

The INPFC: Its History and Accomplishments

“Ocean Forum” by Roy I. Jackson and William F. Royce, published by Fishing News Books Ltd., 1 Long Garden Walk, Farnham, Surrey, England, is subtitled “an interpretative history of the International North Pacific Fisheries Commission,” known widely as the INPFC and set up by a treaty between Canada, Japan, and the United States.

Concern over Japan’s reentry into North American Pacific salmon, halibut, and herring fisheries led to the adoption of the International Convention for the High Seas Fisheries of the North Pacific Ocean in 1953 which established the INPFC to “ensure the maximum sustained productivity of the fishery resources of the North Pacific Ocean.” In many ways the INPFC pioneered and excelled in cooperative high-seas marine and anadromous fisheries research, the results of which serve, after peer review, as the basis for fishery management decisions.

The story of how the national governments of Canada, Japan, and the United States came together under the Commission to study, manage, and develop the fisheries is a complex one involving science, business, and politics, with often widely disparate views. At the time, fishery science was still not widely accepted, let alone utilized, as a basis for regulating marine fishing. The concept that marine resources were inexhaustible was still widespread, and the 3-mile limit was the standard for most fishery resource claims.

The authors present and analyze a considerable amount of material in depth. Reviewed are Japanese fisheries before, during, and after World War II, North American apprehensions of the expansion of Japanese fisheries, con-

cerns for fishery resources, and much more. The Convention set up a newly devised principle of Abstention, which set mid-ocean barriers to the eastward expansion of Japan’s fisheries, an important aspect of which was that it drew lines on the ocean believed far enough west so Pacific fisheries stocks of concern to North American fishermen would be relatively inaccessible to Japanese fishermen. The concept was innovative at the time and was supposed to protect coastal fishermen from distant-water fishing fleets, provided that the resources were fully utilized, under scientific study, and managed so full harvest would be sustained.

Research and statistical programs had to be undertaken, at first devoted largely to defining the continental origin and ocean distribution of various species of salmon. These are detailed in chapter 4. Chapter 5 reviews Commission problems and problem solving between 1959 and 1965, and chapter 6 covers 1966-77, ending with the effects of the Law of the Sea (LOS) negotiations on the Commission and its work. Chapter 8, “a search for rational fisheries,” begins by defining “rational fisheries,” and then appraises INPFC contributions, reviews the directions of fishery development, and addresses the future fisheries in the North Pacific and the future role of the INPFC in the region’s fishery development.

Ample notes and references are given, and appendices include the 1953 and 1959 Conventions (including memoranda of understanding), a list of INPFC Commissioners and their terms from 1954 to 1985, biographies of some major participants in INPFC research or deliberations, INPFC documents and publications, and excerpts pertaining to

fisheries from the Law of the Sea.

The authors call the Commission an “ocean forum” uniquely successful in identifying North Pacific fishery problems and in guiding movement toward solutions and which, they say, should be continued. In sum, the book provides a clear and thoroughly documented account and analysis of the research and accomplishments of a unique body with proven successes in conducting marine fishery research and in fostering high-seas fishery conservation. It should be of considerable interest to historians as well as many who are involved in marine fisheries issues. Indexed, the 240-page hardbound volume is available from the publisher for £19.50 sterling or US\$30.00 (surface mail) or £24.00 sterling or US\$37.00 (airmail).

Marine Mammals of the N.E. Pacific

Publication of the second edition, revised, of **“Marine Mammals of Eastern North Pacific and Arctic Waters,”** edited by Delphine Haley, has been announced by Pacific Search Press, 222 Dexter Avenue North, Seattle, WA 98109. Updated by recognized authorities (including many active and retired NMFS scientists) on the various marine mammals of the region (including the Bering Sea and Arctic Ocean). Geographical boundaries covered range roughly from Baja California and the Gulf of California (at lat. 22°N) westward to long. 180°, and north to the Arctic Ocean and then eastward to the Alaska-Canada border at long. 140°W. Some of the species covered, of course, may often range well beyond those boundaries.

