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Buchbesprechungen (Book reviews)

Baretta-Bekker, J. G., Duursma, E. K., Kuipers, B. R. (Eds.): **Encyclopedia of Marine Sciences.** Berlin: Springer, 1992, 311 pp., DM 69,–.

The Encyclopedia of Marine Sciences is a compact bundle of up-to-date, well-written and excellently illustrated information. It comes in the form of a handy paperback with small print, and contains 1850 entries. The book is aimed at scientists, teachers and students. Although all major aspects of marine knowledge are covered, there is a clear 50 % bias towards marine biology. The other entries are almost evenly distributed between physical oceanography, marine geology and chemistry. The reason for this uneven partition is not quite clear, because the chief editors and a large number of assistant editors and contributors are from all fields of marine science. However, the book is rigorously edited and the entries are concise but generally convey the necessary information. The excellence in clarity was probably facilitated by the fact that most of the entries' authors come from under one roof, i.e. the Netherlands Institute of Sea Research (NIOZ). Accordingly, a large body of expertise could be directly tapped and well-coordinated.

An interdisciplinary approach is typical for modern oceanography, an approach which is well-reflected in this concise encyclopedia. Furthermore, it was certainly an excellent idea to pass the manuscript through the hands of appropriate "test" readers in the form of postgraduate students of NIOZ. Besides using basic information, there are so many interesting details included in the entries on concepts and approaches in the marine sciences that one could well imagine that the book might often be taken up, for some leisure-time reading, both by scientists and all kinds of interested readers. Clear figures complete this positive picture. The drawings encompass complete schemata, e.g. on the carbon cycle, tools and instruments, chemical formulae, maps, and overviews of the habitus of organisms. Very few typographical and factual errors could be detected (e.g. a monoclonal antibody is more than simply a "monospecific antibody"). Some more species names in Latin might have been included (e.g. in Cephalopoda). The Pogonophora are missing in spite of their importance in the ecosystems of the deep-sea rift-valleys.

A major problem with all glossaries is to handle the necessity of cross-referencing in an appropriate manner. Here, this was not always a success. The following is an example of the entries for "tide". Twelve terms are cross-referenced: tide, and astronomical-, solar-, lunar-, neap-, spring-, partial-, diurnal-, semidiurnal-, shallow water-tide, harmonic analysis of a tide, and geopotential field (referred to, but not actually listed). Additionally, more, associated terms are separately listed, e.g. co-tidal lines, etc. It is a bit confusing and time-consuming to grasp the essence of tidal mechanisms. A more continuous text would have been advantageous. Furthermore, the terminology is an oceanographical one, making it rather difficult for a relative layperson to understand the driving forces and effects of the tides. A simple diagram would have been helpful in respect of the latter. The same also applies to the term "plankton". In other cases, the problem was better solved. Sometimes one would have liked to have had more information on a single entry. For example, the text on "osmoregulation" – an important component in marine eco-physiology – is rather short. However, it is certainly to be acknowledged that the editors wanted a concise but informative paperback, which they perfectly achieved. It really comes in a handy form, and as the marine scientist is usually frequently on the move, it can be easily taken along. Accordingly, the Encyclopedia of Marine Sciences can be warmly recommended, as a helpful and time-saving aid; one that will surely find its place on lab-benches or writing-desks of many a rolling and pitching research vessel. Its concept may also be a spark to generate and foster interdisciplinary discussions among colleagues on board, as well as in the home institute.

F. Buchholz (Helgoland)

Lenz, W. & Watermann, B. (Eds): **Historisch-meereskundliches Jahrbuch.** Bd 1. Berlin: Reimer, 1992, 143 pp., DM 58,–.

