graphic data for many specimens from the American midcontinent are given in terminology applicable to the Appalachian region. The curious French practice of translating foreign geologic names has been followed strictly and has introduced at least one source of confusion—plants from the British Lower Coal Measures (Upper Carboniferous) are almost invariably represented as originating from Lower Carboniferous rocks.

Although the work is published on high-quality paper and much expense and care has gone into production, some routine editorial chores have been given skimpy attention. There are many typographical errors; all too frequently, works cited in the discussion are not listed in the bibliography; in some cases, references in the text are over abbreviated (most people will be frustrated by examples like "*Neocalamites squamulosus* Turutanova-Ketova 1962," for "*Neocalamites squamulosus* Turutanova-Ketova, in Prynada and Turutanova-Ketova, 1962"); many works listed in the bibliography are nowhere cited in the text.

It is clear that this volume has shortcomings, but they must be considered in relation to the nature of the task so ambitiously undertaken. It then becomes surprising that one man has been able to accomplish so much. There is no doubt that this volume stands as the most significant single source of information on sphenophytes and noeggerathiophytes. The nonpaleobotanist will find it a useful guide to a complex field, and the professional paleobotanist cannot fail to learn from it. The latter should be particularly grateful for the fine coverage of much recent literature from Soviet Russia. All sorts of intriguing questions are apparent when this largely unfamiliar work is placed alongside the more familiar. How different is *Umbellaphyllites* from *Raniganjia* and *Phyllotheca*? Should the genus *Gamophyllites* really be separated from *Equisetinostachys*? Can the distinctions between *Equisetina, Koretrophyllites*, and *Phyllotheca* really be maintained? Are the differences between Sorocaulaceae and Phyllothecaceae really significant? Clearly, Boureau has presented students of fossil plants with a valuable reference volume that will provoke anticipation of the volumes yet to appear in this treatise.

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Nuclear Technology: Analysis of Materials

Analysis of Essential Nuclear Reactor Materials. Clement J. Rodden, Ed. Atomic Energy Commission, Oak Ridge, Tenn., 1964 (order from Superintendent of Documents, Washington, D.C.). xiv + 1280 pp. Illus. Paper, $4.25.

The purpose of this book, as stated in the preface, is to provide assistance in analyzing materials used in nuclear reactors. This purpose has been achieved, and the result is a valuable reference source that provides the information required for the analysis of reactor materials without the need for further literature searching.

The book is a collection of published and unpublished information, with extensive references up to 1961. The practical aspects of analysis have been stressed with minimal attention given to physical and inorganic aspects of the subject. This, however, does not detract from the value of the book.

Each of the 16 chapters was written by one or more experts in the field. The fuel elements uranium, plutonium, and thorium are each given a chapter, as are the moderator elements beryllium and graphite. The poison element boron is discussed in detail in a separate chapter. The reactor coolants water, helium, carbon dioxide, sodium, sodium-potassium, and polyphenyls are treated in one chapter; heavy water is discussed separately. The trace elements that occur in reactor materials are also discussed in one chapter. The last four chapters are devoted to a description of analytical techniques—for example, mass spectroscopy, radiochemistry, electrometric methods, and x-ray spectroscopy.

The main criticism that can be made of the book is that it is disorganized and contains a certain amount of duplication. This, undoubtedly, results from the many types of materials discussed and from the multiplicity of authors. Thus, to locate a particular analytical method, one may have to consult several chapters. This, however, is a minor point that should not seriously affect the usefulness of the volume. Although the quality of the printing is excellent, the paper binding will not withstand the wear and tear that should be expected in a frequently used reference book.

This book can be recommended as a valuable reference book for those concerned with the analysis of materials used in nuclear reactors.

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NATO Advanced Institute on Books and Non-Books

Algae and Man. Based on lectures presented at the NATO Advanced Study Institute (Louisville, Ky.), 22 July–11 August 1962. Daniel F. Jackson, Ed. Plenum Press, New York, 1964. x + 434 pp. Illus. $14.50.

"With the continuous increase in human population and its constant demands on the aquatic environment, there has been a compounding of the interrelationships between algae and man." This opening statement clearly gives the *raison d'être* of the symposium and at the same time intimates the strong bias toward plankton ecology evident in the assemblage of contributions.

These proceedings join the rapidly lengthening list of non-books which result from the combined zeal of publishers and academic entrepreneurs. Granted the propriety of these principals to seek financial compensation and prestige, the effect on science is not wholly salubrious. As if the information explosion is not enough to cope with, we are faced with a far more formidable phenomenon—the publication explosion. The relationship between the two is not linear: the number of cepts per printed page has declined markedly during the past few years. No one can doubt this downward trend after having read the third, fourth, and even fifth rehash of the same review in as many months.

