Book Reviews

The Geography of the Flowering Plants. Ronald Good. Longmans, Green, London–New York, ed. 2, 1953. 452 pp. Illus. + plates. $10.

The great need for a first-class textbook on plant geography makes the appearance of a revised edition of Good's 1947 book a matter of great interest. It is satisfying to note that many of the obvious shortcomings of the first edition have been eliminated and that this volume goes a considerable way toward filling the need for a modern treatment of one of the most fascinating branches of botany.

As is usual with discussions of plant geography, the four main branches of the subject have not been given equal treatment. Floristic and historical plant geography are treated exhaustively, but physiological plant geography (vegetation science) and economic plant geography are scarcely treated at all.

The plan of this book is generally quite logical. After an introduction, there are three introductory chapters, providing an outline of the geography of the world, a division of it into floristic regions, and some general aspects of plant geography. Then follow eight chapters of detailed statistical information on the distribution of families, genera, and species; then two chapters on the history and distribution of British plants, and one on the geologic history and past distribution of the flowering plants. These make up part I. Part II consists of six chapters on the factors of distribution, with one on Good's theory of tolerance, and a chapter of conclusions. In addition, there are appendixes providing statistics on the world's land surfaces and a list of discontinuous genera. There are also an extensive bibliography and three indexes to the contents—one of subjects, one of plant names, and one of persons and places. The book is illustrated by 25 plates and 75 text illustrations. The revision of the first edition has obviously been very thorough, bringing in data from many papers as late as 1950 and even some published in 1952.

The comprehensive nature of this book, and the great interest of the subject matter warrant a much more detailed and critical consideration of some of these sections than space allows. It is, however, of interest to note that the elementary nature of the introduction suggests that the book is directed toward a popular audience with no particular botanical background. There is little doubt, though, that such readers would be well over their depth before they had read far into the main text. Sixteen of the plates are excellent reproductions of beautiful photographs of vegetation which, since they have no relation to the text, must be regarded as ornamentation to attract the same popular audience.

The enormous mass of statistical information on the distribution of plants, important as it is, serves well to emphasize the diffuse and unsatisfactory nature of the subject matter of plant geography. This is, of course, but a reflection of the fact that the taxonomy of plants is not in a very advanced state and that consideration of any other major aspect of botany is consequently limited.

The section on the British flora, one chapter on its history and distribution, another on the local distribution of plants in an English county, are among the truly excellent parts of the book. The "theory of tolerance," treated in Chapter 21, is apparently considered by the author to be his major contribution to plant geography. It seems eminently sound if somewhat obvious. The summarization, in the concluding chapter, of the history of the flowering plants into a long favorable period of only slow change with widespread generalized types, followed by a period of sharp differentiation of habitats in the late Tertiary and then by the Pleistocene disaster is interesting and well supported by the material presented.

One may sum up one's general impressions by saying that, although this is certainly not a book to be recommended to the casually interested reader or even the usual amateur naturalist, there is an enormous fund of information here for the critical student of plant geography and related fields. It is still not, however, the elementary textbook which is so much needed for beginning plant geography courses, nor will it likely be very satisfactory for even advanced general geography students to round out their background in the botanical phases of their science.

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Light. R. W. Ditchburn. Interscience, New York, 1953. 701 pp. Illus. + plates. $7.

This textbook on physical optics was written for students who have finished the study of physics and mathematics on the intermediate level. The author's aim is to give such students a thorough acquaintance with the manifold phenomena of light radiation, to show them the accomplishments and limitations of the different theories, and finally to present to them the ideas and formulations of the modern quantum mechanics, as developed by Dirac, which resolves the main difficulties of the particle-wave conflict.

There exists no other textbook on this level that contains so many details about the experimental background or goes so far into the theoretical treatment. Only a man of such comprehensive knowledge of the subject and of such superior pedagogical gift as the author possesses could successfully undertake this difficult, although alluring, task.

About half of the book deals with the general aspects of wave theory and the treatment of phenomena and instruments. Three chapters on "Velocity of light," "Relativistic optics," and "Polarized light" conclude this general part. Theoretical and experimental considerations are well balanced, and certain topics are treated in much greater detail than in other

textbooks of the same level. Examples are Chapter IX on measurements with interferometers and Chapter IV on wave trains of finite length. Appropriate figures and five plates accompany and elucidate the text.