During the twentieth century, scientific research in Germany was intensely influenced by the changing socio-economic conditions of war and also post-war times. Historical studies on the mutual relations between science and Zeitgeist are a fascinating topic. However, the post-war and "Wirtschaftswunder" years did not favour research into the history of science. Such periods are generally characterized much more by repairing and restoration than by retrospection. Thus, German science of the 'fifties and 'sixties was about to become a matter of highly professional activity, sophistication of methods and increase of staff and implements, resulting in something like a scientific luxury and finally causing the students' protest of the late 'sixties. As is well known, reactions of the scientific community to such types of criticism are a matter of the succession of generations. Thus, the usual time-lag was just over, and the public began to take notice of those who advocated the importance of persons with culture and education for scientific work. Interest grew again in what kind of people those were to whom we owe current knowledge. Research projects were initiated; scientific societies and institutions rediscovered their roots. But with the end of the Cold War and after German unification, things have changed quite a lot. Socio-economic difficulties have come to light which had before been neglected. Money has to be saved, wherever this is possible, to keep industry going. Support for cultural affairs which are looked upon as a luxury is now difficult to obtain. The "Historisch-meereskundliche Jahrbuch 1", here reviewed, is of exemplary importance in this context. It is a very impressive synopsis of different fields of marine research – mainly in biology – in different periods of German history. The contributions concern early whale studies, plankton research, Anton Dorhn and the foundation of the "Biologische Anstalt Helgoland", German South Polar research and Wilhelminian naval politics, Knudsen's hydrographical tables, overfishing of the North Sea, and marine biologists in the time of National-Socialism. The combined papers strikingly show how densely interwoven the interests of economics, politics and science are. Off-shore studies and competition for resources and human food always cause intimate connections between science and the navy. Marine biologists are under special observation during war-time. German zoologists were among the prominent victims of Nazi terror. Many such topics are dealt with in the above, fascinating volume. But: Habent sua fata libelli. Once again this famous saying by Terentianus Maurus is true. The book was part of the exhibition of recent publications on the occasion of the 100th anniversary of the "Biologische Anstalt Helgoland", when many historical lectures were also given during the festive Symposium on the Island. Now, a little more than one year later, it is frankly discussed whether it is really necessary to have a "Biologische Anstalt Helgoland" and, if so, how to manage it in the future. One is very concerned as to what will be the final decision. The present situation is rather unfavourable for well-considered and innovative discussions, since life is destabilized now. People are nervous, impatient and intolerant. Politics has a good deal of public entertainment and does not favour prudent advisers. Whatever will happen, these are the next chapters in the history of marine science in Germany. Go and buy the book to be informed on the background; it is well-done and offered at a reasonable price! Each purchaser helps to continue these valuable studies.

D. Mollenhauer (Frankfurt am Main)

Preobrazhensky, B. V.: **Contemporary Reefs.** Rotterdam: Balkema, 1993, 319 pp., DM 165,–.

This is Volume 100 in the Russian Translation Series of Balkema Press. A publication date of the original version is not given; the most recent reference is from the year 1983; an appendix deals with some results on underwater landscape mapping of the RV "Volkanov" voyage to the Seychelles in 1989. The author, linked to the Pacific Institute of Geography in Vladivostok, has studied coral reefs for more than two decades. According to him, the contrast between the high number of Soviet specialists in the field of ancient corals and reefs and the paucity of scientists studying recent reefs called for a book to familiarize Soviet students with current knowledge of contemporary reefs (which, to the author, are synonymous with coral reefs).

The manifold biological, geological, paleontological and geographical aspects of reefs can be outlined only very selectively on 275 pages. This selection is unfortunately biased towards formal discussions on terminology and classification of reefs – obviously provoked by a hitherto inconsistent use of terms. Biological and ecological aspects of corals, including symbiosis, nutrition, competition for space, and controls of zonation patterns are only very briefly reviewed. Specific Preobrazhensky-themes are "reef landscapes" (using the term "topia" for extended, lush, garden-like stands of corals). The chapter "Modelling the reef ecosystem" is an abstract reflection on how to assemble so-called artificial reefs to maximize the producer and consumer biomasses. The "Principles of reef classification" (Ch. 9) are detailed with devotion, and differentiate between reef-as-structure and reef-as-process. They culminate in a reef definition which, interestingly, does not require the structure to be close to the sea level (as most definitions do) but just to be in the euphotic depth; by way of contrast, a bank is formed by azooxanthellate organisms (unmentioned in aphotic depths). Reefs are classified within coordinates of cosmic, telluric and supracrustal energy. This approach considers whether reef development is mainly controlled by solar radiation, movement of the earth crust, and climate, respectively.

The preference for general wording disclaims information, especially in phrases such as "The work of . . . is very interesting" (p. 129) and, two lines further on: "They arrived at very interesting conclusions". Page 132 informs us rather inadequately that "Polychaeta feed on Poritidae and other corals". "Many gastropods hide during the day . . . at night they crawl into various corals . . ." – no specifications, no identification, for examples of the Drupella-problem. The list on such non-informations could go on. In many cases, the references are omitted. Furthermore, the quality of the text suffers from a bad translation; for example, several times "coral communities" instead of coral colonies, "deep water hydrothermal societies" instead of . . . "hydrothermal communities" (p. 171). Misspellings are numerous (e.g. cnydoblasts, spyroblasts, Mitilidae).

