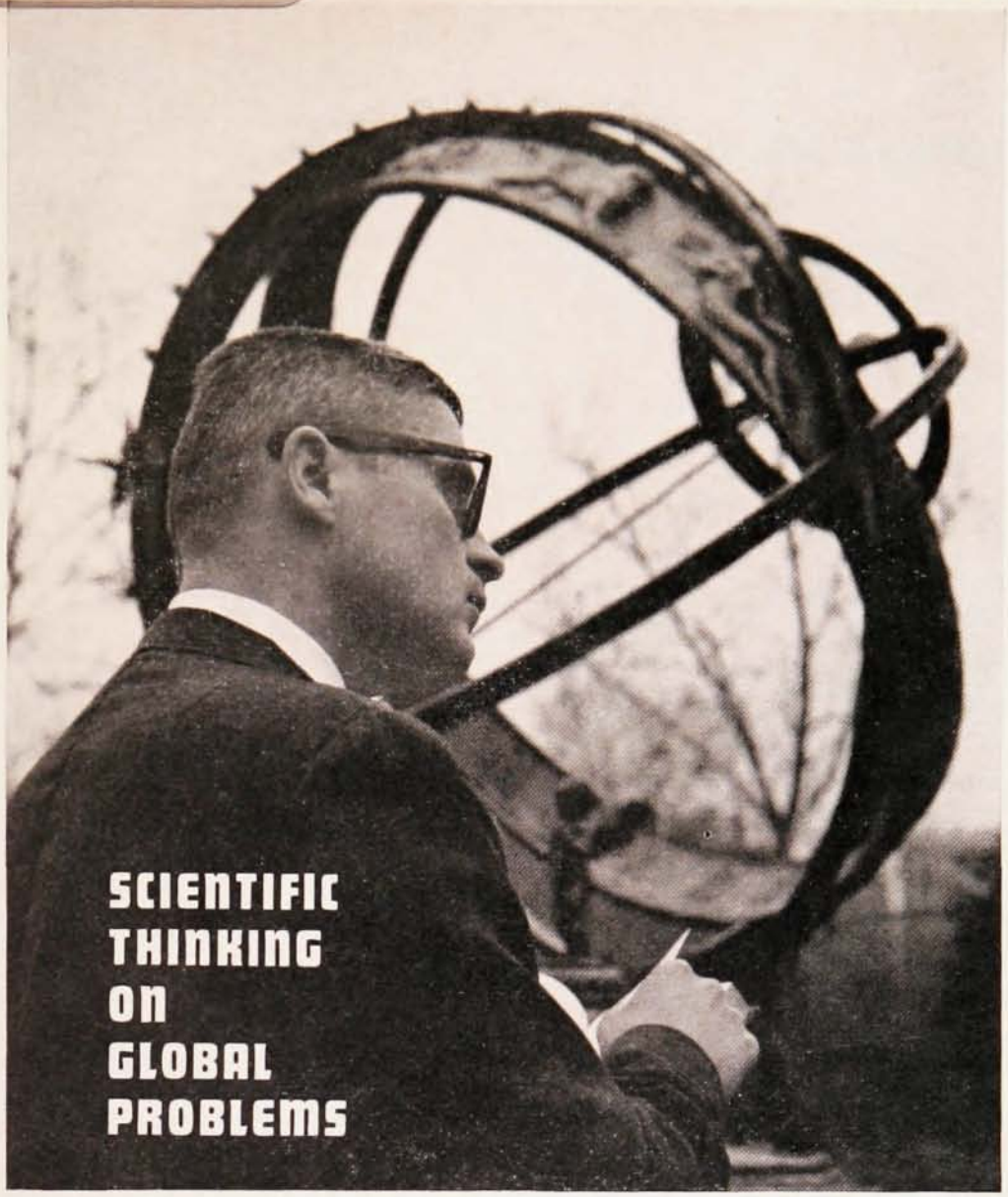
references. A good reference book should provide an abundant opportunity for the inquiring reader to be directed to the subject of interest and to related subjects. The reference to the literature in this book is very inadequately done and does not help the student in going deeper into many of the subjects introduced by the book where further elaboration might be most useful.

