

New NMFS Scientific Reports Published

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NOAA Technical Report NMFS 36. Lasker, Reuben (editor). **"An egg production method for estimating spawning biomass of pelagic fish: Application to the northern anchovy, *Engraulis mordax*."** December 1985, iii + 99 p. (15 papers).

ABSTRACT

The chief advantages of this egg production method are that 1) it yields an instantaneous estimate of egg production and spawning biomass requiring a single cruise

with one or two ships and 2) each factor in the biomass estimate is formally derived with estimates of precision. The major disadvantage of the method is that eggs are patchier and represent a shorter time period than larvae, thus requiring many samples to be taken to improve precision. Each sample must be small to reduce variance and to limit the time needed to sort out the eggs, and the entire spawning area should be encompassed by the cruise to detect the geographic edge of spawning. The egg production method may also be the technique of choice for determining the spawning biomass of other multiple spawning pelagic fish, particularly clupeoids (e.g., sardine, anchovy, and menhaden), and this report is intended to be a guide to fishery scientists in applying the method to their own species. It provides the theoretical basis and describes the operational aspects of the method as used to determine the spawning biomass of the northern anchovy, *Engraulis mordax*, off California in the last 5 years.

NOAA Technical Report NMFS 37. Murchelano, Robert A., Linda Despres-Patanjo, and John Ziskowski. **"A histo-**

pathologic evaluation of gross lesions excised from commercially important north Atlantic marine fishes." March 1986, iii + 14 p., 13 figs., 4 tables.

ABSTRACT

Histopathologic studies of lesions found in commercially important North Atlantic marine fishes are uncommon. As part of a comprehensive Northeast Fisheries Center program ("Ocean Pulse") to evaluate environmental and resource health on the U.S. Continental Shelf from Cape Hatteras to Nova Scotia, grossly visible lesions of the gills, integument, muscle, and viscera of primarily bottom-dwelling fishes were excised and examined using light microscopy.

Several gadid and pleuronectid fishes accounted for most of the lesions observed. Most pathological examinations were incidental to samples taken for age and growth determination and evaluation of predator/prey relationships. Several gadids, with either gill, heart, or spleen lesions, were sampled more intensively. Gill lesions principally affected gadids and were caused by either microsporidians or an unidentified oocyte-like cell. The majority of gastrointestinal lesions consisted of encapsulated or encysted larval worms or microsporidian-induced cysts. Few heart lesions were found. Integumental lesions included ulcers, lymphocystis, and trematode metacercariae. Liver lesions almost always consisted of encapsulated or encysted larval helminths. Necrotic granulomata were seen in muscle and microsporidian-induced granulomata in spleen.

A Field Guide to Alaska's Marine Life

Publication of **"Alaska's Saltwater Fishes and Other Sea Life"** has been announced by the Alaska Northwest Publishing Company, 130 Second Avenue South, Edmonds, WA 98020. The author is Doyme W. Kessler, a fisheries biologist with the Kodiak Laboratory of the NMFS Northwest and Alaska Fisheries Center.

This is a genuine "field" guide for specialists and nonspecialists to the quick identification of the marine creatures off Alaska's shores. The author presents in full color most of the fishes and invertebrates of the region, with the primary sampling region being roughly from the waters of Kodiak Island through Unimak Pass and past the Pribilof Islands to lat. 59°N. The photographs are quite good and were expressly made under standardized and strictly con-

trolled conditions to show the true color, form, and texture of live creatures. These and other diagrams and text guide the user to 370 species, many never before identified and photographed.

Rarely are field guides field tested before publication as this one was, with looseleaf versions with color prints being employed and refined in actual shipboard use. The book, developed over 15 years, includes only the data needed for positive identifications, and simplifies identification by emphasizing the distinguishing features of the living animals such as shape, color, surface texture, etc. It employs a "picture index," instead of a scientific key, to lead users to the proper section for final identification, where the color photos, coupled with key identification marks facilitate final identification. General size and range data are also listed. For data on life history, commercial usage, ecology, etc., readers are referred to other litera-

ture sources in the guide's bibliography. Besides the picture "index," the volume has indexes to both common and scientific names.

Thus it is a unique and excellent contribution to the field identification of the marine life of Alaska's continental shelf waters, which should be very useful to the region's scientists, commercial and recreational fishermen, as well as others interested in marine life further south. Paperbound, the 358-page volume is available from the publisher for \$19.95 (\$24.95 in Canada).

