

## Review: Three British books on micropaleontology

D. G. Jenkins and J. W. Murray, Eds.

*Stratigraphical atlas of fossil foraminifera*. 510 pp. Chichester, England: Ellis Horwood, Ltd., 1981. Order from Halsted Press, a division of John Wiley and Sons, Inc., 605 Third Avenue, New York, N.Y. \$79.95.

J. W. Neale and M. D. Brasier, Eds.

*Microfossils from Recent and fossil shelf seas*. 380 pp. Chichester, England: Ellis Horwood, Ltd., 1981. Order from Halsted Press, a division of John Wiley and Sons, Inc., 605 Third Avenue, New York, N.Y. \$84.95.

John R. Haynes

*Foraminifera*. 433 pp. Halsted Press, a division of John Wiley and Sons, Inc., 605 Third Avenue, New York, N.Y., 1981. \$79.95.

From its beginnings as a hobby for well-situated 19th-century gentry, micropaleontology has moved more or less into the hands of "professionals" (some of whom may still be gentlemen or ladies, to be sure) who work primarily in academic or industrial research institutions. It seems fitting that these three books, which mark advances on several fronts, should all be closely connected with the British Micropalaeontological Society, long a social and a professional group embodying this historical development. Of the books reviewed here, two are published by the Society, and the third, an outstanding textbook on foraminifera, was written by one of its distinguished members.

The *Stratigraphic Atlas of Fossil Foraminifera* is the result of a desire on the part of the Micropalaeontological Society to provide data on the stratigraphic distribution of foraminifera predominantly in the context of lithostratigraphic (as opposed to biostratigraphic) successions. In this, the fifth volume of the series of publications devoted to the faunal associations and stratigraphic distribution of various microfossil groups, the Society has presented a valuable synthesis of the Phanerozoic history of foraminifera in the British Isles.

Of the 12 chapters, the first (history of early students of foraminifera in Great Britain), the second (Pre-Carboniferous faunas) and the last (faunal changes through the Phanerozoic in Britain) were written by Professor John Murray (one of the two editors). In the rest, we are treated to a summary of Carboniferous, Permian, Triassic, Jurassic, Cretaceous, Paleogene, Neogene, Quaternary, and North Sea faunas, in chapters 3 to 11, respectively.

There is a general uniformity of presentation in this book. The local stratigraphic subdivision of each system and the stratigraphic distribution of taxonomically distinct and/or stratigraphically important species is emphasized. Of particular use to readers is the location of important collections, given in each chapter. Generally high quality SEM photographs document the Mesozoic and Cenozoic faunas, and thin section light

micrographs the Paleozoic faunas. Those illustrating the Cenozoic faunas (chapters 8–10) are of especially high quality.

Of particular interest to students of Cenozoic faunas is the contribution on North Sea microfaunas (chapter 11) by Chris King and his colleagues at Palaeoservices, Ltd., a consulting firm. Although brief (5 pp.) this article provides a concise summary of the main faunal development in this, as yet, poorly documented area.

Chapter 8 on the Paleogene, prepared by Messrs. Murray, Curry and Haynes, provides a well-illustrated documentation of the foraminiferal faunas, particularly of the Lower Eocene London Clay Formation, which figures prominently in current attempts at regional biostratigraphic correlation and age estimates of the Paleocene/Eocene boundary based on integrated biostratigraphic, radiometric, and paleomagnetic data.

I strongly recommend this book to all interested in learning more about the distribution of fossil foraminifera in the British Isles. Those concerned with comparative studies of a regional nature will find this an invaluable source of documentation. We owe Professors Murray and Jenkins, as well as the cooperative efforts of the British Micropalaeontological Society, a debt of gratitude for preparing this atlas.

*Microfossils from Recent and Fossil Shelf Seas* is the outgrowth of a 1980 symposium on that topic held in Hull, England, July, 1980. It is a set of 28 papers dealing with micropaleontological studies ranging from the Silurian to Recent. Five papers treat the Paleogene, 9 the Mesozoic and 14 the Cenozoic (4 of Paleogene, 1 the Miocene and 9 the Recent, or Holocene). Geographic treatment is global in extent, but strongly oriented toward NW Europe and the British Isles. Paleozoic topics range from Silurian microfaunas and -floras of Wales (5 papers), global distribution of carboniferous conodonts (1), Permian forams and dasycladacean algae of Iran (1). Mesozoic subjects range from Triassic microflora of British Shelf Seas (1), early Jurassic forams of Great Britain (1), Bathonian

