sitions of the stars on the celestial sphere have been studied for more than two millenia, it is surprising that this book was not written earlier. It is all the more welcome now that it has appeared.

First, the subject of spherical astronomy is introduced by a survey of the most frequently used relations of spherical trigonometry. There follows a brief description of celestial coördinate systems, definitions and formulas of astrometry, and an elementary treatment of the effects of atmospheric refraction. Precession, stellar parallax, aberration, solar motion and galactic rotation are discussed.

The second part of the book is concerned with the relation between plane and spherical astrometry and the techniques involved. Van De Kamp deals with determination of stellar parallaxes, plane reduction of stellar paths and spherical reduction of the positions of nearer bodies including planets, comets, asteroids and satellites. Orbital analysis of visual binaries, including the multiple-exposure technique, is the next subject. From this analysis one may deduce the mass ratio of double-star components and the individual masses if the total mass of the binary is known.

The observation of perturbations in the paths of what appear to be single stars often indicates presence of unseen companions. Particularly interesting are those cases in which the mass of the companion is low enough to be considered of planetary size. The second section is concluded by a survey of the application of the long-focus technique to star fields, clusters and widely separated binaries.

The final section of the book consists of one chapter on the general theory of errors and another on the method of least squares.

The book is meant as an intermediate-level text; a knowledge of elementary astronomy, solid geometry, trigonometry and calculus is expected of the reader. It is concerned with the mathematics of astrometry rather than with the mechanical tools of the trade, thus filling a serious gap in the literature.

Van de Kamp has written a fine text for a course on astrometry that may also be used as supplementary reading for other courses such as those on multiple stars, galactic structure and so forth. It is too succinct, perhaps, to be easily used for independent study; for such study I would have preferred another hundred pages or so for more detailed explanation of the concepts involved (the mathematics is very adequately detailed).

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Physical acoustics and the solid state

PHYSICAL ACOUSTICS, VOL. 3/A: THE EFFECT OF IMPERFECTIONS. Warren P. Mason, ed. 512 pp. Academic Press, New York, 1966. $18.50

PHYSICAL ACOUSTICS, VOL. 3/B: LATTICE DYNAMICS. Warren P. Mason, ed. 336 pp. Academic Press, New York, 1965. $12.00

by Walter G. Mayer

Twenty-one experts have contributed to the two parts of volume 3 of Warren P. Mason's treatise on physical acoustics. While volume 2 was concerned with the motion of atoms and molecules in fluids, these books discuss aspects of mechanical behavior that are to be expected in solids. Part A deals primarily with relaxation phenomena and effects of imperfections; part B is concerned with the relation of acoustic waves and the dynamics of the lattice.

The first two chapters of part A describe the use of internal friction peaks in the study of point defects. The other sections give thorough and extensive discussions of dislocations and their interaction with mechanical waves. Various theoretical and experimental considerations are presented that describe in great detail the important properties of defects including plastic deformation, fatigue parameters and diffusion of defects.

Part B is to some extent a continuation of part A, with main emphasis on special topics of lattice dynamics. With the exception of one section on elastic waves in the earth, the chap-

ters deal with selected topics of solid-state physics. A reëvaluation of the Debye temperature is followed by an article on elastic constants of isotropic and anisotropic solids and relations between them. Two chapters on ultrasonic attenuation as influenced by phonon and thermal processes, as well as by impurities, are preceded by articles on the rather special topics of the effect of light on alkalide halide crystals and on magnetoelastic interactions in ferromagnetic insulators.

Since the articles seem to aim for an in-depth discussion rather than for a broad exposé of the entire field, the reader should not expect to find a great deal of continuity from one chapter to the next. However the individual sections treat the subject matter extensively and thoroughly.

It would indeed be a mistake to assume that the present volumes were written exclusively for acousticians. Anyone concerned with solid-state physics or strength of materials should find many pieces of interesting information about his own field. One of the successful features of the books is the inclusion of a sufficient amount of introductory discussions, in addition to a host of new material, so that a rather uninitiated reader should not find it too difficult to understand the subject matter. Readers working in physical acoustics will find the books extremely valuable.

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Biography collection

THE GOLDEN AGE OF SCIENCE: THIRTY PORTRAITS OF THE GIANTS OF 19TH-CENTURY SCIENCE. Bessie Zaban Jones, ed. 659 pp. Simon and Schuster, New York, 1966. $12.00

by Robert L. Weber

From 1858 to 1931 the Smithsonian Institution published in its Annual Reports more than a hundred biographies of great scientists written by contemporary scientists. Many of the memoirs were translated from the *Éloges* of the French Academy of Sciences. Other memoirs came from the