The Effects of El Niño

"El Niño North," subtitled "Niño effects in the eastern subarctic Pacific Ocean" and edited by Warren S. Wooster and David L. Fluharty, has been published by the University of Washington Sea Grant Program, 3716

Although not numerous, histologically interesting lesions were noted in integument, heart, liver, spleen, and muscle of several fish species. Histologic study of tissues excised from a variety of demersal and pelagic fishes from the eastern North Atlantic (France, Germany, Spain) revealed assorted integumental, renal, hepatic, and splenic lesions. Small sample size and non-random sampling precluded obtaining a meaningful quantitative estimate of the prevalence of the observed lesions in the population at risk; however, a useful census has been made of the types of lesions present in commercially important marine fishes.

NOAA Technical Report NMFS 38. Uchida, Richard N., and James H. Uchiyama (editors). **"Fishery atlas of the northwestern Hawaiian Islands."** September 1986, iii + 142 p., 77 figs., 5 tables.

ABSTRACT

This atlas summarizes data on the crustaceans, molluscs, and fishes caught in a resource survey of the northwestern Hawaiian Islands from October 1976 to September 1981. The geographical and depth distributions, size range, and the type of gear used to catch all of the crustaceans, molluscs, and fishes are tabulated. Species accounts of 37 crustaceans, molluscs, and fishes of commercial potential are presented. The geography, oceanography, and climate of the region are reviewed.

Brooklyn Ave., N.E., Seattle, WA 98105. The volume is a compilation of papers presented at a meeting on the 1982-83 El Niño held in September 1984 at NOAA's Pacific Marine Environmental Laboratory, Seattle, Wash., and sponsored by IRIS (International Recruitment Investigations in the Subarctic) and supported by the NMFS Northwest and Alaska Fisheries Center. All of the papers were refereed; a few are abstracts of papers published elsewhere. But overall, the publication represents a significant record of how a major El Niño event can perturb the ocean and its biota so far north, and also suggests additional research which might help predict the effects of future El Niño episodes.

The papers in part one focus on the physical environment affected from the tropical Pacific to the eastern Bering Sea and the western North Pacific. Contributions in part two examine the biolog-

ical response—plankton and nekton distribution and abundances, effects on the early life history and recruitment of fishes in temperate marine waters, zooplankton and ichthyoplankton responses off Oregon, effects on Oregon seabirds, salmon management in response to the El Niño, records and sightings of fish and invertebrates in the eastern Gulf of Alaska, and others. The collection of papers should form an important reference to the 1982-83 El Niño phenomenon; also included is a selected bibliography of El Niño events in the eastern subarctic Pacific Ocean. Paperbound, the 312-page volume is available from the publisher for US\$10.00.

THE ROLE OF SEAFOOD IN HUMAN HEALTH

The **"Proceedings of Seafood & Health '85, Issues, Questions, Answers"** has been published by the West Coast Fisheries Development Foundation, 812 S.W. Washington, Suite 900, Portland, OR 97205. The Foundation also has available a complete videotape of the conference—five 90-minute tapes covering all the talks in 1/2-inch VHS or Beta formats.

The conference, held in Seattle, Wash., in late 1985 brought together some of the nation's leading medical researchers, nutritionists, dietitians, seafood marketers, seafood industry representatives, and communicators from the trade and popular press to discuss the healthful benefits derived from eating fish and how to better and more effectively promote fish in the American diet. Thus, the contributions review what is known about the health benefits of eating seafood, dietary trends in the United States, nutrient composition of seafoods, the effects of omega-3 (n-3) and other fatty acids and sterols in the diet, the politics of seafood promotion, antithrombotic effects of the omega-3 fatty acids, and impact of omega-3 fatty acids on prostaglandin synthesis and disease mechanisms, relationships between seafood and diet and breast cancer, new frontiers of research in fish oils, and dietary recommendations to the public.

Discussions on the second day reviewed communicating about nutrition

questions, the seafood industry's perspective on seafood and health, where to get good information on seafood and nutrition, retail promotion of seafood, advertiser responsibilities, and the role of food writers and editors in promoting seafoods. The book also includes important segments of discussions surrounding the presentations.

