Reviews

Living and Fossil Brachiopods

By M. J. S. Rudwick. Hutchinson University Library, London. 1970; Humanities Press, New York, 1971. 200 p. illus. Cloth $6, Paper $2.50. Biological Series.

The phylum Brachiopoda occupies a minor niche in today's oceans, represented by about 300 species, many at considerable depth or hidden in caverns of coral reefs. But in Paleozoic times brachiopods were the predominant macro-invertebrate marine phylum and are of considerable economic and cultural significance for correlation and evolution. Martin Rudwick's book is concerned primarily with what is at first sight of lesser interest, the functional morphology of living and fossil brachiopods. This field of study is however relevant to correlation and evolution, if we accept Smut's wholistic philosophy and regard our scientific subdivisions as artificial. The book is eminently readable and copiously illustrated. Emphasis is placed on attachment, feeding, protection, reproduction — in short the day to day routine of brachiopods, partly interpreted from living material, partly from fossil material and model studies by means of word-based logic. The strength of the book lies in the fact that the author has woven the functional morphology of the enormously diverse and long lived brachiopod phylum into one seamless garment, smoothly changing focus from Recent to Ordovician to Devonian examples. It is so well presented that the book has all the "charm" of a nineteenth century nature study. As in many rustic studies little use is made of mechanics and hydrodynamics, or mathematical appraisal and economy, or computer based models.

Even within these limits, the morphology is curiously flaccid and generalized, with several structures, and most variants, unmentioned. For this reason the overall effect is stimulating because the well advised reader will see enormous possibilities of further research in exploring variation, and the vital field of ontogenetic change, and its functional significance, already examined by Russian and other workers, but barely mentioned in the text.

Rudwick concludes his text with strictures on other paleontologists and neontologists. To him "there is a lack of critically evaluated functional interpretation of fossil brachiopods". If we are to agree with Rudwick, and of course exclude his own work from criticism, we must nonetheless have misgivings over the lack of attention in the text to a great deal of published work which seems to go partway towards filling this need. Furthermore, the reviewer finds it impossible to hope with Rudwick that "paleontologists outgrow their subservience to stratigraphy". If more attention had been paid in the text to the stratigraphically controlled succession of morphological adaptions known for brachiopods, and more attention to dramatic changes in climate, ecology, continental drift, and orogenies, it would have been possible to impart dimensions of time and change in his text. His canvas was too small, the colours too few. So the final chapter on evolution merely summarises observations of morphology, dry as dust, with no explanation, or real insight to underlying causes.

The fascinating field of functional morphology will gain relevance and stature by being woven into earth history as a whole in terms of change, ontogeny, and evolution as a continuing response to changing environments. Sitting at sea-side pools, and thinking about how ill-named, ill-described shells open and shut will help this, but we also need more paleontology, not less, in the form of good systematic work, on controlled stratigraphic successions.

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Pollen and Spores of Chile

Modern Types of Pteridophyta, Gymnospermae, and Angiospermae. C. J. Heusser. University of Arizona Press, Tucson, Ariz. 1971. 167 p. $15.00.

One of the most serious impediments to the development of palynological studies of the history of floras and environments is the lack of reliable aids to the identification of microfossils. Investigations of the Quaternary history of tropical and subtropical countries have been particularly hampered in this way.

Professor C. J. Heusser has made a notable contribution to the palynology of the Americas

by the completion of his survey of Chilean pollen and spore types. He offers clear descriptions, a straight forward key and photomicrographs of good quality, in presenting the diagnostic information on all the significant pollen/spore types of the country.

This book will be essential for palynologists working in the tropical and subtropical Americas, of great interest to all palynologists and pertinent to students of Angiosperm taxonomy.

Dr. Heusser is to be congratulated on this notable contribution.

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Analysis of Temperate Forest Ecosystems

David E. Reichle (ed.). Springer-Verlag, New York. 1970. 304 p. $14.50. Ecological Studies Series vol. 1.

Ecology's time has come, inevitably, universally and perhaps permanently. Unlike other disciplines of science, ecology's advent at the forefront of interest and importance was brought on largely by public awareness and general concern among scientists. There were no sparkling breakthroughs or discoveries by ecologists to propel the subject into prominence.

Contemporary writings reflect this uneasy status. In North America we are being deluged by books and pamphlets on the ecological crisis, many of them republishing the same articles with dreary regularity. Most take an excessively gloomy, emotional view of the future of the earth and few succeed in retaining the cool, analytical approach which both the discipline and the problems require.

However, while the environmental scientist-politicians are braying their opinions and prognostications about the eco-crisis from the rooftops, some equally concerned ecologists are getting on, quietly and effectively, with the important task of measuring the metabolism of the world's ecosystems. At present, this effort proceeds largely under the auspices of the International Biological Programme. This volume is an account of a workshop session of ecologists held in 1968 to discuss methods and theory pertaining to investigations of temperate deciduous forest ecosystems.

It provides both the professional biologist and the interested layman with a readable, provocative account of the intellectual and practical joys and difficulties of metering the flows of energy, nutrients and water through such a complex system as a forest. The eighteen chapters, of varied lengths and details, deal with Ecosystem Analysis (4), Primary Production (3), Consumer Organisms (3), Decomposers (2), Nutrient Cycles (3) and Hydrologic Cycles (3).

This collection of papers has launched the *Ecological Studies* series most effectively and those ecologists and others who watch the IBP from the sidelines will look forward with enthusiasm to subsequent volumes. One wonders if a cheaper format would have been more appropriate, reducing the price and bringing the book within the reach of the already over-stressed budgets of graduate students and young scientists.

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Geographical Variation in the Polar Bear, *Ursus maritimus* Phipps

By T. H. Manning. Canadian Wildlife Service, Report Series — No. 13, 27 p. $1.00.

Of all the larger mammals, perhaps none has been subjected to such a confusing array of taxonomic treatments as have the bears. Earlier publications have used *Euarctos* for the black bears, *Thalarctos* for the polar bears, and *Ursus* for the grizzly and brown bears. The generic distinction between *Ursus* and *Euarctos* has been questioned, and most authors now regard them as congeneric. More recently some authors have concluded that *Thalarctos* as a distinct genus is untenable, thus placing all North American bears in the genus *Ursus*. As this concept has not yet been universally accepted, it is unfortunate that at least a short synopsis of the generic status of the polar bear was omitted from this paper.

Past taxonomic treatments have been seriously handicapped by small sample sizes and an in-