The book is divided into four sections of which the first and largest comprises twenty accounts of the Pleistocene stratigraphy of natural regions of the United States. This is a storehouse of up-to-date information. If the diligent reader comes to the conclusion that some of the chapters conflict with others in their correlations and the degree of multiplicity which they accord to a multiglacial hypothesis, he should also appreciate that when this state of affairs ceases to exist there will be little need for a book of this sort.

Part 2 is devoted to biogeography and it is to be noted that there are two fundamentally different methods of approach. The chapters devoted to the records of pollen analysis or to Pleistocene mammals exemplify the palaeontologist's concept of using fossils to provide the answers to questions of speciation, extinction, and changes in geographical distribution relative to alteration of climate.

There is another approach: that of the student of living plants and animals, who reconstructs from the disjunct distribution patterns of present-day species and sub-species earlier unbroken areas of occurrence or the existence of biological 'refugia' and puts forward theories of speciation or sub-speciation. The relation of these to the Pleistocene history of glacial advances, pluvial periods and times of aridity obviously must remain speculative in the absence of a fossil record. The chapters on Rocky Mountain plant geography and on insects exemplify the second approach, but there are also several attempts to combine modern distributional studies with the fossil record, such as it is.

Archaeology makes up the third section of the book, understandably the smallest, since America is very much a new world. Claims are made that man may have been for 25,000 years or more in North America, but there is no really firm evidence beyond about 15,000 years. One realizes how important radiocarbon dating has been as a complement to stratigraphy in establishing the antiquity and sequence of cultures, starting with that of the Clovis points and ending in recent history.

The fourth and final group of contributions is "Miscellaneous Studies", and here are discussed a number of fascinating problems the implications of which extend far beyond the United States, as does the choice of evidence used to develop the themes. It is not possible to do more than list the topics, but isotope geochemistry, palaeopedology, volcanic ash chronology, palaeomagnetic stratigraphy, dendrochronology, palaeohydrology, tectonics and changes of sea-level are matters which concern students of the Quaternary the world over.

The book is supplied with abundant references at the end of each chapter, summarized in a final index of about 1,800 authors; illustrations are mainly very good and there are commendably few typographical errors. Its price of £10 in the United Kingdom has only been made possible by generous financial support from the U.S. National Science Foundation and all students of the Quaternary should welcome the chance of acquiring a work which will remain a standard reference for a long time.

F. W. SHOTTON

STATISTICS AND ECONOMICS

Contributions to Statistics

Edited by C. R. Rao. Pp. 528. (New York and London: Pergamon Press; Calcutta: Statistical Publishing Society, 1965.) 120*s*. net.

Essays on Econometrics and Planning

Edited by C. R. Rao. Pp. 354. (New York and London: Pergamon Press; Calcutta: Statistical Publishing Society, 1965.) 100*s*. net.

CONTRIBUTIONS to Statistics and *Essays on Econometrics and Planning* have been produced in honour of the distinguished Indian statistician, Prof. P. C. Mahalanobis, for his seventieth birthday. There are thirty-three papers in the volume on statistics and twenty in that on economics. The contributors consist mainly of people who have worked with Mahalanobis at some time, or who have worked on some of the methods and problems, both theoretical and practical, that Mahalanobis has developed. Some of the papers have been written specially for these volumes, while others are based on papers read at meetings, or have been published elsewhere. The topics cover a wide range, and the standard varies from original research by Kolmogorov to vague generalities by relatively unknown writers.

Contributions to Statistics contains eight papers on experimental design and related topics. These include a paper by Bose on combinatorial properties of partially balanced incomplete block designs, and there are two other papers on this topic; there is an interesting exposition by Finney on screening processes, also a paper on asymptotic regression by workers in Geneva. The eight papers on probability and estimation problems include a paper by Kolmogorov on limit distributions, and one by Rao in which he discusses a new criterion for estimation from large samples. There are also included papers by Linnik and Kallianpur, and one by Tintner on Mahalanobis's generalized distance.

The field to which Mahalanobis has contributed so notably is, of course, in sampling, and this is reflected in the eleven papers on this topic. In a comprehensive paper on the work of Mahalanobis in this field, M. N. Murthy of the Indian Statistical Institute discusses in detail the methods of sampling and reduction and control of error that Mahalanobis devised. The other papers include one by Dalenius on lattice sampling using Lahiri's method, and one by Deming on interpenetrating networks of samples. There are several other papers exemplifying and developing techniques originally conceived by Mahalanobis. There are two papers on sequential quality control and two on fractile analysis, a graphical method for comparing groups developed by Mahalanobis as recently as 1958.

Essays on Econometrics and Planning also contains a varied assortment of papers. It includes a paper by Frisch on a parametric solution of the Hicksian model, and a paper by Stone on his models for demand projections; there is also an interesting paper by Myrdal on underemployment. Georgescu-Roegen discusses the problems of measurement and scale, and there is a note by Wold on the problem of interpretation in multivariate models. Balogh analyses the problem of "Planning in Britain" in relation to the Conservative Government since the Second World War, and Goldsmith has a paper on the "National Balance Sheet of the Soviet Union".

There are six papers in which the particular problems of India are discussed. These include valuable statistical-economic papers by Nair, Patel and Sastry, and one by M. Mukherjee, who discusses in detail the particular contributions of Mahalanobis in a paper entitled "Scientific Approach in Planning". The volume also includes several papers of a very general nature and of rather variable quality on philosophy and the purpose of economics and planning.

Both volumes are prefaced by a foreword by C. D. Deshmukh, a former president of the Indian Statistical Institute, and concluded with a note by the editors on the "Scientific Contributions of Mahalanobis", and a bibliography. We have here an impressive outline of the work of Mahalanobis, from some of his early work on meteorology and anthropometry to the founding of the Indian Statistical Institute in 1931, and the journal *Sankhyā* in 1933, his extensive work on the sampling of crops commencing in 1937, and the development of survey techniques, an important part of which was the institution of the National Sample Survey to provide periodic estimates of social and economic factors affecting the economy of India.

M. A. WALKER