Overall, the proceedings (and the conference) presented an excellent mix of technical data on the healthful benefits from eating seafoods to ways to better communicate those values to the American consumer and it will be of interest and use to a wide range of professionals involved in studying, managing and communicating facts about the role of seafoods in a healthful diet. The 220-page paperbound volume is available from the Foundation for \$50.00 and the videotapes cost \$125.00 per set.

Also published by the foundation is a seafood supplier guide, titled **"Who hazzit,"** listing seafood firms in Washington, Oregon, and California who wish to expand into new markets, their products and species and marketing forms. The directory lists contacts for each firm and costs \$15.00.

International Game Fish Annual and Record Book

"World Record Game Fishes 1986," published by the International Game Fish Association, 3000 E. Las Olas Blvd., Fort Lauderdale, FL 33316-1616, presents another set of excellent conservation-oriented articles for marine anglers along with the listings of world game fish records approved by IGFA during 1985, which was a very good year. World records granted were 694, second only to the all-time high of 1,074 set in 1984. In addition, the volume updates the records listings in all-tackle, line class, and tippet class categories for more than 150 species of both fresh and saltwater fishes. The listing also reflects the expansion of the number of species recognized for records listings.

New articles include a description of how anglers can increase their fishing efficiency by employing satellite data by Mitchell Roffer, along with two articles on fisheries enhancement: Daniel Sheehy's discussion of the transfer of east Asian artificial reef and fish attrac-

tor technology and Richard Brock's article on how fish habitat can be enhanced for fish and anglers. In addition Carol Hopper describes her studies of marlin reproduction, in conjunction with the Hawaiian billfishing tournaments, and how her findings may help achieve better resource management. Two other reports—one on acid rain problems by Patricia Bradt and Dean Arnold and the other marine debris pollution by NMFS scientist Howard O. Yoshida—provide excellent insights into two serious problems facing anglers and fish. Finally, Peter Fithian discusses the what, where, when, why, and how of "fishing contests."

In addition, the volume presents the usual data on angling rules, world record requirements, contest and club requirements, and other Association data, along with the "guide to fishes" section, plus appendices on fish record-keeping agencies, fishing knots, and an index by common and scientific names of fishes. The volume is free to IGFA members and is sold to others for \$9.75 (in U.S.A.) and \$11.75 (foreign).

The Marine Fishes of European Waters

Publication of Volume I of "**Fishes of the North-eastern Atlantic and the Mediterranean**," edited by P. J. P. Whitehead, M.-L. Bauchot, J.-C. Hureau, J. Nielsen, and E. Tortonese, has been announced by Unesco, Division of Marine Sciences, 7 Place de Fontenoy, 75700 Paris, France. The first of three volumes (the last to appear in early 1987), this book constitutes an important major guide to the marine fishes of Europe's waters and an important ichthyological reference. Whitehead, chief editor of the series, is Head of the Marine Fishes Section of the British Museum (Natural History) and a Vice-President of the European Ichthyological Union. Bauchot and Hureau are Professors at the Museum National d'Histoire Naturelle, Nielsen is Curator of Fishes at the Zoologisk Museet in Copenhagen, and Tortonese is Honorary Director of the Museo Civico di Storia Naturale in Genova. The book covers broadly from the Mediterranean to Madeira, the Azores, and north to

Greenland and eastward to Novaya Zemlya. The volume(s) are a result of >20 years of preparation by more than 70 scientists from nearly 20 countries.

Short title for the three-volume series is FNAM, which is an extension of CLOFNAM, the "Check-list of the Fishes of the North-eastern Atlantic and of the Mediterranean," published in two volumes in 1973, with a second reprinting with a supplement in 1979. CLOFNAM, as an intermediate step toward the new publications, remains a complementary resource to users of FNAM.

Europe's marine fishes are among the most and best studied in the world, but FNAM is the only single work to include comprehensive data on them all, including distribution, biology, as well as keys to them and drawings to facilitate identification. Indeed, this impressive new reference includes the main taxonomic features and biology of all of the known marine fishes of the region—altogether 1,256 species from 218 families. It includes diagnostic keys to families, genera, and species, as well as details on nomenclature, external morphology, reproduction, food, habitat, and maps illustrating geographical distribution. An excellent drawing of each species is presented, and references are thorough.

