adequately, to a degree that should make the work a valuable addition to the scientist's library.

The dictionary, as its name implies, has to do primarily with words found to be indigenously American, and every word or sense of a word that originated within the present limits of the United States is conspicuously indicated as such. For instance, although the word *alkali* is found in English before 1600, there are three senses of the word listed as peculiarly American, as well as the expressions alkali desert, alkali dust, alkalied, alkali flat, alkali grass, alkali lake, alkali plain and alkali sink.

The thoroughness with which the vernacular names of American plants and animals are treated is illustrated especially under the word *American* itself, where no less than eighty biologic and ethnologic terms, ranging from *American antelope* to *Amerindian,* are given with their definitions and histories. For method of treatment let us quote one example:

+American chestnut. The ordinary chestnut (*Castanea dentata*) of the United States. Also attrib. with *tree.*

1785 MARSHALL *Amer. Grove* 46 American Chesnut Tree. . . . The timber is used much for rails, splitting free and outlasting most of our Oaks. **1832** BROWNE *Sylva Amer.* 131 The American chesnut sometimes attains the height of 70 or 80 feet with a circumference of 15 or 16 feet. **1859** HILLHOUSE tr. *Michaux's Sylva* III. 12 Though the American Chestnut nearly resembles that of Europe in its general appearance, its foliage, its fruit, & the properties of its wood, it is treated by botanists as a distinct species. **1901** MOHR *Plant-life Ala.* 468 American Chestnut. . . . Important timber and nut tree.

The number of words purely American in origin is surprising; of these the following examples are selected to represent various branches of science and invention: *abalone, adobe, Alabama, alewife, amberjack, ambrotype, anaesthetic, ancon* (sheep), *angleworm, Appalachian, Arizona, Arkansas, automobile, Bad Lands.* Words originating after the end of the nineteenth century are not admitted to the dictionary.

For any one even only mildly interested in etymology or natural history or geography this dictionary makes good reading, as in fact any good dictionary does. Part 1 (A to Baggage) runs to 116 double-column quarto pages, and there are to be about 20 parts issued separately. By the time it is completed, judged from the beginning, the words of scientific import will mount to a considerable total.[1] It is to be hoped that scientific libraries, museums, and even individuals who can (Part 1 sells for $4) will avail themselves of this monumental reference work, the value of which is bound to increase as Americans become more and more aware of the richness of their own history and culture and put increasing store by the things that had their beginnings in their own country—the United States. In any event, the University of Chicago, the American Council of Learned Societies and the General Education Board of New York should be congratulated for sponsoring such a notable piece of literary research.

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SCIENTIFIC BOOKS

RECENT BOTANICAL BOOKS

The Story of the Plant Kingdom. By MERLE C. COULTER. ix + 270 pp. 119 figs. The University of Chicago Press, Chicago. 1935. $2.50.

MANY students still elect to go through a college course with very little training in science. This applies to certain pre-professional groups—such as those looking forward to law or journalism—who may be pressed for time; but it also holds for many who are not planning to enter such disciplines—the so-called "straight A.B.'s." In spite of the crowded programs and natural reluctance, the college graduate of this generation should live more richly if he has some understanding of the physical and natural sciences, along with the more traditional training in mathematics, the social sciences, the arts and the humanities. A remedy for the educational shortcoming that has thus existed is being tried in the survey courses that are now offered in some universities.

The text-book fruit of this type of course is beginning to mature; and it is to be expected that it will vary widely in different institutions. "The Story of the Plant Kingdom" is a volume that has been prepared for the "Introduction to the Biological Sciences," one of the courses of the "new plan" at the University of Chicago. We are told that the course in biology includes "indispensable readings" in ten books, of which this is one.

Nothing revolutionary has been attempted in this volume. The material presented is for the most part that which is included in the standard texts. Reversing the usual order, this book begins with a consideration of "primitive plants," especially the blue-green algae, and then traces the evolutionary development up through the algae, fungi, liverworts, mosses, ferns, horsetails, club mosses and seed plants. Only well on in the presentation are the structures and functions of the higher plants considered. There is a chapter on the process of evolution and a concluding chapter on some of the commoner families of the angiosperms.