This new edition considerably updates the data published a decade ago in the first edition. Provided is detailed information on the life history, habitat, range, status, exploitation, and the like for the region’s cetaceans, pinnipeds, and other marine-adapted species. Dale Rice covers the blue, gray, sperm (including pygmy and dwarf species), and seven beaked whales (family Ziphiidae). Edward Mitchell covers the fin, sei,

Bryde's and minke whales, while Allen Wolman discusses the humpback whale, James Scarff the right whale, and Willman Marquette the bowhead whale.

Porpoises and dolphins of the region are reviewed by Stephen Leatherwood and Randall Reeves, while Stephen Reilly and Susan Shane cover the pilot whale, Karen Miller and Victor Scheffer the false killer whale, Michael Bigg and Scheffer the killer whale, Francis Fay, the belukha whale, and Murray Newman and Deborah Cavanagh, the narwhal.

Pinniped authors include Clifford Fiscus (northern fur seal), Luis Fleischer (Guadalupe fur seal), Roger Gentry and David Withrow (Steller sea lion), Bruce Mate and Douglas DeMaster (California sea lion), Steven Jeffries and Terrel Newby (Pacific harbor seal), John Burns (ringed, bearded, spotted, and ribbon seals), and Robert DeLong (the northern elephant seal). Karl Kenyon covers the walrus, Hawaiian monk seal, and sea otter, while Jack Lentfer discusses the polar bear, and Delphine Haley covers the Steller sea cow.

In addition, Scheffer provides a chapter on marine mammal conservation and Mitchell has authored a chapter on the origins of the region's sea mammal fauna. An extensive listing of general and specialized references is given, as is the classification of eastern North Pacific marine mammals. The book is amply illustrated with excellent color and black and white photographs and drawings.

Like the first edition, this one is authoritative and is well written, edited, and designed, and both scientists and general readers should find both useful and interesting. Indexed, the paperback 295-page volume is available from the publisher for \$22.95.

Fundamentals of Fisheries Economics

Publication of a revised and enlarged edition of Lee G. Anderson's "**The Economics of Fisheries Management**" has been announced by The Johns Hopkins University Press, 701 West 40th Street, Suite 275, Baltimore, MD 21211.

In it, the author has considerably revised and augmented the material in his 1977 volume: New topics include recreational fisheries, fisheries development, and the share system of remuneration.

The author begins with a chapter that introduces the basic principles of economics important to the study of fisheries, and which underpins the rest of the book, especially for those less knowledgeable about economics. The second and third chapters present the main economic analysis and chapter 4 discusses more intricate economic models of fishery exploitation. Chapter 5 moves beyond the analysis of a single fleet harvesting an independent fish stock to several cases that more closely reflect real-world fishery exploitation. Chapter 6 then presents a general discussion of types of fishery regulation and focuses on their economic aspects and on economical ways of implementing them. Finally, chapter 7 provides a brief introduction to some recent empirical studies and shows how the theory of the previous chapters can be used to provide useful information. The 296-page clothbound volume is available from the publisher for \$29.95.

Modeling Fisheries and Wildlife Systems

Publication of "**Systems Analysis and Simulation in Wildlife and Fisheries Sciences**" by William E. Grant has been announced by Wiley-Interscience, John Wiley & Sons, Inc., 605 Third Avenue, New York, NY 10158-0012. The author is associate professor in the Department of Wildlife and Fisheries Sciences at Texas A&M University, College Station. The volume differs from some others in that it provides a hands-on approach to teaching modeling skills in the fields of fisheries and wildlife science. Thus, the author provides step-by-step guidelines to the application of systems analysis and simulation to questions about those ecosystems.

He begins by tracing the development of systems ecology, and introduces basic concepts of systems analysis and simu-

lation and illustrates it with two brief case histories of modeling for fisheries, the Gulf of Mexico shrimp fishery. Then follow the four phases of systems analysis: Conceptual model formulation (ch. 2), quantitative specification of the model (ch. 3), model validation (ch. 4), and model use (ch. 5). Within each chapter the various stages associated with the given phase are identified and discussed. First, the theory or concept associated with each step is presented, along with brief examples. Then, the application is demonstrated through a detailed example. The same example, which deals with modeling the growth and harvest of fish in a hypothetical pond system, is carried through each chapter. Chapters 2-5 also provide exercises that deal with modeling the dynamics of a plant-herbivore system; appendix 6 gives the answers to those exercises. The final chapter provides advice on the development and use of models within a management framework.

