greenwood. The medical profession, of both sexes, was, from the nature of the case, strongly recruited as to number and also eminence. The religious and moral aspects of the main question involved were under the watchful eye of dignitaries of the Churches of England and Rome, sitting side by side with a distinguished Rabbi, the wife of the General of the Salvation Army, and several well-known representatives of the Free Churches. Nor were economists and those interested in social work, as it is now understood, omitted. Considering that "Commissionitis" is, as it were, endemic in the House of Commons, it is worthy of note that only one Hon. Member is included, but he is a Right Hon.