The family key, valid only for the specified region, includes a representative drawing. Only common synonyms are given (full synonym lists and their literature references are in CLOFNAM); common names are most often given in English, French, and Spanish per FAO listings; some German and Russian and other national names are included as needed. Families included in Volume I range from Petromyzonidae (CLOFNAM 1) through Anotopteridae (CLOFNAM 64).

All species are included from all habitats, including estuaries, lagoons and brackish waters, and from the continental shelves on down to the abyssal depths. The editors and authors have also retained the CLOFNAM family, generic, and species numbers to ease data retrieval and aid those who have adopted the CLOFNAM numbers for museum storage or indexing purposes, while bringing the classification up to date.

Volume I, currently available, con-

tains the lengthy illustrated key to the families; Volume III, when published, will contain the indexes by common and scientific names. This comprehensive work will be of great value to anyone needing information on the region's fishes and should serve as a standard reference for many years for students, biologists, and research scientists, as well as nonspecialists seeking information on Europe's marine fishes.

Hardbound, the 510-page Volume I is available worldwide from Unesco book distributors. In the United States it is available for \$63.50 from Unipub, P.O. Box 1222, Ann Arbor, MI 48106; in England from HMSO, P.O. Box 276, London, SW8 5DT for £37.50; and in France and elsewhere from the Librairie de l'Unesco, 7 Place de Fontenoy, 75700, Paris, for FF250.

A Comprehensive Review of Seafood Utilization

"**The Northeast Seafood Book**," subtitled "A manual of seafood products, marketing and utilization" and written by Susan M. Faria, has been published by the Massachusetts Division of Marine Fisheries, New England Fisheries Development Foundation, and the Northeast Marine Advisory Council. The author is a marketing specialist with the Seafood Marketing Program of the Massachusetts Division of Marine Fisheries. The book was originally written to provide practical and reference information on northeastern U.S. seafoods for home economists, extension agents, and the like, but was vastly expanded to include information useful to virtually all those involved in the seafood industry.

Introductory topics include U.S. seafood consumption and attitudes, seafood industry trends, fisheries management, aquaculture, commercial fishing, fish processing, fish distribution and marketing, Federal inspection and grading of fishery products, seafood pricing, and frozen, cured, and canned seafood products. Also discussed is roe (and caviar), minced fish, surimi, seaweeds, sashimi, and sushi, as well as industrial fishery products. Additional sections review the nutritional aspects of seafoods, public health concerns, seafood quality, and

tips for buying and storing seafoods.

In addition, the author has provided excellent sections on seafood cooking methods plus a "how to" section dealing with items ranging from steaking, filleting, and skinning fish to the handling of shellfish, including squid, home preparation of caviar and sushi, boning out round and flatfish, stuffing large round fish, and the home salting, smoking, pickling, and canning of fish. Another section provides instruction in teaching others about seafood and sources of data and literature. Finally, a lengthy section is devoted to data on northeastern U.S. seafoods. Another on "nonnative" seafoods greatly broadens the scope and usefulness of the volume. Also included is a seafood nutritional composition table, conversion ratios for shellfish (mussels or clams per bushel, etc.), and a glossary.

The volume is an excellent reference source that even most homemakers would find very useful, although it has been aimed at an audience of restaurateurs, food service operators, home economists and other educators, and seafood retailers, wholesalers, and distributors. Paperbound, the 269-page volume is available from the Northeast Marine Advisory Council, NEC Administration Building, 15 Garrison Avenue, Durham, NH 03824 for \$15.00.

International Angling Problems and Progress

"World Angling Resources and Challenges," edited by Richard H. Stroud, constitutes the Proceedings of the First World Angling Conference which was held in Cap d'Agde, France in September 1984, by the International Game Fish Association (IGFA), 3000 East Las Olas Blvd., Ft. Lauderdale, FL 33316-1616. Contributing sponsors included the U.S. Department of Commerce's National Marine Fisheries Service, the Interior Department's U.S. Fish and Wildlife Service, and Canada's Department of Fisheries and Oceans.

The conference's first session, and the Proceedings' first hundred pages, are devoted to a review of various national or regional angling reports on the species available, fishing organizations, angling (fishing) resources, types of

angling available and methods, and much more. For some nations the reports are necessarily brief, but for many, much useful information is provided.

