sequences, limits, continuous functions, differentiability, and integrability. All of this is carried through on a highly abstract plane; however, examples are legion, and through them much of the formal abstraction becomes meaningful. The reader will gain understanding of the concepts of *relation* and *function*, but he will have difficulty with *operation*. This latter term is treated informally, but the reader is left to infer a precise definition. Hartnett has personalized his book not only by a "conversational" approach, which is good when not overdone, but also by a concocted language. For example, he uses "splitting relation" and "external product" for the more usual *equivalence relation* and *scalar product*, respectively; the usual terminology is not mentioned. When two definitions are given for the same concept, their relationship should be shown (see definitions 9.1.3 and 9.3.3). The practice of stating definitions in problems is questionable; this is done for "ideal in a ring," and the concept is used later in textual material.

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Theoretical Interpretations

Solids Under Pressure. William Paul and Douglas M. Warschauer, Eds. McGraw-Hill, New York, 1963. xviii + 478 pp. Illus. $15.

This book, a collection of 13 articles written by different authors, describes the use of high pressures for studying solids. The major topics covered are the influence of high pressures on the electrical, magnetic, optical, and mechanical properties, on kinetic processes, and on phase equilibria. Some of the more descriptive chapter titles are: "Pressure as a parameter in solid-state physics," "Effect of high pressure on diffusion," "Continuum models of the effect of pressure on activated processes," "The equation of state of solids at low temperature," "Some geophysical applications of high-pressure research," "The role of pressure in semiconductor research," "Magnetic resonance in solids under high pressure," and "Magnetic properties of solids under pressure." Major emphasis is on the theoretical interpretation of the effect with respect to properties rather than on experimental techniques for maintaining high pressures. Experimental techniques used to measure the properties in question are discussed, and the excellent, indexed bibliography provides references to general techniques for high pressure experimental research.

Contributors to this well-edited volume were carefully selected. When several authors contribute to a book, there are often problems in achieving continuity and avoiding repetition. In this volume, no attempt was made to achieve continuity; each article is an independent discussion of a particular topic. Although repetition has been kept reasonably low, two chapters deal extensively with phase transformations in metallic solids, but none is devoted exclusively to those of nonmetallic solids. Since a great deal of the recent interest in high pressure physics resulted from the influence of high pressures on the phase transformations in nonmetallic solids, this subject seems to merit a chapter devoted to its treatment.

Although the book probably will not appeal to the average scientist as a source for general information (its high price and compartmentalized treatment will prevent this), it is an extremely valuable reference for those working in these areas of research. It also provides a valuable link between the solid state theorist and the high pressure experimentalist. This book is indeed a fitting memorial to Percy W. Bridgman.

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Geometry

Projective and Euclidean Geometry. W. T. Fishback. Wiley, New York, 1962. x + 244 pp. Illus. $7.50.

The author intends this book to serve a dual purpose: chapters 4 to 10 are intended for use as an introductory textbook in a one-semester course on projective geometry, and chapters 1 to 6, 10, and 11, for use in a one-semester course on the foundations of geometry. After reviewing the deficiencies of Euclid's axioms for elementary geometry and introducing Hilbert's axioms, Fishback initiates a heuristic discussion of the projective plane and of three-space, which he defines by adjunction of ideal elements. A synthetic development based on Desargues' triangle theorem is the theme of chapter 5; homogeneous coordinates derived from rectangular Cartesian coordinates are considered in chapter 6. A short treatment of vectors and matrices precedes the three longest chapters of the book: "Fundamentals of analytic projective geometry" (chapter 8), "Conics" (chapter 9), and "Axiomatic projective geometry" (chapter 10). The final chapter contains a minimal development of affine geometry and a brief mention of several other related geometries. Lastly, a ten-page appendix treats permutations, determinants, and linear equations.

The book is designed for students who have little preparation beyond the rudiments of analytic geometry. Thus, for example, three pages of chapter 6 are concerned with the determination of the solution set of two independent homogeneous linear equations in three unknowns, and chapter 5 contains a more general discussion of function and relation concepts than is usually provided at elementary levels. On several occasions a theoretical development is undertaken only subsequent to a presentation of the basic content in a numerical situation. It is apparent that the author has constantly kept in mind the needs of the student, and he has produced a book which the beginning student should find entirely readable.

The axiomatic development of chapter 10, with its major emphasis on projective planes over arbitrary fields and over ordered fields, is the high point of the book. Postulating the Desargues and Pappus properties in addition to the usual existence and incidence axioms, the author develops the field properties of the projective line, coordinatizes the plane, and proves that lines have linear equations. Fano's axiom on the existence of an infinite net of rationality and Vailati's separation axioms are used to create ordered planes, and the author states, without proof, that an Archimedan axiom and a completeness axiom suffice for the real plane. Thus, the author has made available to the beginning student important material that previously has been largely inaccessible to him.

This book should prove to be very useful not only to the high school teacher but also to any student who wishes his first glimpse of projective geometry to be in its historical perspective as a generalization of Euclidean geometry.

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