



## MARINE SCIENCE

"Marine Science Affairs--Selecting Priority Programs." Annual Report of the President to the Congress on Marine Resources and Engineering Development, 284 pp., April 1970. Can be obtained from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. \$1.50.

Enactment of Marine Resources and Engineering Development Act of June 17, 1966, increased Federal attention to marine science affairs. In accordance with Act's provisions, the President reports to Congress each year "on the state of the Nation's marine sciences programs, describing the activities and accomplishments of the Federal departments and agencies, evaluating these accomplishments, and setting forth recommendations as to future policies, programs, and funding."

During 1969, the Marine Sciences Council moved from identification of "critical Government-wide marine science issues" to development of priority program to meet U.S. needs. The Report presents these priorities:

--A U.S. policy and grants to encourage States to improve planning and managing of their coastal areas.

--Marine research that is "essential to wise use" of the coastal environment.

--Lake-restoration programs to restore quality of "seriously damaged national waters, including the Great Lakes."

--Arctic environmental research "to permit fuller rational use of the Arctic region."

--The International Decade of Ocean Exploration. This is "a cooperative program with coordinated research, surveys and data sharing leading to mutually beneficial understanding of the world ocean."

--Expansion of program to develop oceanographic and atmospheric buoys for produc-

tive use by several agencies in a broad program.

--Research and development to cut operating costs of merchant ships.

## AQUICULTURE

'Marine Aquiculture,' edited by William J. McNeil. Selected papers from Conference on Marine Aquiculture, Newport, Oregon, May 23, 24, 1968. Corvallis: Oregon State University Press, 1970, 172 pages, \$6.

The book describes the hopes for increasing the yield of cultured marine organisms and the obstacles to achieving this. Ten scientists summarize research in fish nutrition, genetics, and other subjects.

Roy A. Young discusses the projected need for food in the "future overpopulated world." He concentrates on the role controlled populations of marine fish and shellfish might play in meeting this need. James E. Shelbourne reports the progress in marine fish cultivation in Britain. He notes the long period of preliminary work needed to establish hatching and rearing facilities for sole and plaice. But he shows that the results have been encouraging.

Energy costs and nutrition--basic to an aquiculture that progresses beyond the empirical stage--are treated in separate articles by J.R. Brett and J.E. Halver. R.C. Simon emphasizes the opportunities to apply genetic principles to improve cultured stocks. L.R. Donaldson discloses the results of years of selective breeding of trout and salmon. He shows the relatively quick responses that can be obtained in growth and fecundity.

Technology can have an impact on aquiculture. The impact can be accidental--through use or change of resources vital to aquiculture--or can be planned into the culture operations. There are articles on fisheries engineering by Milo Bell and on thermal enrichment by T. A. Gaucher.

The contribution by C.J. Sindermann on diseases in marine aquaculture "raises a flag of warning." Gathering marine animals in concentrations necessary for intensive culture often has resulted in outbreaks of disease. He notes necessity of learning as much as possible about the pathogens.

In "Economic Obstacles to Marine Development," Anthony Scott indicates lack of demand for aquaculture products except luxury items and common carp. He outlines conditions for successful aquaculture operation.

The book is an introduction to marine aquaculture that often probes deeper than introductory phase. The literature cited at the end of each article is useful.

#### SCIENTIST'S WATERY WORLD

Three paperbacks discussing oceanography and ocean charting now are available, reports the books' sponsor, the U. S. Naval Oceanographic Office (NOO):

1. "Science and the Sea, Vol. II" (\$1)
2. "Spheroidal Geodesics, Reference System and Local Geometry" (\$1.75)
3. "The Water Planet" (\$1)

Available from Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

1. "Science and the Sea" has 10 articles; chapter on distribution of discolored waters--how concentrated forms of marine life change oceans from green or blue to brown, red, and yellow. A chapter on geological oceanography deals with undersea rock and sediment structuring. One entitled "Navigational Hints" features information on piloting boats and ships. Another, "Survival at Sea," tells what to do in a mishap. "Collisions--1969" discusses four ship accidents.

