end of each chapter and by the inclusion of more refined treatments and calculations in the appendices. These include data on montmorillonites, electric double-layer calculations, and van der Waals attraction between unit layers. Unfortunately, however, the appendix on the preparation of clay suspensions is over-simplified to the extent that it is misleading and may even present some difficulties in any attempt to use this section as a guide for methods and procedures. The organization is fragmentary, in that some of the same principles or phenomena are discussed in different chapters in addition to the synopsis and appendices.

This book should be of value as a general introduction to the field or for use in introductory courses that deal with clay colloids.

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Invertebrate Zoology

The Physiology of Earthworms. M. S. Laverack. Pergamon, London; Macmillan, New York, 1963. x + 206 pp. Illus. $7.

Laverack's purpose was to review the work on oligochaete physiology since the publication of Stephenson's *The Oligochaeta* (1930). The need was obvious; an entire chapter is devoted to *neurosecretion*, a term that does not appear in Stephenson's monograph. Seven chapters deal with physiological attributes of universal concern: "Biochemical architecture," "Digestion and metabolism," "Nitrogenous excretion," "Respiration," "Neurosecretion," "Nervous system," and "Behaviour." Four chapters have a decidedly vermiculous, if not strictly oligochaete touch: "Calciferous gland," "The axial field," "Water relations," and "The physiology of regeneration."

In concentrating on terrestrial species, Laverack had little choice. The bulk of earthworm physiology has been related to perhaps one or two dozen species, and among these we find few aquatic forms. Happily, the volume is "species oriented"; seldom does one find any implication of that nondescript beast, "the" earthworm.

Physiologists will find this book comfortable reading. Laverack sticks to his subject and moves surefootedly through evaluation of laboratory procedures and evidence. Occasionally the oligochaetologist will be troubled—for example, with statements like the following: *Lumbricus terrestris* and *Eisenia foetida* are "fairly closely related"; "the geographical location may be important in arriving at results and conclusions"; and "Oligochaetes are able to regenerate both the anterior and posterior ends with almost equal facility."

On two points, I have bias of long standing. First, inasmuch as laboratory procedures usually indicate precision, it appears insufficient to describe humidity conditions in experimental work as being "at a satisfactory level," and second, I question the synonymy of *aestivation* and *diapause* as applied to earthworm biology.

These few criticisms are not intended to be descriptive of the volume, for it is a fine piece of work. They do underscore an inherent limitation in a brief treatment by a specialist, in which, of necessity, concepts and ideas must be drawn from other areas. If it is inadmissible for the systematist, the ecologist, or the morphologist to be a trifle wobbly in his physiology, perhaps some reciprocity can be expected.

The list of references (more than 300 titles), index, and illustrations are pertinent and well done. The book must be considered an authoritative treatment in which the students of invertebrate zoology will find a vast array of potential avenues for investigation.

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Biography

Erasmus Darwin. Desmond King-Hele. Scribner's, New York, 1964. viii + 183 pp. Illus. $3.95.

Erasmus Darwin, grandfather of the great biologist who established the theory of evolution, had his own notions on the subject, notions that call forth enthusiastic praise in this appreciative biographical essay. The elder Darwin was an ardent broker of 18th-century scientific ideas. Although he undertook few experimental investigations, he had a truly voracious interest in all of science, its prospects, and its application to human affairs. He met frequently with industrialists and urged them to pioneer in applications of technology. His garden in Lichfield was laid out according to the *Systema Naturae* of Linnaeus. His bulky treatises expounded a comprehensive system of materialistic psychology and physiology for both plants and animals, based in large part upon the analogies between them. He was one of the most effective physicians of his time. The distinctive effort of Darwin's life, in which he sought to apply his theories about popular education, was the production of three long poems in an attempt to enlist popular understanding for science. The poems are a tour de force of exposition, even though they employed trivial poetic modes suited only to the audience of fashion Darwin tried to reach. King-Hele has provided a good selection of this poetry—for example, his summary of evolution (from *The Temple of Nature*):

Organic Life beneath the shoreless waves
Was born and nurs'd in Ocean's pearly caves;
First forms minute, unseen by spheric glass,
Move on the mud, or pierce the watery mass;
These, as successive generations bloom,
New powers acquire, and longer limbs assume;
Whence countless groups of vegetation spring,
And breathing realms of fin, and feet, and wing.

By expounding a notion of progress from lower to higher forms of life, Darwin sought to advertise the explanatory powers of science and the epic grandeur of its subject matter. King-Hele contends that his enterprising, self-contradictory, and enormously conjectural notions constituted the first "well-rounded" and "satisfactory theory of evolution with evidence in support." In the interest of this argument, he has had to deny that Erasmus Darwin meant what he wrote about the influence of a male parent's imagination on the endowment of his offspring. Nor is it clear how this use of the word "theory" could be justified in any rigorous sense. The author suggests that the reputation of Charles Darwin is partly undeserved because Erasmus Darwin anticipated him. He does not support this contention with any considered estimate of Charles Darwin's achievement and averts his glance from some of Erasmus Darwin's writings in order to deny his close similarity to Lamarck. Erasmus Darwin's notion of evolution did not arise