New NMFS Scientific Reports Published

Some publications listed below may be sold by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Copies of all are sold by the National Technical Information Service, Springfield, VA 22151. Writing to either agency prior to ordering is advisable to determine availability and price (prices may change and prepayment is required).

NOAA Technical Report NMFS 32. Draxler, A. F. J., A. Matte, R. Waldhauer, and J. E. O'Reilly. **"Nutrient distributions for Georges Bank and adjacent waters in 1979."** July 1985, iii + 34 p., 32 figs., 2 tables.

ABSTRACT

In this report we describe the temporal and spatial distribution of inorganic nutrients over Georges Bank and in adjacent waters and discuss major features with respect to the nutrient environments of phytoplankton. Nitrate and orthophosphorus were rapidly depleted from the surface layer of much of the study area in spring, but major differences were found between the shallow areas on Georges Bank and the surrounding stratified waters. In the "well-mixed" area of Georges Bank, the depletion encompassed the entire water column and ammonium became the dominant form of inorganic nitrogen throughout. Dissolved silicon was depleted slowly over central Georges Bank, reaching a minimum concentration in September while orthophosphorus gradually increased during the summer. The nutrient environment of phytoplankton over central Georges Bank may be described as vertically uniform but temporally changing in the relative availability of the various nutrients. In areas that undergo stratification (e.g., the central Gulf of Maine), a quasi-steady state was established as the surface water layer formed, consisting of declining nutrient gradients from below the euphotic layer to the top of the water column. These intergrading nutrient environments are relatively stable through time. Destratification reintroduced nutrients to depleted areas beginning in October; however, dissolved silicon was again depleted over shallow Georges Bank in late autumn though nitrate remained abundant. Slope water has been found to enter the bottom layer of the Gulf of Maine via the Northeast Channel. High nutrient concentrations observed in the bottom water of the Northeast Channel are consistent with this mechanism being the nutrient source for the Gulf of Maine.

NOAA Technical Report NMFS 33. Serafy, D. Keith, and F. Julian Fell. **"Marine flora and fauna of the northeastern United States. Echinodermata: Echinoidea."** September 1985, iii + 27 p., 42 figs.

ABSTRACT

The echinoid fauna from littoral to abyssal depths off the northeastern United States (Cape Hatteras, N.C., to northern Nova Scotia) comprises 31 species, in 26 genera and 19 families. An introduction to the external morphology, distribution, and natural history is given along with an illustrated key to the species, an annotated systematic list, and an index. The fauna includes 17 species with wide-ranging distributions on continental slopes or abyssal plains. The remaining 14 species occur in shallower waters on the continental shelf or upper slope. Of these, eight are tropical in distribution with their northern range extending to the northeastern United States and three are mainly boreal with the northeastern United States at the southern limit of their range. Two species occur only off the eastern United States and one species is cosmopolitan.

NOAA Technical Report NMFS 34. Garrick, J. A. F. **"Additions to a revision of the shark genus *Carcharhinus:* Synonymy of *Aprionodon* and *Hypoprion*, and description of a new species of *Carcharhinus* (Carcharhinidae)."** November 1985, iii + 26 p., 14 figs., 4 tables.

ABSTRACT

Features of the valid nominal species of *Aprionodon* Gill (*isodon* Valenciennes) and *Hypoprion* Müller and Henle (*hemiodon* Valenciennes, *macloti* Müller and Henle, and *signatus* Poey), plus those of a previously unrecognized species here described as *Carcharhinus leiodon* n.sp., are examined and compared with those of *Carcharhinus* Blainville. Features studied include morphometrics, vertebral numbers and other vertebral characteristics, tooth numbers, color pattern, and some other aspects of external morphology. It is concluded that on these features *C. leiodon* n.sp. is entirely encompassed within the parameters of *Carcharhinus*, and that, although *A. isodon*, *H. hemiodon*, *H. macloti*, and *H. signatus* each extend the range of diversity of *Carcharhinus* in one or more features, *A. isodon* is not uniquely dif-

Omega-3 and Human Health

Considerable research has been done in recent years on the relationship between various fatty acids and certain human diseases. Maurice E. Stansby, a scientific consultant with the NMFS Northwest and Alaska Fisheries Center reviews and discusses the highlights of much of this research in **"Medical Effects of Fish or Fish Oil in the Diet,"** NWAFC Processed Report 85-17. This is an updating of the author's longer 1969 article on "Nutritional Properties of Fish Oils." While that article dealt more with nutrition for animals, this new report discusses and updates the medical effects of ingestion of fish oils on human subjects without repeating the more general topics included in the earlier paper.

