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Tracking Environmental Change Using Lake Sediments. Vol. 4: Zoological Indicators, edited by John P. Smol, H. John B. Birks & William M. Last, 2002. Kluwer Academic Publishers, P.O. Box 17, 3300 AA Dordrecht, The Netherlands; xxi + 217 pages, 51 figures and 6 tables, hardbound; price EUR 69.00, USD 76.00, GBP 48.00. ISBN 1-4020-0658-6.

The book under consideration consists of a brief introduction to the subject matter, a main text dealing with eight different types of indicator species preserved in lake sediments, a glossary and an index; the 19-page length of the glossary is justified by the frequent use of biological terms which are accessible to a limited readership only.

Apart from Fish (last chapter), the various zoological indicators discussed in the book are invertebrates with fossilized parts generally having minute size and often not readily identified to the desired taxonomic level. Unavoidably, therefore, a fairly large part of the eight articles is dedicated to both technical matters (e.g., extraction of fossils from the sediment, sample collection and slide preparation) as well as taxonomic considerations.

As can be expected, another issue encountered throughout the text, is the biology of the species (or other taxa) used as indicators. The pertinent sections focus on morphology, life cycle, mode of reproduction, habitat ecology, evolutionary history and taxonomy of the animals in question, and discuss methods of specimen identification on the basis of fossil remains left behind by them.

The third major topic, which is at the very heart of the book, is the indicator potential of the taxa presented in the successive chapters. This also is the theme of immediate interest to the earth scientist, as it deals with the paleoecology and, thus, with the geological history of lakes. A considerable number of physical and chemical lake parameters is related, one way or another, to either specific indicator organisms or characteristic compositions of assemblages.

Since the days when G.R. Coope began his groundbreaking work with insect remains, there has been a rapidly growing understanding that the deposits of lakes and other aquatic habitats contain numerous important proxy data on paleoenvironmental conditions, on climatic change in the first place. To an increasing extent, geochemical methods (water chemistry, trace elements, stable isotopes) have gained ground. This is well illustrated in the last three chapters of the book dealing with, respectively, ostracods, fresh-water molluscs and fish, i.e., dealing with animals having calcareous body parts. The last chapter discusses (among other things) the indicator value of otoliths (aragonitic concretions formed in the internal ear of most teleost fish). Thin sections of these structures reveal annual and sometimes even daily growth rings that may be microsampled for isotopic analysis. With this approach, climatic details at the time scale of a single storm event may be resolved.

The series 'Tracking Environmental Change Using Lake Sediments' does not stand on its own but forms part of a comprehensive series entitled 'Developments in Paleoenvironmental Research'. As explained by the editors, the master series will consist of works related to any aspect of paleoenvironmental research, and will include, among other works, conference and workshop proceedings. Hopefully, the good quality of the diagrams, microphotographs and general layout of the book reviewed here will be matched by that of the publications still to come.

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