## WELL RECORDS SOUGHT

THE writer is making a mineralogical and chemical study of the saline "black waters" of western New York State. These waters are connate in the Niagara (Silurian) limestone. For the past several months he has been collecting well records but is only interested in those wells actually reporting black water when the Niagara limestone was contacted.

In an effort to obtain as many well records from western New York State as possible, he is asking all those who might have such records in their files to forward them to the writer, care of the Buffalo Museum of Science. Receipt of same will be greatly appreciated. Exact location of the well, the surface elevation and depth at which the black water was encountered are the only data that need be given.

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NEW YORK

# SCIENTIFIC BOOKS

## SOME NEW BOTANICAL TEXT-BOOKS

*The Plant Kingdom: A Text-book of General Botany.* By WILLIAM H. BROWN. ix + 869 pp. 1,040 figs. Ginn and Company, Boston. 1935. $3.50.

THE old order is slowly changing in botanical texts, yielding place to new. This is happily reflected in the volume by Brown. While the mold in which it is cast is essentially similar to that of previous works on the subject, this book has certain distinct and outstanding merits. In the first place, modern discoveries are given due consideration. For example, photoperiodism, growth-regulating hormones and recent suggestions with regard to water movement are succinctly discussed. In dealing with heredity, the usual ratios in the four-o'clock and the pea are explained; but in addition the inheritance of sex in plants and of color characters in corn and wheat is also described.

The morphological treatment afforded the organs of the plant is unusually complete, both in the scope of the descriptive matter and in the abundance of accurate and artistic illustrations. Throughout the book the illustrations are excellent, and, in the first part especially, nearly all are original—a very refreshing phenomenon. The chapter on plant geography, and the earlier chapters generally, serve as reminders that there are plants in the tropics, though the time-honored —and somewhat time-worn—representatives of higher latitudes are by no means neglected.

This is a large book, and the range of material taken up in most of the groups—the algae and fungi, for instance—is much greater than usual. And here again the modern work is given consideration.

A novel feature is the adequate discussion allotted to certain fossils that are now coming to be regarded as links in the chain of evolution. Thus among the lower Pteridophyta, the Psilophytales, including *Rhynia, Hornea, Psilophyton* and *Asteroxylon,* are amply treated; among the higher forms the Calamitaceae and Sphenophyllaceae and *Lepidodendron* and *Sigillaria* are considered. Similarly, among the Spermatophyta the Cycadofilicales and the very important *Cycadeoidea, Williamsonia* and *Williamsoniella* are taken up in some detail.

One might desire, in a book of this size, a better indication of the orders, families and interrelationships of the Angiosperms—a feature that is largely omitted.

The style is simple, direct and easy to follow throughout, and the manner of presentation easily understandable. This book is a distinct contribution in its thoroughness and completeness.

*A Textbook of General Botany.* By GILBERT M. SMITH, JAMES B. OVERTON, EDWARD M. GILBERT, ROLLIN H. DENNISTON, GEORGE S. BRYAN and CHARLES E. ALLEN. x + 574 pp. 429 figs. 3d edition. The Macmillan Company, New York. 1935. $3.50.

THE third edition of the Wisconsin text is larger than many other recent botanical texts, for two reasons: The discussions go into considerable detail, and certain topics omitted or barely mentioned in other books are included. The usual material is discussed in a very thorough fashion. In the chapter on "Inheritance and Variation," for example, the rôle of chromosomes in heredity, characters and genes, linkage and crossing over and their physical basis, the kinds of variations in plants, polyploid series and other variations in chromosome numbers, and chromosome fragmentation are all rather carefully considered. Similarly, in the chapter on "Floral Types and the Families of Angiosperms," nineteen families are characterized and illustrated.

Among the less usual topics included is "The Geographic Distribution of Plants in North America." Tundra, forests, grasslands and deserts are described. The forest types are taken up in some detail.

The subject of "The Economic Significance of Plants" is reviewed under various topics, such as the plant parts used commercially, the geographical distribution of crop plants, medicinal plants, forestry, weeds and plant diseases. It is evident that this text treats of numerous subjects that are beyond the scope of most books on general botany.