Other appendices provide selected techniques in matrix algebra and regression analysis, an overview of differential and difference equations and computers, and a computer program listing with which students can develop and use the pond simulation model described in the text. Altogether, this is a clear and useful presentation of the philosophy and techniques of systems analysis and simulation as is applied in the wildlife and fisheries sciences. Hardbound, the 338-page volume is indexed and is available from the publisher for \$47.50.

On the Study of Predators and Prey

Research on fishes, amphibians, and reptiles—the "lower" vertebrates—has produced considerable information on predator-prey relationships in recent years. An overview of many of the research advances in several related fields is provided in "**Predator-Prey Relationships: Perspectives and Approaches From the Study of Lower Vertebrates**," edited by Martin E. Feder and George V. Lauder and published by the University of Chicago Press, 5801 S. Ellis

Ave., Chicago, IL 60637.

The volume resulted from a 1985 symposium held at the joint meeting of the American Society of Ichthyologists and Herpetologists, the Herpetologists' League, and the Society for the Study of Amphibians and Reptiles. Unlike some symposium publications, this one is not a compilation of data or narrowly defined studies. Rather, the editors have attempted to provide a forum for consideration of critical concepts relating to predation from a variety of perspectives and fields. In general, the symposium first considered functional and mechanistic approaches (typically conducted in a laboratory), and then examined the more naturalistic and evolutionary studies usually done in the field.

Topics and authors are: Measuring behavioral energetics, Albert Bennett; neural mechanisms of prey recognition, Gerhard Roth; functional morphology of feeding, Carl Gans; locomotion as related to predator-prey relationships, Paul Webb; a comparative approach to laboratory and field studies in evolutionary biology, Raymond Huey and Bennett; defenses against predators, John Endler; behavioral responses of prey fishes to predators, Gene Helfman; and laboratory and field approaches to the study of adaptation, Stevan Arnold. Another paper, natural history and evolutionary biology by Harry W. Greene, was invited to round out the book, along with the introduction, commentary, and conclusion by the editors.

In stressing both conceptual and practical issues in the analysis of predator-prey relationships, the editors and authors have provided a good review of selected concepts and experimental approaches to the study of predation. The 198-page volume is available from the publisher and costs \$26.00 (hardbound) and \$11.95 (paperbound).

Marine Pollution and Its Measurement

Publication of "**Marine Pollution**" by R. B. Clark has been announced by the Oxford University Press, 200 Madison Avenue, New York, NY 10016. The

author is professor of Zoology at the University of Newcastle upon Tyne and editor of the journal *Marine Pollution Bulletin*.

Concern about marine pollution may range from, on one hand, fear that the sea itself is being destroyed to a belief that the oceans are the ultimate and safest repository for all human-generated waste materials. In this book, the author has attempted to place the elements of marine pollution into perspective to provide basic information needed so that informed judgements can be made on how serious the impacts of certain pollutants may be to the marine environment and to human health, especially.

To assess the effects of wastes on the sea as accurately as possible, one needs to know what types of wastes reach it (and in what quantities), what then happens to them in the sea, what effects they have on the biota there, and finally what threats they pose. And those are the questions that the authors attempt to answer.

In the first chapter he defines pollution and reviews the nature and sources of inputs and the costs of pollution abatement. Following that are eight chapters that review specific pollutants, their impacts on the marine environment and commercial fisheries, and their threats to human health: Organic wastes, oil spills and clean-up treatments, metals, halogenated hydrocarbons, radioactive materials, and solid wastes and heat (i.e., dredging spoils and industrial solid wastes, plastics, munitions, etc.). Another chapter provides brief overviews on case histories of pollution in specific regions (the North Sea, Baltic Sea, Mediterranean Sea, Caspian Sea, and Caribbean Sea). The final chapter then summarizes and discusses the issues that must be taken into account in evaluating the impact of pollution and the fundamental scientific questions involved. In addition, the author provides a list of scientifically based reports and reviews for further information. The book is a good and concise review of the problems associated with marine pollution. Paperbound, the 215-page volume is available from the publisher for \$17.95.

