In general, the experiments are short and not too complex for individual performance.

JAMES H. M. HENDERSON
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Colloid Chemistry of the Silicate Minerals. C. Edmund Marshall. New York: Academic Press, 1949. 195 pp. $5.80.

This is the first of a series of monographs on agronomy prepared under the auspices of the American Society of Agronomy. The volume is restricted, in the main, to evidence obtained from reasonably pure materials, thus enabling the author to lay before the reader an account from the viewpoint of a participant, in which the advances of the last twenty years are especially emphasized.

After a historical outline, the author takes up silicate structures, silicates based on a three-dimensional framework, the colloidal properties of the zeolites and the structures of silicates with planar frameworks, and the structural interpretation of chemical analysis of the clay minerals. This is followed by chapters dealing with the sizes and shapes of clay particles and with the optical properties of clay aggregates and suspensions, adsorption by the clays and its consequences, clay acids and their titration curves, and ionic exchange reactions of the clays. The book is concluded by three chapters on properties: the electrokinetic properties and mechanical properties of clay suspensions, and sols, and the properties of clay aggregates and films. From this outline of the chapter headings it will be seen that the work is restricted to pure materials, relegating to the background diverse and important applications. In admirable fashion the author has clarified the fundamentals rather than describing the technical details of application. The author has succeeded well in his announced purpose and is to be congratulated.

HARRY B. WEISER
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Fifty Years of Plant Physiology. Th. Weevers. Amsterdam, Holland: Scheltema & Holkema's, 1949. 308 pp.

This contribution to the history of plant physiology covers the years 1895–1945, with special emphasis on Dutch investigators and their works. Since many of these are unfamiliar to American physiologists, their inclusion here is one of the chief assets of the volume, although it tends to overbalance the work of plant physiologists of other countries and thus gives a one-sided picture of the development of the science.

In plan the book is modeled so faithfully upon Hugo de Vries' *Textbook of Botany* that it practically forms a sequel to it. However, in the past fifty years the science of plant physiology has expanded and branched out in many directions unimportant or unheard of in the time of de Vries. The result is that the book seems overloaded in such fields as tropisms and other movements, and inadequate in such fundamental aspects of growth as photosynthesis, water relations, and enzymes. Even after a careful perusal of the entire volume, the reader lacks a well-rounded concept of plant physiology in 1945. However, the book is a valuable addition to a physiologist's library for the sake of its bibliography.

RUTH M. ADDOMS
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Water in the Physiology of Plants. A. S. Crafts, H. B. Currier, and C. R. Stocking. Waltham, Mass.: Chronica Botanica; New York: Stechert-Hafner, 1949. 240 pp. $6.00.

Graduate students in biological science are expected to achieve a somewhat detailed knowledge of a restricted field and a reasonable familiarity with the important ideas and techniques of many associated sciences. The tremendous volume of information that keeps pouring forth in countless technical journals makes this task increasingly difficult. It is quite hopeless to expect graduate students, or even more experienced research workers, to keep abreast of this flood of data, theories, and facts without the assistance of specialists whose critical judgment can bring order and sharper focus to the work in their spheres of interest. The rapidly growing number of reviewing journals, monographs, and articles is tangible evidence that this problem is appreciated and that efforts are being made to provide at least a partial solution.

The volume under review is a contribution of this kind. It endeavors to bring together in readable form both the historical and the modern ideas about water and its role in the physiological processes of plants. Any satisfactory comprehension of water movements in living systems must be solidly based upon an understanding of the chemical and physical properties of water as a chemical compound. It is the recognition of this important point that has prompted the authors to focus attention upon water rather than upon the plant or on specific processes in the plant. This approach to an important segment of plant physiology is something of a departure from tradition, but is sound and logical in its recognition of the close dependence of physiology upon the physical sciences.

The authors first discuss water as a chemical compound and review the various theories that have been advanced to account for its many unusual properties in terms of atomic and molecular linkages. This discussion is followed by a similar treatment of aqueous solutions.

Chapter 4 is devoted to a detailed analysis of osmosis in physical systems from the viewpoint of the physical chemist. In Chapter 5 the terminology common in physiological literature is defined and used in reviewing various hypotheses that have been suggested to account for the origin of pressure in osmotic systems. Although this is still a complex and controversial subject, it seems to the reviewer that the discussion does not dispel all of the confusion that has so long surrounded it.

Attention is then directed to the osmotic systems of living cells and tissues. Particular emphasis is given to