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## BOOK REVIEWS

**Water and Algae; World Problems.** *Clarence E. Taft.* Educational Publishers, Inc., Chicago, Illinois. 1965. xx+236 p. illus. \$5.50.

This book, coming at a time when many people are becoming apprehensive about future water supplies, should be of interest to the layman as well as to the specialists concerned with water quality.

The author gives a brief historical account of water use and cites examples where water supplies have been the deciding factor in the establishment or abandonment of cities and communities. He also shows how early conflicts involving water use eventually led to laws and customs dealing with the use and distribution of water, many of which are in use today. He discusses the sources of water and the relationship of water supplies to the exploding world population. The increased population and the increased per capita use of water have depleted underground water supplies in many areas, making use of surface waters mandatory. Along with the considerations of surface water come the algae and all the problems associated with these organisms.

The major portion of the book is devoted to the recognition of the kinds of algae, the problems associated with specific kinds, and the methods used either to prevent the occurrence of large populations (blooms) or, if the population is already established, to eliminate this population. In the last chapter of the book, "the good things about algae" are discussed. The reader may be surprised by the many uses to which algae and their products are put today.

A list of selected references is included at the end of each chapter. Printing quality and binding are good. However, some of the photographs might have reproduced better on a different type of paper, and a few typographic errors could have been eliminated by better editing. It is an interesting book and should lead to a better understanding of water supply problems.

N. W. BRITT

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**Essays in Geomorphology.** *G. H. Dury, Ed.* American Elsevier, New York. 1966. 404 p. Index, figures, and 26 plates. \$14.50.

This collection of essays by British geomorphologists with experience in several countries examines a variety of problems and methods.

Criteria for Pleistocene eustatic and deformed shorelines are described by N. Stevens and F. M. Syngé and applied to the coasts of Great Britain. The authors point out difficulties of assessing criteria for former sea levels and note finally that restored shorelines must be related to known glacial episodes.

Slope failures, slides, and flows from Macedonia, Britain, and Canada are described by R. Common and related to present climates in these morphogenetic regions. He emphasizes that mass-wasting processes deserve a larger place in our consideration of slope evolution.

The landforms of the McDonnell Ranges, central Australia, are interpreted on the basis of the classic erosion cycle by J. A. Mabbutt. He correlates gravel terraces with erosion surfaces, and uses weathering profiles on rock and gravel to relate episodes of planation to changes in

climate. J. C. Pugh, also using the viewpoint of the erosion cycle, describes the landforms of low latitudes in Nigeria. Correlations of multiple erosion surfaces are based on scarps separating erosional plains, and on bornhardts on resistant rock that may show changes of slope or residual boulders on their summits.

A stratigraphic method for dating erosion surfaces in the Rift Valley region of east Africa, where erosion remnants on different rocks are difficult to correlate, is attempted by W. W. Bishop. Surfaces of diversified relief are traced to more datable stratigraphic positions beneath different volcanic rocks and beneath sediments with different fossil assemblages. Correlation of surfaces in Kenya with those of Uganda is also difficult, for they are on the opposite sides of the continental divide and have had different volcanic and post-volcanic histories. In the Rift Valley region, faulting of the surfaces has been dated by their relationships to fossiliferous deposits in the valleys.

M. M. Sweeting discusses weathering of limestones in England. Massive limestones tend to form cliffs and thin-bedded limestones to form benches. Solution forms are conspicuous on glacially scoured limestone pavements. Erratics on pavement pedestals indicate post-glacial solution of the bedrock; pedestal height is a measure of this solution, which is correlated with present-day rates calculated from lime content of the river waters.

The concept of river grade and the idea of balance between erosion and deposition are questioned by G. H. Dury. He examines streams in terms of American work on velocity, slope, load, and other variables. Because of complex relations between these parameters, the concept of grade is not now a serviceable idea.