In conclusion, this book is of very limited use to the uninformed student of coral and other contemporary reefs; anyhow, the price of DM 165,– acts as a deterrent against their buying it.

H. Schuhmacher (Essen)

Ax, P. (Ed.): **Microfauna Marina.** Vol. 8. Stuttgart: Fischer, 1993, 283 pp., DM 89,–.

Die Serie „Microfauna Marina" behandelt die unterschiedlichsten Aspekte der Ökologie, Systematik und Evolution, der Morphologie und Ultrastruktur sowie der Lebensweise der Kleinstlebewesen des Meeresbodens. Als Volume 8 ist nun ein weiterer Band erschienen, der wie seine Vorgänger durch hervorragenden Druck, zahlreiche Fotos sehr guter Auflösung und akribische Abbildungen glänzt. Band 8 vereint 17 Beiträge, 4 in deutscher und 13 in englischer Sprache.

Die ersten 9 Beiträge widmen sich Ultrastruktur-Untersuchungen und deren Implikationen für die systematische Stellung der jeweiligen Taxa. Dies geschieht am Beispiel der Protonephridien in den Beiträgen von M. Franke (Entoprocta), W. H. Ahlrichs (Rotifera) und T. Bartholomaeus (Annelida, Syllidae), am Beispiel des 2-Drüsen-Haftorgans im Beitrag von U. Ehlers & B. Sopott-Ehlers (bei Plathelminthes, Dalyelliidae) sowie am Beispiel der Photorezeptoren bei Plathelminthen und Anneliden in 3 weiteren Beiträgen von B. Sopott-Ehlers bzw. T. Bartholomaeus. Schließlich liefert der Feinbau der Spermatozoen im Beitrag von A. Schmidt-Rhaesa weitere Autapomorphien für die Prolecithophora (Plathelminthes).

Die Untersuchung der Spermien der Meduse *Halammohydra* aus dem marinen Sandlückensystem führt im Beitrag von U. Ehlers zur Hypothese einer Monophylie von Ctenophora + Bilateria, wohingegen die Hypothese eines Monophylums Cnidaria + Ctenophora (Coelenterata) nicht durch den Feinbau der Spermien gestützt wird.

Die Sektion Biogeographie ist durch 3 Beiträge von P. Ax über Gastrotricha und Plathelminthes der Faröer und von Grönland vertreten. Zwei Beiträge widmen sich der Individualentwicklung. B. Neuhaus stellt die Postembryonalentwicklung von Kinorhynchien der Nordsee vor. H.-U. Dahms beschreibt die Copepoditenentwicklung von 9 Harpacticidenarten und kommt zu dem Schluß, daß nur die ontogenetischen Veränderungen der Antennen und Schwimmbeine phylogenetisch verwertbare Informationen liefern (weil alle anderen Copepoditenanhänge nur die Adultorganisation vorwegnehmen). Mit einer Beschreibung von 6 Arten der Taxa *Orthopsyllus* und *Nitocra* führt W. Mielke seine Studien an Harpacticiden von Costa Rica fort. Schließlich untersuchten R. Düren und P. Ax die thalassogenen Plathelminthen aus Sandstränden von Elbe und Weser.

Damit bietet auch Volume 8 der „Microfauna Marina" wiederum ein breites Spektrum an Beiträgen über diese spezielle Faunenkomponente des Meeres. Allen Beiträgen ist gemeinsam, daß sie für die Spezialisten auf diesen Gebieten unentbehrlich sind und Interessierten einen Einblick in den Stand und die Methoden der Forschungen bieten. W. Armonies (List)

Mullin, M. M.: **Webs and Scales:** Physical and Ecological Processes in Marine Fish Recruitment. Seattle, Wa.: University of Washington Press, 1994, 148 pp., DM 25.–.

This book is another of the series on "Recruitment Fishery Oceanography" of which I had the pleasure earlier of reviewing M. Sinclair's "Marine Populations". The present volume as well deals with the effects of environmental variability on recruitment in populations of marine organisms, and is meant to stimulate international discussion, thereby accelerating the synthesis of ideas. The title "Webs and Scales" refers to the food webs in the plankton, while the term "scales" refers to the ranges in space and time between the recruitment of larval fish and the adult population.

