

## Aspects of oceanography

*Introduction to Marine Geology and Geomorphology.* By Cuchlaine A. M. King. Pp. 309. (Edward Arnold: London, 1975.) £9.90.

*Introduction to Physical and Biological Oceanography.* By Cuchlaine A. M. King. Pp. 372 (Edward Arnold: London, June 1975.) Boards £11; Paper £5.50.

OCEANOGRAPHY has progressed in the last decade to an even greater extent than most sciences. This is reflected in the fact that Professor King when preparing a second edition of his well-known textbook *Oceanography for Geographers* found it necessary to divide it into two volumes. The first of these deals with marine geology and geomorphology. The book commences with an introductory chapter, which skimpily covers topics as various as deep-sea sediment sampling, diving, station fixing and ocean resources. It continues with a chapter on the structure of the ocean basins in which rather restricted coverage is given to ocean spreading and plate tectonics. The next two chapters, which deal with the continental margins and the morphology of the open sea are very good and probably the most useful in the book. The fifth chapter deals with deep-sea and near-shore sediments and their rates and mechanisms of formation; there is, regrettably, little on their chemistry.

The book closes with a chapter on the origin of ocean water and changes in sea level; the treatment of the former is extremely perfunctory, and no mention is made of the origin of the dissolved solids which give seawater its special character. In general, although some effort has been made to include recent work, this has been done in a rather unselective way. It is particularly disappointing to find no discussion of the results obtained during the Deep-Sea Drilling Program as this has done so much to revolutionise our ideas on marine geology and sedimentology. Although this book can be recommended for students of geography requiring an introduction to marine geomorphology, it is likely to be of much less value to those seeking background reading in marine geology, because of its superficial treatment of the subject.

The second book is an uneasy union between physical and biological oceanography. It commences with an introductory chapter which does not relate well with the following chapters and the purpose of which is obscure, particularly when related to chapter 8. Then follow chapters on physical oceanography

dealing with the waters of the ocean and their circulation, tides and waves. Much of it is dealt with in a purely descriptive fashion. On the occasions, particularly in chapter 3, when explanations of physical phenomena are offered they are often garbled to such an extent as to suggest a basic lack of understanding on the part of the author (for example, the first complete paragraph on page 141 and the first three paragraphs on page 68 on westward intensification). There are also a number of unjustifiably bold statements of "fact". Thus, the tsunami wavelength (not a well-defined quantity) is stated to be 900 km on page 8 and 160 km on page 9, but surely not in Loch Lomond (page 190). The discussion of the heat budget on page 30, based on work done in 1936, makes no mention of the fact that the individual contributions to it are still not known with any accuracy. On page 33 the impression is given that the only minor elements present in sea water are silver, gold and radium.

The book is out of date in a number of important respects; thus, in chapter 5 the discussion on the observed wind-wave spectrum makes no mention of JONSWAP and the Pierson-Moskowitz spectrum; nor are the currently accepted ideas on longshore and rip currents presented. In many instances important terms are left undefined and even undescribed (for example, PCB, Coriolis force, primary production, and salinity, the latter being only related to chlorinity (itself undefined) by an out of date formula). The text is strewn with minor undefined terms, of which there are six examples in the first paragraph on page 141.

The next two chapters consisting of 94 pages in all, are concerned with biological matters. The first of them deals in a very disjointed way with marine production at all trophic levels. In spite of its key importance primary production is dismissed in about 6 pages. The following chapter deals with the biological exploitation of the ocean, and is primarily a scrappy account of fishing and whaling. The final chapter on "Uses and problems of the oceans", includes subjects as diverse as oceanic pollution, conservation and law of the sea. The author's literary style is an awkward one, and occasionally sentences have to be read several times before they can be understood. Although this book may perhaps be of value for geographers, in the reviewer's opinion it has little to offer to prospective oceanographers or marine biologists, because of its superficiality.

J. P. Riley

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