



## UNDERWATER EXPLORATION

'Undersea Frontiers--Exploring by Deep Diving Submarines,' by Gardner Soule, 253 pp., illus., \$6.95, 1968. Rand McNally & Co., New York.

"Today a small group of men are exploring landscapes stranger than the surface of the moon and encountering creatures more startling than the monsters of science fiction." This is a book for the commercial fisherman who has everything but a first-hand acquaintance with recent advances in exploring the ocean depths--and who may be unaware of their great potential for supplying man's present as well as future needs. Much of what is recounted was gleaned personally by the author from actual participants in these illuminating investigations.

The latest developments in design, construction, and operation of submarine vehicles are discussed in detail. The success stories of these vehicles--24 of them--are ranged in alphabetical order from 'Aluminaut' and 'Alvin' to the bathyscape 'Trieste.'

The accounts are accompanied by timely information especially interesting to physical oceanographers and geologists looking for mineral outcrops or bottom deposits that might profitably be "mined." Marine biologists will be interested in the notes on animals observed in the course of dives and deep-sea cruises. These range from fish to jellyfish, and include planktonic organisms, plant and animal.

The book is an encyclopedic review of undersea exploration that can be read by specialists and their families for information and entertainment--or as a series of adventure stories rivaling Jules Verne's fictional "Twenty Thousand Leagues Under the Sea."

--W. L. Schmitt

## FISHES

'The World of Fishes,' by Brian Vesey-FitzGerald, 128 pp., illus., 1968. Pelham Books, London, England. For most of us, knowledge of fishes is confined to catching and eating them. But angling has a much larger and infinitely more dedicated following than any other field sport. This book is not concerned, however, with the catching of fish nor with cooking them. The fishes occupy a special place in natural history. They live in a medium hostile to us, and one about which we know very little. For all but the specialist, water provides an impenetrable barrier.

Mr. Vesey-FitzGerald explains how fish adapt to life in a strange world of widely varying pressures; how they breathe and reproduce, grow and feed; how they find their way about, making migrations as vast as those of birds. This book, not intended for specialists, takes the reader on an underwater journey through a world teeming with fantastic forms of life.

## FISH MIGRATION

'Fish Migration,' by F. R. Harden Jones, illustrated by H. E. Jenner, 325 pp., 86 figs., 38 tables, ref., \$21, 1968. St. Martin's Press, New York. No general account of fish migration has been published in the English language since the appearance of Alexander Meek's book in 1916. In 'Fish Migration,' Dr. Harden Jones has summarized the evidence relating to homing and migration in salmon, eel, herring, cod, and plaice. The sensory channels and behavioral mechanisms involved in homing and migration are considered in the light of available data, which are critically reviewed. There are chapters dealing with biological aspects of fish migration and with methods and techniques used in their study.

The work is illustrated with numerous detailed maps, charts, and diagrams, many taken from British Admiralty, Meteorological Office, or Ordnance Survey maps. It will appeal to graduate students and research workers in universities and institutions of zoology, hydrography, and marine biology throughout the world.

## CRUSTACEA

'Aspects of the Physiology of Crustacea,' by A. P. M. Lockwood, 328 pp., illus., 1967. W. H. Freeman & Co., San Francisco, Calif.

The crustacea have always been a popular group for physiological research because they show such diversity in body form and mode of life. To the practical researcher, they are particularly attractive because many of the more readily obtainable species are amenable to laboratory rearing and, as a rule, tolerate experimental conditions very well.

This is a concise book suitable as a textbook for senior undergraduates and as background reading for postgraduates. In neither group do potential readers usually have much time to devote to a single topic. The book provides an outline of the physiology of the crustacea which can be read at a few sittings and yet give an overall appreciation of the subject. The coverage is general, but special attention has been given to those aspects where the physiology differs from that of other animal groups.

## SEASHELLS

'British Bivalve Seashells,' by Norman Tebble, 212 pp., illus., \$3.50, 1966. British Museum, London, England. This handbook describes and illustrates the shells of bivalve molluscs living in the seas around the British Isles. It should be of use to anyone beginning a study of seashells or marine life--the experienced amateur conchologist and the professional zoologist.

## TUNA

'Distribution of Skipjack in the Pacific Ocean, Based on Records of Incidental Catches by the Japanese Longline Tuna Fishery,' by Makoto Peter Miyake, Bulletin No. 7, Vol. 12, in English and Spanish, pp. 511-608, \$1, 1968. Inter-American Tropical Tuna

Commission, La Jolla, Calif. In recent years, it has been found that some tuna fisheries are operating at levels close to, or over, the maximum sustainable catch. At the same time, the world demand for tuna has been steadily increasing. To meet this demand, without further overfishing particular stocks, it will be necessary to increase the production of other species, and to try harvesting tuna at sizes which produce the maximum yield per recruit.

