not. Little reference is made to the pioneering work carried out by the US Army Corps of Engineers and the authors neglect the rudimentary fact that groin emplacement must be attuned to site specific nearshore dynamics. The remaining seven papers, comprising Sessions VII (Structural Form and Materials) and VIII (Cliff Stabilization) are of considerable interest and certainly serve to round off the entire proceedings nicely. Indeed I think that in many past symposia the importance of these aspects of coastal protection have never truly been exploited.

In summary, this is a good compilation, particularly valuable to those concerned with the many aspects of coastal protection in the UK. My only major concern is the obvious lack of attention paid to the many US shore protection schemes. The UK has the prodigious advantage of learning from mistakes made by the US. I recommend *Shoreline Protection* internationally to those working on similar problems on the proviso that they satisfy only their curiosity. By no means do I recommend it as a reference for abating coastal problems. My guess is, you simply will not find too many answers.

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Applied Geomorphology: Geomorphological Surveys for Environmental Development, by H. Th. Verstappen, 1983, Elsevier, 437p. US$ 83.25, ISBN 0-444-42181-5.

Applied Geomorphology is a large book, beautifully printed on glossy paper. Written by one of the world's leading geomorphologists from a lifetime's field and professional experience in Asia, Africa, Europe and South America it is a major work on environmental science. Professor Verstappen is a doyen of the International Institute for Aerial Survey and Earth Science at Enschede, The Netherlands, to which come students from every continent for professional and academic training in cartography, aerial survey, geomorphology, resource planning and development, and from whence go its teachers to carry out contractual and private research likewise in many countries and environments. This book is built not only on Verstappen's own acquired wisdom and knowledge but also on that of his colleagues, students and, as the list of references at the end of each chapter shows, on a very large body of published material from scholars the world over. *Applied Geomorphology* is, then, an international text in its content, scope and application.

Verstappen sees the main application of geomorphology in the fields of geology, pedology, hydrology, vegetation and topographic mapping as these relate to the analysis and development of natural resources, the amelioration of environmental hazards, of rural development and urbanization and in civil engineering. Accordingly his book is subdivided into three sections. In Section A he explores the roles of geomorphology in the acquisition of knowledge about natural environments and resources by the different groups of earth scientists. Geomorphology and appropriate use of the natural environment is tackled in Section B with the foci being upon rural land use, urbanization, mineral resources and engineering. Section C, perhaps the heart of the book, is an illustration and analysis of geomorphological methodologies for use in planned developments. Here, the concept and practice of geomorphological surveys is expounded and then applied to the study of flood and drought susceptibilities, to slope stability and erosion surveys, to violent hazards such as avalanches, volcanic eruptions and earthquakes, and in terrain classification.

Throughout sections A and B, Verstappen is presenting primarily the conceptual and empirical bases for an Applied Geomorphology through a wide range of case studies whilst some appropriate methodologies and techniques are outlined in Section C. The contribution to geomorphology, environmental survey and resource development planning for which both Verstappen and ITC are justifiably renowned lies especially in the mapping of environmental properties and processes from a diversity of remotely sensed imagery and in the field. These emphases are clearly apparent in the book and their utility can be appreciated from the lavish use of air photographs singly, in stereopairs and stereotriplets, many annotated, of thematic and synthetic maps and of ground photographs. These examples and illustrations are drawn from a wide diversity of geographical environments mostly — but not solely —in the developing worlds of Asia, Africa, southern Europe and South America and help to foster in the reader an awareness of the massive problems faced by some societies and their earth scientists.

Some of the applications of geomorphology presented by Professor Verstappen lie outside the mainstream of his research and the work of the I.T.C. and, as a consequence, are handled with less facility than the others. For example the discussion

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 undoubtably 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 nearshore 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 preceeding 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 togtherness, 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 then one might expect from a camera-ready text. Some of the figures are illegible, some photo-