Except for chapter on energy of ocean waves, the book was written by NOO personnel.

2. "Spheroidal Geodesics" would appeal primarily to navigators, mathematicians, and

geographers. Geodetics is science of correctly locating objects, including islands and ships, on world's spheroidal surface. Book was written by P. D. Thomas, staff mathematician.

3. "The Water Planet" describes what oceanographers and surveyors do at sea and in their land-based laboratories. Written and edited for NOO as recruitment publication, it has many illustrations.

It is aimed primarily at students and describes scientists' efforts to learn more about the ocean's physical nature--its geology, chemistry, physics, and biology--in a brief, easy-to-understand style.

The book features an illustrated description of efforts by marine biologists to learn how certain species or marine animals use nature-provided sonar systems either to communicate with each other or to locate food in dark waters. It has information on sea floor geology: how ocean surveyors explore invisible rock structures, many covered by water and concealed by sediment mud. It looks into ocean chemistry through a short, illustrated paragraph on the wide variety of minerals that can be found in a cubic mile of ocean water.

It describes ocean-related careers--for example, how engineering techniques have put the scientist in the sea. It tells how to get started in an oceanographic career.

#### FPC BIBLIOGRAPHY

All references to fish protein concentrate (FPC) research for the last 30 years have been compiled in a bibliography by the Library of Congress. The bibliography, sponsored by the BCF National Center for Fish Protein Concentrate, contains 300 abstracted references.

It can be obtained from Clearing House for Federal Scientific and Technical Information, Sills Bldg., 5285 Port Royal Rd., Springfield, Va., 22151, for \$3. A second bibliography covering fishmeal will follow.

## LAW OF SEA

"The Law of the Sea." National Policy Recommendations. Proceedings of the Fourth Annual Conference of the Law of the Sea Institute, June 23-June 26, 1969. The University of Rhode Island, Kingston, R.I. Edited by Lewis M. Alexander, 533 pages, mimeographed. Available from the Institute for \$7.50.

The book contains the following papers and panel discussions:

- 'Our Nation and the Sea: A comment on the Proposed Legal-Political Framework for the Development of Submarine Mineral Resources,' by E.D. Brown

## Regimes of the Deep-Seabed

- 'The Oceans and Foreign Policy: Laissez-Faire or a Stronger National Purpose?' by Victor Basiuk
- 'The Marine Commission's Deep-Seabed Proposals--A Political Analysis,' by Robert L. Friedheim
- 'Oil Interests in the Deep-Seabed,' by Thomas F. Gaskell
- 'Proposed Regimes for Exploration and Exploitation of the Deep-Seabed,' by George Miron
- 'Some Thoughts on an International Regime and Administrative Agency for the Seabed and Ocean Floor Beyond the Limits of National Jurisdiction,' by W. Langeraar

The Continental Shelf. Considerations of the Marine Science Commission Recommendations.

- 'Recommendations on the Limits of the Continental Shelf and Related Matters,' by Ian Brownlie
- 'Limits of National Jurisdiction Over Natural Resources of the Ocean Bottom,' by Hollis D. Hedberg

## Regimes of the Continental Shelf

- 'Some Dimensions of Defense Interest in The Legal Delimitations of the Continental Shelf,' by Norman V. Brechner
- 'The Continental Shelf and the Public Interest,' by Thomas A. Clingan Jr.
- 'An Oceanographer's View of the Law of the Sea,' by K.O. Emery

- 'International and Domestic Managerial Regimes for Coastal, Continental Shelf and Deep-Ocean Mining Activities,' by L.F.E. Goldie

- 'The Seaward Limit of the Continental Shelf,' by Roger Denorme

International Fisheries: Considerations of the Marine Science Commission Recommendations

- 'Marine Science Commission Recommendations on International Fisheries Organizations,' by J.L. Kask
- 'Critique: Fisheries Management Provisions in the Commission Report,' by P.A. Larkin

