

ulation densities, fecundity, soil infiltration, etc. lead to the overpowering feeling that the desert is in a bad way. Many of the chapters make for enjoyable reading. I particularly liked Wilshire's account of ORV impacts on desert soils, with a nice blend of science and common sense. Also Brattstrom and Bondello's work on noise effects was both entertaining and instructive — I know of no coastal equivalent to this.

My criticisms are mostly minor. The book is a mite introspective, with many citations to 'grey' publications, theses, etc. making life difficult for interested parties to read-up promising research lines. There is also a tendency to slip into jargon. I became weary of the irritating habit of giving everything requiring more than two words to describe it, an acronym. (I am tempted to give a prize for the first correct solution for unravelling OSHA, dBa, USFS, SPL, BLM, BOR, BOD, TWA (not the airline), CEQ, dBl, APC, CQI, ORV, DOI, and ESP (not psychological). This is the stuff of inter-departmental reports, not of scientific writing.

In summary, this is a good compilation, particularly valuable for those working on similar coastal problems. It is a good example of environmental science at its best.

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Environmental Oceanography,

Tom Beer.

Pergamon Press, Oxford, 1983, 263p.,
106 figures. £6.95.

This book's title and contents are clearly different from the average oceanographic text for undergraduate courses. The author suggests that it should bridge the gap between the pure oceanographic texts concentrating on non-coastal waters, and what he terms "low-level introductory texts." The book is the outcome of post-graduate courses taught by the author in Australia, related to natural resource management. This helps to explain the stance and the contents of the book. The stance is that of explaining oceanographic concepts for potential 'environmental managers' such that the coverage of the volume is probably wider than expected, with a mixture of theory and techniques by which coastal waters and their environmental problems may be understood by non-specialists. The

range of contents is greater than one would expect for undergraduate courses and as such makes the need for such a book unlikely as a central element in most mainstream oceanography, geography, and geology courses.

Chapter 1 is an attempt to define 'coastal oceanography' and to indicate some aspects of its growing importance in terms of the increasing biological/mineral exploitation of coastal waters. The race for exploitation only serves to underline the increasing concern of coastal nations to establish their rights of access, exploitation, and management, though hopefully not in that order.

Chapters on shore processes (Chapter 2) and waves (Chapter 3) are something of a disappointment as subject coverage is patchy and not up to the standard of the later oceanographic work. A number of irritating points are found in these chapters; a fixation with $c = (gd)^{0.5}$ for wave velocity in shallow water without making it clear that its realistic application is far from universal, especially in non-swell dominated seas. A discussion on breaker types is given which is not used in any subsequent mention of the action of waves on beaches, and sections which imply that all sand beaches produce storm bars and all sand bars are storm generated are clearly erroneous. Finally, on/offshore sediment transport is not due solely to wave set up/set down as implied in Chapter 3. More disturbing are the concepts which could be considered as essential for any coastal 'environmental manager' to be aware of, (ranking as important as knowledge of oceanic shelf dynamics) — yet omitted. There is nothing on the central problem of longshore sediment transport on beaches (though this may be forgiven if a strict adherence to chapter headings is to be made). There is no comment on the cause or mechanics of wave generation, nor any indication of temporal/spatial variability of wave climates.

The best chapters are undoubtedly the central five concerning tides (Chapter 4), water composition (Chapter 5), water circulation (Chapter 6), boundary layers (Chapter 7), and oceanic mixing (Chapter 8). These are of recommended value to any non-oceanographer who needs a readable, concise, and pertinent introduction into processes governing oceanic motion. They are well presented with useful informative illustrations and are capable of being understood by most undergraduates. However what 'environmental managers' would be able to do with this type of information is a moot point. In fact the absence of a clear example where this type of information has been used in an environ-

mental impact study is a major omission given the stated purpose of this book.

