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

JAMES H. M. HENDERSON
California Institute of Technology

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
Rice Institute

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
Duke University

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

the methods employed to measure the osmotic quantities of plant cells and to their limitations.

In recent years many different lines of experimental evidence have suggested that movements of water between living cells involve physiological as well as purely physical mechanisms. The evidence is described and critically evaluated in a long chapter that bears the rather unfortunate title of "Active Cell Water Relations." The authors conclude that information is still too incomplete to warrant any definite conclusions as to the reality of water movements initiated and maintained in living cells by the expenditure of energy in physiological processes.

The remainder of the book (Chapters 9 and 10) deals with the absorption of water by root systems, its transport through the conductive elements, and its loss in transpiration. The treatment is brief but uneven in the thoroughness with which the various processes are discussed. The restricted treatment given soil moisture relations and the physiology of water absorption undoubtedly stems from the recent publication of an excellent monograph on these subjects.

A concise summary terminates each chapter. All citations of literature are in a single extensive bibliography. Text material is supplemented by many figures.

The book can be recommended to advanced students of biological sciences and to teachers as a very useful presentation of the water relations of the higher green plants. It brings together a great deal of information and the sources from which the data have been obtained. It seems unfortunate that so little attention has been given to the structural framework of the plant within which the physiological processes take place. Full comprehension of physiology must depend upon an appreciation of the relationships between anatomy and the activities located in this framework. In orienting their discussion upon one of the components of the plant rather than upon the interrelationships of the organism as a whole, the authors were limited by the restrictions of their point of view and their treatment fell short of completeness. Nonetheless, the book fills an important place in plant physiological literature and its uniqueness of approach gives it a distinctive flavor which will increase its appeal.

DONALD B. ANDERSON

North Carolina State College

Blakiston's New Gould Medical Dictionary. Harold Wellington Jones, Normand L. Hoerr, and Arthur Osol, Eds. Philadelphia: Blakiston, 1949. 1294 pp. $8.50.

One must live with a dictionary in order to attempt to assess its real value. This the writer has done for several months and hence offers a somewhat belated review.

A sedulous attempt has been made to develop a dictionary along new lines to cover the broad field of the health sciences. Members of the faculty of Western Reserve University School of Medicine formed the nucleus of specialists charged with the responsibility for words and definitions; to this group were added equally eminent leaders in lexicography.

The selection of the words was made after a diligent search of the current literature not only for new terms but also for evidence of change of usage. The drugs described in the latest revisions and editions of the *Pharmacopoeia of the United States of America,* the *National Formulary, New and Nonofficial Remedies,* and the *United States Dispensatory,* and in the various listings of medicinals bearing trade-marked proprietary or other trade names have been included. In order to do this and yet keep the bulk of the volume manageable, it became necessary "to trim away much that clearly is obsolete and valueless."

Pronunciation is shown by syllable division and accent. Eponyms and biographic references have been included with and handled as part of the vocabulary. The illustrations have been grouped in the center of the volume but they are integrated with the rest of the volume by an adequate system of cross references. The selection of the type is good and the excellent spacing makes for unusual facility in finding the words.

The editors and contributors have succeeded in preparing a most useful book and it can be highly recommended. Their wisdom in the choice for deletion of words, such as *aleuronat,* will be evident only after wide usage. It is a bit disappointing to note the omission (surely not a deletion) of the name of Domagk, Nobel laureate in medicine for his work on the sulfanilamides; the etiologic agent of granuloma inguinale given as *Leishmania donovani*; the word spectrum defined without reference to "microbial spectrum"; the statement under Roux: "first used attenuated bacterial culture (anthrax) therapeutically (1880)"; and the "Calmette test" listed as obsolete. These and other shortcomings will unquestionably be rectified in future editions.

MALCOLM H. SOULE

University of Michigan

External Morphology of the Primate Brain. Cornelius J. Connolly. Springfield, Ill.: Charles C. Thomas, 1950. 378 pp. $10.00.

Every important stage of cortical development from lemur to man is dealt with in this monograph. For his study of the 538 brains from more than 50 species, Dr. Connolly had access to the vast collection of the U. S. National Museum. Few, if any, previous investigators have reported on so large a series or on one in which such accurate information was available even on such details as sex and age.

The subjects discussed are: I. The fissural pattern of the primate brain; II. Encephalometry; III. Development of the cerebral sulci; IV. The brain of the newborn and of children; V. The fissural pattern of the human brain (Negroes and whites); VI. Brain and race; VII. The