The subject of non-books is fascinating. To those who may think that the term "non-book" is merely *Timese* and hence cleverly meaningless, let me hasten to say that non-books unfortunately exist, although I should like to believe that they are not here to stay. They may be defined as bound fascicles of printed pages ("signatures" in the trade) without literary purpose

or, if with an avowed purpose, failing to achieve it through use of an improper vehicle. Most non-books intruding upon our libraries today have resulted from unsuccessful attempts to transcribe into book form successful experiences in oral communication. Also making their appearance, however, are non-books that are based on the frank eschewal of both oral and literary traditions. Such a printer's exercise as *Marine Biology I: Proceedings of the First International Interdisciplinary Conference* (American Institute of Biological Sciences, 1963) skillfully transmutes dubious verbal communication into noncommunicable verbiage.

The foregoing criticism should not be construed as a blanket denial of the merits of the volume at hand. On the contrary, in this particular instance the components redeem the whole. Some of the contributions are unusually fresh in approach and in content, and a few are excellent. But the reader should not expect to find here an integrated account of the interrelationships of algae and man. Rather, he will puzzle over a review of the cytology of the Phaeophyta—irrelevant, however worthy in another context; he will discover that the ecology of plankton algae is treated by at least eight authors; he will find only four pages devoted to the role of algae in the purification of wastes and no mention of the fact that algae form an important part of the diet of more than a hundred million persons or that algal extracts enter the lives of hundreds of millions more through numerous industrial applications. The role of algae in agriculture and fisheries is barely noted. There is no index.

Of particular interest and value to me are G. W. Prescott's synthesis of the contributions of current research to algal systematics; C. van den Hoek's examples of modern taxonomy as practiced in two traditionally difficult groups, the Ulvaceae and *Cladophora*; Clyde Eyster's summary of micronutrient requirements; Ruth Patrick's discussion of natural and abnormal diatom communities; Olav M. Skulberg's account of the eutrophication of European water supplies; and Marcel Lefèvre's review of extracellular products. Algal toxicity is well covered in separate chapters by Paul R. Gorham and by David Schwimmer and Morton Schwimmer. The closing paper, "The future of phycology," by F. Evens, is disappointing. After some sophomoric observations, the author proposes the establishment of international cooperative programs, such as the regular compilation and dissemination of phycological bibliographies. Comprehensive literature lists have been published annually since 1954 and are widely used by phycologists, more than 600 of whom from 56 nations belong to the International Phycological Society, an organization apparently unknown to Evens.

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Statistical Methods

Methodes Statistiques dan les Sciences Humaines. P. Pèpe and M. Tisserand-Perrier. Masson, Paris, 1962. vi + 361 pp. Illus. F. 55.

This book is designed as a substantial introduction to statistical methods for practitioners in the "human" sciences, including demography, economics, sociology, psychology, biology, and anthropometry. In style, content, and mathematical level required of the reader, it is best described as a mixture of the better American textbooks, usually intended for use in only one field of application, and the British textbook by Yule and Kendall. Considering its level and universality of appeal, the book is quite concisely written and remarkably extensive in its coverage.

The first two parts of the book, consisting of 134 pages, are devoted to statistical description and can easily be read as required by the student. The next three parts contain the meat of the book and could form the basis of a one-semester course at upper college or beginning graduate level. The third part, on statistical probability, starts with a discussion of the basis of the calculus of probability and a fairly complete discussion of the ordinary binomial, Poisson, and normal distributions. It then continues with estimation problems, a brief but not very general discussion of testing of hypotheses, and concludes with a discussion of the χ^2 test. Part 4, a discussion of association, starts with a treatment of dependence of two quantitative variables in explicit geometrical fashion. Such an extremely intuitive approach could be very useful in developing a feeling for the meaning of dependence and of independence. The section continues with specialization to the case of linear dependence, developing the idea of the correlation coefficient as an estimate of the strength of relationship and developing also tests of significance for the coefficients. The last chapter of this part includes discussion of rank correlation and of association among variables described qualitatively, a brief introduction to factor analysis, and a discussion of covariation in time series. Part 5 is given over to sampling, under the principal headings of survey sampling and of analysis of variance as applied to statistical experimentation.

The sixth and final part of the book is unique in that it provides examples of statistical work in French government agencies and elsewhere. Five chapters present, respectively, discussions of work in the Ministry of Education on medical and educational statistics, on social security statistics, on epidemiological and other work of the National Institutes of Health, on the statistics of causes of death, and on population shifts in the National Institute of Demographic Studies. The construction of mortality tables and their use as basis for life insurance contracts is discussed in the last chapter.

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Ceramic Engineering

The Technology of Ceramics and Refractories. P. P. Budnikov. Translated from the Russian edition by Scripta Technica. M.I.T. Press, Cambridge, Mass., 1964. viii + 647 pp. Illus. $15.

The Western reader may consider the title of this book unusual because it implies division between ceramics and refractories and does not include glass as a ceramic material. The book was written as a textbook for students of ceramics and refractory technology in the U.S.S.R., but, as is mentioned in the preface, it could be useful to engineers and technical personnel working in ceramic industries. The author, P. P. Budnikov, professor at the Mendeleev Institute of Chemical Technology and a member of the Academy of Sciences of the U.S.S.R.,