

finally needs to be known as fluctuations of sea-level can lead to variations in the positions of shorelines. Knowledge of the time of photography will thus allow for sea-level fluctuations to be taken into consideration during interpretation of the coastal features.

The second group of problems arises from the dependency of coastal changes with time, for these changes can be of a daily, weekly, monthly, seasonal or annual occurrence. Thus for effective recognition and monitoring of coastal changes, it would be necessary to have aerial photographs that have

been flown at closely spaced time intervals. In view of the expense involved, however, most sequential aerial photographs are only taken at widely spaced time intervals and thus only allow recognition and monitoring of the long-term coastal changes. This aspect does not reduce the usefulness of sequential aerial photographs for it is usually the long-term changes that have an impact on the environment.

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BOOK REVIEWS

The journal and CERF board members may not necessarily agree with all of the statements contained in the following book reviews. These boards can not assume responsibility for the reviewer's assessments of the books that they evaluate.

Modern Concepts of Oceanography (Benchmark Papers in Geology, Volume 61), edited by G.E.R. Deacon and Margaret B. Deacon, 1982, Hutchinson Ross Publishing Company, Stroudsburg, Pennsylvania, 386p. \$46.00, ISBN 0-87933-390-1.

I did not welcome the task of having to review this book for I have always had difficulty in reconciling my own appreciation of what I believed pioneers in Science did for the advancement of their particular discipline with the choice that other people have made for me in compiling such an anthology as we have in *Modern Concepts of Oceanography*. Such "Benchmark Papers" have always rather irritated me. Are they really useful in this day and age? Who selects them and on what criteria? One could go on.

However, coincidentally, I was greatly moved on reading Professor Keith Stewart Thomson's essay on the literature of science in the *American Scientist* (72: 185-187, March/April 1984), which reached me just after I had received this review copy and was puzzling over how to deal with it.

This is not the place to elaborate Thomson's

philosophy — rather to commend it and pass on the encouragement he has given to today's young scientist to answer his question: "What shall I read?" — meaning how may he put his present work into context — by a "want to look back, if not into the murky depths of philosophy of science, at least to the scientific literature of the last fifty years."

So I set about reading *Modern Concepts of Oceanography* from cover to cover, not merely dipping into my own fields of interest, and I must say I enjoyed the experience. As a biologist, I tackled, for example, Longuet-Higgins on "The electrical and magnetic effects of tidal streams" and Cherry and Stovold on "Earth currents in short submarine cables." Overall, despite a few struggles with unfamiliar terminology, I emerged profoundly enriched with a clearer understanding of what "oceanography" is all about.

Such books as this are timeless. We need constant reminders that we are but dwarfs on the shoulders of giants. Our view may seem further, more detailed, and indeed, we may nearly be able to see over the horizon — but what do we owe to those who have gone before? It is a humbling education to take a chapter at random from this collection and trace

the development of an idea, follow its experimental development and revel in its conclusion, appreciating what it meant then and what it continues to mean now set amidst the framework of contemporary marine science. How much worse off would we have been had not such a study been made?

The general topics included are "Stratification in the deep ocean," "Horizontal patchiness and variability," "Variability in sea level," "Variability near the sea bed," "Equatorial undercurrents," "Electrical and magnetic effects," and "The Antarctic." Within each topic a series of papers, up to 10 in the case of "The Antarctic," are reproduced, prefaced by Editor's comments on each. It makes easy reading but there is a challenge to the reader in seeing, particularly for a topic with which he is not specially familiar, whether he agrees with the editorial assessment of its significance and whether it seems to earn its place in the annals of oceanography.

Taking the Antarctic section as an example, the papers range in vintage from 1911 (Brennecke on the oceanographic work of the German Antarctic Expedition) to 1976 (Foster and Carmack on frontal zone mixing and Antarctic bottom water formation). Would biologists agree with the inclusion of Mackintosh's 1946 paper on the natural history of whalebone whales or, especially, of the 1935 study of the phytoplankton of the Bay of Fundy and the Gulf of Maine by Gran and Braarud? Their demonstration that in turbulent waters the phytoplankton is more or less evenly distributed from the surface down and spends part of its time below the optimum light intensity so that photosynthesis and propagation are reduced is highly relevant in explaining, to a large degree, the lack of limitation of phytoplankton growth in the rich waters of the Antarctic Ocean. The transfer of oceanographic principles from one such study far removed in time and space to another illustrates another important aspect of the reappearance of such "benchmark" papers. Today's student may suddenly relate his work to something found long ago. I believe this will be so especially in future work on the krill resources of the Southern Ocean. Hence the inclusion of Mackintosh's review of the natural history and geography of the Antarctic krill, outstanding in its day and apparently untarnished by time, is thoroughly imaginative.

One concludes that each of these papers included in the Deacons's anthology represents, in the words of Rhodes W. Fairbridge, the Series Editor, "the bricks of our scientific edifice" but I commend them, not merely as he has said from a historical viewpoint, but as a stimulus, each one, to the steady pro-

gress of that fascinating multidisciplinary science known as oceanography.

The book deserves to be read widely and will serve for a long time as a memorial to the late Sir George Deacon, truly a Father of Modern Oceanography, and as a tribute to the skill and diligence of his daughter in documenting the advance of her father's beloved science.

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Florida's Sandy Beaches: An Access Guide, by David W. Fischer, 1985, University Presses of Florida, Pensacola, Florida, 218p. ISBN 0-8130-0820-4.

Florida is noted for its sandy beaches and, indeed, the state derives much of its income from tourism. This tourism depends heavily on an understanding of and access to state beaches. Some beaches are easily accessible and well used by the public whereas others, especially in heavily urbanized corridors, are almost inaccessible to the public. This guide admirably fulfills its stated goals of attempting to show where the beaches are, how to get there, and what to expect on arrival. To this end, the author and supporting staff have compiled a useful book that divides the coast into three major geographic areas: east coast, southwest coast, and northwest coast (Florida Panhandle). Each geographic area is subdivided by counties. The coastal counties are highlighted by selected historical anecdotes and other interesting local features.

The oversize format of the book is conveniently suited to portray long narrow coastal stretches. Three maps are used for each county showing planimetric details for orientation, district maps for general routing, and inset maps for urban areas. Accompanying the maps are charts that outline a variety of facilities and environmental conditions that would be of interest to beach users. This supplemental information is perhaps the most useful part of the book as it is certainly an essential consideration for those not familiar with a particular coastal segment that they intend to visit, or not, as the case may be after perusing the maps and charts.

Photographs and illustrations supplement the maps and charts to advantage. Articles of general interest are also provided for the interested reader. Sports fishermen will find tables listing the locations of saltwater fishing piers and other pertinent