The book is conservative. Recent work is not neglected; it is in many cases almost unnoticeably incorporated in the general body of knowledge presented;

and no particular deference is paid to the spectacular features of the science. The style is readable and yet cautious. The illustrations are clear and mostly original. This work rather suggests a stout ship, of ample tonnage, neither particularly stream-lined nor remarkably high speed, but thoroughly sound and seaworthy, well ordered and well wrought.

*Botany: Principles and Problems.* By EDMUND W. SINNOTT. xix + 525 pp. 310 figs. 3d edition. McGraw-Hill Book Company, New York and London. 1935. $3.50.

IN some ways at least, this is the most modern of the current series of text-books. Several features are striking. One is the inclusion of a chapter on "Development and Morphogenesis (Experimental Morphology)." These terms are used in the broadest sense, and the chapter represents a digest of more recent research in botany, incorporated with some older discoveries. The subjects considered include, among others, polarity, wound hormones, auxin, etiolation, photoperiodism, mitogenetic radiations and metabolic gradients. The chapter on plant evolution contains references to Fernald's taxonomic and ecological work; to many, convincing evidence for plant evolution may be found in a study of the distribution of related species and varieties.

The plant kingdom is divided into three great groups: the Thallophytes, the Bryophytes, and the Vascular Plants or Tracheophytes. The group of Vascular Plants in turn is subdivided; several primitive forms, including the extinct *Rhynia* and *Asteroxylon,* are first considered, together with the living *Psilotum* and *Tmesipteris,* which may be related to them. From these primitive forms three lines of development are postulated: the Lycopsida, including the living *Lycopodium, Selaginella* and *Isoetes,* and the extinct *Lepidodendron;* the Sphenopsida, including *Equisetum* and the Calamites; and the Pteropsida, including the Ferns and also the Gymnosperms and Angiosperms, which are thought to have been derived from them.

Although the third edition of this text is considerably larger than the previous ones, it is still not one of the larger books and its discussions are in most cases brief. Nevertheless, much ground is covered. In the Ferns, for instance, reference is made to *Marsilia;* and in the Gymnosperms, to the Cycadofilicales, the Bennettitales, *Ginkgo,* and the Gnetales. Among the Angiosperms the evolutionary tendencies are pointed out, and some of the more important orders are briefly considered.

The "questions for thought and discussion," at the close of the chapters, for which this book has always been known, now number 782. The style is not so simple as in some of the other texts and is more literary. This book is a modern presentation, scientifically accurate, pedagogically sound, and valuable.

*An Introduction to Plant Life.* By CARL L. WILSON and JULIA M. HABER. xiv + 493 pp. 316 figs. Henry Holt and Company, New York. 1935. $3.00.

ACCORDING to the preface of the book, the authors aim "to set forth the plant as a whole, with emphasis, so far as possible, upon those aspects of plant life which enter into the environment of the student." This they accomplish with a good measure of success.

Less extensive in its treatment than many of the other recent works, this text is obviously intended especially for a one-semester course. In general range of subject-matter it approximates the larger texts. The method of presentation, however, is radically different. Much of the technical detail has been omitted, and the more general features are emphasized.

Modern botanical research and interpretations are not overlooked. This is reflected in various ways: in the discussion of movement of materials in the plant; in the importance assigned to fossils in plant evolution; in the relationship portrayed between the algae and ferns on the one hand and the algae and the bryophytes on the other.

A glance at certain of the topics treated bears strong testimony that the authors have assembled botanical information of human interest and economic significance. To mention a few: the harvesting of the cork of commerce; the nature of the commercially important fibers of flax, hemp and sisal; the formation of coal; the manufacture of malted milk in connection with the digestion of starch; and the method of introducing nitrogen-fixing bacteria into the soil. These and similar topics give this book a decidedly human touch, and will make it valuable for assigned reading, even in courses in which more detailed subject-matter is included.

The style is direct and pleasant, with a journalistic flavor. The introduction of technical terms is kept at a minimum—an advantage to the student who does not need to acquire a scientific vocabulary. Summaries and literature references at the ends of the chapters are useful features, especially in a book that covers a wide field with no great emphasis on detail. This volume represents a new departure in the style of text-book writing; it should appeal strongly to the college undergraduate.

