format of discussion, questions, answers, comments, self-assessment and revision. It incorporates clear diagrams which have been either reproduced from well documented sources, or specifically constructed to illustrate the points under discussion. Each section concludes with a comprehensive list of references and suggestions for further optional reading.

To assimilate the contents of this course without too much difficulty a student would require a basic knowledge of at least two of the major sciences, and in fact would have a considerable advantage if one of these was in the field of geology since there is a distinct imbalance in favour of this subject. However, every effort is made to accommodate the less experienced by punctuating the text with a liberal number of self-assessment exercises. Wherever possible the reader is encouraged to recall and compare different facets, which are in fact interrelated, of an oceanic phenomenon, although previously these might have been treated solely as a particular physical, chemical, or biological event. Indeed, the student should be prepared, for example, to consider such diverse oceanic processes as those that control: the broad eastern boundary currents with their associated regions of coastal upwelling; the balance between oxygen concentration and biological consumption; the rates of production and growth of commercial fish stocks; the sediment accumulation in the deep ocean; and the present legal arguments regarding international straits, artificial installations and marine pollution. Whatever the topic, the information provided is invariably sufficient to enable the reader to gain an insight into the subject which is seldom achieved in the more superficial presentation of many oceanographic text books. The OU team have produced a most commendable script. □

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Isotope geology

Grenville Turner

Lectures in Isotope Geology. Edited by E. Jager and J.C. Hunziker. Pp.329. (Springer: Berlin, Heidelberg and New York, 1979.) DM49.00, US$27.00

THIS book on isotope geology is the outcome of a two-week course of lectures to graduate and postgraduate earth scientists delivered by an international group of scientists at the University of Berne in 1977. It contains 24 chapters and covers topics related to the standard isotope dating methods (Rb-Sr, K-Ar, ^{40}Ar-^{39}Ar, U-Th-Pb and fission tracks) as well as the principles and applications of stable isotope geochemistry. According to the preface and flyleaf it is intended to be an introduction to isotope geology aimed at geologists rather than isotope specialists. My own feeling is that it is not a book to read without some prior knowledge. As a textbook for a course on isotope geology it does not compare at all well with the excellent book by Faure, *Principles of Isotope Geology* (reviewed in *Nature* **272**, 103 (1978)).

In fact, I was rather disappointed by this book. Before reading it I made a mental list of some of the topics in isotope geology which I regard as currently the most exciting. My list included the chronology and early evolution of the Earth's crust, the history of crust and upper mantle evolution based on modern studies of Nd-Sm, Rb-Sr and Pb isotopes, isotopic anomalies in the early Solar System and the chronology of the early Solar System. Apart from a short chapter on Archaean geochronology, an even shorter one on mantle geochemistry, and a discussion of crust and mantle interactions in the chapter on lead geochemistry, these exciting fields are virtually ignored. The contributions to the book are also rather patchy in the sense that 6 of the 24 chapters were of 5 pages or less (the shortest on the now defunct total lead method was 2 pages!). Two authors were particularly guilty in this respect. I feel that the editors should either have rejected some of the contributions or demanded more substantial work. I realise that to construct a coherent whole from a list of 17 contributors is not an easy task. Nevertheless, it is an essential one for a book intended to be used as 'an introductory course'.

This review has emphasised the bad points of the book; like the well known egg it has some parts worthy of consumption and several authors have given worthwhile summaries of particular fields. As a rough but not entirely correct guide, the usefulness of the chapters correlates with their length. Geologists and geochemists entering or already occupying the isotope field will therefore find parts of the book useful. However, considering its high cost I would encourage them to consult a library copy before buying. □

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Cloud physics

J. Latham

A Short Course in Cloud Physics. Second edition. By R.R. Rogers. Pp.248. (Pergamon: Oxford, 1979.) Hardback £14.50; flexi £7.25.

THIS short book is written for postgraduate students entering research in cloud physics. The structure of the book is conventional and logical. The initial chapters are concerned with meteorological thermodynamics. The appropriate thermodynamic laws and equations are first developed for dry air and are then extended to take account of the presence of water vapour. This leads to a discussion of static stability and air parcel buoyancy, which evolves naturally into an account of current understanding of mixing of air masses and theories of convection.

Three chapters are devoted to non-freezing clouds. The elements of homogeneous nucleation of water droplets are presented and then extended to take account of the role of condensation nuclei in the atmosphere. The subsequent growth of stable droplets by vapour diffusion is discussed and attention drawn to recent developments in the molecular kinetics of this phenomenon. The formation of raindrops by the stochastic process of collision and coalescence of cloud droplets is considered. The parallel processes — heterogeneous nucleation, vapour growth and accretion — occurring in clouds containing the ice phase are then discussed. An account is presented of the relative growth rates of precipitation by the coalescence and ice crystal processes.

A chapter is devoted to various properties of precipitation particles. The size distribution of the hydrometeors occurring in natural rainfall and snowfall are discussed. The formation of satellite drops by the processes of aerodynamic breakup of raindrops or the collision of drop pairs is considered, and it is shown how the latter process produces spectra similar to those observed. The aggregation and breakup of snowflakes, and the precipitation rates encountered in various meteorological circumstances are then outlined.

A useful account is presented of the role of radar in meteorology and cloud physics research. A discussion of the basic principles of radar leads to development of the relevant equations linking the received power to the properties of the precipitation scattering the radiation. This chapter concludes with a description of types of radar display and special techniques employed in cloud physics, such as Doppler radar.

Two chapters entitled 'Precipitation