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Recent Foraminifera

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The book (proceedings) seems more suitable as an institutional library acquisition than as a personal acquisition.

MS received October 13, 1977

Quaternary Stratigraphy of North America

Edited by W. C. Mahaney
Dowden Hutchinson and Ross,
512 p., 1976
$27.50

Reviewed by R. J. Fulton
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A friend in thumbing through this book commented that it appeared similar to a bottle of Canadian wine: the label suggests great things but the contents do not live up to the label. The Quaternary stratigraphy of North America is a big subject and this book certainly does not cover it completely.

The preface says that emphasis is on summarizing research completed following publication of "Quaternary Research of the United States" and on new research. However a considerable amount of the material was included in the above mentioned volume and most of the post 1965 information presented has already been published elsewhere. It appears that emphasis was placed on obtaining contributions from big names who would attract attention and sell the book rather than on going after new work and work from critical areas that might have added pieces to the puzzle that has already been blocked out.

The Canadian financed symposium at which these papers were presented would have been an excellent opportunity to pull together recent Canadian Quaternary Stratigraphy and to show how it related to the more fully exposed United States work. However only six of the 24 papers concern Canada and as an example of an omission, important work done in the past 10 years in the strategically located Hudson Bay Lowland is not even mentioned.

The book contains papers on the following areas:
Eastern Arctic Canada - Andrews and Miller; St. Lawrence Lowlands and Great Lakes (2) - Gadd and Terasmae and Dreimanis; Northern New England - Coates; Midwest United States (4) - Black, Wright, Johnson and Ruhe; North Central United States - Moran *et al;* West Texas and Eastern New Mexico (2) - Reeves and Hawley *et al;* Sierra Nevada - Birkeland *et al;* Colorado Plateau and Front Range (3) - Karlstrom, Madole and Mahoney and Fahey; Western Wyoming-Richmond; Washington-Easterbrook; Southwestern Canadian Prairies-Stalker; Central Canadian Rockies - Rutter; Alaskan Panhandle and adjacent British Columbia - Miller; and Alaska - Péwé. Three other areas - Atlantic Provinces, Southern New England and Western Ohio - are included but regrettably are only covered by abstracts. One of these (Grant - Atlantic Provinces) does contain a list of references so that it can be used as an entry to the stratigraphy of the area.

In general each paper starts with a brief history of the development of Quaternary history in the area under consideration, presents the stratigraphy as it is currently understood, provides regional correlations and closes with comments on specific problems, controversies or suggestions for future work. Several papers, in addition to describing the local stratigraphy, include discussions of some of the correlation techniques used (Andrews and Miller - amino acid diagenesis, Wright - vegetation colonization and Birkeland - relative age criteria for correlating moraines).

The quality of the papers is variable, several are excellent, one or two are mediocre and a couple are bad but in general they convey the necessary information in an understandable form. As already mentioned much of the information presented has been in the literature for years but in at least one case (Rutter - Central Canada Rockies) new information is presented. Most of the authors made good use of this opportunity to pull together published information and to enlarge on current problems or controversies so that even though much of the information may already be available these papers provide useful summaries and updates.

Despite my personal disappointment that there was not more emphasis on the Canadian part of the North American continent and that more new information was not presented, I feel that this is a well edited and presented book that is well worth reading. Many papers contain numerous references making the book a fairly complete bibliography for the areas covered. It provides a general review of the Quaternary stratigraphy of classical areas such as the Sierra Nevada, Northern Rockies, Southern Canadian Prairies, Great Lakes and Illinois and also of other important areas such as Eastern Canadian Arctic and Atlantic Provinces. It is unfortunate that other critical or classical areas such as the Yukon and James Bay Lowland were omitted.

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Recent Foraminifera

By Esteban Boltovskoy and Ramil Wright
Dr. W. Junk b. V. Publishers,
The Hague, 1976, 512 p.

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This book presents a well written account of research on Recent foraminifera. Emphasis is on ecology and working methods with systematics and physiology of the living organism of secondary importance. The text has been updated from the 1965 Spanish edition and the addition of new material can be judged from the 750 post-1965 references of the total 1600.

The subject matter is presented in 18 chapters, six of which involve ecology of foraminifera. On the offshore continental shelves the major criterion governing the distribution of species is the water temperature. As a result, the boundaries of the biogeographical provinces based on foraminifera reflect the major current systems; i.e., cold water currents extend the provinces of cold water faunas towards lower latitudes and warm currents have the opposite effect. The authors demonstrate the relationships of faunas to the regional oceanography in a world map of benthonic foraminiferal zoogeography and throughout the text with a frequent use of examples of

foraminifera as watermass indicators both on the continental shelves and in the deep ocean.

