Anyone reading this book will get a clear idea of the state of knowledge of tne mechanical properties of bone as it was in about 1969. There are few later references. The experiments are set out in detail, usually far too great detail. For instance, in 1965 the reviewer published a paper concerning anelasticity in bone. It was 13 pages long, with six illustrations. Evans paraphrases it in 5½ pages using all six illustrations magnified 40 percent (this magnification being a general feature of the book). There is no possible reason for devoting 1½ percent of the book to this possibly pioneering, but certainly naive, paper.

What the reader will not get is any feeling for what are important problems to be solved now. This is for two reasons. First, there are effectively no comments on the worth or significance of different pieces of research. Work done by Rauber in 1876 is treated in exactly the same way, and at the same length, as the highly sophisticated work of, for instance, McElheney or Evans himself. Second, almost no consideration is given to why bone behaves as it does. Sometimes, if the authors he cites themselves discuss the matter, Evans will quote them, but the result is less than satisfactory. For instance, the discussion by Roth *et al.* of the causes of plasticity in bone was interesting in 1961; nowadays it reads like something from another age.

All this is particularly bitter because no one is better placed than Evans to sit back and comment on where the evidence so far accumulated is leading. This is a book that all research workers on bone must own, with regret that it is not a different book.

JOHN D. CURREY
*Department of Biology, University of York, York, England*

## Plant Physiology

**Phloem Translocation.** M. J. CANNY. Cambridge University Press, New York, 1973. xii, 302 pp., illus. + plates. $22.50.

The intriguing question of the mechanism involved in transporting carbon compounds over long distances in plants has evoked much research, and recently several reviews and books on the topic have been published. Canny emphasizes the kinetics of carbon transport and deliberately works "towards a mechanism." In these respects he extends the available literature on the anatomy, physiology, and biophysics of the process.

The early chapters of *Phloem Translocation* cover aspects of the anatomy of the phloem, the chemical composition of the moving solution, the energy supply, and bidirectional transport. Detailed information on these aspects of the process can be obtained from other texts, but in this volume it is oriented toward aspects relevant to the kinetics of carbon transport. Furthermore, it is background information that will allow readers new to the topic to appreciate the biology of the process.

The book collects and interprets almost all the data that have ever been obtained from radiocarbon tracer profiles; this material constitutes a useful résumé and illustrates the accomplishment of existing techniques. The treatment of the theoretical profiles is limited, though the inclusion of the work of Taylor will be appreciated. In contrast experimental data on tracer profiles, that is, the distribution of tracer in a plant as a function of time and distance from the point of application, are exhaustively examined. These cover many species, times, and treatments and generally illustrate that they fit error curves.

Three characteristics must be taken into account to describe mass transfer: the concentration of the solution, speed, and the cross-sectional area involved in transport. The relationships among these components will be important in understanding translocation, and, as Canny comments, whether speed is related to the amount of sugar moving or independent of the mass moved is a "crucial question that awaits experimental attack." Clearly definitive techniques to describe these components are required.

The objective of the book becomes most apparent in part 2—this is, to present the author's theory of the mechanism. This is achieved by a step-by-step explanation of fitting error functions, its application to 28 tracer profiles, extensive discussion showing that the results support the accelerated-diffusion model, and relative neglect of other models. The reader becomes well acquainted with Canny's point of view and may be tempted by the detailed description of the method to apply it without understanding the model. The validity of Canny's interpretation of the profiles has been questioned by MacRobbie and Passioura. I think there are many experimental data showing that the shape of the carbon profile is determined primarily in the source region and that there is little alteration along the leaf or stem, although this conclusion may depend on species and environmental conditions.

This volume emphasizes the need for reliable techniques to obtain quantitative kinetic data about the transport of carbon in plants. Some data already available conflict with Canny's interpretation, but many more are required to elucidate the mechanism of this process that is important in plant production. The chapter entitled "Towards a mechanism" describes the discussion in this book. The goal has yet to be attained.

JOHN H. TROUGHTON
*Department of Plant Biology, Carnegie Institution of Washington, Stanford, California*

## Books Received

**Aging and Behavior.** A Comprehensive Integration of Research Findings. Jack Botwinick. Springer, New York, 1973. x, 326 pp., illus. $10.50.

**Alfred Binet.** Theta H. Wolf. University of Chicago Press, Chicago, 1973. xiv, 376 pp. $13.75.

**Ancient Views on the Origins of Life.** Ernest L. Abel. Fairleigh Dickinson University Press, Rutherford, N.J., 1973. 94 pp. $6.75.

**Annual Reports in Organic Synthesis.** 1972. John McMurry and R. Bryan Miller, Eds. Academic Press, New York, 1973. xiv, 274 pp., illus. Paper, $7.50.

**Atlas of Hawaii.** Department of Geography, University of Hawaii. University Press of Hawaii, Honolulu, 1973. ii, 222 pp., illus. Paper, $15.

**Atomic Structure and Properties of Solids.** Proceedings of the International School of Physics "Enrico Fermi," Course 52, Varenna, Italy, 1971. E. Burstein, Ed. Academic Press, New York, 1972. xx, 608 pp., illus. $39.

**Barobiology and the Experimental Biology of the Deep Sea.** Proceedings of a symposium, 1972. Ralph W. Brauer, Ed. North Carolina Sea Grant Program, University of North Carolina, Chapel Hill, 1972. xiv, 428 pp., illus. Paper, $10.

**Basic Physical Chemistry for the Life Sciences.** Virginia R. Williams and Hulen B. Williams. Freeman, San Francisco, ed. 2, 1973. xx, 524 pp., illus. $14.95.

**Biochemistry of the Developing Brain.** Vol. 1. Williamina Himwich, Ed. Dekker, New York, 1973. xviii, 388 pp., illus. $24.50.

**The Biology of the Indian Ocean.** Proceedings of a symposium, Kiel, Germany, Mar. 1971. Bernt Zeitzschel, Ed., in cooperation with Sebastian A. Gerlach. Springer-Verlag, New York, 1973. xiv, 550 pp., illus. $55.40.

**Chemotherapy of Malaria and Re-**

*(Continued on page 120)*