here presented as factual may not be generally accepted as such, but since the work is intended for a mixed audience and because of the vastness of the information drawn from various fields, a certain number of inaccuracies are to be expected. In fact, the author states "even the actual truth must now and then be strained to simplify presentation."

The concept of conflict of host and parasite as an interpretation of disease is quite acceptable and in fact is firmly established in the consciousness of medical men, but perhaps too much emphasis is given to this concept when it is applied to the entire organic world, for the relation of many organisms involve no more than competition, while beneficial cooperation is also a wide-spread phenomenon. Indeed to many biologists, the wide occurrence of mutualism and well-balanced relations may be quite as impressive.

In the chapter on "The Stage of Conflict between Host and Parasite," Smith is at his best, having wide acquaintance and extensive experience in the field covered. His review of the results of investigations in the field of immunology is most illuminating. There is that unusual capacity of surveying a great amount of material from a detached point of view rather than a rehearsal of intricate detail. Simplicity of presentation gives the reader a ready grasp of the subject. Among the many charms of this work as a whole is the avoidance of hypotheses explaining all results. On the contrary, there is a fair statement of contradictory evidence and a free discussion of many questions as yet unanswered. The chapter on epidemiology furnishes a brief but interesting review of major epidemics and a discussion of factors that play a part in such.

In the opening statements of the last chapter on the utilization of discoveries, it would appear that the author has overstressed the importance of the utilitarian objectives in research. While it is true that the outstanding figures of the last half century in the medical sciences have attacked practical problems, surely this tendency at the present time needs no encouragement. Important contributions by the older zoologists and parasitologists, such as the discovery of intricate life histories, are all but forgotten in modern medicine, but they have doubtless furnished a basis for our views on the relation of parasitism to disease. It need only be pointed out that we do not look to actuaries for outstanding creative work in mathematical problems, nor have generations of horticulturalists engaged in the improvement of the garden pea produced a Gregor Mendel.

Irrespective of whether one agrees with Dr. Smith on all points, this book will be found both stimulating and instructive. Open-mindedness is a quality sufficiently uncommon to be appreciated when encountered. The book will doubtless prove of great value to biologists and zoologists as well as to those interested in the medical sciences.

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CRYSTAL STRUCTURE

A Study of Crystal Structure and its Applications. By WHEELER P. DAVEY. McGraw-Hill Book Co. 695 pages + xi. 1934.

THIS large book is intended for use as a text-book in graduate courses on the structure of crystals. In the opinion of the reviewer the book can not be considered as satisfactory for this purpose.

The subject of the structure of crystals and methods of structure determination is characterized by its inclusion of portions of several branches of knowledge with which the student of chemistry and physics is usually not familiar, such as the theory of space groups, the special geometric apparatus of the crystallographer (including extensions developed for crystal-structure applications), etc. Moreover, any one of the various procedures used in determining the structure of crystals involves a number of steps, some of which depend on logical arguments not often met in other fields of research. There is great danger that a student will become confused, and it is especially desirable that a text-book dealing with this subject be written clearly and logically and be free from errors. It is accordingly regrettable that in the book under review many of the discussions and derivations are needlessly long and complicated and marred by serious as well as minor errors. As an illustration, one chapter will be described.

The detailed discussion of the determination of the structure of representative crystals is an especially important part of a crystal-structure course. In Chapter IX, dealing with this subject, the author treats sodium chloride, calcite and tricalcium aluminate. In the treatment of sodium chloride, the unit of structure is taken as containing four molecules without discussion of the possibility of its being larger or of the evidence that should be collected against this possibility. The very important argument involving determination of the Bravais lattice is not used.

In finding the unit of structure of a crystal with the point-group symmetry of calcite, it is necessary first to find the smallest hexagonal unit which will account for all observed x-ray reflections, and then to apply the rhombohedral criterion to see whether the underlying lattice is hexagonal or rhombohedral.