The skipjack, *Katsuwonus pelamis*, appears to be a species that has not been fully exploited. Extensive surface fisheries exist for it along the coast of the Americas and in waters east and south of Japan. Since skipjack fisheries have been limited thus far to waters relatively close to shore, information on distribution is limited also. The Japanese longline fishery covers almost the entire Pacific, but very few skipjack are caught compared with other species.

All available longline data on skipjack captures in the Pacific by Japanese research vessels (1959-1965), and from incidental skipjack catches by Japanese commercial vessels (1956-1964), are analyzed.

"Early Life History and Spawning of the Albacore, *Thunnus alalunga*, in Hawaiian Waters," by Howard O. Yoshida, Fishery Bulletin, Vol. 67, No. 2, pp. 205-211, 1968. Fish and Wildlife Service, Dept. of the Interior. Available from Branch of Reports, Publications Unit, 1801 N. Moore St., Arlington, Va. 22209.

The albacore in the North Pacific are believed to constitute a single subpopulation, the adults of which support fisheries off the coasts of north America and Japan. The age and growth of adult albacore have been estimated and hypotheses have been developed on their migrations among the fisheries. However, basic information on young albacore before they are recruited into the commercial fisheries is sketchy.

This report treats aspects of the early life history of albacore before their recruitment into the commercial fisheries. Growth in the first year of life is estimated, and inferences are made about the spawning habits of the adults. The juvenile albacore for this study came from the stomachs of billfishes, good collectors of tuna.

The following articles appear in *Fishery Bulletin*, Vol. 67, No. 1, 1968, Fish and Wildlife Service, Dept. of the Interior. Available from Branch of Reports, Publications Unit, 1801 N. Moore St., Arlington, Va. 22209:

'Distribution, Apparent Abundance, and Size Composition of Albacore (*Thunnus alalunga*) taken in the Longline Fishery Based in American Samoa, 1954-65,' by Tamio Otsu, and Ray F. Sumida, pp. 47-69, illus. Before World War II there was almost no longline fishing for tuna in the South Pacific. The fishery began in 1954, when tuna canning began in Pago Pago, American Samoa, with fish delivered by 7 Japanese longliners. A second cannery opened in 1963. By 1965, a 105-vessel fleet was covering about 23 million square kilometers in the central and eastern South Pacific. This paper describes the fishery, gives biological data (size and sex) on albacore, and presents results of some preliminary analyses of the catch rates of albacore as a measure of apparent abundance.

'Micronekton of the Eastern Tropical Pacific Ocean: Family Composition, Distribution, Abundance, and Relations to Tuna,' by Maurice Blackburn, pp. 71-115. To the extent that net hauls sample kinds of micronekton that are important as food for tunas, they can be used to compare quantities of tuna prey in different areas. Because tunas feed on micronekton, a knowledge of its distribution might help to explain the tunas' variable distribution in the eastern tropical Pacific. Comparison of net-caught and tuna-caught micronekton (from tuna stomachs) might be of value in the study of feeding behavior of tunas. Food-chain relations in the ocean have had much physiological and statistical study between the producer and herbivore levels, but comparatively little study has been made between those levels and the carnivore levels. This paper summarizes most of the micronekton data obtained before 1964 in the eastern tropical Pacific and analyzes them in reference to distribution and relation to contents of tuna stomachs.

#### SALMON

'Spawning Areas and Abundance of Chinook Salmon (*Oncorhynchus tshawytscha*) in the Columbia River Basin--Past and Present,' by Leonard A. Fulton, SSR-F No. 571, 26 pp., 1968. Fish and Wildlife Service, Dept. of the Interior. Available free from Branch of Reports, Publications Unit, 1801 N. Moore St., Arlington, Va. 22209.

Chinook salmon formerly spawned in the main stream and in nearly every accessible tributary of the Columbia River. This species is the most important of the area in total population, poundage harvested, and in value to commercial and sport fisheries. The catch declined from 19.5 million kilograms (kg.) in 1883 to an annual average during 1962-66 of about 2.3 million kg. The decline has been attributed to the advance of civilization in the Pacific Northwest. Irrigation, logging, mining, dam construction, and other activities reduced the size and capacity of spawning areas. Resolution of the problems of safely passing migrating salmonids--particularly young downstream migrants--has not kept pace with dam construction in the Columbia River drainage.

To plan research effectively, and to aid management of the remaining runs of Columbia River chinook salmon, it was necessary to review the many reports available on spawning of salmonids. There is a need for published summaries that are comprehensive and cover the entire Columbia River basin. This report on chinook salmon is intended to fill that need.