Much larger and more specific is "**Concepts in Marine Pollution Measurements**", edited by Harris H. White and published by the Maryland Sea Grant College, University of Maryland, 1222 H. J. Patterson Hall, College Park, MD 20742. The 43 papers in it, peer reviewed and edited, examine a wide variety of techniques for measuring marine pollution and its effects on the environment. Many of the contributions point to recent progress in more realistic assessments of the effects of environmental contaminants, and some challenge some of the strategies and techniques used in marine pollution measurement. Overall, the editors challenge environmental researchers to reexamine the fundamental bases of their science, and argue that any useful assessment of pollution impacts depends on holistic conceptual approaches and suites of measurements that require coordinated team planning.

The contributions are arranged under the following general categories: Toxicity tests, laboratory microcosms, community parameters and measures of community impact, bioaccumulation tests, chemical measurements and effects criteria, anomalies in field specimens, mesocosms and field systems, field monitoring programs, and a summary and synthesis, in which are presented several issues to be considered if environmental science is to develop groundwork for understanding the dynamics of the marine environment and better protect its health. The 743-page clothbound volume is available from the publisher for \$12.50.

Pacific Salmonids and Recreational Fisheries

"Marine Recreational Fisheries 10," which is titled "**Recreational Uses, Production and Management of Anadromous Pacific Salmonids**," and edited by Richard H. Stroud, has been published by the National Coalition for Marine Conservation, Inc., for the International Game Fish Association, the NCMC, and the Sport Fishing Institute. It encompasses the Proceedings of

the Tenth Annual Marine Recreational Fisheries Symposium held 26-27 April 1985 in Seattle, Wash. and chaired by Frank E. Carlton. And as a whole, the book is an excellent survey of the status, biology, fisheries, management and outlook for recreationally important Pacific salmonids, principally the coho, *Oncorhynchus kisutch*, and chinook, *O. tshawytscha*, salmon and sea-run trout of the genus *Salmo*, as well as the challenges facing them today. Also of interest are the discussions of the then-new (March 1985) U.S.-Canada Pacific Salmon Treaty.

The book and the symposium were divided into four Panels: 1) The salmonid resources (with contributions on species biology, environmental factors affecting their abundance, recreational and commercial uses of coho and chinooks, and restoration and enhancement of Pacific salmonids), 2) management for recreational purposes (natural and artificial production, MRF problems in management decisions, and strategy to maximize angler participation), 3) international aspects of stocks and policies (ocean migrations of chinooks, cohos, and steelheads; international problems in and beyond the U.S. FCZ; and consequences to anglers of the new U.S.-Canada Pacific Salmon Treaty), and 4) local and regional aspects of stocks and policies (locations of local and regional salmonid stocks, restoring Columbia Basin salmon under the Northwest Power Act; regional and local problems in salmon and steelhead management; and redirecting the Pacific Northwest's salmon and steelhead management process). A summary and recommendations were made by Peter Larkin. As usual with this series of MRF symposia, contributors and speakers are internationally recognized experts, and it also publishes questions and comments from the floor.

Management of the various stocks of Pacific salmon and trout is often complicated and controversial. Species are often popular as food fish, sport fish, and as treaty-protected species important to Native Americans. But many will find this book to be a good and handy reference, especially for those interested in the recreational fisheries aspects of

these species. The 217-page hardbound volume is available from the IGFA, 3000 East Las Olas Boulevard, Ft. Lauderdale, FL 33316 for \$15.00.

Problems and Prospects for the Atlantic Salmon

"The Status of the Atlantic Salmon in Scotland" edited by David Jenkins and William M. Shearer, has been published by the Institute of Terrestrial Ecology (ITE), Monks Wood Experimental Station, Abbots Ripton, Huntingdon PE17 2LS England. The volume presents 15 papers from the ITE Symposium 15 at Banchory Research Station, 13-14 February 1985, which, in sum, thoroughly describes the regulation of the fishery (early history to present), the biology of *Salmo salar*, fishing methods, catch statistics, and compares the status of Scotland's salmonids with that of the stocks of other nations.

Of interest are the discussions of 30 years data on exploitation of the species in Scottish waters, changes in fishing methods and gears, management of a rod-and-line and a commercial fishery, effects of the competition of farmed salmon in the market place on the status of commercial salmon fisheries, salmon farming and the future of Atlantic salmon, potential impact of fish culture on wild stocks of Atlantic salmon in Scotland, data and analysis of Norwegian and Irish salmon catches and other papers.