The next four chapters treat the classical electromagnetic theory, including the theory of absorption, dispersion, and anisotropic media. A chapter on "Interaction of radiation and matter" makes the student familiar with quantum effects and leads naturally to the last chapter on "Quantum theory of radiation." The space allotted to the treatment of these two chapters is definitely too limited, and therefore the presentation contrasts unfavorably with that of the earlier chapters. However, it must be admitted that this shortcoming is partly due to the topic itself. The student must have made considerable progress in mathematics during the advance of this course in order to be able to grasp the content of this last part. But even when the student is not able to absorb all the details presented, he will definitely profit from reading the sections of more general content, which give a clear picture of the trend of the modern theory.

It can hardly be avoided that such a comprehensive treatment as this is not free from occasional defects. One misses the names of Franck and Hertz in section 17.11 on critical potentials. One of the weakest parts is section 17.5, which deals with the regularities in line spectra of atoms. This brief section needs considerable extension and clarification. Ritz's combination principle is of such fundamental importance that its mention in one obscure sentence is not sufficient. Furthermore, it may be mentioned that Fig. 19.2 does not represent the rosette orbit of a simple harmonic oscillator in a magnetic field (as claimed in the text) but that of a precessing Kepler-ellipse. It should be replaced by another one. However, these minor defects cannot affect the otherwise excellent impression of the book, which in general is characterized by clarity, detailed treatment, and a high degree of completeness.

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Nature and Structure of Collagen. Papers presented for a discussion convened by the Colloid and Biophysics Committee of the Faraday Society at King's College, London, 26–27 Mar. 1953. J. T. Randall, Ed. Academic Press, New York; Butterworths, London, 1953. 269 pp. Illus. $6.50.

The problem of the structure of collagen is as yet unsolved. At the suggestion of J. T. Randall, an informal discussion of the properties of collagen in relation to its structure was held recently. Many of the principal workers in the field contributed papers, dealing with the histology and nature of connective tissue, the metabolism of collagen, the properties of collagen solution, the chromatography of amino acids in collagen, the precursors of skin collagen, the x-ray diffraction pattern of collagen fibers, the structure of collagenous tissue and collagen preparations as shown by electron micrographs, and a number of other subjects. The book containing these papers and the discussion that was given them by participants in the meeting can be recommended to everyone interested in collagen and connective tissue.

LINUS PAULING

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The Physical Chemistry of the Silicates. Wilhelm Eitel. Univ. of Chicago Press, Chicago, 1954. xvii + 1592 pp. Illus. $30.

The author, director of the Institute of Silicate Research, University of Toledo, presents a most complete encyclopedia of the silicates. This book is an extended, up-to-date English version of the well-known German standard work on silicates, which Eitel wrote while he still was director of the Kaiser Wilhelm Institut für Silikatforschung in Berlin. The work is far more comprehensive than the title indicates. On account of the excellent general review of reactions in the solid state and the detailed description of the mechanism and kinetics of sintering, it not only is of interest to ceramists and silicate chemists but is also fascinating for metallurgists and solid state physicists.

The book consists of five parts. Part I, which is the most comprehensive, with more than 500 pages, describes the crystalline state in general, the special structures in silicates, such as isolated, chain, layer, and framework structures. It further contains a complete analysis of the fused and glassy states, the constitution and physicochemical properties of melts and glasses. The colloids also are described in this part, and attention is especially called to the systematic discussion of the clay-water system as colloidal phenomena in silicate systems and to the intimate relationship of changes in fired clays with reactions in the solid state.

Part II is concerned with the fusion and polymorphic equilibria in dry silicate systems. A description of the various methods for the determination of fusion points introduces this part, which contains interesting details on the correlation between undercooling and crystallization and on polymorphic inversions. A brief discussion on the effects of pressure on inversion equilibria, with references to the work by Bridgman, Tammann, and Sosman, is of great actuality with respect to some recently described effects of pressure in metallurgical diffusion work. More than 200 pages, containing 150 phase diagrams, are devoted to special silicate systems such as alkali-, aluminum-, heavy metal-, and the presently much-discussed borosilicate systems.

Part III covers the silicate systems with volatile components and silicate hydrates. The gas absorption phenomena in fused silicates are described in detail. Many readers will be especially interested in the discussion of hydrothermal mineral synthesis. This remarkable synthesis of clay minerals, and others, by hydrothermal reactions of different minerals of the