other hand, presents the evidence for his theory that there is a "wholesale rejection of nearly all sperms on the basis of their haploid chromosome set having chiasma associated errors." Presumably the great majority of spermatozoa are genetically defective and for this reason are infertile.

J. Heslop-Harrison, in an excellent paper, reviews the extensive literature on male gametophyte selection and the interactions involving the male gametophyte and the female sporophyte in incompatibility phenomena in flowering plants. The evidence for both haploid transcription and gametophytic competition in plants is compelling.

Most of the other papers are research reports on various plant and animal systems in which there may be gamete or gametophyte competition. Many of the papers deal with pollen development and the factors that influence male transmission in flowering plants. This bias in favor of studies of pollen is open to criticism.

The book can be recommended to students interested in incompatibility and gamete interactions. The prompt publication of the volume makes it possible for researchers to find out what happened at the symposium before the information is outdated.

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Plant Nutrition

Ion Transport in Plant Cells and Tissues. D. A. BAKER and J. L. HALL, Eds. North-Holland, Amsterdam, and Elsevier, New York, 1975. xiv, 438 pp., illus. $54.25.

The book under review is one of a spate of new books dealing with the mineral nutrition of plants or with ion transport, one of its central topics. The renewed emphasis on this aspect of plant physiology is most welcome, for the subject has to do with the primary acquisition by the biosphere of the great majority of the nutrient elements required for its functioning. And since toxic elements such as cadmium and lead also enter the biosphere largely by the same processes, the current interest is all the more apt.

The book is addressed to advanced undergraduates, graduate students, and teachers. It has much to commend it, above all the high caliber of the contributing authors. The writing for the most part is clear, and there are author and subject indexes. The production and the illustrations are good, as indeed they ought to be, considering the book's high price.

The price is not the only feature of the work that will create trouble for students and teachers. The introductory chapter outlining general principles condenses a vast amount of material and deals with some matters so briefly as to convey little information or understanding.

The greatest problem with the book, however, is its basic organization. With the exception of the first one, the chapters are given over to specific objects. This is justified for mitochondria and chloroplasts, which are highly specialized organelles, study of which requires correspondingly specialized, often unique, approaches. But is it helpful to break up the discussion of ion transport in cells and tissues into chapters devoted to algae, storage tissues, excised roots, and the like? This approach makes for both repetitions and omissions and forfeits the opportunity of illuminating general principles by reference to diverse plant materials. For example, ion fluxes in relation to cell electropotentials make separate appearances in the chapters on membranes, algae, storage tissues, seedling roots (both chapters), and salt glands, as well as in the introductory chapter. On the other hand, the kinetic approach is extensively discussed in one of the two chapters on roots and in the introduction, although it has been applied to algae, storage tissues, and other systems as well.

There are other problems. A chapter is devoted to storage tissue, most of which is inactive in ion transport and must be coaxed into activity by laboratory manipulations. The cells of leaf tissue, on the other hand, absorb ions delivered to the wall spaces by the transpiration stream. This process of absorption is a normal and essential function in the life of terrestrial plants, and it plays an equally important role in the leaves of floating aquatics. But there is no chapter on the extensive research that has been done on ion transport by leaf tissue, whereas salt glands and stomata, which are specialized leaf structures, both get the full treatment.

In spite of the shortcomings of organization and selection, the individual chapters are highly valuable, and serious students of ion transport in plants cannot fail to benefit greatly by giving them the close attention they deserve—and will require.

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Books Received

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Animal Biochromes and Structural Colours. Physical, Chemical, Distributional and Physiological Features of Coloured Bodies in the Animal World. Denis L. Fox. University of California Press, Berkeley, ed. 2, 1976. xvi, 434 pp., illus. $22.50.

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Annual Review of Energy. Vol. 1. Jack M. Hollander and Melvin K. Simmons, Eds. Annual Reviews, Palo Alto, Calif., 1976. xii, 794 pp., illus. $15.

Applied Pharmacology. American Edition. Walter Modell, Heinz O. Schild, and Andrew Wilson. Saunders, Philadelphia, 1976. xii, 926 pp., illus. $19.50.

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Chemical Endocrinology. Edward H. Frieden. Academic Press, New York, 1976. xii, 238 pp., illus. $19.50.

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