

tinarius formed ectotrophic mycorrhiza on at least three forest plants, viz., *Acer saccharinum* Wang., *Quercus rubra* L. and *Celastrus scandens* L. In two cases the fruit-bodies were found, attached to the strands which were associated with the roots. Other trees and shrubs in the same locality, even including individuals of red oak, had no connection with the fungus.

Further Studies on the Ascus: J. HORACE FAULL.

The differences of opinion regarding the systematic position of the Laboulbeniaceæ have been in a large measure due to ignorance of the nuclear phenomena within the spore sac. An examination of a fair abundance of material shows that the young spore sac is occupied by a fusion nucleus, that three generations of nuclei follow, that as a rule four of the last generation pass to the upper end of the spore sac and break down, and that through the activity of the rest four spores are formed. These spores are formed in a way that differs in no essential respect from that already described for several of the Ascomycetes. The paper concluded with a summary of the essential phenomena of *Ascus* and spore formation in Ascomycetes, and with these the phenomena just noted in *Laboulbenia* were found to agree.

Ecological Reconnaissance of the Isle Royal Region: W. P. HILT.

Notes on Nebraska Grasses: CHARLES E. BESSEY. BRADLEY M. DAVIS,
Secretary pro tem.

SCIENTIFIC BOOKS.

A Text-book of Physiology. For medical students and physicians. By WILLIAM H. HOWELL, Ph.D., Professor of Physiology in the Johns Hopkins University. Philadelphia, W. B. Saunders and Co. 1905. Pp. 905. 8vo. Cloth, \$4.00.

The 'American Text-book of Physiology,' which had its first edition in 1896 under the

editorship of Professor Howell, was at that time and is perhaps now the most pretentious effort of American authors in physiology. It was thought that 'the advantages derived from the collaboration method' would be great in that it would give the reader the advantage of the specialist's point of view in every field of physiology. As a matter of fact these joint author text-books are proving heavy for the student and are being relegated to the field of the reference book. Users of the 'American Text-book,' who are, therefore, familiar with the uniform high excellence of the chapters written by its editor, will be more than gratified by the appearance of the present volume by Professor Howell. The author's well-known terseness of style and directness of statement permeate the book from cover to cover. The treatment is kept well within the limits set by the title-page, yet Dr. Howell has gone far afield into the most recent literature, giving us a storehouse of physiological fact and scientific theory such as one rarely finds in a modern text-book.

Much new material, evidently the accumulated experiences of the Johns Hopkins laboratories, is presented to the public for the first time. The number of new illustrations is a feature of the work. Of the two hundred and seventy-two illustrations about one half are original.

The author has departed radically from the conventional arrangement of subject matter by introducing as the second and third sections, respectively, the subjects of 'The Central Nervous System,' and 'The Special Senses.' Professor Howell has always, both as a teacher and a writer, emphasized the necessity for laboratory experience by the elementary student as a necessary preparation for the presentation of the principles of physiology. The subject of muscle and nerve, treated in the first section of the volume, of all the subdivisions of physiology, unquestionably lends itself best to experimental demonstration to the student. The facts can be more directly observed with less confusion by indeterminate factors, and the subject matter can be used to give a more rigid training in experimental technique. These three chapters, 'i. e., on'

'Muscle and Nerve,' 'Central Nervous System' and the 'Special Senses,' prepare the way for the presentation of the complex nervous coordinating machinery found in the digestive, the respiratory or the circulatory systems, for example. The statement of the details of the sensory apparatus and the afferent nervous system thus early in the text seems strictly logical from this point of view, and it is gratifying to see an author of eminence take the responsibility for the order of presentation.

The relative space allotted to the various sections is good, and the subdivision of sections into chapters and paragraphs presents an analysis that appeals to the reader as both logical and exhaustive. This analysis, together with the printing of the paragraph topics in bold-face type, lends itself to quick and satisfactory use as a reference, a feature particularly valuable to the advanced medical student and the physician.

The general sections presented are as follows: 'The Physiology of Muscle and Nerve,' 105 pages; 'The Central Nervous System,' 127 pages; 'The Special Senses,' 132 pages; 'The Blood and Lymph,' 53 pages; 'The Organs of Circulation of the Blood and Lymph,' 132 pages; 'Respiration,' 68 pages; 'Digestion and Secretion,' 149 pages; 'Nutrition and Heat Production and Regulation,' 56 pages; 'Reproduction,' 35 pages; and an Appendix of 13 pages.

The section on 'The Physiology of the Organs of the Circulation of the Blood and Lymph,' 132 pages, has the following nine chapters, each with from 7 to 15 sectional topics: the Velocity and Pressure of the Blood Flow, 26 pages; the Physical Factors Concerned in the Production of Blood-pressure, 9 pages; The Pulse, 8 pages; The Heart Beat, 19 pages; The Cause and Sequence of the Heart Beat—Properties of Heart Muscle, 16 pages; The Cardiac Nerves and their Physiological Activity, 19 pages; and The Vasomotor Supply of the Different Organs, 16 pages.

The detail with which each chapter is treated is well illustrated by the subtopics on the twenty-five pages devoted to the chapter on 'The Cardiac Nerves and their Physiological

Action.' These topics are: Course of the Cardiac Nerves, Action of Inhibitory Fibers, Analysis of Inhibitory Action, Effect of the Vagus on the Auricle and the Ventricle, Escape from Inhibition, Reflex Inhibition of the Heart Beat, the Cardio-inhibitory Center, the Action of Drugs on the Inhibitory Apparatus, the Nature of Inhibition, Course of the Accelerator Fibers, Tonicity of the Accelerators and Reflex Acceleration, the Accelerator Center.

A notable chapter, not often found in such text-books, is introduced at the end of the section on the 'Central Nervous System' on the neglected subject of sleep. The sectional topics of this chapter are: Introductory Statement, Physiological Relations during Sleep, The Intensity of Sleep, The Effect of Sensory Stimulation, Theories of Sleep, Hypnotic Sleep.

The type and press work, and especially the illustrations, are good. The publishers have maintained their recognized high standard of mechanical excellence. By a choice of thin paper the size of the volume is kept within reasonable limits. However, it is to be regretted that a book which will unquestionably rank as the leading text-book of physiology issued in America could not be printed on light-weight linen paper.

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Karl Heumann's Anleitung zum Experimentieren bei Vorlesungen über anorganischen Chemie. Von Professor Dr. O. KÜHLING. Dritte Auflage. Braunschweig, Friedrich Vieweg und Sohn. 1904. Pp. xxix + 818. Price, gbd. 20 Marks.

The first edition of this admirable work appeared in 1876. Since then great advances have been made in the subject of inorganic chemistry and many of the new discoveries have found an appropriate presentation in the lecture room. Space has been found for the presentation of this new material, partly by the omission of parallel experiments previously given in several forms, and by the omission of methods of preparing substances which are