

entitled "Random Eigenvalue Problems", "Wave Propagation in Random Media" and "Branching Processes in Neutron Transport Theory". Each is accompanied by a comprehensive specialized set of references to further literature. The authors of these articles have all made original contributions to their subject, so the exposition is authoritative and leads naturally to the consideration of unsolved problems.

The branches of mathematics most involved in the book are stochastic processes, functional analysis and numerical analysis; and these fields are entered at a relatively advanced level, so that the book is not for the beginner in research but more for the established mathematician who is trying to become up to date in the areas of research under discussion.

L. S. GODDARD

## MARKOV PROCESSES

### Markov Processes and Potential Theory

By R. M. Blumenthal and R. K. Gettoor. Pp. x+313. (Academic Press: New York and London, 1968.) 140s.

THE study of the relationship between Markov processes and potential theory began in the mid-1920s, but the fact that this relationship has a deep probabilistic basis emerged only gradually. The purpose of this book is to give a modern exposition of the subject, much of which is inevitably based on the famous papers (1957-58) by Hunt. The general theme is that various potential-theoretic notions (superharmonic functions, balayage, equilibrium potential, capacity) arise naturally when one investigates Markov processes, and thus have illuminating probabilistic interpretations. To carry out this programme one needs extensive measure-theoretic preliminaries, covered in chapter one. Chapter two deals with excessive functions and exceptional sets, and ends with a brief discussion of how these probabilistic notions are related to those of classical potential theory when the Markov process is Brownian motion; here the reader is expected to be familiar with classical potential theory. Chapters three to five, highly technical, deal with multiplicative and additive functionals, and chapter six includes the relations between capacity and equilibrium potential on the one hand, and hitting probabilities on the other.

This is a specialist monograph which can probably be tackled only by readers who have some previous experience in probability and stochastic processes as well as a good grasp of measure theory, and who are prepared to work through some of the many non-trivial exercises. Its appearance will also certainly be welcomed by workers in this field, who have been referring to its forthcoming appearance for several years.

G. E. H. REUTER

## GLACIAL GEOMORPHOLOGY

### Glacial and Periglacial Geomorphology

By Clifford Embleton and Cuchlaine A. M. King. Pp. xv+608. (Arnold: London, 1968.) 70s.

LANDFORMS have been modified directly or indirectly by the Pleistocene glaciations over a great part of the globe, and the present interplay of erosional and depositional forces is intimately related in its pattern of incidence to that of ice distribution, which is necessarily impermanent. This must never be forgotten during the analysis of existing landforms and the assessment of the nature and rates of operation of the forces currently modifying them. Progress in glaciology is necessarily of interest to the geomorphologist.

During the past twenty years a sustained growth of interest in glaciological research in both field and laboratory has been reflected in the healthy development of the literature. Until now no summary or assessment has

been available in English to workers in related fields. Charlesworth's monumental *Quaternary Era* and Flint's *Glacial and Pleistocene Geology* were published in 1957 and both had a central emphasis on Pleistocene geology and stratigraphy rather than on the nature of the processes at work in glacial erosion and deposition, and the relationships of these to the basic characteristics of glacier ice. *Le Modelé Glaciaire et Nival* by Tricart and Cailleux appeared in 1962, and Lliboutry's very important *Traité de Glaciologie* in 1964-5. These two works covered the general field, but a great gap remained in the English literature. *Glacial and Periglacial Geomorphology* is planned to fill it, and does so in a very acceptable way.

This important book is thorough, scholarly, and well documented. It is pleasantly fitting that the authors are former students of the late W. V. Lewis, who did so much to stimulate glaciological field work and promote cooperation between glaciologists and geomorphologists. Their treatments of the present state of knowledge of glacial and fluvioglacial erosion and deposition, their operations and results, and of periglacial geomorphology, follow a discussion of glaciations and glacial behaviour which occupies the first quarter of the book. It is this section which will bring most in the way of fresh ideas and information to the geomorphologist. There is a reasonable historical slant in the presentation of the literature, but with a proper emphasis on recent work. The particular interests and experience of the authors have helped to determine the detailed cases selected for illustrative treatment, and the book profits from this.

There are obvious difficulties in producing a book covering a wide field and involving the selection of key papers for discussion from an ever-increasing spate. In a few sections length of treatment appears to reflect the bulk of recent work published rather than the inherent importance of the subject. In others, concepts and ideas seem somewhat veiled by factual detail. A rather more prominent discussion of the operation of some of the climatic controls might have interested some readers, and others might feel that an enlargement of the glaciological sections even, if necessary, at the expense of the periglacial geomorphology, which is better covered elsewhere, might have been an advantage. But these are minor criticisms of a stimulating and extremely useful book. After reading it one awaits with all the more interest the geomorphological results which will be forthcoming from the sounding of the Antarctic ice cap from the air, and the publication of work now in hand applying quantitative techniques in geomorphology to glaciated land forms. The authors have revealed that progress in glaciology has recently been more fundamental than in geomorphology, but it may be hoped that appearance of this book will have a stimulating effect on future research.

J. M. GROVE

## Obituaries

### Professor J. E. Harris

JOHN EDWARD HARRIS died in his office in the University of Bristol on July 1, 1968, at the age of 57. He had been professor of zoology for twenty-two years and vice-chancellor of the university for a few weeks short of two years.

He was born in Lincoln and was educated at the City School, Lincoln. In 1928 he went to Christ's College, Cambridge, with an open exhibition to read physics, chemistry and mathematics. He obtained first class honours in the London External General BSc in 1930 and in the Natural Science Tripos Part II in zoology at Cambridge in 1931. In 1936 he obtained a PhD from Cambridge.

His research career began with a Bachelor Research