J. I. Clarke, in a paper on morphometry from maps, discusses types of hypsometric (area-altitude), clinographic (average slope), and altimetric (frequency or areas at various altitudes) curves. All these curves have been used to demonstrate erosion platforms. He concludes that altimetric curves are likely to be most useful.

Statistical methods and their applications to geomorphology are summarized by R. J. Chorley in the longest paper in the collection. Unfortunately many readers will not have enough mathematical knowledge to appreciate the amount of information summarized here. An extensive bibliography up to 1961 provides the reader with working methods necessarily abbreviated in this paper.

These essays provide a worthwhile sample of work being done outside the United States by a representative and active group of geomorphologists.

G. H. CROWL

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**Let us Start Here. An Introduction to Basic Readings in the Life Sciences.** Paul Gibbons Roofe. The World Publishing Company, Cleveland and New York, 1967. viii+102 p.

For book lovers, the next best thing to reading is sharing their enthusiasm for books with young impressionable minds. It was in this spirit that, in 1925, the noted biometrician Raymond Pearl wrote an article in *The Scientific Monthly* entitled "the reading of graduate students." Two years later it was expanded into a little book with the title *To Begin With, Being Prophylaxis Against Pedantry* (Alfred A. Knopf, New York and London). That book, listing and describing 70 works covering the breath of literature and science with emphasis upon biology and a bias toward the area of vital statistics and biometry, was a delight to those interested in books. Paul Gibbons Roofe, professor of Anatomy and Zoology at the University of Kansas, has now updated Pearl's work. All those who are interested in reading or who have need to advise students of biology will applaud. Roofe says, "Basically, the original *To Begin With* is probably the best recommended selection of books extant for those who plan to work in the life sciences." The list has been expanded to a total of 94 titles, with about a dozen from Pearl's original list deleted. It has a new bias toward works on behavior and learning, with emphasis on man brought out by a new chapter entitled "The nervous system and behavior." The basic plan is retained: an annotated and suggestive discussion of each work, with humor and insight about related books and authors which covers a broad range from philosophy and living to biology and anthropology. As a guide for the uninitiated, this work does not assume previous knowledge of literary or biological publications. In fact, it is an introduction to a reading program.

It would be easy to quibble about this or that title or to suggest additions, but as Pearl noted, "Doubtless this list of readings will be violently criticized by some. But so probably would any other list. The real test of its value is the effect which the books in it produce upon the minds of those who read them. As to the outcome of such a test I am not in the least worried." Pearl's delightful first two chapters are reprinted as appendices. Publishers and dates are included for each officially listed title and for some others, mentioned in passing. A valuable consideration for students is the inclusion of information about paperback reprints. With the deluge of them, it is no wonder that several have been overlooked such as: Eislely, L. *The Immense Journey*, Random House, 1957; Merz, J. T. *A History of European Thought in the Nineteenth Century*, 4 vols., Dover, 1965; Vallery-Radot, R. *The Life of Pasteur*, Dover, 1960; and Whitehead, A. N. *Science and The Modern World*, Mentor Books, 1948, and Free Press, 1967. Entry to the joy of exploratory reading will be made easier by professor Roofe's dedicated efforts.

EMANUEL D. RUDOLPH

**Crop Response to Water at Different Stages of Growth.** *P. J. Salter and J. E. Goode.* Research Review No. 2. Commonwealth Agricultural Bureaux, 1967, Farnham Royal, Bucks, England. x+246 p. \$6.80.

The objectives of this excellent book are 1) to review the main results of research work on plant response to soil moisture conditions at different stages of growth, and 2) to discuss critically the possible explanations of these differential responses. These objectives have been achieved in a most interesting manner. The literature is not only reviewed, it is analyzed and summarized.

The book is divided into four parts. First there is an introduction that concisely handles the scope of the book and the factors affecting the interpretation of experimental data. Part two discusses plants that are grown as annuals or biennials. This includes cereals, legumes, fruits, leaf crops, seed and fiber crops, biennial field and vegetable crops, and tuber, bulb, and corn plants. In part three, which includes perennials, fruit and other tree and bush crops receive the major emphasis. Part four contains a final analysis of the subject matter and its practical implications. In this section, practically every crop is analyzed relative to the research that has been accomplished about it, with a concluding paragraph that gives a concise statement relative to the water responses of the crop. This is especially well illustrated in the case of the cereals, where the discussion includes both separate statements for wheat, maize, barley, oats, and a final summary for the small grains as a group. The analysis of various crops indicates that, generally speaking, annual crops are more sensitive to moisture deficiencies during the formation of reproductive organs and during flowering, while, for biennials, the period of sensitivity coincides with the time of the growth of the storage organs and when potential evapotranspiration is greatest. With perennials, all stages of development must be within the range suitable for growth.

There is a comprehensive bibliography with references through 1965. The book will be of great value to plant scientists, both in research and in teaching. It should be of special interest to science teachers, because it will give them information on a wide variety of plants, something normally not available to them.

L. D. BAVER

**Thomas Nuttall, Naturalist Explorations in America 1808-1841.** *Jeannette E. Graustein.* Harvard University Press, Cambridge. 1967. 481 p. \$11.95.

Thomas Nuttall (1786-1859) is frequently regarded as one of North America's most important, widely traveled, pioneer naturalists. Miss Graustein's full-length biography presents for the first time in scholarly detail the career of this brilliant naturalist, born in Yorkshire, England, who at the age of 22 emigrated to Philadelphia to start his scientific explorations. These travels through the Old Northwest, up the Missouri River, down the Mississippi River, through southeastern United States, down the Ohio River, up the Arkansas River, across the Rocky Mountains, down the Columbia River, over to Hawaii, and into southern California are mapped and described. She presents details of his physical hardships in the American wilderness, vivid descriptions of frontier scenes and living conditions of the peoples, personalities of the companions with whom he sometimes traveled, names of many organisms he collected, and the geological and archaeological phenomena he observed.

Although it may be inferred from the title that this book might be concerned only with Nuttall's travels in America, the contrary is the case, for the author adds considerable information on his family affairs, his several visits to England, and his horticultural pursuits in England during his later life. In addition, major portions of five chapters deal with his 11 years at Harvard University, a chapter in his life previously little known. For a man who left scattered on two continents bits and pieces of information concerning his personal life in letters, itineraries, travel narratives, and scientific papers and books, Miss Graustein has woven these facts remarkably effectively amongst the reports of his exploring expeditions. Throughout the book she frequently lets Nuttall speak for himself in many quotations from previously unpublished letters.

This biography also presents another look at the story of American botany during the period 1808-1841. Not only does the reader learn in detail about Nuttall's botanical pursuits in exploration and publication, but also about the many botanical friends and associates he had in America and England, friends such as William Baldwin, Benjamin Smith Barton, Zaccheus Collins, John Bradbury, William Gambel, Henry Muhlenberg, Charles Pickering, Frederick Pursh, and Nathaniel Wyeth, to name a few of the important ones. These people provide much of the background against which the story of Nuttall's career is enacted.

A list of notes occupying 54 pages at the end of the book documents each of the 22 chapters. In addition, there is a page listing 15 titles primarily concerned with biographical sketches of Thomas Nuttall. On pages 473-474 of the index, a partial list of Nuttall's own publications appear. A more complete list can be found in Smith and Thieret (*Leaf. West. Bot.* 9(3): 33-42, 1959), an important reference not cited by Graustein.

For the student interested in biography, travel, and/or natural history in pioneer North America, this important book adds another rewarding chapter.

RONALD L. STUCKEY

**Diagnostic Microbiology.** *W. R. Bailey and E. G. Scott.* The C. V. Mosby Company, St. Louis. 2nd Edition. 1966. xi+342 p. \$7.25.

A comparison of this edition with the first edition indicates an updating of thought and fact in many of the chapters of the book. Accordingly, it meets the stated objectives of providing a current reference text for practicing medical microbiologists while at the same time serving as a college textbook indicating procedures for the recovery and diagnosis of bacterial, viral, rickettsial, and fungal pathogens of man.