Stansby notes that the research indicates the beneficial effects of fish oils on heart disease, but that its effects on other types of disorders, such as inflammation diseases, etc., are still imperfectly understood. Much research remains to be done, he points out, to fully understand how fish oils, particularly the long-chain omega-3 fatty acids, help to lower the incidence of heart disease and whether they do indeed have beneficial effects on other human health problems. Further information on this report is available from the author at the Northwest and Alaska Fisheries Center, 7600 Sand Point Way N.E., Bin C15700, Seattle, WA 98115.

ferent from *Carcharhinus*, and there is no common pattern of difference between the three species of *Hypoprion* and *Carcharhinus*. Accordingly, and because the nature of the teeth of *Aprionodon* and *Hypoprion* has been found insufficient to warrant generic distinction from *Carcharhinus*, the genera *Aprionodon* and *Hypoprion* are synonymised with *Carcharhinus*.

A diagnosis and description are given for each of the above species. The descriptions include measurements, counts, and line illustrations that show the whole shark in lateral view, underside of head, nostril, and teeth. The geographic distribution is summarized, as are also the meager biological data available on number of embryos, size at birth, size at sexual maturity, and maximum size.

NOAA Technical Report NMFS 35. Butler, Philip A. **"Synoptic review of the literature on the southern oyster drill *Thais haemastoma floridana*."** November 1985, iii + 9 p.

ABSTRACT

This literature search identifies a majority of the publications in the period 1880-1980 concerned with the marine gastropod, *Thais haemastoma floridana* (Conrad). The southern oyster drill is an economically important oyster predator in the western Atlantic and Gulf of Mexico littoral. Major contributions of each paper to our knowledge of the drill's biology are briefly categorized. Hitherto unpublished research by the author on the snail's biology is documented.

Research on and Culture of Freshwater Crayfish

"Freshwater Crayfish V," edited by Charles R. Goldman and published by the AVI Publishing Company, Inc., Westport, CT 06881, P.O. Box 831, presents the papers from the Fifth International Symposium on Freshwater Crayfish held in Davis, Calif., in 1981. In it is initiated the annual Sture Abrahamsson Memorial Lecture, this being Per Brink's account of the late ecologist's approach to dealing with Sweden's loss of *Astacus astacus*, including a review of Mr. Abrahamsson's work and the development of systems for crayfish culture which culminated in replacing the plague-stricken indigenous crayfish stocks successfully with an exotic species, *Pacifastacus leniusculus*.

Following that are nearly 60 reviewed papers divided into eight sections: General crayfish biology and physiology, acidification problems of crayfish, cation physiology of crayfish, ecology of crayfish, pathology and toxicology of crayfish, crayfish production problems, Soviet crayfish studies, and several "descriptive papers" on various research methods, Spanish crawfish farming, rearing young *P. leniusculus* in Poland, and others.

As with other Congresses, this one presents an excellent and wide range of research papers, both basic and applied, on a variety of crayfish species in many nations. Thus the papers range from a review of selected Lithuanian literature on crawfish studies to discussions of sexual dimorphism and condition index in *A. astacus*, and to the reproductive cycle of *A. astacus*, responses of crawfish to acid stress, differences in the trapability, locomotion, and diel activity patterns of *A. astacus* and *P. leniusculus*, ecological studies of various species, effects of several pesticides and herbicides on *P. clarkii*, production problems in crawfish culture, and more. Hardbound, the 569-page volume is available from the publisher for $35.00.

Also recently available is **"The Crayfish: Its Nature and Nurture"** by Roy E. Groves, which was published by Fishing News Books Ltd., 1 Long Garden Walk, Farnham, Surrey, England GU9 7HX. This small handbook is written for a general audience and provides a good, well-illustrated review of general crawfish biology, culture, harvest methods, and cooking tips.