The book is divided into 5 main chapters, the first of which deals with the necessity for an adequate approach to interpret phenomena, based either on large-scale or small-scale investigations. The author puts forward the opinion that, as our intellectual, technological and financial resources for environmental research are limited, funds must be deployed efficiently. Thus, we cannot launch new long-term programmes comparable to the long-term data sets available from fishery or meteorology, because time is running short. Therefore, we have to come up with a workable solution that will have some predictive power. The second chapter deals with the predictability of the impacts of physical oceanographic features on biological scales (i.e. plankton production); this involves the application of mathematical models, and emphasizes particularly the role of microscale transport of nutrients to micro- and phytoplankton and small-scale patchiness of potential food organisms as a factor influencing fish larval and copepod survival. The third chapter deals with horizontal mesoscales in the distribution of phyto- and zooplankton, the implications for secondary production, and the possibility to explain large-scale effects with small-scale causes. It describes various processes at ocean fronts and eddies, and the author resumes that in order to gain new insights we require new technological tools and "shrewdness" in the design of novel sampling programmes.

Taking one example of the complexity of the systems to be looked at more closely, the author describes in Chapter 4 larval recruitment in the California Current whereby he poses more questions than offering answers. Even though several factors governing the success or failure of recruitment are discussed, the author fails to bring forward a workable hypothesis and resorts to the opinion that, despite the fact that a large amount of information on larval ecology has been collected, our understanding of processes in the field is limited because of a general lack of ideas on how to combine and look at available data for interpretation. Thus, even though several factors that potentially cause variability in recruitment are discussed in Chapter 5, no satisfactory explanation is offered; instead, a summary of a multitude of potential mechanisms is given.

The book reflects the situation of all who are presently involved in the field of larval recruitment and who are well aware of the fact that, although a large amount of information exists, scientists are as yet not sufficiently able to "move the topic of small-scale causes and large-scale effects from 'Discussion' to 'Results' in their published papers". A lot of the science published to-date on this topic remains on the level of inferences rather than of direct proofs. The author is of course not able to find a solution for the many remaining questions at hand, but he muses on what the processes are that should be studied in more detail. Thus, the book presents a description of the status quo rather than a presentation of new ideas for future approaches. It is a book for specialists in the field who will read through the volume realizing that up to the present day the apparent break-through in recruitment studies has still to come. This is encouragement for those who are still at it!

H. v. Westernhagen (Hamburg)

Stebbing, A. R. D., Dethlefsen, V. & Carr, M. (Eds.): **Biological Effects of Contaminants in the North Sea.** Results of the ICES/IOC Bremerhaven Workshop. (Marine Ecology Progress Series. Vol. 91.) Oldendorf/Luhe: Inter-Research, 1992, 361 pp., DM 129,–.

The MEPS SPECIAL 1992 contains the results of the 1990 Bremerhaven Workshop on the Biological Effects of Contaminants which is a continuation of the Oslo and the Bermuda Workshops on biological effects techniques. While the latter workshops were shore-based, the Bremerhaven event was a 'sea-going' workshop, with the aim of developing biological effects techniques offshore. It was conducted from 12th to 30th March 1990 with the Alfred-Wegener-Institute hosting the laboratory-based activities as well as all meetings ashore. Over 100 scientists, mainly from countries bordering the North Sea, deployed various biological and chemical techniques on two transects in the German Bight. The results of this endeavour have been published and summarized in more than 40 papers in the present volume of MEPS.

The rationale for employing biological effects techniques is that pollution monitoring has been dominated by the use of chemical analysis of contaminants catalysed by the use of chemical criteria in pollution legislation. Biological techniques provide an integrated response of the biota to all contaminants and "it is primarily through the use of biological techniques that new or unsuspected contaminants of biological importance are first detected".