*Plant Life.* By D. B. SWINGLE. xiv + 441 pp. 290 figs. D. Van Nostrand Company, New York. 1935. $3.00.

DEPARTING less from the traditional treatments of the subject, this text again is intended for a short course, and consequently is limited in the quantity of

material considered. The scope is rather wide, however, and frequently the more interesting and striking features are emphasized. Thus attention is directed to the noteworthy cases of insect pollination in the fig and the *Yucca*. Similarly, the spectacular culturing of fungi by the leaf-cutting ants of the tropics and the courting home of the bower bird are described.

The aim of the author is to emphasize the functional rather than the morphological approach. In general the details of structure presented are no more than are sufficient for an understanding of the activities of the plants considered. The point of view is conservative, in certain respects perhaps too much so. Care is used in the introduction of technical terms, so that their meaning may be easily comprehended; and a glossary is appended. Selected review questions on the material covered in each of the chapters further enhance the pedagogical value of the book.

In part six, on "The Different Kinds of Plants," the Thallophyta are emphasized comparatively strongly, 103 pages being devoted to this division, and only 53 pages to the remainder of the plant kingdom. But this allotment of pages seems justified, since the other parts of the book deal especially with higher plants.

The style throughout is simple and easy to follow, though occasionally it smacks of the paternal. Elementary students should have no difficulty in using this text; those who do will profit especially by its simplicity and its logical presentation.

*A Textbook of General Botany.* By RICHARD M. HOLMAN and WILFRED W. ROBBINS. xiii + 626 pp. 463 figs. 3d edition. John Wiley and Sons, New York. 1934. $4.00.

THE third edition of this popular text-book obviously merits the approval with which the two previous editions were received. A little more than half of the book—Part I—is devoted to "The Structure and Physiology of Seed-bearing Plants." The first chapters deal with topics of wide import. Then follow chapters on the cell and on the nature and functions of the plant organs. Each of these is executed with exceeding care and thoroughness. A chapter of 63 pages, for instance, deals with the structure and physiology of the stem; one could hardly find a clearer and more concise treatment of the gross features, development, histological characters and physiology of the stem. The discussions of the other organs are equally good. Chapter 8, for example, deals with the fruit, seed and seedling in masterly fashion. The concluding chapter of Part I, on the "Relation of the Plant to its Environment," contains an excellent treatment of the conditions to which the plant is exposed, in addition to presenting the rather difficult subjects of plant invasion and plant succession.

Part II is a survey of the plant kingdom. The important groups are presented in clear, almost diagrammatic fashion. The authors include a fairly limited number of forms—for a large book—and present them in considerable detail. This makes for ease of understanding. In the chapter on the Spermatophyta the tendencies in the evolution of the flower are traced, and some of the possible relationships are indicated by means of charts. The concluding chapter deals with evolution, heredity and fossil plants. Modern literature has received consideration in the preparation of this treatise, and reference books are listed in the appendix.

Throughout, the style is simple and direct; there are frequent enumerations of significant points, and summaries are rather extensively introduced. Also, boldface type and paragraph headings facilitate the use of the book. These features no doubt are in part responsible for the wide-spread popularity of this text. Unusual care has been taken in the preparation of the original illustrations, so that they are diagrammatically clear and well labeled; those that are borrowed have been judiciously selected. These many virtues make this text an outstanding one; it covers the field of modern botany in clear, concise fashion.

The subject is treated similarly, but much more briefly, in "Elements of Botany" by the same authors.

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# SPECIAL ARTICLES

## CHEMICAL RELATIONSHIPS BETWEEN COMPOUNDS OF PHYSIOLOGICAL IMPORTANCE HAVING THE PHENANTHRENE NUCLEUS

THE following chart summarizes the chemical relationship between numerous classes of physiological compounds as given by investigators in many laboratories at present. About 1769 the main constituent of gallstones was isolated and soon recognized in bile itself. Chevreul gave it the name cholesterine from the Greek *chole,* meaning bile, and *steros,* solid. The name was later changed to "cholesterol" because it was shown to possess an alcoholic hydroxyl group. Sterols have been found in the cells of every class of living being so far investigated. They are especially abundant in nervous tissue of animals. That animals really can synthesize sterols has been demonstrated by ex-