Any book which treats the general subject of botany

[1] The prefatory note to Part 1 states: "In A, the largest group of words denoting actual things consists of the names of plants or trees and animals."

in a short space must omit or pass lightly by some of its aspects. If the volume under consideration is considered in its entirety—only twelve of the twenty chapters constitute "indispensable reading"—then relatively more emphasis than usual is placed upon the evolutionary development and life cycles of plants, and relatively less on the functions of the higher plants; very little attention is given to plant inheritance.

The book is written in simple, easily understandable, rather narrative style. The 119 figures are all original, and consist mostly of somewhat simplified, clear drawings and some good half-tone reproductions of photographs.

Those who come to their botany by way of "The Story of the Plant Kingdom" should gain an appreciation of the more classical and fundamental aspects of the science; they should be able to visualize the broad evolutionary panorama as it unfolded in ages past, and understand it; and they should acquire some insight into the nature and workings of the higher plants. They will not be burdened by a host of details, nor will they achieve the understanding and the pleasure that real intimacy engenders.

Botany: A Textbook for Colleges. By J. BEN HILL, LEE O. OVERHOLTS and HENRY W. POPP. xiii + 672 pp. 335 figs. McGraw-Hill Book Company, New York and London. 1936. $4.00.

THIS volume aims to present the material and interpretations of a two-semester college course in general botany. It gives an unusually comprehensive survey of the whole field of botanical science.

A general introduction is followed by a brief chapter on "Coloration in Plants," a feature which is so obvious in the autumn when most students begin their formal study. Otherwise the plan followed is similar to that of the majority of texts, the first half of the book being devoted to the structure and activities of the higher plants, the second half to evolutionary development. Inheritance is considered at the very end.

The organs of the seed plants are discussed in detail. In the chapter on the stem, for instance, in addition to the data usually presented on the external characteristics and the internal anatomy and development, the various types of bundles and of steles are described and figured. There are chapters each on "Food Synthesis," "Absorption of Water and Inorganic Salts," "Growth and Movement" and "Digestion, Respiration, Fermentation." There is hardly another general text in which one could find, for example, a discussion of photoperiodism, grand period of growth, presentation period, autonomic and paratonic movements, nasties and taxies.

The second part of the book, dealing with the divisions of the plant kingdom, similarly goes into considerable detail. Thus in the chapter on the gymnosperms, the Cycadofilicales, the Bennettitales, the Ginkgoales and the Gnetales are discussed, together with the more usual Cycadales and Coniferales; and among the last named some of the less commonly known genera, such as *Torreya* and *Agathis,* are mentioned and illustrated.

In the chapter on the "Families of Angiosperms" the authors have had the courage to depart from the sequence followed in the manuals; they discuss the dicotyledons before the monocotyledons. The buttercup and rose families are considered first in the dicotyledons, and the willow family last. The cat-tail family is taken up at the end of the monocotyledons.

Nearly all the abundant illustrations are original; this gives the volume a pleasantly new flavor. The style is simple, clear and not very animated. Summaries and bold-face type are used, with discretion, however, so that the reader has the privilege of doing some thinking for himself. The facts and interpretations are not presented dogmatically, and the whole field is portrayed as one that is still growing and expanding.

This book is no child's play. As a text to be used in a general elementary course, it is a tribute to the diligence of the authors and to the seriousness of the students for whom it is intended.

Practical Problems in Botany. By WILFRED W. ROBBINS and JEROME ISENBARGER. ix + 402 pp. 230 figs. John Wiley and Sons, New York. 1936. $2.00.

THIS volume is intended for use in a course in botany for "high school classes, especially if preceded by a course in general science or one in general biology." The authors aim to establish "a foundation of fundamental principles which will enable pupils to develop an understanding of the significance of plant life which is such an important part of their environment."

The text is composed of ten units, each introduced by its own preview; these ten divisions concern themselves with the organization and composition of plants, nutrition of green and non-green plants, growth, reproduction, dependence upon and adaptation to environment, the development, improvement, classification and economic importance of plants. Each of these units is then in turn subdivided into from four to ten "problems." The 63 problems thus outlined are treated in considerable detail, each with a thorough discussion. An unusually large amount of material is presented within these pages.

