lactosidases deserves careful consideration.

This reviewer found much to recommend in a brief, thoughtful chapter on starch metabolism by M. A. R. DeFekete and G. H. Vieweg. Studies of starch accumulation and starch breakdown in detached leaves reveal a fine balance in the control of amylolytic and phosphorylytic activities on the one hand and between phosphorylases and synthetases on the other. The concentrations of low-molecular-weight products, particularly maltose and inorganic phosphate, provide important information regarding the flow of carbohydrate from starch to sucrose and vice versa.

Among the remaining chapters one finds reviews on the plant polyols, glycolipids, sucrose metabolism, starch degradation in cereal grains, cell wall polysaccharides, algal polysaccharides, and glycoproteins. The book should interest all who work with plant carbohydrates but, as so often is the case with collections of this kind, its contents offer a viewpoint in time and prompt reading is essential if the message is to have value.

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Marine Ecology

The Study of Benthic Communities. A Model and a Review. ROBERT H. PARKER. Elsevier, New York, 1975. x, 280 pp., illus. $29.95. Elsevier Oceanography Series, 9.

The study of marine organic communities, begun in earnest about 70 years ago, was initially undertaken for very practical reasons. Early on, the relationship between marine bottom communities and fishery productivity was the chief rationale for undertaking detailed analyses of the benthos. In ensuing years, this practical motivation was gradually superseded by a "pure research" orientation. This book indicates a return to practicality. Parker's purpose in studying relationships between marine benthic communities and their physical environment is to assay the conditions before and after the onset of human activities in coastal areas. He has built a consulting practice based on this approach. This book, in large measure, is a statement of his rationale and method. Almost the entire book is devoted to the techniques of data collection, collation, and interpretation used in the study of the benthic communities of the Hadley Harbor complex which lies just southwest of Woods Hole, Massachusetts, between Buzzards Bay on the northwest and Vineyard Sound on the southeast. In a sense, then, the title might be misleading to a reader who expects a broad general treatment of principles and practices. The book is more specialized, but those principles and practices that have been successfully used by Parker in this and other detailed studies do emerge.

Aside from the detailed treatment of Hadley Harbor benthic communities, three more general aspects of the study strike this reviewer. First, Parker takes a holistic approach to his communities by attempting to study all the common taxa present. In many community studies researchers have simplified the "communities" studied to a few taxa, or even a single taxon, with which they have felt most competent to deal. Often such simplification distorts the situation past all reality. Parker's community spectrum contains (including only those species present in sufficient abundance for significant relationships to be deduced) 14 species of gastropods, 12 of pelecypods, 26 of amphipods, 10 of ostracods, 9 or 10 of decapods, 6 or 7 of smaller arthropods, plus kinorhynchs, polychaetes, foraminiferans, copepods, and others. The author not only attempts a more holistic biological approach but has collected copious data on physical environmental variables at the same stations and at the same time as biological data. From these biological and physical data he has reconstructed by both empirical and computer techniques the communities in the harbor complex and deduced their relationship to controlling environmental variables.

The second striking and unique aspect of the study is the careful and objective comparison of community maps derived from factor analysis of the data with maps drawn by "subjective" collation of species habitat ranges. As the author points out, the two sets of maps are quite similar and the comparison suggests that empirically drawn community distribution maps in other studies are more objectively correct than might normally be assumed. It is especially noteworthy that Parker's "subjective" maps used more of the data (in terms of numbers of species) than the factor-analytical techniques were able to accommodate.

Finally, Parker's data suggest that the four (at least) communities of Hadley Harbor are derived by fragmentation and reorganization from one or two very widespread, level-bottom communities of Buzzards Bay and Vineyard Sound.

The only major shortcoming of this book lies in the illustrations. Some, such as figures 14 and 15, are not needed. Others, such as figures 25, 27C, 30, and 39, could have been made more useful by additions or corrections. The most confusing omissions involve the map pairs of figures 67 and 68 and figures 84 and 85. Figures 67 and 68 show the "subjectively" drawn distribution of communities—nonoverlapping, unique community areas in figure 67 and areas of overlapping communities in figure 68. Several large areas occupied uniquely by the eel-grass community are omitted from figure 67, and their addition would increase by perhaps 20 percent the total area within the complex occupied by nonoverlapping, unique communities. Essentially the same criticism applies to figures 84 and 85, which are similar plots based on factor analysis of the data. Unique areas of the eel-grass community are left off of figure 84 and their addition would increase by about 10 percent the areas occupied by unique "factor" communities.

In conclusion, the reviewer recommends this book to ecologists and paleoecologists interested in the community approach to ecosystem analysis.

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Invertebrates

Myriapoda. Proceedings of a symposium, Manchester, England, April 1972. J. GORDON BLOWER, Ed. Published for the Zoological Society of London by Academic Press, New York, 1974. xxviii, 712 pp., illus. $37.50. Zoological Society of London Symposium No. 32.

The volume at hand is the proceedings of the second International Congress of Myriapodology, and contains the text of 44 papers presented at that congress as well as transcripts of the discussions following each and a summary of an informal session on the phylogeny of "Myriapoda." It is by far the largest volume yet published in the Zoological Society's symposium series and in many ways one of the most significant.

The book will be a disappointment to anyone looking for a modern reference on the classification and biology of the several myriapod classes. It reflects merely the current research interests of the congress delegates, and the coverage is markedly unbalanced. This reviewer counts 28 papers on Diplopoda, eight on Chilopoda,

two on Pauropoda, and one on Symphyla, in addition to five that are concerned with two or more of the classes. It is at least clear from this distribution that the era of specialization has arrived and that few modern workers try to cope with "myriapods" collectively except under very favorable conditions (as in inventories of local and well-known faunas). One might also infer that diplopods are more amenable to investigation than the other classes, particularly as regards life cycles and ecology. Another imbalance shows up in the following breakdown: systematics, six papers; evolution and phylogeny, three; morphology and development, 14; biochemistry and physiology, two; behavior, one; distribution, four; life cycles and ecology, nine; population dynamics, four; control of pest species, three.