The author briefly discusses some of the species native to Europe, but much is devoted to the signal crawfish, *Pacifasticus leniusculus*. He reviews crawfish biology, feeding, habitats, reproduction, growth, and diseases in Part I. In Part II the author describes various problems and techniques in the culture of crawfish. In addition, the author discusses some of the problems of crawfish culture experienced in Europe and describes his suggestions for culture methods to avoid cannibalism and predation, including proper feeding, securing water supplies, etc., rearing pond design and construction, and keeping proper records. Thus, the volume presents a handy, general overview of crawfish culture for those who might be interested in trying it. Paperbound, the 70-page handbook is available from the publisher for £8.00.

Good Safety Lessons for Marine Fishermen

Safety is an important consideration for those who fish the sea, whether for science or for profit. And now a new **"Vessel Safety Manual,"** edited by John Sabella, has been produced by the North Pacific Fishing Vessel Owners' Association (NPFVOA) which should go a long way toward improving marine fishing safety, and perhaps thereby helping to control rising insurance costs. The volume itself is entirely new, with new illustrations, and was produced for the NPFVOA Vessel Safety Program in cooperation with the U.S. Coast Guard and the National Marine Fisheries Service, and in consultation with many prominent experts in marine safety procedures.

Following brief introductory remarks on crew responsibilities and how accidents happen, the book discusses vessel familiarity, including an orientation with the fishing vessel, the fisherman's gear, health, general safety measures and considerations while working on various vessels, emergency procedures, and more. Another chapter reviews seamanship and nomenclature for commercial fishermen, particularly with reference to safe use of vessel equipment. Other chapters discuss safety aspects of working conditions, vessel systems, and vessel stability.

Material on medical emergencies at sea presents up-to-date data on first aid, CPR, rescue breathing, control of bleeding, shock, and on-board treatment of the injured, as well as oxygen administration, hypothermia, frostbite, immersion foot, cold water near drowning, first aid kits, and other problems unique to commercial fishermen. Another important chapter reviews fire prevention and control aboard ship; yet another discusses safety equipment and survival procedures, including abandoning ship, distress signals, PFD's, exposure suits, etc.

Also included are authoritative chapters on U.S. Coast Guard procedures, rudiments of navigation, and a condensed version of the "Rules of the Road." Another is devoted to important aspects of watchkeeping, including techniques for assessing weather changes. The last chapter addresses common vessel safety concerns, such as avoiding other vessels, traffic services, towing, contact with explosive ordnance, refrigeration systems, first aid for injuries by ammonia or freon, hazards common to confined spaces, combustible and toxic gases and vapors, and more. Finally, various forms, lists, station bills, and sample contracts are appended.

The book is in looseleaf format with heavy-duty paper and comes in a sturdy three-ring binder. Each chapter is tabbed for quick reference in class or at sea and has a form at the end for crew members to sign signifying that they have discussed aspects of it with the skipper and have a basic understanding of the material.

The 15 chapters total more than 300 pages and 300 illustrations and comprise one of the best books devoted to fishing vessel safety. The manual should be a valued reference far beyond the North Pacific where it was developed, and it is available at $30 per copy from the Vessel Safety Program, Building C-3, Room 207, Fisherman's Terminal, Seattle, WA 98119.

Fish, Fisheries, and Marine Mammals

Publication of **"Marine Mammals and Fisheries,"** edited by J. R. Beddington, R. J. H. Beverton, and D. M. Lavigne, has been announced by Allen & Unwin, Inc., 8 Winchester Place, Winchester, MA 01890. The volume is an outgrowth of the Workshop on Marine Mammal/Fishery Interactions which was convened in La Jolla, Calif., in 1981, including revised versions of some of the papers presented there, as well as other papers written since the workshop in response to problems identified at it. The volume centers on the difficult and often highly controversial ecological problems involving the relationships between certain marine mammal populations and their food sources, especially those fishery resources utilized as well by humans. Such conflicts are often of long standing, often fraught with emotion, and getting facts upon which to base sound decisions can be both very demanding and difficult.

The volume begins with an analysis of marine mammal and fisheries interactions and problems by Beverton and a review of economic aspects of marine mammal-fishery interactions by Colin Clark. Then follow 12 case studies of specific interactions including interactions between marine mammals and commercial fisheries in the Bering Sea; modelling marine mammal-fishery interactions in the Southern Ocean; Russian studies of marine mammal-fishery interactions; marine mammals and California's marine fisheries; fisheries and cape fur seals in southern Africa; harp seals and fisheries in the northwest Atlantic; British gray seals and fisheries; elephant seal population changes in the Kerguelen Archipelago; sea otters and shellfisheries; dolphins and the yellowfin tuna purse-seine fishery; and the fishery-dolphin conflict of Iki Island, Japan.

