mensions, including pollution, erosion hazards, loss of biodiversity, and sea level rise. The authors have selected a biogeomorphological perspective and present an understanding of coastal ecological and geomorphological systems in order to improve management and solve coastal problems.

Chapter 1 presents some fundamental characteristics and principles including coastal dynamics, linkages, and sensitivity as a basis for understanding how coastal ecosystems function. A review of human uses and management of the coast provides a context for approaches to the study and solution of coastal problems. In Chapter 2, the authors describe attempts to classify coastal environments and the role of plate tectonics, and Late Quaternary sea level changes. A general, but useful, review of wave dynamics is presented, providing the uninformed reader with an excellent initial exposure to the scientific understanding of these complex processes. The book provides a very limited review of coastal ecology, which would have been greatly improved with further descriptions of controlling factors and ecosystem types. A short discussion of physical disturbances such as storm surges, El Niño, and sea level rise is also provided.

Chapters 3 to 7, which comprise the majority of the book, describe individual coastal features, including sandy coastlines, rocky coasts, wetlands, reefs, and cold coasts. For each chapter the authors have attempted to describe the individual features in reference to geomorphological and biological conditions, significant processes and features, human induced impacts, and management approaches. An excellent feature is the presentation of a series of case studies within each chapter. Although one may question the selection and relevance of some of the case studies, in general they provide specific examples of the range of complex issues that face many coastal environments. A review of the information provided in each of these chapters reveals that for the most part they present a good summary of the current scientific understanding and are very complete.

This book concludes in Chapter 8 with a discussion on attempts to manage coastal problems. However, the topic is given very limited attention, covering only 24 pages (with over one-half for case studies of the Bay of Bengal and the Mediterranean) out of a total of 350 pages in the book. Given that the clear focus of this book on coastal problems is was disappointing to reach the end with a lack of discussion on management as a possible solution. The only management concept introduced is sustainable coastal zone use and management and even it is only given limited discussion. My main criticism of this book is although I was encouraged by the approach, in the end the reader is left unfulfilled. If the intention of the authors was to examine coastal problems then a more detailed review and recommendations concerning management initiatives should have been provided.

In general this book is well-organized and written in such as manner that individuals with limited scientific background will be able to begin to understand some of the basic principles that underlay coastal systems. The presentation could have been improved with the use of a standard format for chapters describing specific coastal systems. The text is supported by an outstanding set of photographs and illustrations which are clear and concise and add immensely to the presentation. The authors and publisher are to be commended in this regard. The reference material is very complete, although I am sure many practitioners would point out important missing material, as I would in regards to rocky coasts. It would have also been very useful to list the references at the end of each chapter, reflecting subject matter, rather then simply at the back of the book. In conclusion, this book would be excellent addition to any undergraduate or introductory course related to coastal environments. The low cost and presentation of information all combine to create a fine introduction to the wide variety of problems that exist in many coastal regions.

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G.M. Friedman, J.E. Sanders and D.C. Kopaska-Merkel, 1992. **Principles of Sedimentary Deposits: Stratigraphy and Sedimentology.** New York: Macmillan 717p. ISBN 0-02-339359-9.

Coastal specialists who have used the earlier volume *Principles of Sedimentology* by Friedman and Sanders (1978) will need no urging to get this volume, a largely reworked update of the earlier one. It has been a time of rapid developments in geology. Plate tectonics, a totally new paradigm for earth science, has called for extensive new thinking in sedimentology. Seismic stratigraphy and the sequence-eustatic theory have revolutionized historical geology. The two together generate a base for a totally new approach to historical paleogeography, and thus to sedimentology. The reluctant acceptance (by the meteorological establishment) of the Milankovitch orbital control of insolation has created an atmosphere that makes the acceptance of extraterrestrial climatic forcing a logical necessity in historical Earth science. Both for convenient data handling and predictive modeling, the personal computer has revolutionized every sedimentological laboratory and office.

So, the time could not to more appropriate for the introduction of a serious top-level textbook, suitable for both advanced students and for every practitioner of the sedimentological disciplines. The authors retain a highly pragmatic classification of the field, partly paleogeographic, partly genetic: (a) intrabasinal, (b) extrabasinal, (c) carbonaceous, and (d) pyroclastic (as explained in chapter 4).

A high point of the volume is the authors' insistence on a historical and humanist approach to problems. The first (1978) version carried 4500 references requiring 200 pages (cited in full, not indecipherably truncated in the style of Science or Nature). This giant list has now been trimmed to somewhat over 1800, occupying 35 pages. The authors take some pride in attempting to adhere to rules of grammar and logic. They claim that sediments are made up of "particles," not necessarily "grains", and thus, for example, prefer a "fine-

textured" sediment and eschew "fine-grained." True enough, but I don't know, as they say in politics, if it will "float."

The volume comprises seventeen chapters, and besides the 35 pages of references, it also carries an invaluable index of 30 pages. A separate glossary is available, on request. The chapters are arranged in five parts, working up from elementary ideas for the beginning students to concepts of increasing complexity. Each chapter concludes with "further readings".

