



BOOK REVIEWS

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Sea Cliffs, Beaches and Coastal Valleys of San Diego County: Some Amazing Histories and Some Horrifying Implications, by Gerald G. Kuhn and Francis P. Shepard, 1984, University of California Press, Berkeley, California, 175p. \$22.50, ISBN 0-520-05118-1.

Shepard and Kuhn's recent work on indurate cliff changes in historical times is a small oasis in a period when coastal geomorphology's chief concern appears, from the literature, to be with the dynamics of depositional coasts. Therefore the arrival of this book, which from the title, suggests a drawing together of much of their work in a regional context, was warmly welcomed on my part. However after reading it (and enjoying it), I am positive that it is more than synthesis of earlier work, as it presents a well stated review of some of the coastal erosion problems (both cliff and beach related) which face southern California.

The book is in two parts. Part I is something of a surprise given the book's title. It shows the nature of climatic change over the "past few centuries" and the way in which dramatic events of high-magnitude storms follow upon volcanic eruptions. The main warning carried in this section is that twentieth century coastal oriented California does not appreciate the havoc and destruction that could occur within the present climatic range. The authors show that despite major storms and floods in the period 1884-1891, the memory of the geomorphic results of such events in the form of mass-movements and cliff and beach changes are quickly forgotten and because the bulk of California's urban growth has been twentieth century, the lost lesson may have to be relearned in a dramatic and catastrophic fashion. One tends to think of the east coast USA as having the dubious prerogative of a coastal Damocles sword hanging overhead in the form of a hurricane threat, yet the authors show that southern California may be also living on borrowed

time: if the Fault doesn't get you then the storms probably will!

Part II is the photographic delight! The authors cover the San Diego County coast from north to south, systematically noting coastal problems as they go. Most problems relate to man siting his urban infrastructure too close to the shoreline. Time-based oblique air-photography and ground photography show the oft slow progressive erosion of cliff and beach as well as the more dramatic effects of infrequent storms. A litany of bad sitage problems whether port, marina, cliff top urban dwellers, vacation homes, roads, recreation facilities and even parts of Scripps Oceanographic Institute show how the scramble for access to the coast has triumphed over the geomorphic problems associated with such sites.

The book is capable of being read by anybody interested in coasts. It shows to the geologist and geomorphologist that the applied side of the subject is a real and vibrant area. It shows to the planner the need for greater geological and geomorphological understanding when dealing with coastal planning, and best of all it can show to the layman the pitfalls of pressing on with coastal development without regard for the range of environmental responses to such activities.

Although in many ways the photos speak for themselves, the book can be read in one sitting. The plates are supported in several instances by maps. The overall presentation is very good. The price is, as always, debatable. Non-USA inhabitants watching a soaring dollar may consider the price too high for what may be regarded as a book of only regional interest. However, its contents transcend the regional viewpoint, as it is a good illustration of problems that may beset many urbanized coastlines. It carries a warning to all countries of the perils of littoral urban expansion, and on that basis should have a wide readership.

I would have no hesitation in recommending a

coastal geomorphologists to browse through it. It should prove more beneficial to coastal students than any number of lectures! To conclude, two points to ponder on: is this the publication path that coastal scientists need to follow in order to publicize their work to the world at large? Secondly, coming from a cool temperate climate, the image of several meters of effective rainfall being washed into the cliffs from suburban garden hoses, is one that will remain with me for a long time!

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Sea Bed Mechanics, by J.F.A. Sleath, 1984, Wiley-Interscience, New York, 335 p. £46.00, ISBN 0-471-89091-X.

John Sleath's new book aims, in the author's own words, to 'study various aspects of the flow near the sea bed: the currents that carry pollutants from one place to another, the dissipation of wave energy, the formation of ripples and dunes, the transport of sediment.' Apart from chapter three on Sediment Properties the remaining five chapters are divided into three sections: Waves Alone, Steady Currents, and Combined Waves and Currents. This approach is rigorously maintained and provides an effective framework for the detailed material.

The first chapter, Basic Wave and Current Theory, briefly deals with choice of wave theory followed by more detailed sections on small amplitude, shallow water, rotational, and numerical solutions. Each section describes the assumption and then quotes formulae for the most useful wave parameters. These formulae are not derived and rarely referenced so that the reader must trust the author and his proof reading. Edge, internal, and breaking waves are treated in a similar manner followed by the wave-induced longshore currents. The second part of this chapter presents a concise summary of standard boundary layer theory with a very brief outline of tidal and ocean currents and the effects of combined flows.

Chapter two, Fluid Velocities and Pressure Near and in the Sea Bed, presents a detailed and up-to-date summary of laminar, transitional and turbulent boundary layers beneath waves, followed by a page on unidirectional boundary layers and a slightly longer section on combined boundary layers. Chapter three, Sediment Properties, provides a

brief summary of standard material on grain size, shape, density, repose, and permeability together with the detail on fall velocities which is required for the sediment transport chapter later in the book.

Chapter four, Bedforms, deals firstly with the qualitative and quantitative description of wave-generated rolling grain and vortex ripples and some of the theories of ripple generation. The standard empirical and quasi-theoretical formulae which describe the full range of unidirectional bedforms are presented, but it is perhaps a pity that the author does not relate the bedforms to their role as roughness elements in preparation for the following chapter. Two pages describe the effect of combined flows on bedform geometry.

Chapter five, Bed Friction, Energy Dissipation, Forces on Bodies on or Near the Bed, is the longest in the book and is again highly abbreviated, yet fairly comprehensive and up-to-date. Formulae are presented which deal with the various forms of wave and current attenuation due to frictional drag and with the lift and drag forces on cylinders and spheres.

Chapter six, Sediment Transport, presents a wide range of formulae for the initiation and bedload and suspended load transport rates of sediment beneath, first, waves, then unidirectional currents and, finally, beneath combined waves and currents. Here, as elsewhere in the book, the author has cleverly re-arranged and tabulated the formulae to express the results in terms of comparable parameters. For example the twenty bedload formulae which are listed in Table 6.1 generally use a mean and critical flow, or discharge or shear stress. The reader may then easily compare the form of the solutions, but is given little guidance as to their respective predictive capabilities.

In conclusion this review must address two questions. Firstly does the book achieve its stated aim and secondly can it be recommended for this or other reasons. I feel that the answer to the first question must be no, because a study of even this limited number of aspects of the benthic boundary layer deserves and requires a much longer book. Such a volume does not, of course, exist and in that sense *Sea Bed Mechanics* comes top of a class of one. The answer to the second question must however, be a strong "yes." This is not a teaching text but many engineers and research scientists require access to a comprehensive list of formulae dealing with these aspects of hydro- and sediment dynamics. If the reader accepts the rigidly structured framework, the bland quotation of equations and