It is not possible to reverse the order of these steps; yet in the discussion of calcite given in this book the steps are reversed.

The third section of this chapter deals with the determination of the structure of tricalcium aluminate from powder data, based on original work by the author. The photographs showed only eight lines. These are not correctly interpreted at their face value; they lead to a unit with $a_0 = 5.4$ Å, a fact which is overlooked. Instead, a_0 is taken to be 7.62 Å, and the possible atomic arrangements are discussed at length, one finally being accepted as satisfactory, despite very pronounced disagreement between observed and calculated intensities of the lines. (This structure is described elsewhere (p. 553) as representing a new class of chemical combination, of which it is the sole representative.) As could be expected, the results are all wrong; a better powder photograph leads to the value $a_0 = 10.8$ Å and a completely different atomic arrangement.

Although this book can hardly provide the student with a sound basis for independent work on the determination of the structure of crystals, certain portions of it may be found useful. Some of the sections, such as Chapter VII, on the rotating-crystal method, are brief and clear and provide good presentations of their topics. The book contains many excellent drawings.

LINUS PAULING

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TIMBERS OF NORTH AMERICA

Identification of Commercial Timbers of the United States. By H. P. BROWN and A. J. PANSHIN. McGraw-Hill Book Co., Inc., New York. Pp. 223, illus. 1934. $3.00.

THIS is the first of the books to be published as the American Forestry Series, of which Professor Walter Mulford, head of the division of forestry of the University of California, is consulting editor. It is fitting that such a series, which eventually is to deal with all phases of forestry, should be introduced by a book on the identification of wood, the chief product of the forest. It is stated in the preface that the primary objective of the book is to give information for the accurate identification of our commercial timbers and that a second text covering the general field of wood technology is planned.

The first part of the book deals with wood structure, which is the chief basis for wood identification. The text begins with a description of the coarser structural features, such as the annual rings, sapwood and heartwood, and proceeds toward the finer elements.

The structural characteristics are supplemented by such physical characteristics as color, odor, taste, weight and hardness, which in general are less specific or more difficult to describe than structural features.

The portion of the text dealing with the minute structure of wood is of necessity couched in technical language, but, like everything else, when once mastered it no longer seems so formidable.

Two keys by means of which a piece of wood may be traced down and identified are given. One is based on gross characteristics visible with the unaided eye or hand lens; the other is based on microscopic characteristics. The authors are of the opinion that for teaching purposes at least it is better to keep the two separate.

The keys are followed by detailed supplemental descriptions of each wood, which are an aid in identification.

An outstanding feature of the book is the numerous excellent reproductions of photomicrographs which it contains. There are plate figures of cross sections of 90 species of wood magnified 5 times, and of cross and tangential sections of 84 species magnified 75 times. In addition the book contains illustrations of special structural features magnified 250 times for the most part, and some text figures.

Identification of the Timbers of Temperate North America. By SAMUEL J. RECORD, John Wiley and Sons, New York. 196 illus., 1934. $3.00.

THIS is a revision of the author's "Identification of the Economic Woods of the United States," first published in 1912 with Part I, which deals with the discussion of wood structure, enlarged so as to cover the anatomical features found in tropical woods as well as in those of temperate climates. The anatomical terms and definitions used are in conformity with those recently adopted by the International Association of Wood Anatomists ("Tropical Woods," December 1, 1933) after protracted work by the Committee on Nomenclature, of which Professor Record is the chairman.

Several pages are devoted to the origin and development of the primary and secondary tissues, which makes the book considerably better adapted for class work than the previous editions. A brief description of the formation of the secondary wall with its numerous modifications is given. A tertiary layer of the cell wall is no longer recognized by the author; spiral thickenings, gelatinous layers, etc., are considered a part of the secondary wall. The confusion which has prevailed among botanists as to the precise meaning of such terms as middle lamella, primary wall, secondary wall and tertiary wall is pointed out.

A new conception of a pit is brought out, namely,