quantitation and toward conjointly mechanical and chemical understanding. However, that perspective is conveyed somewhat remotely, two chapters later, in the discussion that essentially concludes the book. The final chapter is actually an appendix of methods and materials. It is comprised of abstracts arranged alphabetically by author, and references to them in the preceding chapters are conveniently distinguished by enclosure in brackets rather than parentheses. There are 13 pages of references through 1967, an author index, and a subject index. The numerous line drawings and electron micrographs are well chosen and well labeled to illustrate discussed points. Most are reproduced better than passably in spite of the economies of coarse halftone screen and paper, but about half a dozen evidence poor control of contrast and exposure. That lapse may be discounted as merely esthetic, and the book is recommended for specialists in the field of fertilization, biologists in related disciplines, and advanced biology students.

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Tropical Crop

Yams. An Account of the Nature, Origins, Cultivation and Utilisation of the Useful Members of the Dioscoreaceae. D. G. COURSEY. Humanities Press, New York, 1968. xiv + 230 pp., illus. $9.50. Tropical Agriculture Series.

This work, the eleventh in the Tropical Agriculture Series, is the third dealing with a major tropical staple. A preferred crop and often the basis of a prestige economy, yams are also a major institution in themselves in the few areas of the intertropical world where they are known to be indigenous. From time to time different writers have analyzed one or more of the many aspects of the "yam culture." The author of this study brings together a vast amount of material in what is the first attempt at anything like a comprehensive overview of the edible yams of the tropical world.

This book is divided into ten chapters which could be conveniently grouped according to three major themes: yams in space and in time, their agricultural and institutional environments, and the technical aspects.

The first two chapters take the reader on a journey "into space and history," introducing him to the crop, the places where yams developed as a "cultivated crop," and the major centers of production and consumption. By a careful examination of the major species and their distribution pattern (such as the tendency to local concentration), Coursey isolates four distinct centers of origin for edible yams, including a West African area.

The agricultural and institutional aspects of yam production are covered in chapters 4, 5, 6, 8, and 9. The conventional topics, including the agronomy of the crop, pest and disease problems, the economics of yam production and consumption, and the social and cultural role of yams in the West African area, are treated. A reference to the "yam traditions" of Asia might have enhanced the comparative value of the West African data. There are gaps and some unevenness of treatment in this section, but these do not detract greatly from the value of this pioneer effort.

Further work is needed on the economics of yam production. This reviewer finds no convincing evidence in this study which leads to the conclusion that yam farming "belongs primarily to subsistence rather than to commercial agriculture" (pp. 3, 68). The labor-intensiveness of commercial yam production notwithstanding, high seed requirement remains one of the problems. One or two statements in this section can be misleading to the ignorant and annoying to the informed: First, despite the ritual ambivalence which the Igbo manifest toward them, *Ajokuji* and *Mmaji* do not constitute a "group of tabu persons (*Osu*)" (p. 201) and must not be confused with *Osu,* a caste group. Second, the number 400 is not "synonymous with infinity" (p. 201) but is a maximal counting unit, and the qualification for the first rank in an Igbo yam title is not 400 yams but 400 yam stakes—a stake carrying from 40 to 120 yams (see plate 28).

Technical questions regarding yams, ranging from taxonomy, storage, and processing to toxic and pharmacologically active ingredients, are discussed in chapters 3, 8, and 10. Despite the technical treatment demanded by these subjects, the writing in the book is exceptionally literate, and it can appeal to a wide range of readers: professionals, students, agricultural administrators, and laymen.

The book is well documented, a reference list following each chapter. There are 16 figures and 28 plates, including closeups of yam barns. Coursey does not claim to have said the last word on yams. He has written a book which no serious student of yams can afford to ignore.

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Paleobotany

Les Plantes Fossiles dans Leurs Rapports avec les Végétaux Vivants. Eléments de Paléobotanique et de Morphologie Comparée. LOUIS EMBERGER. Second edition. Masson, Paris, 1968. 758 pp., illus. 198 F.

This volume, a very substantial and handsome and expensive elaboration of the previous edition (the plan and spirit are said to be the same) with new material added, is a strange blend of old and new. Americans may be inclined to view the cryptogam and phanerogam classification of plants as a now outmoded relict of a pre-evolutionary era, but, with the intercalation of an intermediate group, called the Prephanerogams, these taxa still form the basis for organization of higher plants in Emberger's new edition. Perhaps this organization reflects an ultra-causal rather than a conventional philosophy and a theoretical rather than a practical approach to the subject. Theoretical aspects are discussed at considerable length, but Emberger generally leaves the issues unresolved. Unfortunately, it is frequently difficult to relate statements in the text with the original works on which they are based. Written in French, the book must be judged as a reference volume for Americans.

The book may be regarded as a compendium of how paleobotany appears in review to a neobotanist who has attempted a comprehensive summary of literature. A tremendous number of groups of fossil plants are mentioned, and many good new illustrations are included. Few, if any, taxa are critically discussed in detail. Points others regard as having importance are given little emphasis, and features that seem too indefinite to be of value commonly are given exaggerated importance (as in Prephanerogams). Quite a few neobotanical matters are dis-