The second session presents several fine reports on fisheries habitat—types needed, problems causing fish habitat losses or degradation (i.e., acid rain in Europe and Canada; sources and effects of various contaminants, etc.), and a call by Douglas S. Dallas to sportsmen to guard their angling heritage.

Session three then presented several avenues through which angling resources could be enhanced—via habitat restoration, use of cultured fishes, and by constructing artificial reefs and fish aggregating devices. The following session provided several insights into the needs for and uses of research and data requirements for management, an economic evaluation of sport fishing, a look at the diversity among recreational fishermen, the importance of cooperative game fish tagging programs in marine fisheries research, tagging game fish in the Indo-Pacific region, a review of the transatlantic migrations of the blue shark, and a plea for angler-scientist cooperation and an international inventory of marine sport fishes.

Session five presented status reports on the Atlantic bluefin tuna resource, world billfish stocks, and a review of Pacific salmon management in Canada. Session six, problems and opportunities in managing recreational fisheries, reviewed a number of knotty problems. Papers included a basic review of why and how fisheries should or could be managed, the international management of tunas and billfishes and Atlantic salmon, and a discussion of the means of funding recreational fishing programs in the United States.

The final session presented a discussion on marine recreational fishing development, an overview of angling contests, a short review of fishing clubs (especially university clubs), and the role of industry in recreational fisheries—all generally directed at fisheries development. The final article reviewed the nutritive values of fish, as opposed to the esthetic values in angling for them.

The volume is thus an excellent source of information on worldwide

game fish and angling and the problems besetting anglers and their quarry. However, it also provides some good suggestions for developing or improving the resource and the sport. It unfortunately lacks an index, but otherwise will be a very valuable reference for those involved in recreational fishing, either as an angler or as a fishery biologist, manager, or administrator. The 390-page volume, hardbound, costs \$25 in the United States and \$30 elsewhere.

Sturgeon, Carp Culture, and Fish Disease Reviews

Publication of "Recent Advances in Aquaculture, Volume 2," edited by James F. Muir and Ronald J. Roberts, has been announced by Westview Press, 5500 Central Avenue, Boulder, CO 80301. Contributions by authorities from four continents emphasize nutrition and diseases of farmed fish, along with an interesting chapter on sturgeon culture which describes both the traditional Russian system and innovations in white sturgeon culture in California.

Chapter 1 constitutes a review of the fish parasite *Ichthyobodo necator*, a kinetoplastid in the family Bodonidae. Discussed is the protozoan flagellate's biology and life history, host-parasite interactions, environmental effects on infestations, and chemical treatments for it. Chapter 2 then reviews egg development (oogenesis) in the common carp, *Cyprinus carpio*, and chapter 3 reviews smoltification physiology in the culture of salmonids.

Chapter 4 presents a lengthy discussion of the biology and culture of the grass carp, *Ctenopharyngodon idella*, with special reference to its utilization for weed control; appended is a listing by E. M. Ebreget of parasitic agents reported from the species. In chapter 5, diseases induced by the mold *Aspergillus* are reviewed, along with possible control methods. In chapter 6, Simon J. Davies outlines the role of dietary fiber in fish nutrition, including fiber in natural ingredient diets, studies using alpha-cellulose, chitin as a fiber source, and the experimental use of galactomannan as a gel-fiber.

Finally, in chapter 7, Sergei I. Doroshov reviews the biology and culture of sturgeons, and discusses life history

aspects of several important species. He then explains approaches to sturgeon culture, sturgeon "ranching" in the Soviet Union, hatchery techniques, and grow-out to market size; much, he adds, remains to be learned about the species and their culture. Indexed, the 282-page hardbound volume is available from the publisher for \$42.00.

Olfaction, Taste, and Their Use by Finfish

Volume 8 in the series *Developments in Aquaculture and Fisheries Science* is "**Chemoreception in Fishes**," edited by Toshiaki J. Hara and published by Elsevier Scientific Publishing Company, P.O. Box 330, 1000 AH Amsterdam, The Netherlands. Research in the field has grown rapidly in recent years and indeed, has special application in the development of effective fish bait, in understanding fish migration, social behavior, and feeding, effects of pollution on fishes, and more.