Like other salmon researchers, contributors bemoan gaps in the existing data base and the difficulty in filling them. More data is needed on catch statistics, they report, as well as on a better understanding of the species' ecology. Scottish salmon catches have declined from a peak in the late 1960's and early 1970's to a point closer to the levels of the 1950's, yet the available smolt production estimates show no continuous downward trend. Reduced catches, biologists believe, are related more to biological changes than to overfishing, though they also believe that the establishment of NASCO will provide the mechanism for controlling the distant-water high-seas Atlantic salmon

fisheries. The 127-page paperbound volume is available from the publishing agency for £7.30.

On the Right to Fish

"Treaties on Trial, the Continuing Controversy Over Northwest Indian Fishing Rights" by Fay G. Cohen has been published by the University of Washington Press, P.O. Box C-50096, Seattle, WA 98145-0096. Cohen is Associate Professor, Institute for Resource and Environmental Studies, Dalhousie University, Halifax, Nova Scotia, Canada. The book basically updates and extends material published in "Uncommon Controversy" by the U.W. Press on the problems involved in the long-running conflict over Native American fishing rights in Washington, and is told essentially from the tribes point of view. Since similar controversies are found in many other states nationwide, the book will be of interest beyond the Pacific Northwest.

While the original volume (reprinted four times) dealt with three tribes—the Muckleshoots, Puyallups, and Nisquallies—this new volume extends the scope of inquiry to all Northwest tribes engaged in treaty-protected salmon fishing in western Washington and along the Columbia River. Reviewed are historic Indian salmon fisheries, Indian treaties and court decisions impinging on or clarifying them, the problems or controversies involved in leading up to those court decisions, and the "Boldt Decision" in which Federal Judge George Boldt ruled that the Indians were treaty-bound to get half the salmon resource covered by the treaty, and which was eventually upheld by the U.S. Supreme Court. The 256-page book is a report prepared for the American Friends Service Committee, which has been involved actively in treaty rights struggles for many years, and is available from the publisher for \$20.00 (cloth) and \$9.95 (paperbound).

ICLARM Reports Useful for Aquaculturists

Publication of "A Hatchery Manual for the Common, Chinese and Indian

Major Carps," by V. G. Jhingran and R. S. V. Pullin, has been announced by ICLARM, the International Center for Living Aquatic Resources Management, MCC P.O. Box 1501, Makati, Metro Manila, Philippines. Number 11 in the ICLARM Studies and Reviews series, the volume begins with brief reviews of the biology of the following cultured carps: Grass carp, *Ctenopharmgodon idella*; silver carp, *Hypophthalmichthys molitrix*; bighead carp, *Aristichthys nobilis*; common carp, *Cyprinus carpio*; catla, *Catla catla*; rohu, *Labeo rohita*; and mrigal, *Cirrhinus mrigala*.

Chapter 2 discusses the components of a carp hatchery, including site selection, construction, ponds, and operational procedures. Chapters 3 and 4 outline proper broodfish selection and care and induced spawning and breeding of the common carp, while chapter 6 reviews the transport of live fish seed and broodfish. Chapter 5 provides data on postlarvae and fry rearing, fish feeding, and rearing pond management, and chapter 7 reviews applied genetics of cultured carps.

Carp nutrition and diseases are also thoroughly discussed, and a later chapter provides an outline for routine upkeep and maintenance tasks for carp hatcheries. In addition, specialized scientific equipment and implements needed for a hatchery are detailed, along with requirements for applied research programs in carp culture. Extensive references and additional sources of information are appended, along with selected Asian units of measure and their metric equivalents. The hardbound 191-page volume includes geographical and subject indexes and is a thorough reference for those interested in carp culture. It is available from the publisher or, in the Americas from ISBS, the International Specialized Book Services, Inc., P.O. Box 1632, Beaverton, OR 97075. Owing to considerable delays or losses in surface mail, ICLARM also recommends requesting their publication by airmail.

This volume was copublished by the Asian Development Bank, Manila, Philippines. The authors have provided much practical information for carp hatchery workers and managers, as well

as data useful beyond simple hatchery work, to include production of fingerlings for stocking in growout ponds.