Despite the lack of treatment of several topics of great interest to the modern experimental physicist, this book should find a useful place in the reference library of physics laboratories.

The Theory of Crystal Structure Analysis. By A. I. Kitaigorodskii. Transl. from Russian by David and Katherine Harker. 275 pp. Consultants Bureau Enterprises, Inc., New York, 1961. $12.50. *Reviewed by Leland C. Allen, Princeton University.*

EVERY physicist has at least an elementary understanding of the physical principles underlying the use of x-ray diffraction methods to determine the atomic geometry of crystals, and almost every one has heard of the famous "phase problem" concerning the coefficients in a Fourier series expansion of the crystal charge density. Yet, because of the classical and straightforward physics involved in x-ray diffraction, very few physicists, outside of those actively engaged in the field, have any idea of the techniques actually used in the structure determination of a moderately complicated crystal. Since about 1950, a revolution in methods has taken place and two pathways to the unraveling of crystal structures have been evolved. The first is the reciprocal-space or phase-determination pathway and this has been concerned with the development of statistical and probabilistic relationships between the Fourier-expansion coefficients. This is the primary research interest of Prof. A. I. Kitaigorodskii and the central part of the book under review is devoted to a generalization and review of the work of Kitaigorodskii and others on these techniques. (The heavy-atom scheme which has proved so successful in a variety of biologically interesting systems is a quite limited and specialized case in which heavy atoms of known position dominate the phases, and so this scheme is not the principal concern of a book devoted to the theory of general decomposition methods.) The second is the direct space or Patterson map deconvolution route. The methods employed are the image-seeking and superposition techniques and with these there is no "phase problem." Although these latter methods are used by the majority of crystallographic laboratories they receive little attention in the book and the reader interested in them should refer to the standard texts by Buerger or Lipson.

Perhaps the most unique and valuable feature of the book is a brief (18 pages) mathematical introduction. This chapter presents in an especially clear, concise, and general manner all of the transforms which interrelate the measured and theoretical quanti-



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ties of interest to x-ray crystallography. A second chapter gives a good survey of physical principles including a discussion of finite lattices and a comparison of x-ray, electron, and neutron-diffraction methods. The translation has been handled competently by a specialist in the field.

The theory required for the analysis of complex crystal structures involves sophisticated techniques closely related to those of modern communication theory and signal analysis. It is currently undergoing rapid development and deserves the attention of more physicists.

Interfacial Phenomena. By J. T. Davies and E. K. Rideal. 474 pp. Academic Press Inc., New York, 1961. $14.00. *Reviewed by Stuart A. Rice, University of Chicago.*

THIS book deals solely with the properties of liquid interfaces. The coverage is wide and the treatment throughout is elementary and requires scarcely more background than a first course in physical chemistry. A considerable amount of experimental information is incorporated into the text, and the authors have attempted to test theory and correlate experiment when possible.

The principal shortcoming of this book is the almost complete omission of any detailed theoretical discussion. We cite, as examples, the following three important topics which should have been included: Koenig's theory of the electro-capillary curve (1934) is never mentioned; the statistical theories of Kirkwood and Buff (1950) and others are cited only in passing and never discussed; the simple lattice theories, which do not require elaborate mathematical treatment, are also omitted; and the recent thermodynamic treatments of properties in regions of variable density (Kahn, Hilliard, Hart, 1959) are also never mentioned, even though these have proved to be of great value in discussing nucleation and other surface-determined phenomena.

To sum up, this book is a useful compilation and introduction to the study of liquid surfaces but the lack of basic theory severely restricts its utility as a general reference.

Fluid Mechanics. By Richard H. F. Pao. 502 pp. John Wiley & Sons, Inc., New York, 1961. $7.50. *Reviewed by Allen I. Ormsbee, University of Illinois.*

AS stated in the Preface, this volume has been written as a text for a junior level course in general fluid mechanics for engineering students.

In an area already well populated with good texts (e.g., Binder, Vennard, etc.) this is yet another. The book is well written, at about the right level of difficulty for its intended user, and the content is fairly broad and up to date. The illustrations are excellent. The order of presentation is standard: The first six chapters, covering statics, kinematics, dynamics, vis-