After discussing the distribution of the various benthonic species found in normal marine waters, the text touches upon the distribution of species in several marginal marine environments, such as marshes, lagoons and other nearshore habitats of abnormally high or low salinities.

The principles of foraminiferal ecology are treated in simple terms by showing how the most commonly measured factors of the environment can be correlated with the distribution of species. Altogether 13 environmental parameters are described with temperature, salinity, depth and substrate as major factors that are discussed at length. Most of the evidence presented has been gathered in the field with only a few laboratory experiments that test the observed species - environment relationships. This shortcoming has been recognized for decades, but new advances in experimental ecology of foraminifera have not been forthcoming at a rate comparable with other aspects of foraminiferal research.

A relatively new and expanding field is the cytological study of foraminiferal protoplasm and the investigation of test microstructures. The authors' treatment of these fields is rather short, but sufficient as an introduction. It is well supported by references for anyone interested in the topic beyond the scope of the book. Microstructures of foraminiferal tests are discussed in conjunction with the general description of the foraminifera. In additon to a classical account of the various shapes of foraminiferal tests, the authors describe recent advances in the research of foraminiferal wall structures based on scanning electron microscopy.

A large section of the text is dedicated to the methods of sample collection and their preparation for study. The description of samplers is detailed and includes some of the less well known and highly specific instruments in addition to the commonly used corers, bottom grabs and nets. The discussion of laboratory methods include such common problems as staining of protoplasm, separation of tests from sediments, and the highly specialized field of cytological techniques.

Foraminiferal tests exhibit a great variety of morphologic features that must be sorted according to genera and species. The book describes a number of methods that permit the recognition of some of the more obscure but diagnostic features of the tests such as, the arrangement of chambers next to the proloculus made more visible by oils and stains. The principles of classification of foraminifera are discussed, including the history of foraminiferal research.

The chapter on faunal studies and their application is the longest and illustrates a new trend in research on Recent foraminifera. The new emphasis is twofold: 1) an improved utilization of the information that foraminifera can supply through analysis by multivariate statistics and graphics, and 2) the use of foraminiferal data in describing relatively recent changes in oceanography. The classical studies of faunas are thus being supplemented with environmental studies that involve a number of disciplines.

The concluding remarks of the book deal briefly with the existing gaps in foraminiferal research. The authors emphasize the need for more studies in physiology of foraminifera, in particular the functional role of structures, such as the function of sieve plates, pores and various subcellular bodies of the protoplasm. Life cycles of most species are poorly understood and more work is needed with foraminiferal cultures focusing on the duplication of the natural environment as much as possible.

It is evident that in future foraminiferal research will increasingly depend on expertise in many fields and the most recent advances in instrumentation. To mention only a few, the various electron microscopes capable of resolving extremely minute structures, electron probes and microanalysers that can detect trace elements and determine isotope ratios within the layers of a test may provide answers in such problematic fields as taxonomy, natural histories or paleoecology of foraminifera. These possibilities are not evaluated sufficiently in the concluding chapter, but on the other hand, I recognize the fact that it is virtually impossible to include everything in a book dealing with such a multi-disciplinary topic as Recent foraminifera.

Working with Recent foraminifera I find the book useful both as an aid to research and as a basic text. It is easy to read and the illustrations are sufficient in number and of good quality. More discussion on advanced ecological and statistical principles would be helpful, however, reference to these can be found in the extensive bibliography, which in itself is a great asset to the volume. Using the argument of James Hutton that the present is a key to the past, the book is also highly recommended to fossil foraminiferologists.

MS received January 26, 1977

The Bowels of the Earth

By John Elder
Oxford University Press
222 p., 1976
Price $17.65

Reviewed by A. E. Beck
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I wish I could recommend this book, but I cannot.

Heaven knows we need fresh approaches in the teaching of our subject and in methods of really stimulating the interest of those people outside it, particularly the younger and uncommitted ones. The author has attempted to do this by presenting the earth in an unusual, and what should have been refreshing, way but somehow or another the book just does not come off, and it is difficult to point to any one particular reason why it does not come off.

However to judge from the preface, I think one reason may be that the author started off with a specific approach, and very limited audience, in mind but then changed course half way through.

An extensive quotation from the preface might be in order.

"Who is this book written for other than myself?

The man in the street. You should see one aspect of modern geology very clearly; our understanding of dynamical processes inside the earth - a sort of meteorological - physiological insight. The glossary-index will be especially helpful, not only for this book but for others which cover