plants for trace element analysis are reviewed. Statistical models and approaches in sampling, as well as sample collection, storage, preservation, and contamination, are touched upon. The final section of this portion of the book describes three methods of trace element analysis: activation analysis, atomic absorption analysis, and spark source mass spectrometry. Attempts are then made to assess the relative merits of these methods in analysis of environmental samples.

The second half of the book surveys health problems and the relationship of trace inorganic levels to optimum health and to cancer and cardiovascular and infectious diseases. In reporting on studies relating to deleterious concentrations of trace elements the authors are careful to point out drawbacks inherent in various analytical schemes and the lack of agreement between data from different laboratories. The consensus is that a standardization of methods of sample preparation, analysis, and data interpretation is a necessary first step toward the improvement of communication among participating disciplines.

There is general agreement among the contributors that more understanding of the comparative physiology of the action of trace elements in animals and humans is needed and that there is an increasing demand for a coordinated interdisciplinary effort in environmental epidemiology and for the utilization of the most advanced technologies of sample preparation and analysis.

This book is a good introduction to the epidemiology of trace elements in the natural environment. It is well organized and takes the reader through a logical succession of topics which are all pertinent to the central theme, a feature that is certainly not the general rule for a proceedings publication. It should be remembered that this work does not deal with pollution, and those interested in this aspect of the subject must look to other publications. The material presented also deals more with nutrition than with toxicity, but this is probably dictated by the limitations of present knowledge. One of the weak points of the work is in analytical methodology. Many worthwhile techniques are not mentioned, although this problem is recognized in panel discussions. Another is the occasional, and likely to be quoted, claim of specificity based on inadequate data, as, for example, when a correlation is asserted between particular metals in water and cancer mortality of specific sites when the waters analyzed were all surface waters rather than the sources of the drinking water supply of the cancer victims. Despite these shortcomings, the participants' insights into the nature of problems at hand and their general willingness to share information through coordinated interdisciplinary communication, particularly as revealed in the panel discussions, make the book a valuable one.

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Topics in Statistical Mechanics

Statistical Mechanics. New Concepts, New Problems, New Applications. Proceedings of a conference, Chicago, March 1971. STUART A. RICE, KARL F. FREED, and JOHN C. LIGHT, Eds. University of Chicago Press, Chicago, 1972. viii, 424 pp., illus. $16.

As with all other conferences the proceedings of the sixth International Union of Pure and Applied Physics Conference on Statistical Mechanics suffers from the fact that the title, *Statistical Mechanics: New Concepts, New Problems, New Applications*, represents the organizers' aspirations rather than the speakers' contributions. Of the book's five sections, Fundamental Principles, Developments in Biology, Generalized Hydrodynamics, Phase Transitions, and Liquids, the title seems appropriate to only one, the second. For the most part, the remaining sections deal with familiar problems, and the applications, new or otherwise, are sparse. At the same time, the burst of experimental activity on one- and two-dimensional systems and their phase transitions, the quantitative studies of metastability with superconductors, and the extensive activity on complex fluids like liquid crystals by statistical physicists go unnoticed. In general, the organizers have invited speakers with chemical and mathematical approaches and underrepresented the experimental and theoretical physicists' contributions to the field, tending to open a gap previous conferences had partially closed. Scheduling the conference in coincidence with the American Physical Society solid state meeting also did not help the conference discussions.

In spite of these omissions the book is worthy of attention. There are several interesting innovations. Although I cannot give expert comment on the biological section, I found Elliott Montroll's "Nonlinear processes, especially those involving competitive processes," Jack Cowan's "Stochastic models of neuroelectric activity," and Cohen and Robertson's "Cell migration and the control of development" enjoyable to read. Each gave me new perspective in areas not normally considered by statistical physicists. The section Generalized Hydrodynamics contains a thoughtful review by Robert Kraichnan, "Some modern developments in the statistical theory of turbulence." Since the subject is so opaque and the achievements so obscure, his review performs a particularly valuable function. Three articles by Resibois, Zwanzig, and Kawasaki describe from three different viewpoints the coupled-mode ideas discussed by Kadanoff at the last conference, and the questionable assumptions these theories employ are at least partially aired in the articles and subsequent discussions. Fortunately we seem to be hearing fewer long tales about long-time tails! The first section benefits from the fact that Robert Griffiths writes clearly and simply, and Joel Lebowitz is never dull. The latter's contribution on "Hamiltonian flows and rigorous results in non-equilibrium statistical mechanics" is especially informative. There is also an article on aspects of the microscopic theory of liquid helium by Eugene Feenberg, who has been a leader in this area for many years.

It has been clear for a long time that serious study at a fundamental level of steady states far from equilibrium (metastability, activation energies, and so forth) is highly desirable and long overdue. The present volume contains at least two articles addressed to these problems—Kraichnan's and one by Rolf Landauer and James Woo—but much remains to be clarified. Future conferences should deal more extensively with these questions and the objections that were confined to discussion periods here.

This book suffers from many omissions and includes many contributions better left unmentioned, but it retains redeeming scientific value. It is to be hoped that the worthy aims and innovations will be extended at future conference sessions.

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