Problems in estimating food consumption by various marine mammals (individually and as a whole population) are addressed in the final six papers: An introduction to a "modified volume" method of assessing marine mammal food habits; two biases in diet determination of northern fur seals; digestion and retention of Atlantic herring otoliths in gray seal stomachs; opportunistic feeding by the northern fur seal; an energy budget for northwest Atlantic harp seals; and the effects of variation in population parameters on the energy requirements of a hypothetical gray seal population.

This volume, as a first effort to get a handle on such very difficult issues, should be of interest and value to a wide audience including fishery biologists, managers, and students, as well as those who are involved in framing public discussions and working toward resolution of these conflicts. Hardbound, and indexed, the 354-page volume is available from the publisher for $55.00.

Fisheries and Management of the Penaeid Shrimps

"Penaeid Shrimps - Their Biology and Management," edited by John A. Gulland and Brian J. Rothchild, has been published by Fishing News Books, Ltd., 1 Long Garden Walk, Farnham, Surrey, England GU9 7HX. It constitutes selected papers presented at a workshop on the scientific basis of the management of penaeid shrimp which was held at Key West, Fla., in late 1981, and was cosponsored by the NMFS, FAO, and the Gulf States Marine Fisheries Commission.

These shrimps support many important fisheries, and described are the shrimp fisheries of Australia, China, the Guianas and Brazil, the Gulf region between Iran and the Arabian Peninsula, India, Indonesia, Senegal, and the United States. Then, J. W. Penn discusses the behavior and catchability of some commercially exploited penaeids and their relationship to stock and recruitment. Another section deals with methods of analyzing or modelling several shrimp fisheries; yet another deals with interaction between penaeid shrimps and other species. Other papers discuss environmental factors affecting shrimps and shrimp management. As the workshop considered future prospects, the volume provides a number of suggestions for additional research and rating the priorities for it and for determining management objectives.

The book also provides a good, comprehensive account of the status of the important penaeid shrimp stocks, important insights into the relationships between fishing effort and shrimp abundance, and it will likely be an important reference for those concerned with shrimp fisheries. Paperbound, the 308-page volume is available from FNB for £30.00.

A Mussel Culture Guide and Fisheries Dynamics

The edible blue or bay mussel, *Mytilus edulis*, is widely found and cultured. Its culture is also expanding in the U.S. Pacific Northwest, and **"Mussel**

Aquaculture in Puget Sound" by Douglas Skidmore and Kenneth K. Chew, Technical Report WSG 85-4, is a good review of culture techniques used in many parts of the world. As well, it is a fine summary of a decade of regional mussel culture studies and their application for commercial firms. It also includes a comparison study of the culture of *M. edulis* and *M. californianus*.

Topics include seabottom culture methods, bouchot and intertidal culture, raft culture, and longline culture. Methods of seed collection in Puget Sound are reviewed, as are sociopolitical aspects of mussel culture (i.e., permits and leases), predator problems, weather and pollution problems, paralytic shellfish poisoning problems, and other considerations. In sum, the volume is a fine survey of mussel culture that would be useful well beyond the Pacific Northwest. The 57-page paperbound report is available from the University of Washington, Sea Grant Communications, Seattle, WA 98105 for $5.00.

Also published by Washington Sea Grant Program is **"Fisheries Dynamics: Harvest Management and Sampling"** by Phillip R. Mundy, Terrance J. Quinn II, and Richard B. Deriso. The volume is a two-part collection of lectures at the University of Washington in May 1984.

Part I is devoted to the theory and practice of harvest control systems for commercial marine fisheries management by Phillip R. Mundy, especially in regard to Alaskan salmon and North Carolina shrimp fisheries, while Part II focuses on the management of nonandromous marine fish populations, specifically Pacific halibut. Terrance J. Quinn II discusses sampling techniques for the data collection phase of fisheries management, with emphasis on the monitoring of population abundance. Finally, Richard B. Deriso presents quantitative techniques for analysis of fisheries information and the detection of population responses in relation to fisheries management.