Part I and chapter 1 are introductory and attempt to set up a global perspective, and touch on things like sea-level change, ice ages, and the greenhouse effect.

Part II ranges from particles to rocks, with chapters 2 through 4 treating with sediment types and properties (Chap. 2), diagenesis and lithification (Chap. 3), and finally classification and nomenclature (Chap. 4). Their approach to the latter is logical, that is, descriptive and in general they avoid Grabau's genetic scheme. Nevertheless, a liberal philosophy permits them to add some "genetic interpretations, where they can be reasonably inferred . . . (and) judiciously blended." We are thus encouraged to use turbidite, a clearly genetic inference, but there is no place for tempestite (a storm-generated deposit). We are allowed till, but, curiously, no tillite. Eolian processes are treated but there is no eolianite; nevertheless, its first cousin beachrock gets full attention. Incidentally, although they mention cyanobacteria and algae in contributing to the high pH needed to precipitate the aragonite or high-magnesium cement, they curiously seem to forget the role of solar heating during low-tide stages and the selective leaching out of NaCl and other sea salts during the lithification process (which is achieved in less than a single season). They turn a discrete eye away from the bulky literature on beachrock, generated mainly by physical geographers; much of it is complete nonsense.

Part III is called "From Layers to Sequence—and Seismic Stratigraphy," consisting of two chapters, a brief one on layering (Chap. 5) and a long one on "mesosequence" and up (Chap. 6). The topic of base-level control is critically explored. The classic historical concepts of undathem, clinothem and fondathem are given a little exercise, though, in truth, they rarely get an airing nowadays.

Part IV treats with process and environment in eight chapters. Chap. 7 reviews physical, biological and chemical processes in 48 pages, and does it very well. Chap. 8 outlines the present-day circulation of atmosphere and oceans, including the Mediterranean and euxinic (Black Sea) situation. Figure 8–17, a map of the Mediterranean could have been immensely improved by the addition of five little black arrows for the mouths of the Ebro, Rhone, Po, Danube and Nile, each with the annual (pre-dam) freshwater discharge (with volume in m^3), because paleoclimatic variations of this parameter must be recognized in order to understand a sediment like sapropel. Chaps. 9–14 deal successively with deep-water settings, shelf seas, beaches and barriers, coastal flats, deltas and estuaries, and finally all the non-marine lumped in one (deserts, rivers, lakes and glaciers in 52 pages). In the last series I was sorry not to see a development of the concept of *ephemeral deposition*, so important for the understanding of redbeds (and dinosaur footprints! See p.168). The printer committed the unforgivable "boo-boo" on p. 544 (box 14-3, Figure 1) of printing a nice air photo of the Dead Sea in place of a picture of some Triassic redbed sediments (correctly, in Figure 14–43). The authors use an etymological "bastard" term *peritidal* for coastal areas subject to waves and tides, typically the *Wadden* of the Netherlands (also the *Watten* of the German Frisian Islands, the site of a long-established mud-flat research station, Senckenberg-am-Meer, home of much "Aktuogeologie", unfortunately not even mentioned in this volume.) Ironically enough, the Netherlands Geological Survey, specifically Bob Hageman, named this environment the perimarine area, a term not only with priority, but that is also etymologically correct. Also representative of the perimarine areas are the sabkhas of the Persian Gulf ("sebkhas" in North Africa), which are typical of the subtropics. Incidentally, both Mediterranean and Persian Gulf settings are subject to only minor tidal influences, the rise and fall of the local sea levels being largely the consequence of prevailing or diurnal wind reversal; thus the sedimentation cycles may range from the semidiurnal (land and sea breeze), to the various lunar periods, to the multi-year categories.

Part V takes up large-scale patterns of sedimentary deposits, in three chapters: first, extraterrestrial forcing (an excellent and very unusual inclusion in this sort of text), and next (Chap. 16), the principles of stratigraphy (nice to see this condensed into 32 pages, but really this does not belong here; it calls for a separate textbook). Lastly (Chap. 17) we have "basin analysis," an interesting discussion to wrap up a university lecture course, taking in everything from sea-floor spreading to geosynclines, a historical, almost nostalgic review of its American (Appalachian) underpinning and its European (Alpine) expansion to *flysch* and *molasse*. The last two are subject to discussion, but not much clarification. They are, most certainly, both examples of tectono-sedimentary facies; it could be useful if we had been guided through actualistic models. Somewhat hidden under a misleading headline "Where do sedimentology and stratigraphy stand today? we discover interesting definitions of *mélange*, *wildflysch*, *exotic blocks* (not a word about "sedimentary klippes") and deep-sea trenches. A rather unsatisfactory ending, but nevertheless the whole volume is immensely worthwhile, and much of it is spectacular in quality.

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Karol Rotnicki (ed.), 1995. **Polish Coast: Past, Present and Future.** Fort Lauderdale, Florida: *Journal of Coastal Research*, Special Issue No. 22, 308p. $37.00. ISSN 0749-0208. ISBN 83-902295-6-0.

This volume is an unusual joint production of the Coastal Education and Research Foundation (CERF) and the Association of Polish Geomorphologists. It is printed (excellently)