it distills much data that is scattered in various disciplines and because it brings to us some important topics that have not been discussed in any detail in the English literature. The author states that the book was written as a convenient reference for researchers and senior students. Ancillary to the primary goal, Trenhaile wanted to identify deficiencies in our knowledge, and to encourage and facilitate new investigation. Both objectives have been achieved in this new and important work.

Although the subject of this book may seem specialized, it is useful to recall that a large proportion of the world's coasts are rocky. In fact, many 'soft' shores are backed by rock cliffs or underlain by rock platforms. Thus, rock coasts are actually more common than might be initially suspected putting this book on equal footing with works that deal primarily with depositional coastal landforms.

The book, organized into two main parts (I. Processes and II. Landforms) is further divided into eleven chapters that cover Mechanical Wave Erosion, Chemical and Salt Weathering, The Solution of Limestones, Bioerosion and Other Biological Influences, Frost and Related Mechanisms, Mass Movement, Changes in Relative Sea Level, Coastal Cliffs, Shore Platforms, Limestone Coasts, and Some Aspects of Coastal Scenery. Each chapter is well illustrated and documented. It might have been useful if references were listed at the end of each chapter but this probably would have resulted in some redundancy in the citations from chapter to chapter. The bibliography is impressive with more than 1300 references cited. Further, the references are completely cited in proper format making for a truely valuable research volume. The index lists subject and geographical references. Significant discussions of topics are indicted in boldface type providing a means for rapid look-up.

This book is recommended to coastal specialists with interest in hard and soft rock coasts. It will no doubt find its way into senior and graduate-level courses at many universities. With its vast reference list and detailed discussions, many researchers will find it difficult to get along without this new and important text.

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Proceedings of Workshop on Berm Breakwaters (Ottawa, 1987), American Society of Civil Engineers, 278 p, $36.50.

The book includes 13 papers on the design and function of berm breakwaters. Berm breakwaters are mound structures where the outside straight slope has been replaced by a broken line berm slope above M.S.L. The berm is built of material of uniform size and is supposed to adjust itself to the occurring wave action without hurting the general integrity of the structure. Where large rock is hard to get such structure has proven to be economical. The most prominent examples are Helguvik, Iceland, and St. George, Alaska. A few lightly armored mounds were built in Australia.

The papers present various concepts of the berm breakwater including related problems of wave action, some model results, field surveys and practical experiences. There is no example of rational design theory based on hydraulic or wave mechanics principles.

When practicioners, including the PIANC 1976 report, have demonstrated reluctance in accepting the berm design this is mainly a result of uneasiness about letting nature handle the final design. The PIANC "2nd Waves Commission" expresses itself as follows in paragraph 7 of its 1976 published report:

> The Commission has also noted the new ideas that aim at reducing the strength (hence the cost) of rubble mound breakwaters, by letting the waves gradually establish an equilibrium profile of the outer shell, starting from slopes purposely kept too steep at first. The Commission has acknowledged the principle value of these ideas, uniformly distributed (thus obviating the need to sort them out) and the fact that these ideas are valid for seas with limited tide action, where the periods of strongest storms recur without wide variation, from one storm to another, these breakwaters being stable only within a narrow range of periods. It may however, sometimes be advantageous to initially construct a berm profile and vary rock size in accordance with the slope. Moreover, the Commission fears that it would be difficult to use this type of breakwater in some regions, for aesthetic reasons.

Designers principally always tend to avoid any kind of risk involved in a non-conventional concept which they feel has not been thoroughly tested—regardless of an obvious economic advantage. They prefer "yesterday's technology"—and perhaps "just formulas"!! Consequently, it has proven to be difficult to "sell" the berm breakwater. The "from the beginning of stable" S-breakwater is more receptive to them. Its advantages include developed theories (Bruun and Johannesson, 1974, 1976, Kobayashi and Jacobs, 1985) and the same economic advantages as the berm-breakwater (which is its "younger brother"). Its design meets the criticism by the PIANC-1976 report and other oppositions better by its compromising features. An example of an S-breakwater compared to a straight slope breakwater is shown in Brunn *et al.* (1985) for Nome, Alaska. It eliminated the need for large expensive rods.

The stable S-berm breakwater was not the topic of the Ottawa workshop which only has 3 references to it in its literature lists and no reference to PIANC-1976.

The proceedings include much good and useful information and "enthusiasm," without any fully rational handling, but an excellent paper by Dr. Mansard on wave criteria in shoaling waters, and a paper by Ahrens on reef breakwaters. The authors were not concerned with "inertia of human nature." The proceedings have no general conclusion—but just a little step "towards the right" (the stable S) may solve the problem with the unstable berm.

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Tides, Surges, and Mean Sea Level: A Handbook for Engineers and Scientists, by D. T. Pugh, 1987: Wiley, London, 472 pp. $115 plus postage and handling.

The author has a background in geophysics and physical oceanography, but has shown practical aspects of engineering nature including recording and analysis of data of considerable interest. As mentioned in the preface, some of the material in the book was used for education of students with an academic background varying from mathematics to field geology. It is stated by the author in the preface that:

> This range of previous scientific experience inevitably causes difficulties in determining the level of mathematical treatment which should be adopted. In this book, I have tried to keep the mathematics as simple as is consistent with a proper physical explanation, while developing the non-mathematical discussions in an essentially independent yet parallel way. Sections which may be omitted by the non-mathematical reader are marked with an asterisk.

As such, the book is "service-minded" and it does serve a good purpose of bridgebuilding between basics and applied subjects. No similar book on the combined topics exists.

Chapter 1 gives basic overviews ranging from "history" to "basic statistics of tides as time serves." It is followed by Chapter 2 on observations and data reduction covering of tide instrumentation. Satellite altimetry is a new, very important and promising development for defining the sea surface offshore. The same chapter reviews current measurements and the corresponding data reductions.

Chapter 3 on "forces" gives a detailed, but easily understandable, account on tidal forces on the seas by the moon and the sun as well as on the solid earth. Spring and leap tides, diurnal and semi-diurnal tides are explained. Section 3.22 on "the equilibrium tide" explains the equilibrium theory of tides which assumes the free surface to be level under the combined action of earth's gravity and the tidal disturbing forces. A subsection on "the geoid" says: