1928, 1933), by Dr. Oran Raber. The first edition numbered 377 pages, the second has 432. The second edition is bound in warm red cloth, which should withstand laboratory wear better than the now unsightly green of my own copy of the first edition. It is a book to read and ponder; it is a statement of "principles," or fundamentals, or concepts, rather than a detailed guide to laboratory procedure. It presents the names and in twenty cases small photographic or other likenesses of contributors to the development of plant physiology. Six of these twenty are pictured in both editions, *viz.*, Willstätter, Molliard, Jost, Bose, Blackman, Dixon. Of these, three have profoundly influenced the thought of plant physiologists everywhere, by their individual contributions, while the other three have affected the study in their respective countries of France, Germany and India. The changes among the other fourteen are interesting to the professional plant physiologist, in many instances causing him to wonder, "Why?" But the inclusion in a book on a scientific subject of the likenesses of those who have contributed to it at once humanizes it. In the same way, the allusions in various places throughout the book to the contributions of plant physiology to human life are also valuable. And in this scientific book at least the author occasionally ventures a witticism. Thus in the course of a lucid discussion of respiration and its products one reads, "This would lead to the conclusion that plants in a sleeping room are not harmful and that one can continue to sleep in forests without danger of asphyxiation." Again "Saprophytism is living from life insurance."

The language of the book is excellent. The reviewer may express his individual dislike of the terms *cold* temperature, *warm* temperature, in place of *low, moderate* or *high temperature;* but everywhere the exposition is clear and concise, the subjects well chosen. At the end of each chapter one finds a set of questions. Are these needed, and are they by any means all that are suggested? Also at the end of each chapter are "References," under which one finds cited in full some of the contributions to the subject of the chapter. In the chapter itself the names of the authors, and in some instances the dates, but not the title or place of contributions—thus "Kahlenberg and True (1896) as well as Coupin"—are given. A professional botanist with library facilities would find no difficulty in determining and consulting these references; but those without adequate library equipment would be in difficulty. Furthermore, the papers or books cited in full under "References" are not all of greater value or importance than those mentioned in the course of the exposition. The reviewer fails, therefore, to recognize the basis of the treatment. As to the quotations taken from sources as varied as Tacitus and Eugene Field and used as chapter headings, are they appropriate as well as apt?

However, these are minor defects, individual, and the book is to be valued as source and stimulus.

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THE LITERATURE OF VERTEBRATE ZOOLOGY

An Introduction to the Literature of Vertebrate Zoology, Based chiefly on the Titles in the Blacker Library of Zoology, the Emma Shearer Wood Library of Ornithology, the Bibliotheca Osleriana and Other Libraries of McGill University, Montreal. Compiled and edited by CASEY A. WOOD. Oxford University Press, London, Humphrey Milford, 1931; 4to, pp. xix + 643; colored frontispiece. $15.00 or 3 Guineas.

SINCE books are ever of interest to the working zoologist, zoological bibliographies are well-nigh indispensable. So important a work as the present, giving as it does a catalogue of the zoological books in the library of McGill University, is worthy of special mention. It is, however, much more than a catalogue, since the first part of the three into which the book is divided is an attempt to trace the development of zoological literature from the earliest times to the present, with what success an examination of the pages readily reveals. Some of the interesting captions of the nineteen chapters in this part of the work convey an excellent idea of the contents and of the method of development of the subject: "The Beginnings of Zoological Records"; "Medieval Writers on Zoology and Their Immediate Successors"; "The Renaissance and Its Effect on the Records of Zoological Science"; "The Literature of Comparative Zoology"; "Travelogues of Explorers"; "Forerunners, Contemporaries, Followers and Successors of Linnaeus"; "From Natural Philosophy to Modern Biology"; "Some Important Zoological Treatises and Serials Published during the Nineteenth Century"; "The Literature of Zoogeography"; "Oriental Literature on Vertebrate Zoology"; "Periodicals and Serials on Vertebrate Zoology"; "Unique and Rare Printed Books, Manuscripts and Drawings in the Zoological Libraries of McGill University."

It is manifestly a great task that the author has set for himself, yet it is perhaps unfortunate that he did not find it possible to include all important literature in his treatment, rather than to restrict this to books in the McGill Library. However, the abundant material presented contains so much of interest and value

not only to the bibliographer, but to the working zoologist as well, that the reader forgets to be critical.

The "Students' and Librarians' Ready Index to Short Author-Titles on Vertebrate Zoology," which forms the second division of the book, aims to furnish the means of quickly finding the most important works on any subject in vertebrate zoology. To this end the authors, each with a word or two of catch title, are arranged chronologically under geographical headings.

By far the larger part (more than two thirds) of the book is devoted to "A Partially Annotated Catalogue of the Titles on Vertebrate Zoology in the Libraries of McGill University," and this forms the third section of the contents. In this catalogue the annotations include much information, such as obscure dates of publication and other items of value.

Of rare printed books the McGill University possesses so many that space does not avail to list them here. Of particular interest are the first edition (1680–1681) of Borelli's "De Motu Animalium"; the first edition (1570) of John Caius's "De Canibus Britannicis"; Scopoli's "Deliciae Florae et Faunae Insubricae"; and especially important for ornithologists, Blasius Merrem's "Beyträge zur Besondern Geschichte der Vögel gesammelt"; and the original editions of the two earliest (1544) bird books—Longolius's "Dialogus de Avibus," and Turner's "Avium Precipuarum."

There is also in the library a noteworthy collection of original manuscripts and unpublished drawings, some of the latter apparently unknown to the zoological world until unearthed for the McGill library by the activities of the indefatigable "compiler" of this published catalogue. Among the most interesting of these is the collection of 121 colored paintings of Indian birds executed early in the nineteenth century by Lady Elizabeth Gwillim. It now appears that she was the first ornithological artist to paint full-sized portraits of the very large birds, an honor heretofore always accorded to John James Audubon.

The present treatise catalogue makes evident that the several collections of zoological works contained in McGill University together comprise one of the most important scientific libraries in the western hemisphere, and zoologists owe Dr. Wood a debt of gratitude for making available a knowledge of these treasures.

HARRY C. OBERHOLSER

WASHINGTON, D. C.

SPHERICAL ASTRONOMY

Text-book on Spherical Astronomy. By W. M. SMART, ii + 414 pp. Cambridge University Press, 1931.

THIS book is an excellent text for a second course in astronomy in a liberal arts college, but it is not suitable as a text for a graduate course in spherical astronomy or as a reference book for the working astronomer. The wide range of topics treated, the inclusion of the recent developments in the subject, the excellent diagrams, the omission of troublesome details and the large number of problems enhance its value for the casual reader and for the elementary student. However, for one who desires a thorough treatment of the traditional problems of spherical astronomy, too large a part of the book is devoted to extraneous material, while many important details are omitted. For example, in chapter five about forty pages are devoted to a discussion of planetary motions. This adds to the completeness of the book from a pedagogical point of view, but the student of astronomy already has adequate treatments of this subject in the well-known book of Moulton and in that of Crawford. In the same class are portions of descriptive material normally treated in text-books of general astronomy, such as that of Russel, Dugan and Stewart: for example, parts of the discussion in paragraphs 25 and 84. Much of this space might well have been devoted to discussions of practical methods of computation, to critical examination of the formulae derived and to more thorough discussions of such topics as astronomical photography. Chapter one gives alternative proofs for the formulae of spherical trigonometry, but does not list them for convenient reference.

The most serious faults of the book are the lack of preciseness and the absence of references. As examples of the former we have on page 21 a discussion of "trigonometrical ratios for small angles" without mention of what is meant by "small," and on page 95, the statement that the error of a Shortt clock on any day "could be almost exactly predicted several months in advance." The redefinition of astronomical latitude, page 196, to mean geographical latitude is of a similar nature.

WALLACE J. ECKERT

COLUMBIA UNIVERSITY

REPORTS

ACTIVITIES OF THE ROCKEFELLER FOUNDATION

DURING 1932, The Rockefeller Foundation appropriated $11,577,064 for projects in the fields of the medical, social and natural sciences, the humanities and public health. A printed report on these activities has just been issued.

For public health work the foundation expended