

## BOOK REVIEWS

*Clinical, Biochemical and Nutritional Aspects of Trace Elements.* Edited by Ananda S Prasad, Current Topics in Nutrition and Disease, vol 6, Alan R Liss, Inc, New York. 1982. 577 pp hardcover, illustrated, \$96.00.

Without question, Dr Ananda Prasad has been the motive force behind compendia on trace elements in general, and zinc in particular. The present volume, a thick, heavy, and expensive text, represents one of his two recent contributions in this area to the Current Topics in Nutrition and Disease series. The secret to a superb, multiauthored monograph is to have contributors of superior knowledge, up-to-date and reliable information, comprehensive and balanced treatment of the topic, and relevance to the intended readership. Trace minerals represent perhaps the area of most rapidly accelerating interest and literature proliferation in nutrition in the last decade, and heroic efforts are required to keep pace with the field. This book represents such an heroic attempt. The volume derives from the proceedings of a conference of the same title sponsored by the International Union of Nutritional Sciences (IUNS) held in December, 1980. Its appearance within 20 months of the event is, itself, a major achievement.

The volume contains 30 chapters organized into five sections: Essential Elements; Trace Element Methodology; Trace Elements in Total Parenteral Nutrition; Trace Element Interactions; and Toxic Elements. The contributors—although many, the traditional veterans of such trace mineral symposia—are of high scientific reputation, productive, and appropriate to their distinct tasks. Fourteen of the chapters, and a full 50% of the pages, however, are dedicated exclusively to *zinc*, and three additional chapters are devoted in part to this mineral. The lead chapter—an overview of zinc deficiency in humans by the editor—comprises, itself, one-ninth of the text. It is a beautifully balanced and superbly organized treatise with the depth and perspective that only someone with over a score of years at the forefront of zinc research could deliver. I was gratified by Dr Prasad's emphasis on updating the topic with *recent* findings; many literature citations appearing since the date of the conference have been included. Other contributors also graced the reader with the most current bibliographic references.

Within the zinc subsection, the chapters on the metabolism and biochemistry of zinc and on the cellular and molecular mechanisms of zinc absorption are outstanding. Zinc nutriture through the life span (in pediatrics and in pregnancy) are also exceptionally well developed in informative chapters. The treatment of zinc supplementation and surgery is surprisingly fair and objective. Even the chapter on taste perception and zinc, an area not known for galloping advances, contains substantial amounts of new findings from peer-reviewed sources. The chapter on zinc and immunity is disappointing, a superficial treatment of a profound topic, but the more specific theme of zinc and neutrophil function is comprehensive and innovatively synthetic.

Two chapters each are devoted to copper and selenium, whereas chromium, manganese, and the ultratrace elements (nickel, arsenic, silicon, vanadium, and tin) are each addressed in one chapter. The quality of the information in each of these contributions is superior. The piece on chromium, in particular, is a gem of comprehensiveness and depth. Given the explosion of recent information, one feels that at least copper and selenium merit a greater share of the total volume than has been afforded. Molybdenum is not covered in any

context; molybdenum has perhaps seen the most exciting developments in trace mineral nutrition during the past 4 yr. Zinc has been the premier trace mineral, but a balance should be struck in the future between consolidation of our information regarding this element and expansion of the discussion of the other essential trace minerals.

The clinical significance of exposure to three toxic metals—lead, cadmium, and mercury—is discussed. The chemistry, biochemistry, mechanisms of toxicity, and epidemiology are well described for each of the elements. Refreshingly, physiological aspects of intestinal absorption and internal metabolism of the minerals, themselves, are included for cadmium and mercury. Given the quantity of reports on human lead absorption and metabolism using stable isotopes of lead, it is unfortunate that a similar physiological focus was not developed for this element as well.

A vitally important conceptual area is the interaction of essential metals in human physiology. Buttressed by 189 literature citations, a team of German physiologists expertly develops a review of interactions involving copper, zinc, manganese, nickel, and cobalt, covering mechanisms of interaction at both the intestinal level and in intermediary metabolism, and discussing the role of metallothionein in several interactions. It represents the major conceptual consolidation since Hill and Matrone first developed the theme in 1970. Ironically, despite the title of their chapter, 80% of the data derives from experimental animals, pointing out the distance that remains before the consequences of mineral-mineral interactions for *human* biology will be understood.