The outlook of the book is scientific, but economically significant and otherwise interesting features are

emphasized throughout. Thus some fifteen pages are devoted to a lucid discussion of artificial propagation in which stem, root and leaf cuttings, layering, suckers, runners and the various types of grafting are succinctly described. Similarly, the unit on the economic importance of plants to man deals with such mundane but nevertheless vital subjects as the various food plants from the cereals to the spices, beverage plants, fiber plants, wood, coal, cork, resins, turpentine, gums, dyes, oils, rubber, medicinal plants, weeds, poisonous plants and hay-fever plants. The evolutionary development of plants, while not overlooked, is not used as the theme of at least half the book, as is so frequently done in college texts.

The bulk of the book is devoted to the presentation of basic facts and principles. But those who are susceptible to mental stimulation will find ample opportunity for reflection in the 144 "exercises," many of which consist of several parts, the very numerous "additional questions and exercises" and the frequent "suggested activities." The well-chosen references will guide those who seek to go farther afield.

Paragraph headings and bold-face type are used extensively; but the style is not unpleasant nor is the reading difficult. The 230 figures, consisting of drawings and photographs, are simple and well selected; they are mostly original.

The student who has read, digested and assimilated the contents of this volume will have acquired a good grounding in the principles of botany; he will have learned many of the facts on which they are based; and he will have become acquainted with the humanly important applications of the science.

A Manual of Southern California Botany. By PHILIP A. MUNZ. xxxix + 642 pp. 310 figs. Claremont Colleges, Claremont, California. 1935. $5.00.

IT seems a little strange that despite the philosophical and penetrating analyses of Asa Gray our manuals should to this day be essentially compilations of descriptions of genera and species, coupled with brief notes on distribution and sometimes on time of flowering. Only with exceeding slowness have the challenging and important features of plant distribution been unravelling. This subject, to be sure, is still far from complete, but it has reached a stage at which it is now possible for students living in certain parts of the country to gain not merely a knowledge of the plants of their flora, but an understanding of that flora as well.

Those who live in southern California are especially fortunate in having in this volume an account of the development of their flora as well as the descriptions of the genera and species of which it is constituted. A discussion of some twelve pages is devoted to the distribution of the plants of southern California, in which such important geological changes as the submersion of large areas in the Eocene, Miocene and Pliocene, the glacial and interglacial conditions of the Pleistocene and the uplifts in the Tertiary are taken up. Next the physiographic features are considered; these include the Colorado and Mohave deserts, the various mountain regions, the "cismontane" areas and the islands. The characteristic plants of these regions are listed. The relationships with the north, with the Rockies, with deserts and the south and with islands are discussed; affinities with South America and the Mediterranean region are also mentioned. Throughout, the relatively high proportion of endemism is emphasized and explained on the basis of isolation.

Then follow a key to the families, and the descriptive flora, from the pteridophytes through the angiosperms. There are family and species keys, as usual. The family, genus and species descriptions are terse and sufficient. Brief ecological and distributional notes accompany the account of each species. Varietal differences are commonly given; it is possible to do this, since the volume deals with a relatively limited region. Three hundred and ten of the species are illustrated by well-drawn figures.

The botanically minded of southern California may rejoice in having both an authoritative and interpretive account of their own flora. Although less pretentious in its design than so many manuals, it gains by the familiarity with details that an intensive study of a more limited area alone makes possible.

An Illustrated Manual of Pacific Coast Trees. By HOWARD E. MCMINN and EVELYN MAINO. With lists of trees recommended for various uses on the Pacific Coast. By H. W. SHEPHERD. xii + 409 pp. 415 figs. University of California Press, Berkeley, California. 1935. $3.50.

ONE of the most discouraging features confronting those who aim to become acquainted with the plants of any fairly well-populated region is the distinction between "wild" and "cultivated" forms. This is the result, in part at least, of a certain inherent disdain with which the latter are treated by so many professional botanists. The "escapes" have tended to eliminate this barrier to some extent, but there are relatively few books that give both native and introduced plants together. In this regard the volume under consideration is a happy exception to the majority.

All the known species of trees, and some varieties native to California, Oregon, Washington and British Columbia are described—146 in all—together with some 400 introduced forms which have been planted as ornamentals in gardens and parks and along highways. These are grouped into families essentially

according to Engler and Prantl. The genera are keyed out largely on leaf characters. They are listed alphabetically in each family, each being discussed, and then the species are keyed. The species descriptions are brief but readable and give the outstanding characteristics in clear, concise fashion. A short note on distribution accompanies each account. There is nothing stifling about these species portrayals—in fact, they rather beckon.