Number 12 in the same series is "**The Biology and Culture of Marine Bivalve Molluscs of the Genus *Anadara***" by M. J. Broom. Several species of this genus constitute an important source of protein in many tropical to warm temperate areas; the more important species include *Anadara granosa*, *A. subcrenata*, and *A. broughtoni*. The author reviews the general biology, ecology, population dynamics, reproduction, and culture methods for those and other species. A major impediment to improving the productivity of culture of the species is predation by gastropod drills and starfish, and the author believes that hatchery production—if economical—could overcome the considerable year-to-year variability in spat supplies for some species. The 37-page paperbound review is priced at \$6.00; ISBS shipping and handling is \$2.25 for the first book and \$1.25 for each additional volume.

Also available are ICLARM Conference Proceedings 10 and 12, the former being a "**Summary Report of the PCARRD-ICLARM Workshop on Philippine Tilapia Economics,**" and the latter being "**Philippine Tilapia Economics,**" edited by I. R. Smith, E. B. Torres, and E. O. Tan, a compilation of the complete workshop proceedings. Number 10 basically reproduces the abstracts of the workshop presentations, along with the reports of the four working groups (inputs, lake-based production systems, land-based production systems, and marketing) plus the workshop recommendations. The workshop included an overview of Philippine tilapia farming practices, problems, and prospects, as well as contributions on the economics of private tilapia hatcheries, a cost analysis of a large-scale hatchery producing *Oreochromis niloticus* fingerlings, and a paper reviewing the impact of the adoption of tilapia farming on a small community. Other papers review the economics of various cage culture systems in the Philippines as well as several land-based fish-pond and rice-fish culture systems, and the transfer of fish culture technology. Five final papers discuss aspects of Philip-

pine tilapia marketing. Conference Proceedings 10, 45 pages and paperbound, is currently out of print; Conference Proceedings, Number 12, 261 pages, paperbound costs \$21.00.

ICLARM Technical Reports 14 is "**Experimental Rearing of Nile Tilapia Fry (*Oreochromis niloticus*) for Saltwater Culture**" by Wade O. Watanabe, Ching-Ming Kuo, and Mei-Chan Huang. The study is a preliminary evaluation of several approaches of early salinity exposure for saltwater culture of tilapias. Reproductive performances of the Nile tilapia was monitored under laboratory conditions at various salinities, and the salinity tolerance of the progeny was determined. Survivorship of fertilized eggs, spawned in freshwater but removed from the mouth of the parent female and artificially incubated at various salinities was also evaluated, and the salinity tolerance of resultant fry was determined. The salinity tolerance of fry spawned and hatched in freshwater, but subsequently acclimatized to various salinities was also determined. The 28-page paperbound report costs \$6.00.

ICLARM Technical Reports 16 is "**Salinity Tolerance of the Tilapias *Oreochromis aureus*, *O. niloticus* and an *O. mossambicus* × *O. niloticus* hybrid**" by Wade O. Watanabe, Ching-Ming Kuo, and Mei-Chan Huang. In it the authors have evaluated several indices as practical measures of salinity tolerance in the tilapias spawned and reared in freshwater, and evaluated the changes with respect to age, size, and condition factors, and suggested avenues for future research. The 22-page paperbound report costs \$6.00.

ICLARM Technical Reports 13 is "**An Atlas of the Growth, Mortality and Recruitment of Philippine Fishes**" by Jose Ingles and Daniel Pauly. The atlas presents the results of a detailed analysis of length-frequency data collected from 1957 to 1981 throughout the Philippines, for 23 families, including 34 genera and 56 species representing 112 stocks of commercially exploited teleosts. The raw data, covering 0.9 million single fish measurements, were compiled by the authors from a number of different sources, particularly

the files of the Philippine Bureau of Fisheries and Aquatic Resources.

The atlas presents estimates of the vital statistics of commercially important Philippine fishes, obtained exclusively through analysis of length-frequency data. The authors have attempted to present information relevant to the fisheries management of tropical fish using the type of data that is most commonly collected from tropical fisheries, i.e., length-frequency data.

The results are presented in the form of 112 plates, providing for each stock: 1) An outline drawing of the fish discussed, with name and sampling location and date, a graphic representation of the length-frequency data with superimposed growth curve, a length-converted catch curve as used for estimating total mortality, a recruitment pattern used to infer the seasonality of spawning and recruitment, and a graph where probabilities of capture are plotted against length to estimate mean length at first capture (L_c). Also, a legend is provided giving, for each stock, the numerical values of the estimates of growth, mortality, and exploitation rate, the source of the data used, brief comments on the biology of the fish in question, and reference to a source of further information.