The 60-page paperbound report, WSG 85-1, is available from the publisher for $5.00, and it provides an interesting introduction to the management of fisheries and fisheries harvests.

Promoting Fisheries in Developing Countries

"Fishery Development Experiences" by W. H. L. Allsopp has been published by Fishing News Books, Ltd., 1 Long Garden Walk, Farnham, Surrey, England GU9 7HX. The author, who spent much of his 36-year career in fisheries development in Third World nations for both the United Nations Food and Agriculture Organization and for Canada's International Development Research Centre, has provided a unique review and assessment of such fishery developments and the reasons therefore.

In sum, the author has carefully examined a fairly wide variety of fishery development programs in different areas of the world and presents his analysis of the reasons for success or failure and the factors that limit fishery development in the Third World. Included are projects for both freshwater and marine fisheries, aquaculture, and distant-water capture fisheries, and the author presents a number of conclusions and recommendations that should be useful to a wide variety of fisheries specialists.

An introductory chapter provides historical background and a perspective on Third World fishery development. Then, each of the author's case histories describes the existing fishery and outlines the background and objectives of the development project. This is then fleshed out with details of the project inputs, outputs, effects and impact, and ultimately an evaluation and assessment of the projects. Topics important to project success which are discussed also include operational constraints, loan policies of development banks, bilateral aid in multilateral programs, project management guidelines, etc. The author also discusses why some projects either failed or did not achieve their full potential, as well as why others were more successful. Specific topics include institutional organization for inland fisheries research and development programs, motorization of a west African canoe fishery, improving the artisanal fisheries infrastructure in a Middle East nation, building and operating large tuna vessels and attendent shore facilities in Latin America, and others. The 160-page paperbound volume (no index) is available from the publisher for £12.50.

MANAGING THE MARINE FISHERIES

Publication of **"Bioeconomic Modelling and Fisheries Management,"** by Colin W. Clark, has been announced by Wiley-Interscience, a division of John Wiley & Sons, Inc., 605 Third Avenue, New York, NY 10158. Clark is a Professor of Mathematics at the University of British Columbia and also authored the earlier volume "Mathematical Economics," also published by Wiley, which reviews resource management techniques based on contemporary mathematical and economic methods.

In this new volume, the author uses simple mathematical models (as opposed to the complex or holistic ones) and readers need to be familiar with calculus and simple differential equations, as well as elementary probability theory. The author discusses commercial marine fisheries almost exclusively and uses the term "bioeconomics" to encompass the interrelations between the economic forces affecting the fishing industry and the biological factors that determine the production and supply of fish in the sea. The models are thoroughly explained and numerous illustrations are included.

Clark focuses on methods of preventing overfishing and overcapitalization, economically effective and practical forms of fisheries regulation, management of developing fisheries, natural fluctuations in fish stocks, and the various complexities of marine ecosystems. He is also critical of certain traditional fishery management approaches which, he says, have produced severe overcapacity of various fishing fleets around the world and thereby inhibited rehabilitation of depleted fish stocks and impinged upon the economic performance of the affected fishing industries. He outlines methods of controlling overcapacity and improving economic performance, especially discussing the advantages and limitations of quota allocations; he also discusses dynamic investment strategy, and fluctuations and uncertainties in fishery stocks and their management.

The author has provided a thorough discussion of the economics of fishery management, a complicated and sometimes controversial field, and the book would be of interest to students as well as fishery managers. The hardbound 291-page volume is indexed, has a good bibliography, and is available from the publisher for $44.95.

Progress in Salmonid Reproduction Research

The International Symposium on Salmonid Reproduction, sponsored by the University of Washington Sea Grant Program, Seattle, WA 98195 in late 1983, covered five important aspects: Endocrinology, genetics, nutrition, environmental factors, and husbandry. More specific topics included precocious maturation, sex reversal, induced ovulation, dietary requirements of captive broodstock, genetic studies in reproduction, temperature and photoperiod effects on maturation, and the normal endocrine events preceding and concurrent with salmonid maturation and spawning.

"Salmonid Reproduction, An International Symposium," edited by Robert N. Iwamoto and Stacia Sower, contains slightly over half of the presentations and includes review papers, summaries of the roundtable discussions, and abstracts of other contributions. Original and previously unpublished research papers were published in an issue of *Aquaculture*.