The contents are arranged in 10 parts, from "Classification of the Plant Kingdom" (Part I) through several methodological parts to "Culture Media, Stains, Reagents, and Tests" (Part X). Tables are used to summarize certain procedures or to illustrate test results. A variable number of references to classical and recent literature appear at the ends of most chapters.

Perhaps the most extensive revisions were made to Chapter 31, "Laboratory Diagnosis of Mycotic Infections," by the inclusion of the dermatophytes, and the expansion of the coverage of the pathogenic fungi inciting cutaneous, subcutaneous, and systemic mycoses. Morphological features of fungi in general and of the more important mycotic agents in particular are illustrated by drawings prepared by the authors from photomicrographs. Although not artistically executed, these drawings represent the morphological features as they would probably be seen in most laboratory preparations.

The authors have continued the questionable practice of including actinomycosis and nocardiosis among the mycotic diseases. Although the medical mycologist frequently deals with these diseases by default, there is no more justification for their inclusion as mycoses than there would be to include the organisms causing tuberculosis among the mycotic agents. A somewhat more serious error is the orthographic misspelling, *Tricophyton*, for the dermatophyte genus *Trichophyton* (trich-hair; phyton-plant). These do not negate the general utility of this second edition.

JOHN A. SCHMITT

**Glacial Geology of the East Liberty Quadrangle, Logan and Union Counties, Ohio.** *Jane L. Forsyth.* Report of Investigations No. 66, Ohio Geological Survey, 1207 Grandview Ave., Columbus, Ohio 43212, 1967. Folded, colored map, scale 1:24,000, with text on sheet. \$1.14.

The area of the East Liberty quadrangle is covered by thick glacial deposits. Three end moraines are shown on the colored map, as well as outwash deposits, kames, and an esker which have provided commercial sand and gravel. In the text, which appears alongside the map, Dr. Forsyth describes the glacial deposits, the underlying bedrock, and the mineral resources, including the limestone quarried in the area.

OHIO GEOLOGICAL SURVEY

**Statistical Methods.** *George W. Snedecor and William G. Cochran.* The Iowa State University Press, Ames, Iowa. Sixth Edition. 1967. xiv+593 p. \$8.50.

In the 30 years since the publication of the first edition of this book, *Statistical Methods* has become one of the most highly regarded statistics books available. Few people in this field are unfamiliar with the earlier editions of this text. The present edition, like previous editions, serves both as an excellent text for an introductory course in statistics as well as a reference book for the statistical techniques used by research workers. The mathematical background required for the sixth edition continues to be little more than elementary algebra, and there are numerous illustrations and numerical examples taken from a wide variety of statistical applications.

There are a few structural changes in the sixth edition; for example, all of the statistical tables have been placed in an Appendix. New topics in the sixth edition include: 1) the analysis of data recorded in scales having only a small number of distinct values; 2) in linear regression, the prediction of the independent variable X from the dependent variable Y; 3) linear regression when X is subject to error; 4) the comparison of two correlated estimates of variance; 5) an introduction to probability; 6) the analysis of proportions in ordered classifications; 7) testing a linear trend in proportions; 8) the analysis of a set of 2 x 2 contingency tables; 9) recent work on the selection of variates for prediction in multiple regression; 10) a more extensive discussion of the effects of failures in the assumptions of the analysis of variance; 11) the discriminant function; and 12) the general method of fitting non-linear regression equations and its application to asymptotic regression. There are ample references included in the bibliography at the end of each chapter.

Even in this day of high-speed computers, it remains essential that students, teachers, and research workers learn the standard, desk-calculator techniques of statistics for the analysis and interpretation of numerical data. This book is ideally suited for this objective. *Statistical Methods* would be a good addition to the library of any scientist, and teachers of introductory courses in statistics would do well to consider this book as a possible text.

RUSSELL V. SKAVARIL