than high school mathematics, as well as for the more advanced mathematician." It is claimed that the book "can be read once lightly for enjoyment, and a second time more seriously as an exciting mental stimulant." I did read the book once lightly for enjoyment and found it an entertaining excursion. Beginning with about page 60, I began to find things I had not known before.

There are spots which could be improved. On page 22 the authors seem to confuse a statement with its converse. In dealing with certain arithmetic progressions they lapse into the teaching role and prove results by mathematical induction which could be much more easily obtained by other means. The "monkey and the coconuts" problem can be solved with less algebra. On page 80, line 2, a multiplication sign appears instead of an addition sign. But these are minor flaws.

The important fact is that this book could be understood and read with enjoyment by the high school student having some acquaintance with algebra. The "amateur mathematician" would be fascinated by it (as a matter of fact, I know one to whom I want to lend my copy). Also there is at times the turn of phrase, the fresh approach, the new relationship which gives the mathematician pleasure even when the facts are not new. The book does not claim to be all things to all people but it is many things to many.

BURTON W. JONES
Department of Mathematics, University of Colorado, Boulder

Metallurgy

Alloy Phase Equilibria. A. PRINCE. Elsevier, New York, 1966. 305 pp., illus. $30.

This is an extremely well-done book. Although it is written for metallurgists, we would recommend it also to other scientists and engineers in related fields. The author's style is very readable, and the book is well illustrated.

The first two chapters outline in an unusually lucid manner almost all the most essential thermodynamic principles used in phase equilibrium and phase transformation. The author then applies those principles extensively to the construction and interpretation of phase diagrams. Many derivations of the phase diagrams from free energy curves are given. Colored space diagrams greatly help the reader to visualize ternary and other multicomponent phase diagrams.

Chapter 14 introduces the essential part of L. S. Palatnik and A. I. Landau's recent work on application of topo-analytical methods to the study of phase diagrams. This may stimulate the reader to read Palatnik and Landau's *Phase Equilibria in Multicomponent Systems* (J. Joffe, Transl. Holt, Rinehart and Winston, 1964).

The book deals only with metal systems. If the author had included discussions of some of the phase diagrams in *Phase Diagrams for Ceramists* by E. M. Levin, C. R. Robbins, and H. F. McMurdie (American Ceramic Society, 1964), it would have had even more value to nonmetallurgists.

The book discusses binary and ternary systems quite thoroughly. The higher-component systems are discussed selectively. No exercise problems are given. A discussion of recent research work on spinoidal decomposition would have improved the book.

Although its price is high, this excellent book could be used as a textbook for senior and graduate students of material science, or by professional scientists and engineers.

H. C. YEH
A. M. ALPER
Technical Staffs Division, Corning Glass Works, Corning, New York

Light, Reactions, and Techniques

Photochemistry. JACK G. CALVERT and JAMES N. PITTS, JR. Wiley, New York, 1966. 917 pp., illus. $19.50.

During the last 15 years photochemistry has grown explosively and has also become highly diversified and compartmentalized. Photochemists who study the reactions of simple molecules using vacuum ultraviolet light have few interests in common with those who investigate the reactions of polyatomic molecules produced by visible or near ultraviolet light. Neither group has much enthusiasm for the work of organic chemists who use photochemical techniques as a method of organic synthesis. The author of a work on photochemistry must decide whom he wishes to address. He must also decide whether his book is to be a text for beginners, an introductory monograph for physical or for organic chemists, an advanced monograph for specialists, or an encyclopedia of published results.

The present volume appears to be the result of an attempt to embrace most of these diverse and partially incompatible aims. The book includes, in chapter 1, an introduction to the "wave and particle properties of light"; in chapters 2 and 3, discussions of the spectroscopic properties of atoms and diatomic molecules; and in chapter 6, outlines of the collision and transition-state theories of reaction rates. This material is clearly and well written, but is all readily available in standard textbooks. It occupies 180 pages—nearly a quarter of the entire volume.

Chapter 4, entitled "The primary photophysical processes of polyatomic molecules," contains an excellent account of that rapidly developing subject. Much of this information has not previously been brought together in any one place.

More than 100 pages of chapter 5 are devoted to an encyclopedic listing of published studies of decompositions of aldehydes, ketones, esters, amines, and other compounds. For many of these reactions, the mechanisms postulated by the original authors are briefly stated. Usually, no convincing evidence is cited in support of them, but they are followed by statements such as "most investigators agree," "by analogy with," or occasionally by "again it is difficult to differentiate between. . . ." The chapter is followed by a list of 759 references.

In chapter 6 it is correctly stated that detailed, systematic measurements of the quantum yield as a function of the concentrations, temperature, wavelength, and intensity are essential for the determination of reaction mechanisms. Unfortunately, the order of presentation and the amount of space devoted to the several topics is likely to leave the young-man-in-a-hurry with his opinion unchanged that analogy, prejudice, and one critical experiment are enough to "prove" any mechanism.

The chapter on experimental methods should be required reading for all beginners in the field. It contains some new unpublished material which is of value to the expert as well as the neophyte.