Commercial fish harvest, like the exploitation of any natural resource, is influenced by many factors, and economic and geographic ones are often more important than the biological potential of the region in question. This is one of the main tenets of the book, and the author stresses it throughout.

There are three sections; the first deals with the physical environment, briefly tells about marine productivity, and surveys the potentials of fish harvest the world over. A chapter on the economically important types of sea fishes is also included here.

The second section treats fishing gear and techniques of fish distribution and storage. Fishing ports and communities are classified, leading into the third section, which is an analysis of world fisheries by regions. Stated criteria of comparison are the stages of technical development, total and per capita production of fish, imports and exports, to name the most essential ones. Despite his stating of these criteria, the author deals essentially with continents or parts of continents as units of discussion. Asia, Africa, Europe, North America, Central and South America, and Australasia are the chapter headings. A short chapter on whaling and one on the changing aspects of fisheries terminate the book.

It is not easy reading, because a wealth of information has been compressed into relatively few pages, and, in spite of a somewhat textbook like style and organization, the reader is often left with abstracting some general principles from the individual chapters.

In certain places one might have liked to see more stress on the historical development of fisheries, and the final chapter especially would have benefited by considerable expansion with a more discoursive summing up than has been given on the relative role of fresh-water and marine fisheries in the food economics of the future.

As a survey of world fisheries, the book is up to date to 1953 and it does fulfill its publisher's claim—that of being comprehensive. Thus it supplements earlier books of this kind, such as Tressler and Lemon's *Marine Products of Commerce,* still outstanding, however, because of its detailed treatment of fisheries technology and information on all kinds of marine products apart from fish.

JOHN E. BARDACH
University of Michigan

Jurassic Geology of the World. William J. Arkell. Hafner, New York, 1956. xv + 806 pp. Illus. $16.50.

William Arkell has been studying the Jurassic and ammonities for a number of years. This impressive work is "the first attempt at a synthesis of one system on the basis of marine faunas in all parts of the world."

The book is divided into eight parts: introduction; western and southern Europe; Africa and Arabia; southern Asia; Australia; north-eastern Asia; America and the Antarctic; and a general survey and conclusions.

Arkell considers the ammonites the best guide fossils of the Jurassic because of their short vertical range, wide horizontal distribution and, in part, their ease of recognition, whereas the pelecypods and gastropods often do not have the first two of these requirements. In nonammonite beds other fossils must be used and, in fresh-water deposits, ostracods look promising. Because of the great extent of Jurassic in western and southern Europe and because of the long-continued study of the system here, this is by far the most detailed part of the book.

Arkell gives his conclusions to his world study of the Jurassic in part VIII. During Jurassic times, the Pacific, the North Atlantic, and Arctic oceans were open, and the Indian Ocean had a barrier from Madagascar to Ceylon and India. The South Atlantic Ocean is not bordered by any known Jurassic. In other words, except for the South Atlantic, all the primordial oceans were open and much as they are today. Arkell rejects the 1911 marine realms or theories of Uhlig and devises for the Jurassic the following: (i) the Lias realm as a universal realm with world-wide distribution; (ii) the Pacific realm starting in the Toarcean, retreating in the Middle Bathonian; (iii) the Boreal realm spreading south from the Lower Callovian, retreating during the Upper Oxfordian, and again readvancing in the Lower Kimeridgian; and (iv) the Tethyan realm, which fluctuated in width throughout the system.

There is some speculation on the Jurassic climate, but except for the emphasis on the lack of known Jurassic icecaps, it adds little to the picture. The most active mobile belt during the Jurassic was around the Pacific, and the Tethys was the east-west mobile belt. Arkell rejects the complicated terminology of Kay for troughs and geosynclines, a step with which I agree. Arkell considers Stille's studies on diastrophism in the light of his (Arkell's) work on the Jurassic and in general finds that his own work supports the ideas of Stille. In connection with diastrophism, he states: "So far as our knowledge goes at present, it does not point to any master plan of universal, periodic, or synchronized orogenic and epeirogenic movements. The events were episodic, not periodic. There was no 'pulse of the earth.'" This last table, No. 28, gives four orogenies and six phases as named diastrophic episodes. A biblography of 116 pages is arranged by regions.

This book ushers in a new approach to world geology as applied to marine faunas. (Similar work was done for Lower Cretaceous floras in 1911.) It represents an immense amount of detailed work. I know of no one who could have done a better piece of work on the Jurassic. This is an important contribution and sets up a very high standard of investigation for others to follow.

The publishers and the printers are also to be complimented—the work is excellent, the maps are readable and clean; the plates are fine-screen; and the type is clear.

E. WILLARD BERRY
Duke University

Miscellaneous Publications

(Inquiries concerning these publications should be addressed, not to Science, *but to the publisher or agency sponsoring the publication.)*

Observations on the Taxonomy, Biology and Ecology of the Engraulid and Clupeid Fishes in the Gulf of Nicoya, Costa Rica. Bull., vol. 1, No. 5. Clifford L. Peterson. 144 pp. *Studies of the Sexual Development and Spawning of Yellowfin Tuna (Neothunnus Macropterus) and Skip-Jack (Katsuwonus Pelamis) in Three Areas of the Eastern Pacific Ocean, by Examination of Gonads.* Bull., vol. 1, No. 6. Milner B. Schaeffer and Craig J. Orange. 69 pp. Inter-American Tropical Tuna Commission, La Jolla, Calif., 1956.

Radiation Field of an Oscillating Dipole–I. Notas de Física, vol. II, No. 11. Erasmo M. Ferreira. 20 pp. *Elastic Scattering of oc-Particles.* Notas de Física, vol. III, No. 1. S. W. MacDowell and J. J. Giambiagi. 4 pp. *Polarization of Spin One Particles by Nuclear Scattering.* Notas de Física, vol. III, No. 2. S. W. MacDowell and J. Tiomno. 14 pp. Centro Brasileiro de Pesquisas Físicas, Rio De Janeiro, 1956.

The Commonwealth Fund, Thirty-Eighth Annual Report for the Year Ending, June 30, 1956. Commonwealth Fund, New York, 1956. 61 pp.

Durability of Concrete. Highway Research Board Bull. 128. National Academy of Sciences–National Research Council, Washington, 1956. 50 pp. $0.90.

Notes on Some Intertidal Coleoptera with Descriptions of the Early Stages (Carabidae, Staphylinidae, Malachiidae). Trans. vol. XII, No. 11. Ian Moore. San Diego Society of Natural History, San Diego, Calif., 1956. 24 pp.

Oak Ridge Institute of Nuclear Studies, Tenth Annual Report. 30 June 1956. Oak Ridge Institute of Nuclear Studies, Oak Ridge, Tenn., 1956. 113 pp.

Unmeasured Hazards. An analysis of the effects of tests of atomic and thermonuclear weapons. World Federation of Scientific Workers, London, 1956. 40 pp. 2s.

John and Mary R. Markel Foundation, 1955–56 Annual Report. The Foundation, New York 17, 1956. 79 pp.