

on the exploration for mineral deposits reveals a limited familiarity with American, French and British work. Applied geomorphology in coastal environments is even more thinly treated with but a few pages being devoted to coastal engineering, coastal flooding and dune encroachment.

The main strengths of the book lie in its wide ranging demonstration of the use of geomorphology in general and of the fundamental importance of mapping in particular. In this it is superb. Verstappen's *Applied Geomorphology*, like his *Remote Sensing in Geomorphology*, should be in the course bibliographies of every proselytizer of geomorphology and teacher of environmental science and should, of course, be well thumbed by every planner, developer and manager of natural environmental resources, although individuals will not feel inclined to spend eighty-three dollars from their own pockets to buy this book.

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Sandy Beaches as Ecosystems, edited by A. McLachlan and T. Erasmus, 1983, Dr. W. Junk, The Hague, 757p. US\$ 120.00, ISBN 90-6193-77-1.

This volume arose from the First International Symposium on Sandy Beaches held in Port Elizabeth, South Africa in 1983. It has been published as number 19 in the series *Developments in Hydrobiology*. The volume is divided into five main sections covering the physical (13 contributions), chemical (10), ecology (20), ecophysiology and autecology (11) and management (5), plus 18 abstracts. Each of the main sections starts with a review (or partial review) and ends with a workshop report.

The papers are, as with all symposia volumes, a mixed bag. The host country contributions have a tendency to be parochial, the international contributions somewhat general. Much of the subject matter of the latter has been published before.

The physical section is typical. It starts with an idiosyncratic review of nearshore processes by Swart, marred by poor diagrams and a tendency to cite obscure internal reports instead of the correct sources. The review is followed by good papers by Chapman, Bird and Short and Wright on Australian beaches and Aubrey on the American ones, although all are re-hashes of their earlier work. The 'local' papers on crenellate coasts, beach structures and

flow through beaches are based heavily on imported ideas, and offer little that is new. An interesting paper on coastal sediment budget changes following dam construction should have been in the management section, if anywhere. A paper on Holocene coastal changes in The Netherlands appears to have been presented at the wrong meeting. Perhaps the most useful contribution is that by Winter on the relationship between surf zone circulations and diatom populations, although the mathematics are offputting, and perhaps unnecessary. The section is concluded by a 'where-do-we-go-from-here' type summary, that was not worth including.

The chemistry section follows the same basic pattern, although the review is a little more conventional and most of the papers are biased towards ecological processes. Pugh's paper on nutrient cycling is particularly clear and concise, if not very profound, while the two papers by Quinlan and her associates are both enjoyable and of a high standard.

The standout section of the book is undoubtedly the ecology. McLachlan's review is excellent and will be much read by aspiring students of beach ecology. He has made a great effort to mesh physical, chemical, and biological concepts and apply them to sandy beaches. The subsequent 200 pages of ecology range across primary and secondary producers, decomposers and bacteria. Many papers highlight the intimate connections between near-shore communities and their generally hostile environment *e.g.* Lewis and Schaefer on surf plankton, and Woolridge on *Mysis*. It is also clear that much good work is being carried out in South Africa on beach ecology; I particularly liked the papers on shore birds and on kelp.

The ecophysiology section is really a continuation of the preceding ecological one. The final section on management is a disappointment. The papers are not indicative of the state-of-the-art, Clark's review is missing (a summary is provided, seemingly scribbled from notes by one of the audience). Bird's review of global beach changes has, or is, appearing all over the place and the remainder are just disparate examples.

Overall this is an important book. I suspect ecologists will like it for the physical and chemical sections, non-ecologists, like myself, for the ecology. It does however manage to convey a sense of multidisciplinary togetherness, which often eludes this type of volume. I ended up learning a lot from reading it. There are a few typographical errors, but probably less than one might expect from a camera-ready text. Some of the figures are illegible, some photo-

graphs too small. These are minor points for what is a useful book.