ostracodes of Great Britain (1), Mesozoic ostracodes in the cost wells of the east coast of North America (1), Jurassic agglutinated benthic forams from Svalbard (1), Late Jurassic and Cretaceous biostratigraphy of the North Celtic Basin offshore Ireland (1), British Cenomanian ostracodes (1), East Anglian Gault ostracodes (1) and anoxic events in the Late Cretaceous of NW Europe (1). Paleogene topics treat of the Eocene-Oligocene of the North Sea (1), Eocene of Israel (1) and Gulf of Guinea (1), the ostracode genus *Schizocythere* in the Early Tertiary of Pakistan (1) and a lone contribution discusses equatorial Pacific Ocean temperature variations in Mid- and Late Miocene based on foram evidence. The last nine papers discuss Holocene faunas of the English Channel; western Barents Sea; Thames River, London; Christchurch Harbor, Dorset; the tidal Humber Basin; Norwegian continental margins; distribution of Holocene benthic forams in the western North Atlantic; and fringing reefs off Mombasa, East Africa.

Hart and Bigg, writing about Late Cretaceous anoxic events, demonstrate the relationship between contemporaneous global processes on the NW European Shelf (Germany, Denmark, England) with rich planktonic faunas and poor, low O<sub>2</sub> agglutinated benthic faunas and black bituminous mudstones associated with shelf sea carbonates.

It is nice to see Tertiary faunas from the North Sea finally in print, and in his contribution on the Eocene-Oligocene foraminifera of the North Sea, Hughes places these in the perspective of the well-known faunas developed in NW Europe. The faunas are well illustrated, but identification to the species level of a fragment of *Ammodiscus* (pl. 15.1, fig. 1) is carrying things a bit far; the identification of "*Eponides*" *schreibersi* (pl. 15.4, figs. 9, 10, 12) appears to be incorrect. The taxon *schreibersi* (= *antillarum*) is a Neogene taxon with distinctive umbilical ornament not exhibited here.

The study by Sturrock and Murray clearly demonstrates that similar depth habitat, salinity, and temperature do not result in the same benthic foram fauna and that substrate and current action play important roles in faunal composition.

In what I found to be the most interesting contribution, Boyd demonstrates the application of a comprehensive micropaleontologic analysis to archeological reconstruction (in this case, the life and times of medieval London). It seems that modern industrial pollution (predominantly caused by chemical manufacturers) has its counterpart in nutrient enrichment caused by human sewage pollution in the 14th century, and that the butchers of 1357 for instance, paid no more heed to the regulations of the city magistrates (see p. 274,

175) than do some of our equally (ir)responsible citizens charged with disposing of toxic wastes. Boyd's study provides data on the earliest evidence of anthropogenic eutrophication and pollution of a river or estuary in the world and of the environmental impact made by urban man (p. 286). Fascinating reading.

Finally, Banner and Pereira show us the complex relationship between standing crop and diversity of benthic foraminifera, and environmental parameters, post-mortem distribution patterns, etc., and that, taken individually, none of the statistical parameters they used would conclusively identify mesohabitats of physical environments with any temporal or spatial consistency (p. 363).

All in all, this is a comprehensive volume which provides a valuable addition to our knowledge of a relatively neglected area of research—The Shelf Seas.

*Foraminifera* by John Haynes is a joy. From its prefatory quote, "Let us not be too mechanical, Baconian and experimental only" (Richard Jefferies) to its concluding quote by the same author following the chapter on the Globigerinida, this book should provide a source of inspiration for the student of the Foraminifera, regardless of his level of specialization. As a so-called specialist I found it full of up-to-date information on state-of-the-art research in the group.

The book is written in an engaging and colloquial style; strongly oriented toward applied micropaleontology—an approach with which I strongly identify. The initial two chapters thoroughly treat of the scope of studies and the nature of collecting, preparing, and studying forams and provide an excellent bibliography at the conclusion of each chapter. The latest studies on the biology of the living foraminifera (ch. 3), morphology and composition of the test (ch. 4), and classification (ch. 5) are then discussed in considerable detail. An excellent discussion on the formation and function of the test (ch. 4) is followed by a theoretical consideration of the relationship between test coiling mode and feeding habitats (pp. 52–56), and this is completed by a consideration of the adaptive significance of the wall structure.

In chapter 5 Haynes begins with a statement (p. 60) that should become enshrined in the didactic hagiography of foraminifera, not so much for its profundity, as for its simplicity: "Scrupulous taxonomic work is fundamental to the use of Foraminifera in both stratigraphical and ecological studies. This is because precise zonal stratigraphy and palaeo-ecological reconstruction depend upon precise discrimination of species." Self-evident, obvious, you say? One would think so, but the message seems to have been all too often lost—particularly of late—by some (not all, thank goodness) of the closet computerologists (masquer-

ading as micropaleontologists; watch out for them, they are all around and sometimes dangerous), who are all too eager to show you an impressive array of computer cards and elegant graphs, but when asked to sit down at a microscope to distinguish between *Bulimina marginata* and *Bulimina aculeata* or discuss the reasons for preferentially assigning *pachyderma* to *Globigerina*, *Globorotalia*, *Turborotalia*, *Globobulimina* or *Neoglobobulimina*, throw up their hands, stare blankly into the distance, while uttering a feeble (or, worse yet, defiant) "who, me?". An appreciation of the central role played by taxonomy in all applied micropaleontologic work is fundamental to the ultimate quality of work that a student will produce in his/her professional career. This message is one of the two or three most important that should remain with students after a course and that should be inculcated in all graduate students before they are released into a cruel and unforgiving world.

