TROPICAL FOODS

Tropical Foods: Chemistry and Nutrition, Vol. 1, edited by G. E. Inglett and G. Charalambous. Academic Press, New York, 1979, 340 p., illus. $19.50 (79-397).

This is the first of a two-volume treatise, which includes papers presented at the International Conference on Tropical Foods: Chemistry and Nutrition, held in Honolulu, Hawaii, 28-30 March 1979. The cover title *Tropical Foods* with the series divided into volumes suggests that it will be a comprehensive coverage of the subject. In actuality it is, as stated on the bottom of the second page, a "Proceedings of an International Conference on Tropical Foods"; it consists of individual papers of varying quality on a variety of subjects, and it suffers from many of the problems inherent in "proceedings" of meetings. Although it was an international conference on tropical foods, surprisingly there were no contributing authors from Asia or Africa, and authorship of the book is 62% American, 19% Belgian, 9% Mexican, 6% Israeli, and 3% Puerto Rican.

In my opinion, this book is not up to the standards expected from Academic Press. For example, the chapters in Volume 1 are not numbered, and there are no outlines of the subject matter in the individual chapters of the book as a whole. In addition, there is no index in Volume 1, and the reader looking for specific information on a subject may have a problem finding it. Finally, there is no listing in Volume 1 of the papers or subjects that will be covered in Volume 2.

The first subject covered is "Tropical Foods of the Pacific Region" by Standall. This is a fairly good general review, which classifies tropical foods into (a) carbohydrate foods, including aroids (taro), yams, sweet potatoes, cassava, arrowroot, green bananas, breadfruit, sago, cereals, and sugar plants; (b) fats, including pork lard and coconut (without, however, even mentioning palm oil); (c) foods for proteins and amino acids, including meats, insects, eggs, fish, milk, legumes, nuts, and seeds; (d) foods for vitamins and minerals, i.e., vegetables and fruits; and (e) beverage plants, such as coconut and kava.

In the remainder of the book, two chapters deal with papaya and three chapters with citrus fruits and processing. Separate chapters deal with subtropical fruits in the United States, tropical yams, prickly pears, edible aroid (taro) crops, rice and rice foods, and sorghum and pearl millet foods. One chapter discusses the importance of sensory characteristics of tropical foods, primarily fruits. Two chapters discuss raw sugar and sugarcane refining. Although sugar is a tropical product, it is a universal, rather than a tropical, food. Two chapters deal with production of leavened breads from nonwheat tropical starchy crops. Although these are of interest to those trying to produce breads from starches other than wheat, I do not consider such leavened breads "tropical" foods. Thus, the book is not what its title suggests to me—a comprehensive coverage of *Tropical Foods: Chemistry and Nutrition*. Rather, it is a collection of papers related to tropical foods.

The book is poorly organized. For example, the two chapters on leavened breads from nonwheat starchy flours are separated by two unrelated chapters: one on tropical yams and one on aroid root crops. I wonder what subjects closely related to those in Volume 1 are included in Volume 2. It probably would have been better to have combined both books in a single volume.

I recommend the book as a reference for those researchers working directly on specific products it covers. Others may wish to borrow a copy from the library.

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MEMBRANE TRANSPORT

Membrane Transport in Biology II: Transport Across Single Biological Membranes, edited by G. Giebisch, D. C. Tosteson, and H. H. Ussing. Springer-Verlag, New York, 1979, 443 p., $74.00.

This second volume in a continuing series addressed to membrane transport in biology is focused on the characteristics of transport in seven well-studied membranes: the plasma membrane of red blood cells (four chapters), the plasma membrane of nerve and muscle cells (one chapter each), and the membranes of four organelles (a chapter on the mitochondrion, chloroplast, lysosome and sarcoplasmic reticulum, respectively). The 10 chapters generally are well-organized and well-written. It would be difficult to find a more balanced and authoritative treatment of the membrane-transporting systems that have been selected for this volume.

The editors in their preface point out that while great progress has been made in the phenomenology of membrane transport, the molecular mechanism of transport is still an enigma. The 10 chapters reflect this missing dimension of mechanism. They are necessarily descriptive in the absence of first principles or highly speculative when invoking man-inspired models of how membrane transport could work.

The emphasis on energy-coupling in a treatise on membrane transport has very special significance, since active transport or transport leading to synthesis is an integral feature of all energy-coupling systems. It cannot be a happenstance that ignorance of the mechanism of membrane transport goes parallel with ignorance of the mechanism of energy coupling. The article of A. Scarpa on the mitochondrial membrane system points up this parallelism very clearly. What this implies is that, until we can discover the mechanism of membrane transport, the mechanism of energy-coupling will inevitably elude us.

The articles in Volume II of the series amply document the fact that biological membranes can transport the whole spectrum of small molecules that are required for the metabolic needs of the cell—cations, anions, nucleotides, sugars, amino acids, etc. This transport can be enzymically energized as in the energy-coupling organelles, or it can proceed in the absence of any enzymic intervention. There are two fundamental questions: What is the nature of the molecular machinery that mediates this transport? And is there a basic mechanistic distinction between energized and non-energized membrane transport? There is now growing evidence that specialized membrane-spanning proteins (the porins of bacterial membranes) provide the channels through which transport must proceed. The discovery that intrinsic to energy-coupling systems, such as the complexes of the mitochondrial electron-transfer chain, are porin-like proteins (the ion-transport complex of cytochrome oxidase is one such example) suggests that channel-forming proteins provide the structural underpinning for membrane transport. The porins and ion-transport complexes are the biochemical realities that can now give experimental support to the time-honored pore theory. But the real question concerns what is contained within the protein channels, and how this material mediates ion and solute transport.

There are multiplying signs that phospholipid is contained within the protein channels, and phospholipid is the molecular vehicle for all membrane transport. Phospholipid, given appropriate modulation, has the capability for transporting the whole range of biological solutes. The modulants could be peptides, nucleotides, divalent metals, etc.

If, as it now appears, we are approaching the molecular stage of transport and energy coupling, we can expect that one of the future volumes of the series can be written with full knowledge of the mechanistic dimension. The detailed information provided by the chapter in Volume II should be invaluable background for the next phase in the development of membrane transport. This volume is highly recommended for all investigators in the transport field.

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