## International Fisheries Regimes

- 'International Fishery Regimes,' by Donald L. McKernan

## Science and International Organization

- 'Freedom of Scientific Inquiry,' by William L. Sullivan Jr.
- 'International Organizations for Marine Science--An Eclectic Model,' by Daniel S. Cheever
- 'Report on Jurisdictional, Administrative, and Technical Problems Related to the Establishment of California and Other State Coastal and Offshore Boundaries,' by F.J. Hortig

## Ocean Strategy for U.S.

- 'The Ocean Regime of the Real World,' by Wilbert M. Chapman

## Contributed Papers

- 'A Framework Towards a Seabed Regime,' by L.R. Heselton Jr.
- 'The United States, Chile, Ecuador and Peru: Some Reflections on the 1969 Report of the Commission on Marine Science, Engineering and Resources,' by Thomas Wolff
- 'The Malta Plan and the United Nations,' by Eugene Brooks
- 'Applications of Mathematical Economics in Marine Resources Research,' by Clifford S. Russell

THE FOLLOWING PUBLICATIONS OF THE DEPARTMENT OF INTERIOR, FISH & WILDLIFE SERVICE, ARE AVAILABLE FROM DIVISION OF PUBLICATIONS, BCF, 801 N. MOORE ST., ARLINGTON, VIRGINIA 2209:

#### LAKE ERIE

"A Brief History of Commercial Fishing on Lake Erie," by V.C. Applegate and H.D. Van Meter, Fishery Leaflet 630, pp. 1-27, April 1970.

"Salient features of the development of the industry from about 1815 to 1968, changes in fishing gears and methods, changes in the kinds and abundance of fishes caught, and the attendant effects of disappearing species on the stability of the fishery are described. The history and present status of the walleye, yellow perch, and eight other fishes, still taken in commercial quantities, are presented in more detail and are considered in the context of their effect on the current moribund state of the U.S. fishery. Past and present contributions of Lake Erie's tributaries and northerly connecting waters to the fishery are outlined briefly. The 'outlook' for the fishery under present conditions of selective over-fishing for high-value species, excessive pollution, ineffective and uncoordinated regulation, and antiquated methods of handling, processing, and marketing fish are discussed, and possible solutions to these problems are suggested."

#### MOTION PICTURES

'Fishery Motion Pictures,' Fishery Leaflet 629, pp. 1-28, May 1970. Leaflet lists commercial fishery motion pictures produced and distributed by BCF. It tells how to borrow prints without charge (except return postage).

BCF films provide conservation education, consumer information, and technical training. Each year millions of persons see the films in classrooms, on TV, in civic and religious programs, at sportsmen's meetings. The films also stimulate demand for U.S.-produced fishery products.

#### FWS PUBLICATIONS

Fishery Leaflet Nos. 597 and 628 are listings of available fishery bulletins of the U.S. Fish and Wildlife Service.

Fishery Bulletins are technical reports on scientific investigations of fishery biology.

#### SCREENING FISH

"Diversion and Collection of Juvenile Fish with Traveling Screens," by Daniel W. Bates, Fishery Leaflet 633, pp. 1-6, March 1970.

"A horizontal traveling screen, suitable for screening fish or debris from powerplant water intakes or irrigation diversions, was designed and operated by the Bureau of Commercial Fisheries during 1965-69. The structure consisted of a vertically hung, endless belt of wire-cloth screen panels, flush with the face of the water intake structure or at an angle to the direction of flow.

"Field tests in different water approach velocities, with the screen traveling at various rates, proved that such a facility can be operated efficiently. The horizontal traveling screen . . . should contribute materially to the development of an efficient, relatively low-cost diversion facility for fish and debris."

Mr. Bates states that biologists and engineers have been trying for many years to develop an efficient method to safeguard juvenile fish exposed to hydroelectric or irrigation developments in rivers. They studied the possibility of deflecting these migrating fish from their normal paths to alternate routes. Numerous methods were examined: bands of rising bubbles, curtains of hanging chains, electrical stimuli, lights, louvers, sound, and water jets. These methods were never completely reliable.

In 1965, a new approach promised to overcome disadvantages of fish-guiding or deflection devices. Development of the horizontal traveling screen provided many practical solutions to the problems of fish diversion. The leaflet lists its advantages.

Large illustrations tell the brief story.