#### FISH PASSAGE

'Diel Movement and Vertical Distribution of Juvenile Anadromous Fish in Turbine Intakes,' by Clifford W. Long, *Fishery Bulletin*, Vol. 66, No. 3, pp. 599-609, 1968. Fish and Wildlife Service, Dept. of the Interior.

The behavior of fingerling salmonids in turbine intakes, including their time of passage and distribution in the water mass, can profoundly influence development of efficient and economical methods for reducing fish mortality in turbines. The need for fish protection at dams is becoming particularly acute in the Columbia Basin because the progeny of upriver stocks of salmonids soon will be forced to pass through the turbines of 8 to 10 dams to reach the sea.

This paper reports on experiments at two dams on the Columbia River to acquire data on timing and distribution of fingerling salmonids entering turbine intakes.

#### GREAT LAKES

'Plankton Studies in the Largest Great Lakes of the World,' by Charles C. Davis, and 'A Review of Great Lakes Benthos Research,' by E. Bennette Henson, Publication No. 14, 54 pp., illus., 1966. Great Lakes Research Division, Univ. of Michigan, Ann Arbor.

Biological investigation of the St. Lawrence Great Lakes began about 1890 and has continued at an increasing rate, with a distinct upsurge in the past decade. This upsurge is due to a national and regional interest in the lakes as a water resource. It is a resource of such importance that a management program must be effected. Published results of the numerous studies on the lakes are scattered through government reports, scientific journals, notes from industry, sports magazines, and special publications. Drs. Charles Davis and E. Bennette Henson have written these papers in an attempt to review the work in the areas of benthos and plankton, and to compile a complete bibliography.

#### ALASKA

'A Limnological Reconnaissance in Interior Alaska,' by Gene E. Likens and Philip L. Johnson, Research Report 239, 45 pp., illus., 1968. U. S. Army Materiel Command, Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire.

The aquatic environments in arctic and subarctic areas are, for the most part, little known. Numerous data are available on the quantity and chemical quality of river waters in Alaska, but relatively little is known about their biological and physical factors. Very little limnological information is available on the abundant lake habitats. Furthermore, few data are available on the interaction of organisms and these aquatic environments. Yet these ecological features seem to be very important to man's consideration of future use and development of the cold regions.

The physical, chemical, and biological features of river and lake waters are important with regard to sources of potable water, transportation, and industrial development. Understanding these features is also basic to understanding organic production and food supply. A reconnaissance to obtain information about various aquatic habitats in Alaska, particularly lakes, was begun in 1964 and continued in 1965. This report concerns the information gathered on about 40 lakes and other aquatic environments.

'Oceanographic Surveys of Traitors Cove, Revillagigedo Island, Alaska,' by Douglas R. McLain, SSR-F No. 576, 15 pp., illus., 1968. Fish and Wildlife Service, Dept. of the Interior. Available from Branch of Reports, Publications Unit, 1801 N. Moore St., Arlington, Va. 22209.

Pink salmon (*Oncorhynchus gorbuscha*) and chum salmon (*O. keta*) spawn in the gravels of many of the streams of southeastern Alaska. In the spring, the juvenile fish emerge from the gravel and soon migrate downstream to salt water. Their first few weeks in salt water are a critical period in their life cycles. Probably a large portion of the total ocean mortality of these fish takes place during this period.

Relatively little is known of the oceanography of the salt-water areas in southeastern Alaska, where this mortality occurs. The paper describes a study of water temperature, chemistry, and surface currents of such an area--Traitors Cove, a small fiordlike estuary near Ketchikan, in southeastern Alaska.

#### FISH DISEASES

'Diseases of Fishes,' by C. van Duijn, Jr., 2nd edition, 309 pp., illus., \$9.50, 1967. Charles C. Thomas, Springfield, Ill. The new edition of this book dealing with the identification and treatment of fish diseases has been updated and expanded to include new knowledge about therapy and drugs. The 1956 edition was intended for aquarists and pond-keepers. It met with such enthusiasm and approval from professional fish breeders that this new edition includes even more information regarding diseases of economic importance.

#### MARINE MICROORGANISMS

'Microbial Population of Oceans and Seas,' by A. E. Kriss, I. E. Mishustina, I. N. Mitskevich, and E. V. Zemtsova, edited by Gordon E. Fogg, translated by K. Syers, 287 pp., maps, \$16.50, 1967. St. Martin's Press, New York. This survey of the distribution of marine microorganisms could be a starting point for much future investigation into the occurrence and activities of microorganisms responsible for the chemical and biological processes which take place in the ocean.

--Barbara Lundy

