

*o*-phenanthroline. Two of the new papers are longer than the others: one describes the effect of x-rays on the metabolism of *Lactobacillus*, and the other discusses oxygen transport by illuminated chlorophyll.

It is indeed interesting, and in many ways helpful, to have collected in one volume a considerable number of important papers concerned with the methodology of investigation and the biochemical activities of cancerous and of photosynthetic systems. Those working in these areas certainly need to be familiar with this material. It must, however, be emphasized that much of the methodology is based on manometric techniques, and that many other means exist for investigating metabolism, which are of equal importance with manometry and which are not discussed in this book.

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## Oscillating Theories

**Fundamentals of Mid-Tertiary Stratigraphical Correlation.** F. E. Eames, F. T. Banner, W. H. Blow, and W. J. Clarke. Cambridge University Press, New York, 1962. viii + 163 pp. Illus. Plates. \$9.50.

This book, written by four paleontologists of the British Petroleum Company, is an ambitious attempt to synthesize what is known about marine Oligocene faunas, on a practically worldwide scale. According to the interpretations they adopt, discrepancies that have bothered some paleontologists are neatly resolved: discrepancies such as the absence of reticulate *Nummulites* in American deposits long accepted as of Oligocene age, the occurrence of *Pliolopidina* in the Eocene in America, and the appearance of *Miogypsina* s.s. and of some essentially Neogene and Recent molluscan genera in American deposits currently considered of late Oligocene age.

In part 1 (by the four authors), Oligocene and lower Miocene are traced from the Mediterranean region through the Middle East to East Africa and the Indo-Pacific region. The alleged Oligocene of the southeastern United States and the Caribbean region is examined. L. R. Cox, of the British Museum (Natural History), has con-

tributed a general survey of the Oligocene and Aquitanian (early lower Miocene) marine molluscan faunas of parts of Europe. In an appendix the generic name *Palaeonummulites* is resuscitated for nummulitids that have been referred to *Operculinella* and *Operculinoides*. In another appendix *Pliolopidina*, in a restricted sense, is given an exclusive early Miocene age.

In part 2, Blow and Banner discuss late Eocene to Aquitanian planktonic Foraminifera and zones based on those fossils. Trinidad and the Lindi area on the coast of southern Tanganyika are taken as standards. Two late Eocene zones in the Lindi area are substituted for Bolli's one zone of the same age in Trinidad, and the overlying Oligocene *Globigerina oligocaenica* zone of the Lindi area, missing in Trinidad, is added to Bolli's succession of zones. Some 50 species and subspecies, almost half of which are new, and a new genus are described. Seven lineages are traced in a final discussion of the evolution of some late Eocene to early Miocene species.

Discrepancies are resolved at a price that is likely to be unacceptable to American paleontologists. This price is the almost complete wiping out of marine Oligocene and the great expansion of Aquitanian in America. Oligocene, based on the occurrence of *Globigerina oligocaenica*, is recognized, however, at three American localities: the lower part of the Alazan shale of the Tampico area in Mexico, an unspecified locality in Cuba, and an unspecified locality in the Dominican Republic. The Cuban and Dominican specimens were identified by Bolli and Bermúdez.

It is difficult to reconcile an Aquitanian age with the Eocene stamp of the extensive molluscan fauna of the Vicksburg group of the southeastern United States—an Eocene stamp as marked as that of Oligocene European molluscan faunas. Wherever the American species *Pliolopidina toberi* is associated with larger Eocene Foraminifera—and it is generally so associated—the Eocene fossils are claimed to be reworked. The implication that all of the Gatuncillo formation of Panama is Aquitanian, with reworked Eocene fossils on an extensive scale, surely is not intended.

At the turn of the century, Dall claimed that all the Miocene of the Caribbean region and of southeastern United States, except the very latest, as

well as a little Eocene, were Oligocene. The pendulum has now swung to the other end of the arc. The Oligocene of the southeastern United States and almost the entire Caribbean region is Miocene and some Eocene is thrown in for good measure. Time will tell whether the pendulum will stay there.

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## Yesteryear in Nigeria

**Barth's Travels in Nigeria.** A. H. M. Kirk-Greene. Oxford University Press, New York, 1962. xii + 300 pp. Illus. Maps. \$6.10.

Quite apart from its unique value as the only biography of Barth in English, this book is a godsend to everyone interested in the history and geography of the central and western Sudan. It will be appreciated especially by those who have been unable to procure the increasingly rare original editions of Barth's journal or who hesitate to wade through five ponderous volumes.

The author opens with a brief but full biography, followed by a critique of the *Travels and Discoveries*, an evaluation of Barth's work in the light of present knowledge, and an impressive essay in critical bibliography. Then come a series of extracts, from the original English text, covering the most important phases of Barth's travels, trials, and adventures in the region that extends from Lake Chad to Sokoto; this is all smoothly connected by seemingly effortless résumés of the intervening material. One does not need to be interested particularly in Barth, or even in Nigeria, to be charmed by the many vivid word-pictures of landscapes and of native life; the photographic reproductions of Barth's colorplates (in black-and-white) are equally fascinating and informative.

Kirk-Greene's delightful, easy-flowing style and his extraordinary mastery of a very complex subject give the deceptive impression of a skillful novelist, so experienced that he can write effortlessly and almost without thought. And yet no one who is familiar with Barth's work at first hand can help being impressed profoundly by, and appalled at, the amount of labor that must have gone into such an admirable summary.

I am writing this review in the heart