Haynes also considers the "species problem," and suggests retaining morphologic variants as subspecies (for geographic and climatic recognition) rather than grouping variants together with no name to distinguish them, as Hansen and his colleagues in Denmark have tended to do based on SEM and TEM analysis of wall structures.

Haynes's discussion of taxonomy and classification above the generic level is thorough, and he provides his own classification scheme with realistic emphasis upon wall structures, apertural form and chamber arrangement together with information on stratigraphy and ontogeny as primary features. He shows in historical perspective how history has come full cycle in its (early) emphasis on wall structure and layering of the test (Carpenter and Reuss), an opinion tempered more recently by the realization that radial and granular wall structure, while crystallographically close to each other, appear in species of the same genus in some instances (*Turritina*, *Cassidulina*), so that certain taxonomic groupings are demonstrably artificial.

The remaining chapters (6–14) treat the major foraminiferal orders, agglutinated forams (ch. 6), Fusulinida (ch. 7), Miliolida (ch. 8), Nodosariida (ch. 9), Buliminida (ch. 10), Robertinida (ch. 11), smaller (ch. 12) and larger (ch. 13) Rotaliida, and Globigerinida (ch. 14).

Space considerations preclude a comprehensive analysis of Haynes's treatment of all these categories. Some highlights (and comments) must suffice.

I found the treatment of the agglutinated benthics (ch. 6) and the Globigerinida (ch. 14) to be the most interesting and, at the same time, perhaps because of my current interest in these two groups, to be the most frustrating.

In the case of the agglutinated benthics, Haynes presents them in terms of their utility in paleoecologic analysis and draws a fine portrait of his own and others' contributions to unraveling the Cretaceous cyclic deltaic sedimentation history of the Western Interior of Canada. He draws distinctions among marsh, delta, and flysch faunas. But while tantalizing us with the early studies of Grzybowski in the Polish flysch basins at the turn of the last century, he fails to follow up with a real analysis of these faunas based on the more recent studies by Książkiewicz and his colleagues in Poland, Hanzlikova (Czechoslovakia) and the occurrence of similar faunas in the Deep Sea (Krasheninnikov, Rögl, Pflaumann). Finally, he includes descriptions and illustrations of only a few flysch-type elements, omitting such common forms as *Trochammina*, *Cribratommoides*, *Recurviroides*, *Pelosina*, and *Hormosina*, among numerous others.

I found the discussion of the Globigerinida (ch. 14) excellent, and the problem of competing taxonomies and classification schemes handled in a well-balanced manner. The inclusion of a treatment of recent studies on stable isotopes and the use of planktonic foraminifera in biostratigraphy, paleo-oceanography, and paleoclimatology will be of great interest to students looking for directions to go. Then I turned to the illustrations accompanying the chapter and noted that only three plates of line drawings illustrating major taxa were allocated to this group, with a couple of figures at the top of an essentially blank fourth plate, as if the author or the illustrators ran out of time, money, figures or a combination of all three. There are no illustrations of *Globotruncana* or *Rugoglobigerina* in the Mesozoic, and for the Tertiary *Globanomalina wilcoxensis*, *Chilostomella midwayensis*, *Catapsydrax dissimilis*, and *Globigerinatheka barri* are the only four figured. The photographic plates in the middle of the book cannot be considered an adequate substitute, for while they do provide a few SEM images of *Globotruncana* and *Rugoglobigerina*, they treat primarily of Neogene taxa. There are no illustrations of *Subbotina*, *Acarinina*, *Truncorotaloides*, nor the small forms characteristic of the basal Tertiary (= early Danian). It can be argued as to how comprehensive any basic textbook should be, but I think in this instance that, as a minimum, illustrations of taxa should be more comprehensive in order to balance a text that deals so thoroughly with the problem of the taxonomy of the group.

Haynes treats the various taxonomic groups in a uniform manner, including discussions of the possible evolutionary relationships, stratigraphic use, ecology and paleoecology, and provides additional reading lists at the end of each chapter. In the chapter (12) on smaller rotaliids, Haynes presents a thorough discussion of recent studies on this group in the Paleogene