Coastal meteorology (Chapter 9) makes an unusual but welcomed appearance. It is efficiently outlined, as are the dynamics of estuaries (Chapter 10), though the inclusion of a section on coral reefs in this last chapter must be a reflection of the author's Australian background rather than a judgement on coastal environments at risk world-wide.

The last three chapters are technique orientated; considering the basics of direct and remote sensing (Chapter 11), methods of oceanographic data analysis (most notably time series analysis, Chapter 12), and finally a section on coastal assessment (Chapter 13) using cost-benefit analysis and an ecosystem approach to coastal waters. Each of these chapters tries to cover a substantial area of analytical method, but I do not see how such coverage could be sufficient for the user to make any real headway into the problems indicated.

The author has an idiosyncratic habit of including interesting but probably non-pertinent sections in a number of his chapters. The best of these is his recommended medication for sea-sickness, though on reflection this may be the most useful oceanographic advice for any land-locked environmentalists!

This book is subtitled 'An introduction to coastal waters' and is addressed by the author to both environmental practitioners, in order to provide them "with the necessary skills to communicate with physical oceanographers." and to physical oceanographers, in order to introduce them to "types of problems which interest the wider community." Clearly an ambitious proposal, so does this volume fulfill these two aims? I can see that the first aim is more likely to be fulfilled than is the second, in that the items which the oceanographer is supposedly to be interested in are scarcely developed. The sections on environmental aspects are only briefly outlined and at no point do they match the oceanographic input.

This book is well produced, clearly printed and contains numerous good line diagrams, though the plates are not always well reproduced. There has been good proof reading, only minor misprints (page 40: e.g. 2.1 should be 3.1, page 160: salt particles are scarcely 1 m across, page 244: should sillage read sewage?). There are reasonable wave and oceanographic glossaries plus two appendices concerning SI units and a typical equipment list for oceanographic surveys. Each chapter has its own list of annotated references which tend towards comprehensive book/journal reviews of chapter contents.

In conclusion, I do not think that the author has fully achieved his stated aims. There are more comprehensive texts which approach the environmental issues, likewise there are more comprehensive oceanographic texts. On balance the book is a useful account for non-oceanographers interested in dipping their toes into deeper waters, but insufficient for oceanographers who may want to know more about coastal environmental issues.

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Estuaries and Enclosed Seas,

Edited by B.H. Ketchum.

Elsevier, New York, 1983, 500p.

As volume 26 of the Ecosystems series (edited by D.W. Goodall, CSIRO, Wembley, Western Australia), we have another from a fine stable. Earlier ones have dealt with swamps, deserts, heaths, Mediterranean-type shrublands, and tropical savannas. Of particular interest to coastal specialists was volume 1, *Wet Coastal Ecosystems* (1977).

Color-printed end-papers serve to synthesize the global distribution of the subject matter, in three categories: (a) "Offshore Estuarine Zones" (e.g. Bay of Bengal, Sunda Shelf, Gulf of Alaska, Gulf of Panama, Patagonia, Rio de la Plata, Amazon Mouth, New England, eastern Canada, southern Greenland, Norway, Gulf of Guinea); (b) "Enclosed Seas" (e.g. Baltic, Mediterranean, Gulf of California, East-Asian Seas); and (c) "Other Enclosed Seas" (e.g. Gulf of Mexico, Caribbean, Hudson Bay, Arctic North Sea, and East Indian Seas). From this classification it is evident that the editor is using the chemical definition of estuary as "a body of water in which river water mixes with and measurably dilutes sea water" (citations to Alexander, Rockford, Prichard, Ketchum, and Tully). The standard geomorphological definition of estuary is totally ignored (e.g. Webster's dictionary; or Fairbridge, 1980: p.1-35, In E. Olausson and I. Cato (eds.), *Chemistry and Biogeochemistry of Estuaries*, John Wiley and Sons).

With salinity as one's only basic criterion, the "estuary" can be expanded from a tidal river or lagoon to embrace some marginal seas out to beyond the edge of the continental shelf. Nevertheless, in Chapter 1 the role of tides receives a routine