The various salmonids are valuable, both as a wild natural resource and as a cultured one. The contributions in this review volume are valuable in outlining what has been learned about salmonid reproduction and what more we need to learn in identifying aspects of salmonid reproduction that require further study. And, the printed discussions are useful in elucidating the benefits and limitations in applying research results to the production of salmonids.

In addition, the volume presents, from the Aquaculture Data Base, a compilation of the more recent articles on induced spawning and artificial fertilization of *Oncorhynchus* spp., selective breeding and brood stock management of *Salmo* spp. (1977-82), and salmonid genetic studies.

The symposium and contributions were truly international, featuring excellent contributions from many nations. Some of the work is controversial, especially in its potential application, and the symposium served as a valuable exchange of information, with the publications an equally valuable record of it. The 167-page paperbound volume is available from Washington Sea Grant Communications, University of Washington, 3716 Brooklyn Ave., N.E., Seattle, WA 98105, for $10.00.

Advances in Marine Biology

Volume 22 of the series **"Advances in Marine Biology,"** published by Academic Press, Inc., Orlando, FL 32887, presents four articles of interest to marine scientists. The series is edited by J. H. S. Blaxter, the late Sir Frederick S. Russell, and Sir Maurice Yonge.

First is an article by B. E. Brown and L. S. Howard of England's University Newcastle upon Tyne, Department of Zoology, on "Assessing the Effects of 'Stress' on Reef Corals." The article is divided into three sections, the first dealing with field observations, the second reviewing laboratory assessment of pollutant effects, and the third presenting a discussion of the validity of generalizations made to date on the overall vulnerability of coral reefs to man-made disturbance, and an assessment of future research needs. The second article is a thorough review of sea anemone nutrition by M. Van-Praet of France's Museum National d'Histoire Naturelle. Included is a discussion of chemoreception and feeding behavior, absorption of dissolved organic matter, gathering and digestion of particulate organic matter, predation and digestion of prey, symbiosis, and sea anemones as prey. It concludes with remarks on the diet of sea anemones, and is well illustrated with photomicrographs and drawings.

Third, H. B. Akberali and E. R. Trueman of the Department of Zoology of England's University of Manchester review the "Effects of Environmental Stress on Marine Bivalve Molluscs." The authors discuss behavioral reponses to stressors, detection of stress, respiratory physiology during stress, the protective role of the shell, action of heavy metal stressors, etc. Finally, D. J. Crisp of the U.K. Natural Environment Research Council's Marine Science Laborabories, and E. Bourget of the Universite Laval Biology Department in Quebec address "Growth in Barnacles," beginning with a review of the evolution of barnacles and their shells, mechanisms of growth, modification of shape, factors influencing the growth rates, age and growth (the growth curve), growth rates of various species, growth and ecdysis, shell structure in relation to function, and cyclical factors in growth.

The hardbound volume has taxonomic and subject indexes, is well illustrated, and the 260-page volume is available from the publisher for $57.00 or £52.00 in England. The well-written reviews should be a useful reference for the advanced student and scientist.

THE PRAWNS OF AUSTRALIA

"A Guide to the Australian Penaeid Prawns," by D. L. Grey, W. Dall, and A. Baker, has been published by the Department of Primary Production of the Northern Territory, Australia. Over 50 different species of penaeid prawns have been found in Australia's waters, 10 of which are of major economic importance, often as exports. Those 10, along with about 36 others, some of which are rare there, have been included in the volume.

Basically, the book is a simplified field guide to the 46 species of interest in the region. And, most of them are illustrated with large, excellent full-color photographs. A distribution map is provided for each species, as is relevant data on principal taxonomic features, color in life, habitat, size, synonymy, and other comments on the species usefulness or distinctive features, etc.

In addition, the authors have provided a helpful key to the families of the Penaeoidea and to the species. Other information and figures, along with a glossary, help guide nontechnical readers in using the key to identify

specimens. For those needing greater detail, the authors have provided a bibliography of authoritative taxonomic publications on Australian prawns. The excellence of the photographs will enhance the use of this handbook. Indexes are included by genus and species and by common name, and the official and unofficial Australian common names, as well as the FAO common names, are listed for the species. Price not listed.