The aim of this atlas is to provide parameter estimates for the assessment of multispecies stocks in Southeast Asian countries, where most of the species considered are important components of the fishery resource. The growth and mortality parameters estimated here are sufficient for performing single-species yield-per-recruit analyses which may be combined into a multispecies analysis. The authors also suggest using atlas data in the construction of ecosystem models, which usually require parameter estimates for a large number of species. The 127-page paperbound report costs \$10.00.

Also published is ICLARM Bibliographies 5, "A Bibliography of the Giant Clams (*Bivalvia:Tridacnidae*)" by J. L. Munro and W. J. Nash. With giant clams garnering interest by aquaculturists, the authors have tried to

locate and list all scientific papers and reports published up to 1985 which deal specifically with aspects of the biology, ecology, exploitation, and cultivation of the various species of giant clams. In addition, they have included a selection of papers on topics which are highly relevant to giant clam culture, such as the use of serotonin for spawning induction and key papers dealing with aspects of the biology of the symbiotic zooxanthellae. Omitted were such reports as faunal surveys which merely mention the presence of tridacnids without further detail. The 26-page paperbound bibliography costs \$4.50 (airmail) and \$2.50 (surface).

Identification of Fish Subpopulations, Remote Sensing, and Fish Hearts

"Applications of Remote Sensing to Fisheries and Coastal Resources," subtitled "Report of a California Sea Grant Workshop" and edited by Rosemary Amidei, has been published by the California Sea Grant College Program, University of California, A-032, La Jolla, CA 92093, as Publ. no. T-CSGCP-012.

This free 68-page paperback is a report on a national workshop sponsored by the California Sea Grant College Program in November 1983, presenting discussions of the status of remote sensing applications to fisheries and coastal resources, operational aspects of remote sensing, and future applications of remote sensing.

Also available from the UCSGP is "Identifying Fish Subpopulations," the "Proceedings of a California Sea Grant Workshop," edited by Dennis Hedgecock, Publ. no. T-CSGCP-013. The workshop was held to 1) determine why and how techniques such as electrophoresis are being applied to problems of fisheries research, 2) assess how data on fish subpopulations are presently applied to management policy, and 3) identify future applications of subpopulation identification to fisheries management. Part I includes discussions of

the application of electrophoresis to fisheries research and management and Part II is a panel discussion on the usefulness of the "stock concept" in fisheries management. The 51-page paperbound report is also free.

"Social Consequences of Maritime Technological Change" by Alastair Couper is another in the University of Washington's McKernan Lecture series. The author, head of the department of maritime studies at the Institute of Science and Technology, Cardiff, Wales, concentrates primarily on current and future technological changes in ports and shipping, but also includes remarks on the effects of change on commercial fisheries and fishing communities. The 17-page paperbound report, WSG 85-6, costs \$3.00 and is available from Washington Sea Grant Communications, 3716 Brooklyn Avenue, N.E., Seattle, WA 98105.

Also published by the UW Sea Grant Program is WSG 85-5, "Preservation of U.S. Maritime Freedoms: Mission Impossible?" by Bruce Harlow. In it, the author, a retired U.S. Navy Rear Admiral, outlines his reasons for optimism on navigational rights even though the United States has not signed the LOS treaty, and concludes that the 1982 convention, however imperfect, represents the best codification of the law of the sea available. The 34-page paperbound booklet also costs \$3.00.

"Morphology and Innervation of the Fish Heart" by Robert M. Santer is the first book devoted to the subject and is a thorough review of the literature on the structure and development of the fish heart, amplified by the author's extensive observations on the hearts of many species taken from both marine and freshwater habitats. It describes the variations that exist in the structure and innervation of the fish heart, and points out areas needing further investigation. Well illustrated with photomicrographs and drawings, the 102-page paperbound volume is number 89 in the Series "Advances in Anatomy, Embryology, and Cell Biology" published by Springer-Verlag New York, Inc., 44 Hartz Way, Secaucus, NJ 07094-2491 and costs \$24.00.