Aside from several background papers, the volume contains the reports and results from several fields, such as biochemistry, molecular and cellular pathology, gross- and histopathology, water quality bioassays, sediment bioassays and benthos community analysis. In the biochemistry section a suite of methods could be tested among which hepatic mixed function oxidase (MFO) induction, including measurements of EROD and P-450 1A1, proved once again to be reliable indicators of organic contaminant exposure. Other methods gave more ambiguous results. The aim of the molecular and cellular pathology group was to test for evidence of biological changes indicative of exposure to toxins, as well as of their adverse effects. With the methods applied, findings clearly demonstrated degenerative changes in liver cells and embryos from the most contaminated inshore sites. The most obvious early-onset cellular 'distress signal' was given by the various measurements of lysosomal damage. The gross pathology group aimed at assessing the value of epidemiological studies of disease in dab. Yet despite the apparent promise of hypodermal hyperplasia/papilloma and other phenomena for biological effects monitoring, its aetiology remains largely uncertain, and further studies are needed. Also water quality bioassays and sediment toxicity tests have been developed to an applicable state. While varying in sensitivity, the techniques are sufficiently responsive to give quantitative evidence of toxicity for a variety of sample material collected. For both approaches, tests should be conducted using standardised techniques, in particular in the preparation of the elutriates. The use of benthic communities in monitoring is based on the distribution and the abundance of species present. To increase predictive power, the causal mechanisms leading to changes in abundance should be better understood at several levels of organisation.

One of the key questions to be answered by the workshop was whether it is possible by using biological techniques to anticipate significant deleterious effects, or quantify retrospectively the damage caused by pollution. For some techniques, these questions could be answered with "yes". It became clear, however, that neither biological nor chemical techniques alone can adequately satisfy the objectives of monitoring programmes. The implication is that chemical analytical efforts should focus on those instances where there is a biologically demonstrable change in environmental quality.

The book gives a wide overview of today's techniques for biological monitoring purposes and will certainly be a useful tool for policy makers when it comes to programme implementation. The involved scientist will find a lot of techniques to chose from if he decides to go into this type of work, which in the future will hopefully gain in importance in pollution abatement measures. A very professional volume, the contributions of which all merit publication.

H. von Westernhagen (Hamburg)

Rapsch, H.-J.: **Ölunfallbekämpfung auf Nord- und Ostsee.** Bielefeld: Erich Schmidt Verlag, 1993, 244 pp., DM 68,–.

Long running issue: measures of precaution against oil spills

After 20 years of oil defence in marine and coastal environments there is good reason for monitoring what exactly has been achieved, particularly since 170 million Deutsche Mark have been spent on ships and equipment, and another 58 million on research and development (in addition to this, a radar guideline for the Jade waterway, a pipeline from Wilhelmshaven to Hamburg, and the maintenance of a registration and operation system were financed). An evaluation has been made by H.-J. Rapsch on the basis of experience which he gained as a representative of Lower Saxony in the Oil Spill Committee: Sea/Coast (ÖSK), and as their chairman for three years. With occurrence probabilities between six years (for spills of 1000 tons) and 110 years (50 000 tons) in the German Bight, 20 control and combat vessels and two aircraft have been put into operation – an expense which Dr. Rapsch justifies, for this heavily-frequented sea route, as follows:

"The costs of the 'Exxon Valdez'-catastrophe (1989) amounted to 4500 million Deutsche Mark, the mere one-year interest of which would cover operation and maintenance of the German oil defence fleet for 50 years" (p. 18).

This is an example of the way of argumentation in this book, which can be read and not simply used as a reference book; nevertheless, as the latter, the text is a highly welcome one, regarding the international agreements on marine safety. Rapsch uses 36 of the 233 text pages for analysing and evaluating four oil defence cases (1981–1988), of which only one had a totally positive result. There are some severe objections to the three other cases. Although Rapsch finally admits that the German "traffic and ship safety has a generally recognized high standard" (p. 176), from his analysis he derives technical and organizational recommendations extending from closing the Lower Elbe river to oil tankers (alternative: existing pipeline from Wilhelmshaven), to tightening and simplifying the federal oil defence organization. From Rapsch's description of the present structure, even those readers who are not involved in the matter will realize how badly reorganization is needed.

The book concentrates on Germany. There are only marginal remarks on oil defence strategies of the other North Sea states. Therefore Rapsch's question of whether German practice bears comparison with that of neighbouring countries, cannot be answered satisfactorily. International cooperation is not described, presumably because it does not exist. Most strikingly, foreign literature is not adequately considered: for instance, the best analysis of an oil-tanker accident so far – the 'Amoco Cadiz' catastrophe (1978) – is lacking, as well as the coastal sensitivity index which was determined on that occasion and is generally accepted worldwide. There, the highest sensitivity is allocated to saltmarsh coasts and tidal flats, a statement which provides a most convincing justification for the German preventive measures.

Th. Höpner (ICBM Oldenburg)