Oligocene beds. The Red Bluff Clay rests disconformably on the Shubuta Member. It is perfectly clear from field relations that the Shubuta is a tongue of the Yazoo Clay, which, in western Mississippi, comprises the greater part of the Jackson Group.

F. STEARNS MACNEIL
U.S. Geological Survey, Menlo Park, California

Plant Physiology

The Absorption of Solutes by Plant Cells. D. H. Jennings. Oliver and Boyd, Edinburgh, Scotland, 1963. viii + 204 pp. Illus. 30s.

This is a well-written and informative book in which the author presents a constructive analysis of important data that has appeared in the current literature. The presentation of subject matter follows a logical order with continuity of thought between chapters.

In the second chapter, which deals with theoretical considerations of solute movement, Jennings discusses the meaning of the terms *active transport, passive transport, free diffusion*, and *facilitated diffusion*. This discussion includes a thorough mathematical description of the several types of transport that have been investigated. The reader is thus given the basis for critical evaluation of data presented in later chapters.

Chapters 3 and 4 clearly point out certain of the pitfalls that may be encountered in interpreting generalized measurements of solute movement in plant cells if the cell is not considered as a multicomponent system and if the concept of free space is neglected.

Salt absorption and metabolism are reviewed in chapter 5, and the author compares the early findings of Hoagland and Davis and of Lundegårdh with the current concepts of active transport. Detailed discussion is given to papers that have treated demonstrations of the coupling of respiration and salt uptake with the use of metabolic inhibitors. In this chapter, as well as the following chapters, frequent references are made to transport studies carried out with the use of animal cells. The author also describes his own research in the area of active transport. Most of the remaining chapters are devoted to a discussion of the transport of particular solutes. Detailed attention is given to the uptake by plant cells of potassium and sodium, bivalent cations, phosphate, anions other than phosphate and nitrate, and organic compounds such as amino acids and sugars.

In chapter 14, the final chapter, the author summarizes the content of the book and describes his thoughts concerning the experimental data presented throughout the book. He considers these data in the light of traditional studies but suggests that a radical rethinking of the fundamental assumptions of solute transport may be required. As evidence of this, he discusses at length the transport hypothesis recently proposed by Mitchell.

This book will serve as a valuable reference work for the experimentalist and as an authoritative text for students of plant physiology.

HENRY N. WOOD
Rockefeller Institute, New York

Zoological Sciences

Collegiate Dictionary of Zoology. Robert W. Pennak. Ronald, New York, 1964. viii + 583 pp. $8.50.

The appearance of a large new dictionary in any field of learning is always a notable event, especially so when it stands alone as does this one. Robert Pennak has dedicated this massive labor to his students, but he has written for zoologists generally—students, research workers, and teachers (high school, college, and university), as well as the general scientific public. It will be a very handy volume to have at one's elbow.

The approximately 19,000 terms are clearly and accurately defined, and they cover a very wide and up-to-date spectrum of the zoological sciences. The range of topics extends from ATP, the ampulla of Vater, and gnotobiotics to Nansen bottle, solenocyte, and zymogen. The emphasis is on North American usage and fauna, but I was hard put to it to find anything to which a British colleague would object, outside of essentially trivial differences in spelling.

Over 8500 genera and higher taxa are defined with cross references to common names when these exist. In the present unsatisfactory state of taxonomy, this sometimes becomes a tricky business. *Diemictylus* is not given under *Triturus* as a possible generic home for the common North American newt, *viridescens*, although *Diemictylus* has become fashionable again after 30 years of *Triturus*. Instead, *Notophthalmus* is suggested, which is going back even further. However, under *Diemictylus* the reader is referred to *Triturus*! *Nassa* is given but not the "older" term *Ilyanassa*, still used by many experimentalists and for which there is a vast literature. But such is the nature of taxonomy, and we can only extend our sympathy to any zoologist, including taxonomists, who must struggle with it. Despite such inherent difficulties, the wealth of material will be a ready source of necessary information.

A welcome feature is the inclusion of the names, dates, and brief characterizations of the work of a large number of zoologists, both American and European. O. C. Marsh (who collected the fossil horses that T. H. Huxley traveled especially to this country to see) must have turned over in his grave to have been omitted while his bitter rival, E. D. Cope, is listed. But the selection is generally both discriminating and adequate, and the ghost of Marsh can be appeased in a second printing.

There are a few surprising omissions: induction, circadian, centrifuge, morbidity, infectious, and all the terminology of soils such as mull, podzol, chernozem, horizon, and pedology itself. Of course these terms are geological, but they are fully as important to the zoologist as thermocline or epilimnion which are included. Actual errors are virtually absent, although I did notice that John Needham is credited with having aided in the demise of the theory of spontaneous generation when in fact he supported the theory against Spallanzani.

Unlike Samuel Johnson, Robert Pennak has not attempted to use his dictionary to reform the language. On the contrary, he explicitly states that in many cases he follows prevailing usage even when he does not agree with it. (No, Pennak was not one of the editors of the controversial new edition of Webster's *Unabridged*.) In what he set out to do he has succeeded, handsomely. There is a useful appendix that contains a taxonomic outline of the animal kingdom down through the level of families.

GAIRDNER MOMENT
Department of Biological Sciences, Goucher College