The chapters on the trace element analyses in biological samples and foods contain some valuable reference material, although they tend to ignore voluminous data from Belgium based on neutron activation analysis. The remainder of these two chapters, however, contains a mundane checklist of procedures and pitfalls which, although correct and systematic, is not consistent with the exciting biological tone of the monograph. By contrast, the third chapter in this section, on the use of stable isotopes as tracers in human investigation, complements the biology of trace elements in a superb manner. It represents not only a tour de force of analytical achievements, but also sets the stage for nonhazardous—albeit expensive and laborious—inquiries into the metabolism of trace and ultratrace elements in humans, heretofore limited by considerations of radiation exposure.

Zinc, copper, and selenium deficiency syndromes in populations were first recognized in the Middle East, Peru, and China, respectively. The present conference was an “international” colloquium sponsored by the IUNS; had the theme been protein, energy, or even vitamin nutrition, a major input from Third World investigators would have been expected. It is a provocative commentary on the dependency of trace element research on advanced analytical technology that 23 of the 30 contributions came from laboratories in the United States, and the remaining chapters originated from the United Kingdom, Canada, New Zealand, Australia, Germany, and Sweden. Perhaps that greater depth and breadth of knowledge in mammalian physiology and human consequences of elements *other than zinc* will come when populations of developing countries and tropical and geographic diseases are considered for modern trace mineral inquiries.

The editor states that this book “will be of value to nutritionists, biochemists, physiologists and pediatricians, as well as researchers concerned with defining the role of trace elements in health and disease.” The advanced conceptual concerns and in-depth technical considerations would, indeed, limit the assimilation of this information by practitioners of medical specialties, dietetics, or public health nutrition. It is most appropriate for students and professionals

familiar with the fast-moving trace element field. For these latter individuals, however, the text represents a challenging and important up-date, and an indispensable resource and reference.

*Noel W Solomons, MD*

Associate Professor of Clinical Nutrition  
Massachusetts Institute of Technology  
Cambridge, MA 02139 and  
Affiliated Investigator  
Institute of Nutrition of Central America and Panama  
Guatemala City, Guatemala

*No Sugar Added*. 1st ed. Nicholas Krilanovich. Santa Barbara, CA: November Books, 1982. 300 pp, paperback \$14.00.

The author has a BS in Chemistry and an MS in Electronics, both from UCLA. In addition, he has had "informal training driven by the innate urge to learn." That training "combined with the natural feel for organizing" enabled him to "collect a huge amount of recent scientific information that relates refined sugars to human health." He claims that a major reason that a "recognized authority" failed to write this book is because "many nutritional scientists and doctors are directly employed by, or indirectly dependent upon, the food processing industry." Those authorities not financially compromised are thought to be so wedded to outmoded theories that they are "oblivious to new information" or they "still seem to think that all carbohydrates are alike to the human body."

The book was not written for a professional audience. It was written for consumers who are urged to work for governmental scrutiny of "refined" sugar usage. This is not specifically an antisucrose book. Glucose, fructose, maltose, and even starch are lumped in with sucrose as refined carbohydrates when removed from their natural food sources. Only lactose is viewed by the author as "natural" and, therefore, relatively risk-free in terms of human health.

The capstone of this book is a detailed analysis of part of the 1979 ASCN report, "The Evidence Relating Six Dietary Factors to the Nation's Health" (1, 2). The author felt obliged to design his book in this way because the ASCN report seriously lessened the impact of his own call for political action against harmful refined sugars. It is instructive to note that the author considered abandoning this book after the ASCN report first appeared. However, a broad scale search by the author unearthed some 200 references dated 1981 and 1982 that relate to carbohydrates. Many are not nutritional in nature. The resulting stance is that this is a rapidly expanding research area and the ASCN report is already outdated.

It is not surprising that the author found some 200 recent references on carbohydrates. It is surprising that he attempts to relate them to human health problems that are linked to carbohydrate nutrition mainly by his imagination (ie, cancer and birth defects). As a call to political action and a change in nutrition policy, the book is a failure. Theories, speculations, and confirmed scientific findings are confused and so, finally, is the reader. It does point out that scientific controversies will only be resolved in the laboratory.

*Richard A Ahrens, PhD*

Professor  
Department of Food, Nutrition and  
Institution Administration  
University of Maryland  
College Park, MD 20742

## Reference

1. Bierman EL. Carbohydrate: carbohydrate and sucrose intake in the causation of atherosclerotic heart disease, diabetes mellitus, and dental caries. *Am J Clin Nutr* 1979;32:2644-7.
2. Bierman EL, Connor WE, Horton ES, et al. Carbohydrates, sucrose, and human disease. *Am J Clin Nutr* 1979;32:2712-22.