Studying and Managing Marine Fishery Resources

"Exploitation of Marine Communities," edited by R. M. May, constitutes the "Report of the Dahlem Workshop on Exploitation of Marine Communities" (Dahlem Konferenzen) held in Berlin in 1984. It has been published as Life Sciences Research Report 32 by Springer-Verlag New York, Inc., 175 Fifth Ave., New York, NY 10010.

The workshop's goal was to "evaluate the ability of fishery science and management to deal with changes in the marine ecosystems." As such it is a fine review of current levels of understanding of the dynamics of multispecies marine ecosystems and how this applies to fisheries management.

The workshop (and the volume) were divided into four groups, each of which presented an overall "group report" along with the individual contributions. The first section, "Dynamics of Single Species," included presentations on why fish populations vary (i.e., factors affecting fish hatching, death, and general life history), the availability and information content of data, needed and existing, which are necessary for making predictions about fish stocks; and the dynamics and evolution of marine populations with pelagic larval dispersal.

"Ecosystems Dynamics" presents an account of patterns observed in multispecies fisheries under exploitation, several approaches to modelling and studying multispecies systems, and a review of the kinds of responses to disturbance that multispecies systems may show.

"Management Under Uncertainty" includes articles on the kinds of variability and uncertainty affecting fisheries, managing fisheries under biological uncertainty, and the wider dimensions of management uncertainty in world fisheries, i.e. that beyond natural variability of fish stocks—the intellectual, political, legal, and administrative ones.

Finally, "Strategies for Multispecies Management" includes papers discussing objectives and constraints on management and the techniques for multispecies management. Overall, the contributions both review the current state of our knowledge, as well as identify important questions or problems and fertile areas for additional research.

Thus, the volume provides an excellent and succinct look at the problems and opportunities in fisheries science and management, and it should be of interest to a wide range of scientists, students, and administrators. Indexed by subject and author, the 367-page hardbound volume also contains a glossary of technical terms, maps of the areas discussed, and a list of workshop participants, and it is available from the publisher for $20.00.

On the Energy Budget of Fishes

"Fish Energetics, New Perspectives," edited by Peter Tytler and Peter Calow, has been published by the John Hopkins University Press, 701 West 40th Street, Suite 275, Baltimore, MD 21211. Tytler is Lecturer in Biological Sciences at the University of Stirling and Calow is Head of the Department of Zoology at the University of Sheffield, England.

The volume is divided into four parts: 1) Evolutionary aspects of energy budgets, 2) food and feeding, 3) growth and reproduction, and 4) field and laboratory studies of energy budgets. The last also includes a paper relating fish energetics to aquaculture.

In the volume, the authors explore fish energetics both as individuals and collectively as fish populations, with particular emphasis on new theory and practice. Much emphasis is placed on food, feeding, growth and reproduction, and energy budgeting which have the most application to fish culture.

Part one begins with a review of the adaptive aspects of energy allocation and the metabolic scope of fishes. Part two presents discussions of the application of optimal foraging theory to feeding behavior, the energetics of feeding and digestion, protein and amino acid requirements, hormonal control of metabolism and feeding, and laboratory methods in fish feeding and nutritional studies. Part three is devoted to chapters on metabolism and growth and the energetics of reproduction. The 349-page hardbound volume has a systematic and subject index, is an interesting review of important aspects of fish physiology, and is available from the publisher for $32.50.

Fishing Herring in the Firth of Forth

Among fisheries publications, historical treatises are comparatively rare; by the time someone decides to chronicle or trace the history of a particular fishery many of the records of participants are gone. Sometimes, though, family or business records, recollections, or diaries can be pieced together, as Peter Smith has done in **"The Lammas Drave and the Winter Herrin',"** subtitled "A History of the Herring Fishing from East Fife."

The author traces the rise and fall of the herring fishing in the Firth of Fourth, and the Lammas Drave, one of two main "fishings," that took place in August and September. The book differs from other histories in that it is virtually a year-by-year chronicle of the highlights of the fishery, through which can be traced its ups and downs, introduction of new gears and vessels, etc., from 1845 to 1954 when the fishery had virtually ended. Such books may be more useful or instructive to anthropologists and sociologists than to biologists, but can have broader interest when well written, as is this one. It would be unfortunate if similar historical sketches of many American fisheries went unwritten. The 166-page paperbound volume is available from the publisher, John Donald Publishers Ltd., 138 St. Stephen Street, Edinburgh, Scotland EH3 5AA, for £5.95.