Book Reviews

An Annual Survey of Oceanography

Progress in Oceanography. vol. 1. Mary Sears, Ed. Pergamon, London, 1963; Macmillan, New York, 1964. viii + 383 pp. Illus. $15.

The volume is a collection of unrelated articles by experts in several phases of oceanography. It is reminiscent of the editor's earlier volume, *Oceanography,* which contained a collection of invited lectures presented at the International Oceanographic Congress held in New York in 1959. In *Progress in Oceanography,* Mary Sears has attempted to bring together some outstanding articles that are too long for publication in the usual journals but too short for publication as monographs. She is to be congratulated for rescuing some meaningful contributions from the obscurity of manuscript reports or "house" organs. The articles are not of equal quality or uniform general interest, and it may be that the variety of topics is too great for one volume. However, the one article of interest to each kind of oceanographer is worth the purchase price. The enforced association with other aspects of oceanography is a dividend.

"Geological investigation of nearshore sand transport: Examples of methods and problems from the Baltic and North Seas," by Eugene Seibold, is a long and rather rambling account of the author's personal observations in the immediate vicinity of Kiel. The principal study is in the Baltic foreshore region where the tides are small and the fetch is too short for the winds to create sand dunes but adequate to create ripple patterns on the bottom. The geology, mineralogy, and grain size of the sands and their movements are treated exhaustively. Particular attention is given to the orientation of elongate quartz grains in the ripple structure on the shallow bottoms.

The paper may be of interest to the shallow water geologist, but it lacks the organization necessary to hold the interest of those in other areas of oceanography. There are too many filler paragraphs and repetitive statements of the obvious, too much emphasis on difficulties and too many descriptions of hopefully better methods that were not used. There is a notable lack of generalized conclusions with respect to bottom behavior in such situations. Editing and proofreading could have been more stringent.

"The electrification of the atmosphere by particles from bubbles in the sea," by Duncan C. Blanchard, is essentially a Ph.D. thesis, with full detail and discussion of the erudite measurements, procedures, and conclusions.

When a sea-foam bubble breaks, the outer, negatively charged surface collapses and a particle from the inner, positively charged surface is projected at high speed into the atmosphere and becomes aerosol. This phenomenon is suggested as the source of a 160-ampere positive current from the world oceans. There are maxima of the space charge over the oceans in the latitudes of maximum bubbling, which are also the latitudes of maximum convection. Whether the bubbling or the convection is responsible for the distribution of the space charge is discussed thoroughly.

This is the best and most complete article on this topic, which is of interest to both meteorologists and oceanographers concerned with the interaction between air and sea. After completing the thesis in full and wordy detail, it is probable that Blanchard was too exhausted to rewrite it in reduced form for general consumption.

"Suspended organic matter in sea water," by T. R. Parsons, is an orderly, complete, and readable review of the state of knowledge of the subject. Excellent tables define the character and distribution of composition by species and region, and the tables are supported by comprehensive references and intelligent discussion. This paper is suitable for both biological and physical oceanographers.

"The salinity problem," by Roland A. Cox, reviews the origin, history, and use of the terms *chlorinity, salinity,* and *conductivity* as measures of the salt content of sea water. Cox shows that each is a precise definition of a related property but that they are not interchangeable. He proposes that they can be related empirically by reference to *Copenhagen Standard Sea Water.*

This timely, concise, well-written article is readable as well as historically interesting, and the information that it contains is prerequisite for any oceanographer.

"Gulf stream '60," by F. C. Fuglister, contains the data, the cruise procedure, and a discussion of the results of a multiple ship survey. It shows the correspondence between the stream lines, computed from temperature and salinity data, and the current pattern deduced from direct current observations. It also shows that in the northern part of the Gulf Stream the *meanders* are fairly stable features that move some 2 to 4 miles per day.

This is probably the first complete description of a multiple ship survey published in the open literature. It is of considerable value in that it shows how such things are done, what data may be obtained, and how the data are analyzed. The brief, lucid description of the behavior of the Gulf Stream can be appreciated by any marine scientist.

JOHN P. TULLY
Fisheries Research Board of Canada, Pacific Oceanographic Group, Nanaimo, British Columbia

Introductory Textbook

Principles of Astronomy. Stanley P. Wyatt. Allyn and Bacon, Boston, 1964. xii + 561 pp. Illus. $8.95.

This unusual textbook, which is intended for college freshmen, is difficult to evaluate objectively. Stanley Wyatt is a master of exposition—to use his own vernacular, he has the gift of gab. His book abounds in excellent and provocative analogies. I have never read a text in which so many questions are