

Book Reviews

Antarctic and Subantarctic Pycnogonida: Nymphonidae, Colossendeidae, Rhynchothoraxidae, Pycnogonidae, Endeididae, and Callipallenidae.

C. Allen Child

Biology of the Antarctic Seas XXIV (ed. Stephen D. Cairns). Volume 69, Antarctic Research Series. American Geophysical Union, Washington (1995).

165 pages. \$45 (members \$31.50) ISBN 0 87590 885 3.

The sea spiders or pycnogonids are an enigmatic group of arthropods with doubtful affinities. Thought by some to be arachnids, they are usually placed in a class of their own. In European waters pycnogonids are usually small, inconspicuous, slow-moving and rarely numerous. They gain their common name by virtue of their eight walking/swimming legs. In contrast, the Southern Ocean contains numerous species, some of which are of considerable size, and include several which possess 'extra' pairs of limbs, further hinting at monstrosity. The giant, ten-legged *Decolopoda australis*, sometimes more than 30 cm across, was the first Antarctic pycnogonid to be discovered (by Eights in 1835) and is common and conspicuous in shallow subantarctic waters, as well as being remarkably active. A decade ago I conducted physiological studies on the species, which I identified using the only readily available monograph (written by Fry & Hedgepeth in 1969). This gave me an appetite for study of other species, but identification of material was a major problem; Fry and Hedgepeth had not dealt with the Nymphonidae, the most numerous of the Antarctic pycnogonid species and coverage of other families was limited. I heard rumours of further publications, but the untimely death of Bill Fry no doubt prevented their completion. It was with great delight that I read the monographs in this volume by Allen Child. They follow earlier monographs in Volume 63 of the same series (published in 1994), which together form an amazing, comprehensive body of highly professional taxonomic research on Southern Ocean pycnogonids. The scale of the labour involved is incredible; thousands of specimens have been inspected, great numbers of excellent drawings produced, and all woven together by immaculate scholarship. Numerous new species have been described and it is evident that Child has produced a piece of work that will be the definitive information source for many decades to come. The standard of physical production of the volume is excellent, with good paper and a stout binding. In

an age when financial support for such detailed taxonomic work is lacking, despite public protestations of concern over 'the environment' and 'biodiversity', it is heartening to see that the Smithsonian Institution fosters such study, and that the American Geophysical Union supports its dissemination.

JOHN DAVENPORT

The Ocean and the Poles: Grand Challenges for European Cooperation

Edited by Gotthilf Hempel

Gustav Fischer Verlag, Jena Germany (1995)

381 pages. DM98.00. ISBN 3-334-61023-3

In 1990 the European Science Foundation (ESF) and Directorate General XII of the Commission of the European Communities (CEC) decided to establish jointly an advisory panel for development of European cooperation in ocean and polar sciences – the European Committee on Ocean and Polar Sciences (ECOPS). This body was given two major tasks: to develop a European long-term strategy on marine and polar research, and to foster major individual European projects in ocean and polar studies. The members of ECOPS are drawn from research administration (4), biology (2), geology (6), and physical oceanography (4).

In order to derive the research agenda for ECOPS a number of workshops were held on prescribed areas of marine science and from these the major topics of research that European science should concentrate on, the Grand Challenges, were developed. The four Grand Challenges suggested by ECOPS are: 1) Operational Forecasting of the Oceans and Coastal Seas, 2) Variability of the Deep Sea Floor, 3) The Arctic Ocean and 4) European Programme on Ice Coring in Antarctica. Two other aspects were considered, the coastal zone and biodiversity, but have not yet developed into Grand Challenges. The Grand Challenges were discussed at a major European conference in Bremen in September 1994 attended by 300 participants. This book contains the revised texts of the invited scientific papers at this conference and presents the Grand Challenges.

The book opens with an introduction by Gotthilf Hempel, chairman of ECOPS and one of marine science's most powerful voices, who describes the development of the Grand Challenges. This is followed by a rather personal view of international collaboration in marine science by Warren Wooster.

The Grand Challenges are described in a semipopular way, presumably for policy makers rather than for scientists. First there is the Climate Change and Ocean Forecasting which is covered by five short papers. This section includes a general description of climate change and GCM predictions by von Storch and Hasselmann, four pages on satellite techniques, a short review of the Global Ocean Observing System by John Woods, three pages on numerical models and a curious article on long range predictions in the Mediterranean Sea. From such a mixed bag of short popular articles one hardly gets an impression of what the real questions are in this Grand Challenge.

The second Grand Challenge discussed is the Deep Sea Floor where a more cogent case is made by Pichon who argues that the deep sea floor covers 60% of the earth's surface and is an area of rapid biogeochemical cycling and environmental change! Surely it is the coastal ocean floor that meets these criteria? Karin Lochte gives a good summary of the technology that is needed to study biogeochemical processes operating in four-dimensions on the deep sea floor. The technology is extremely costly and hence can only be tackled by international efforts.

The Arctic Ocean Grand Challenge is presented by Johannessen, Wadhams, Lemke and Sandven who show clearly the relevance to global climate processes and again the high technological and logistical needs of studying the key processes. Thiede presents the scales of geological variability and Wadhams the technological needs.

Lorius and Jouzel present the Ice Coring in Antarctica Grand Challenge, again demonstrating the relevance to our understanding of climate change processes from Arctic cores and the need for similar data from the Antarctic. Again the logistical need dictate European-wide project support.

No explanations are given as to why the Coastal Seas and Biodiversity programmes are not Grand Challenges but they are still presented. Pernetta argues cogently that coastal

management needs both natural and social sciences and Dronkers presents the needs to predict changes in coastal seas. Perhaps the biodiversity section illustrates best why it is not a Grand Challenge since it neither gives an overview of what are the research needs nor does it show the threats to European coastal diversity.

The final section of the book includes very short "national" science policy statements which do not in fact represent views of governments of the Grand Challenges, which would have been interesting, but are from a variety of individuals from different countries.

The ECOPS Grand Challenges are purported to represent a consensus on the directions that European marine and polar research should be developing. It does not, as claimed, represent what European scientists believe are the most important research questions. The workshops set up by ECOPS covered only a small number of disciplines and biology is extremely poorly represented. Neither are the scientists that attended a representative cross-section of European marine and polar scientists, they were simply those fortunate enough to be invited. European marine science cannot simply ignore important topics such as coasts and biological resources. So I do not believe that ECOPS has in fact developed a long-term strategy for marine and polar research. ECOPS has certainly identified a few, clearly interesting, scientific issues that demand expensive technological solutions. Are these really the most pressing and/or the best scientific questions in marine and polar sciences facing Europe? Will these be of interest to those that fund marine science – the politicians? I feel not since the four Grand Challenges do not cover marine topics that are of public and political concern such as coastal water quality, habitat degradation and loss, coastal management issues and fisheries and coastal biodiversity.

JOHN S. GRAY