The editor of the volume, who was also organizer of the congress, remarks in his foreword that "perhaps most important are those papers which are examining the very bases of description and classification to find the foundations cracking, or even wholly unsuited to support the superstructure of zoogeographical and evolutionary studies already built upon them." This reviewer, himself a systematist, can heartily endorse such a sentiment, and notes with regret the paucity of papers in basic taxonomy. There are really only five. One exposes the classification of a large and important family of juloid millipeds for the first time; a second is a modern revision of the classification of the order Sphaerotheriida that reflects the possible paleogeography of the group; a third discusses some of the Gordian knots in current nomenclature of lithobioid centipeds; the last two are accounts of the variability and usefulness of various taxonomic characters used in Chilopoda. Nowhere in the volume is the fact brought out that probably fewer than 20 percent of the world fauna of "myriapods" have even been named so far, or that the number and definition of *orders* have yet to be settled. It could be noted in this connection that most of the existing classification is either inadequate or outright wrong and must be redone in toto.

What the reader does get from this book is a sampler of the research possibilities presented by these generally neglected arthropods; there is clearly plenty to do, in a diversity to suit almost any investigator's fancy, and virtually every discovery will be new and important. It is especially evident both from the papers and the references they cite that so far the laurels for advancing the knowledge of "myriapods" must go to European scientists.

The papers range in scope from preliminary reports on research in progress to fairly sophisticated accounts of ultrastructure or population structure. The informal symposium on relationships of the myriapod classes reflects how little consensus there is on this subject. One author (S. M. Manton) endorses the essential homogeneity of the "myriapods" while opposing them to the several "hexapod" groups, chiefly on the basis of a functional difference in mandibular anatomy. Another (J.-M. Demange) believes that chilopods are, in principle, composed of incipient diplosomites just like diplopods (a point refuted by Manton). A contribution on segmentation in the germ band of the diplopod embryo brings out, in discussion, the interesting fact that studies of the embryo do not yield as much structural detail as investigations of the adult.

Some nationalistic trends may be noted: papers on ultrastructure and neurohormones in diplopods are predominantly by French authors, whereas the British hold a clear dominance in studies of ecology, life cycles, and distribution (reflecting the emphasis placed on these areas by Blower and his associates at Manchester). Nationalism shows up in the languages: all nine papers by French authors are written in French, whereas authors from Germany, Italy, India, and Scandinavia opted almost entirely for English. The French contributions are easy to read, and the discussions of them have been translated into English.

In format and typography *Myriapoda* is well designed, and the paper quality and the illustrations are excellent. I have found no typographical errors. The binding is good and the book will lie open readily at any place without being forced. Following some information on the activities of the Centre International de Myriapodologie, the book concludes with author, subject, and scientific name indexes and a provisional classification designed to help the nonsystematist orient himself. Although it was almost three years in press and commands a rather high price, *Myriapoda* will generally be held as worth both inconveniences. The very existence of such a volume is remarkable. Less than a decade earlier such a congress as this would have been unimaginable because of the dearth of investigators in Myriapoda. Now a third congress has been convened in Hamburg, and this reviewer feels optimistic about the statement in Blower's foreword: "The time is now coming for the Myriapoda to get their just share of attention and it is hoped that this volume might hasten that day."

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Edible Plants

Crop Physiology. Some Case Histories. L. T. EVANS. Ed. Cambridge University Press, New York, 1975. viii, 374 pp., illus. $23.50.

The nine plants reviewed in this study of crop physiology account for 65 percent of the world production of edible (plant and animal) dry matter and 55 percent of the world production of edible (plant and animal) protein. That a reasonably complete review has been accomplished so successfully in a single volume indicates the excellence of the authors, but it also indicates how limited is our knowledge of the crops on which man depends.

The book is a collection of 25- to 50-page monographs, one on each crop, together with introductory and final chapters by the editor. The style of the monographs is between that of a review and that of a text and, happily, they include many unpublished data and observations drawn from the knowledge and experience of the contributors.

The introductory chapter provides statistical data on the crops and their yields together with a brief history of crop physiology and major research trends. This chapter is a conventional one and lacks consideration of new trends leading to minimum-energy-input crops and cropping practices. It is followed by chapters on maize (W. G. Duncan), sugarcane (T. A. Bull and K. T. Glasziou), rice (Y. Murata and S. Matsushima), wheat (L. T. Evans, I. F. Wardlaw, and R. A. Fischer), soybean (R. M. Shibles, I. C. Anderson, and A. H. Gibson), pea (J. S. Pate), potato (J. Moorby and F. L. Milthorpe), sugar beet (G. W. Fick, R. S. Loomis, and W. A. Williams), and cotton (J. A. McArthur, J. D. Hesketh, and D. N. Baker) and a summary chapter on the physiological basis of crop yield by L. T. Evans.

The chapter on maize is exemplary. It is rich in unpublished observations, particularly concerning effects of kernel number on yield, and suggests whole new subjects of research. The chapters on sugarcane, rice, and wheat have fine discussions of leaf area and many data on carbohydrate transport and source-sink relationships. The chapters on soybean and pea have good discussions of protein content, and the pea chapter is distinguished by a schematic description of ontogeny and a consideration of the distribution of nitrogen and photosynthate between nodules, leaves, and seeds. The best model for yield and almost the only enzymology are provided in the chapter on potato. Excellent developmental studies are presented in the