After introductory chapters on elementary crystallography and crystal optics there follows a comprehensive account of the polarizing microscope and its use with both orthoscopic and conoscopic observation. Three later chapters describe the stereographic projection, the preparation and handling of specimens, and practical examples. Appendices follow that list a selected bibliography, tables and collections of optical crystallographic data, and sources of materials mentioned in the text.

The treatment of the optical chapters generally follows the authors' earlier work *Crystals and the Polarizing Microscope* and fully maintains their reputation for clarity. The long chapter on the microscope contains an admirable section on correct illumination and its variation to meet differing needs, a topic of prime importance, sadly overlooked by students, and by writers of optical textbooks in the past. The later chapters contain much valuable advice and give a clear account of the operation of a simple stage goniometer for changing the orientation of a crystal. This section describes and illustrates the universal stage but does not say how to use it, an omission which is the more surprising in view of the inclusion of a whole chapter on the stereographic projection whose relevance otherwise is not immediately obvious. The least satisfactory section is the opening chapter which requires to be greatly supplemented if it is to provide a really adequate crystallographic foundation for the optics that follow.

The book retains the good qualities of its predecessor in its clear exposition of elementary optics and at a price that makes it attractive as an undergraduate textbook. To this extent it is undoubtedly a success but one is left with the feeling that with the same approach its appeal could be greatly increased by a drastic shortening of the less relevant sections and such further development of the practical aspects of the later chapters as would leave its total size and price unchanged.

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Statistics in physical science. Estimation, hypothesis testing and least squares. By Walter Clark Hamilton. Pp. [xii]+230. New York: The Ronald Press Company, 1964. Price $10.00.

This comparatively short book treats a wide range of subjects. The first chapter, which occupies about a quarter of the total volume, is devoted to basic concepts and mathematical preliminaries. The second chapter is concerned with estimation of a single variable, including goodness-of-fit tests. Further chapters deal with analysis of variance in a thorough fashion, with the method of least squares and tests of linear hypotheses, and miscellaneous topics. Each chapter ends with exercises for the reader. The book ends with sixteen pages of tables, a bibliography, and a subject index. A bibliography cannot contain everything, but I missed my own favourite reference book, Cramér's *Mathematical Methods of Statistics.*

An unusual feature of the book is the space devoted to crystallographic problems, in which the author became interested while working with Dr Verner Schomaker. The longest crystallographic section is a discussion of significance of the value of the agreement factor R, a matter not often mentioned in papers on structure determination. A seven-page table has been compiled by the author for use in such tests. There is, however, nothing on statistical methods for the determination of symmetry and structure (other than least-squares refinement).

A crystallographer seeking to increase his knowledge of statistical methods in general will find this book a good introduction because of the many examples drawn from his own field. There is rather extensive use of matrix methods, which some may find a disadvantage.

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Applications of neutron diffraction in chemistry. By G. E. Bacon. The international encyclopedia of physical chemistry and chemical physics. Topic 11, Vol. 1. 141 pp. Oxford, London, New York, Paris: Pergamon Press, 1963. Price 42*s*.

Most crystallographers will by now be familiar with the ambitious project launched by Pergamon Press which envisages a hundred volumes devoted to 'a comprehensive and modern account of all aspects of the domain of science between chemistry and physics'. The present volume is the first devoted to topic 11, *The ideal crystalline state*. None of the volumes will be encyclopedic in the sense that the contents in them are arranged alphabetically; merely that the individual volumes of the project as a whole will be classified systematically.

Professor Bacon's book is somewhat shorter than the 200 pages which most of the volumes are expected to be. It is divided into eight chapters: principles and methods, hydrogen bonds in inorganic compounds, organic compounds, heavy-element compounds of carbon, nitrogen and oxygen, metal hydrides and ammonium compounds, compounds which include neighbouring elements, magnetic materials, liquids and gases. The author strikes a good balance throughout. He gives just sufficient background material to make the principles clear and his treatment of individual crystal structure is, on the whole, excellent. (The reader has to have a substantial grounding in the jargon of X-ray analysis. He is expected to know an F_o when he sees one. In this respect it is rather surprising to find Bragg's *The Crystalline State,* 1949, recommended as background reading rather than, say, Bunn's *Chemical Crystallography,* 2nd ed., 1961.)

The book is good and so eminently readable one hesitates to suggest improvements. On occasion, however, one feels the author might with advantage have used more of his ration of 200 pages to expand some of the topics he tackles. One gets this feeling on the very first page. Here the author illustrates diffraction by means of a one-dimensional simple-harmonic grating. Not only does this, as it stands, imply regions of negative scattering amplitude for light but it is a highly special case in which only the first order of diffraction is observed (correctly noted, but unexplained by the author). Similarly a sentence or two would have clarified why, in the projections of KH_2PO_4 (pp. 25, 26), the applied electric field appears to cause the hydrogen atoms to move in such differing directions. It is only later (page 28) that we realize that we are looking along the applied field. A portion of the periodic table might have