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Fish Farming Handbook: Food, Bait, Tropical and Goldfish, edited by E.E. Bron and J.B. Gratzek, 1980, AVI Publishing Company, Inc., 391p. US\$ 39.50, ISBN 0-87055-341-0.

Aquaculture topics have now become a significant proportion of the current world's fisheries literature. To write a comprehensive and up-to-date book on such an important subject to the growing body of aquaculturist is a daunting task. The emphasis given to US aquaculture activity in the present book is a practical one, yet even in the short time since publication, new species have become of interest in the USA, for example, the white sturgeon, *Acipenser transmontanus*. Surprisingly some fish are not given attention, like *Gambusia affinis*, a small viviparous top minnow (used for mosquito control) which suffers from lack of an efficient mass-rearing method, and coolwater fish, like *Muscellunge*, the northern pike and many others.

This book is aimed at . . . 'private and public aquaculturists, and to those interested in fish culture as a hobby or as a large scale operation' . . . to quote from the cover, . . . but only within the limit of the species covered. So assure yourself in advance if the fish you are interested in is described by the authors under the categories: food, bait, tropical or goldfish or is among the 'others' not mentioned.

An opening chapter on Environmental Factors (by R. Reinert) includes diffuse information; a one-page table could be more instructive than this mixture of fish physiology and environmental effects, not many corresponding to readers requirements. A chapter on types of culture methods describes ponds and raceways, mentions cages, but gives no information on aquaria, tanks, and recirculated systems, often an essential part of commercial aquaculture enterprises. When reading about the control of fish populations and vegetation, a novice may be convinced that using chemical methods (11 pages) instead of biological ($\frac{1}{2}$ page) or mechanical methods ($\frac{1}{2}$ page) is best. Such preference is neither justified by its selectivity nor by the economics.

In the methods section, culture techniques for catfish (20 pages), trout and salmon (30 pages), American eel (4 pages), bait (minnows and suckers)

and goldfish (38 pages), and tropical fish (40 pages) are reviewed. This is an essential part of the book, but should serve only as preliminary information for most species.

Nutrition and feeding by R.T. Lovell covers largely the nutrient requirements for catfish, but adds two diet formulations for golden shiner and angle fish, and finishes with a feeding schedule for channel catfish and rainbow trout. Thus the chapter has little correspondence to the important fish species mentioned elsewhere in the book. Most significantly the book neglects entirely live food culture, growing facilities, and methods. In the second, and most extensive part, common fish diseases and their control receive unequal treatment. The range of coverage is enormous and superficial. The reader is expected to learn about a monocular microscope and 50 pages later about the isolation of gram negative bacteria and virus diagnostic procedures on cell culture. Authors very 'generously' supply 4 scanning electron micrographs of the protozoan *Ichthyophthiris multifillis* (2 pages) and 4 SEM (3 pages) of *Costia* and *Chilodonella*, etc., when simple drawings would have done. The part covering prevention and treatment is useful but too short.

The last chapter, Processing and Marketing by E.W. McCoy and M.L. Hopkins is notable for the fact that it neglects to mention at what condition fish should be kept and marketed. Literature is cited after every chapter, so Leitritz and Levis' book is quoted 3 times (page 39, 69, and 209). This seems excessive. As authors state (page 71) . . . 'no one book or any number of books are a substitute for practical knowledge.' On the evidence here, I agree with them.

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Glacial Marine Sedimentation, edited by Bruce F. Molnia, 1983, Plenum Press, New York, 844p. US\$ 67.00, ISBN 0-306-41497-X.

1983 was especially rich in glacial geology books. However this volume is the first one on glacial marine sedimentology. The editor has compiled eighteen papers describing a variety of temporal and spatial settings for glacial marine sedimentation. Many characteristics of Quaternary sediments have been studied allowing regional differentiation between glacial marine environments and their resulting deposits and facies. Some