This volume broadly reviews chemoreception with special emphasis on its significance in behavior and in environmental interactions. Its 21 chapters are divided into five categories: Organ structure and function, chemoreceptive mechanisms, role of chemoreception in feeding, role of chemoreception in social behavior and migration, and chemoreception and water pollution.

An initial chapter by H. Kleerekoper presents an interesting historical review of the studies and ideas on olfaction in fishes from the 18th to the early 20th century. Subsequent chapters discuss development and regeneration of the olfactory organ in rainbow trout, comparative morphology of the peripheral olfactory organ in teleosts, synaptic organization of the olfactory bulb and central projection of the olfactory tract, and the taste organ in the barbel of the bullhead. Additional chapters review the role of olfaction in the orientation of fishes, chemoreception in the lateral-line organ, responses of olfactory receptor cells to electrical and chemical stimulation, and amino acids as olfactory stimuli for various species.

Another paper relates the results of behavioral studies on feeding in the puffer and their correlation with the

electrical responses of the taste nerve. Those results can then be compared with two subsequent reviews of chemical stimulation of feeding behavior of fishes and of identification of gustatory feeding stimulants. Another chapter reviews baits in various fisheries, with emphasis on North Atlantic cod. Final chapters review chemoreception in salmonid homing and in fish communication, the adaptive significance of the alarm substance-fright reaction, and chemoreception and aquatic pollutants. Overall, the contributions are well written and the volume constitutes a good basic reference to the field; each chapter includes extensive references into the early 1980's. Hardbound, the 433-page volume is available from the publisher for US\$91.50 or Dfl. 215.00 (and in the U.S. and Canada from Elsevier Science Publishers, Inc., P.O. Box 1663, Grand Central Station, New York, NY 10163.

Patterns and Processes Along the Rocky Shores

Publication of "**The Ecology of Rocky Coasts**," edited by P. G. Moore and R. Seed, has been announced by the Columbia University Press, 562 West 113th Street, New York, NY 10025. The volume is dedicated to J. R. Lewis, a pioneer of British studies on the topic. Altogether there are 24 contributions which, with Lewis' own 1964 book "Ecology of Rocky Shores," form an impressive reference for students and researchers.

The volume is a compilation of three types of papers: Major "background" reviews, critical reviews of aspects of zonation or littoral ecology, and original research papers on the biology of certain species which contribute significantly to the overall community structure of rocky shores. And they are grouped into, first, descriptive surveys and zonation patterns, dynamics of key species, local heterogeneity, and the problems this poses for monitoring and surveillance programs. Thus, the diversity of the papers provides a good review of temperate rocky coastline ecology.

Included are reviews of the littoral epifaunal communities of algal fronds, meiofauna of seaweeds, and the amphipod fauna of kelp holdfasts. Another

chapter provides a critical review on the influence of physical factors in controlling the grazing, competition, and distribution of rocky shore gastropods (in New South Wales), while yet another describes variation in shell shape of the dogwhelks.

Some of the more specialized contributions deal with biology of barnacles, gastropods, certain other very small littorinids, etc. Other general reviews deal with major features of rocky shore zonation, each stressing one particular dominant, and the role of mussels in the littoral zone. Additional contributions examine predation in rocky shore communities, reproductive strategies of North-temperate rocky shore invertebrates, detection of long-term trends in rocky sublittoral communities, community ecology of vertical rock walls in the Gulf of Maine, zonation of seaweeds on rocky shores, the organization of algal epifaunas, phytal meiofaunal ecology, and variation and persistence of rocky shore populations.

Other contributions develop themes on predation and optimal foraging theory and life history strategies for various species on rocky coasts. Overall, the chapters present an authoritative description of current knowledge and research on rocky shore ecology. The 467-page hardbound volume also has an excellent and lengthy list of references, and is available from the publisher for \$45.00.

Australian Prawn Seminar Proceedings Are Published

The proceedings of the "**Second Australian National Prawn Seminar**," edited by P. C. Rothlisberg, B. J. Hill, and D. J. Staples, has been published by NPS2, P.O. Box 120, Cleveland, Queensland, Australia 4163. The first seminar was held in 1973, the second in October 1984 with 51 papers and 9 posters presented. Topics covered include life histories, ecology, fisheries biology, aquaculture, commercial fisheries, population dynamics, and management aspects, and 34 of the presentations were included in the publication. Additional information on the 368-page paperbound volume is available from the publisher (price not listed).