The great majority of species are figured by exceptionally clear and rather artistic drawings of the leaves, in most cases of the fruits, and occasionally of the flowers. All the illustrations are original. The authors have shown good sense in making enlarged illustrations of the small leaves of such genera as *Callitris, Chamaecyparis, Cupressus, Juniperus, Libocedrus* and *Thuja.* Forms like *Dracena, Yucca, Musa* and the palms are effectively shown by photographs of the entire plant.

Such general topics as the leaf, flower, inflorescence, fruit and seed are discussed in a rather elementary way in the introduction. These are followed by a consideration of the origin and distribution of Pacific Coast trees, in which four sources are given: the subarctic and cool-temperate regions of the northern hemisphere, the arid Southwest and northern Mexico, the Great Basin and Rocky Mountain region and the Pacific Coast. The forms characteristic of each of these are listed. Because of the varied climate of the Pacific Coast, trees from the four corners of the earth have been introduced there—from the Himalayan region, various parts of Africa, Australia and New Zealand, as well as from Mexico, eastern and central United States and Canada. The climatic similarities between those regions and certain parts of the Pacific Coast, which have made their introduction there feasible, are elucidated.

The final pages of this volume are devoted to lists of trees recommended for various uses on the Pacific Coast. Intended primarily for the horticulturist, these lists include trees particularly desirable from such diverse standpoints as: alkali, drought and heat tolerance; autumn foliage; appropriateness in borders, hedges, lawns and avenues; erosion control; flower production; pest resistance; speed of growth; and numerous others.

The authors have produced a volume that may be considered a distinct contribution in many ways, especially because of its relative simplicity and ease of use, its broad scope and its uniformly excellent illustrations.

Krakatau, 1883–1933. *A. Botany.* By W. M. DOCTERS VAN LEEUWEN. xii + 506 pp. 10 figs. 36 plates. E. J. Brill, Leiden. 1936.

THIS volume summarizes and interprets the original work of a number of men, including the author, on the three volcanic islands of the Krakatau group, and especially of Krakatau itself.

The great eruption of Krakatau occurred in 1883, and so the present work presents the results of some fifty years of investigation. After a critical evaluation of the evidence, Docters van Leeuwen concludes that the vegetation was obliterated completely at that time. Situated between Java and Sumatra, the Krakatau group is consequently very favorable for ecological study. A comparison is made with more or less similar areas, such as Volcano Island, parts of Japan, Tarawara Mountain in New Zealand, Katmai in Alaska, and others. The botanical investigations of various collectors in Krakatau are then discussed, from the early ones of M. Treub in 1886 to the more recent ones in which the author was active.

The Cyanophyceae were "pioneers on the soil," and they were followed by mycorrhizal ferns. In 1886 eleven of the twenty-six species of vascular plants were ferns; in 1934 only fifty-two of two hundred seventy-one were pteridophytes, the majority of the remainder being dicotyledons. Four possible methods of distribution are suggested for these plants: wind, water, animals or man. It is estimated that the plants disseminated especially by wind contribute some 41 per cent. of the total of 271 species; approximately 28 per cent. were carried by water; some 25 per cent. were brought in various ways by animals; and about 15 species, or nearly 6 per cent., were brought in by man. These last, including some common weeds, did not thrive well.

One chapter is devoted to "Associations and Successions," in which grass associations, ferns, shore types and forests are considered.

In the last two hundred pages of the volume the galls that have been found on the islands—some of them are known only from Krakatau—and the various species of mosses, hepatics, pteridophytes and spermatophytes that have been collected are discussed. In some cases, for instance in the coconut, an extensive account of the adaptations for dispersal is presented.

The story of the vegetative recapture of these islands is graphically portrayed in the sixty photographs; those taken in 1928 and 1932 form a very striking contrast to those of 1886.

The book is a translation, and the style is not smooth. The whole work might gain in general interest if it were less polemic.

Docters van Leeuwen has made an important contribution to the botany of this unique and ecologically fascinating group of islands.

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