The reviewer does not know the extent of trivial errors in the book, but a brief random search revealed the following: the date "1935" instead of "1939" (p. vii); "methane yields" instead of "methanol yields" and "$O_3$" instead of "$O_2$" (p. 415); and "$C_{14}H_{66}$" instead of "$C_{34}H_{66}$" and "substance" instead of "substances" (Table 12, p. 581).

The author index appears incomplete, but mathematical equations seem to be reproduced faithfully and well, and the arrangement and typography are excellent. A conversion table from c.g.s. to f.p.s. has been added by the translator.

Apparently, in his zeal to couple Jost's book to the much-publicized and fetching term, "jet propulsion," the publisher has misstated on the cover page that the book is "A translation of the classic German work on jet propulsion." This, Jost's book is not—the term "jet propulsion" does not even appear.

Despite the above, this translation should fill a needed gap for those who, for one reason or another, have been deprived of reading Jost's book in the German.

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***Basic mathematics for technical courses.*** Clarence E. Tuites. New York: Prentice-Hall, 1946. Pp. xiv + 309. $5.00.

This book covers the material usually treated in trigonometry and precollege algebra courses. The approach is standard but is in some respects better suited to the needs of the technical man than most existing texts. The author is to be commended on the representative choice of problems from all fields of engineering, the inclusion of Kirchhoff's laws in his discussion of linear equations, as well as the use of $j$ for $\sqrt{-1}$ instead of $i$, so easily confused with electric current. On the other hand, the viewpoint is not rigorous. The author tends to talk around his subject instead of saying exactly what he means. By the addition of four or five pages the presentation could be made mathematically correct without detracting from the clarity of the subject.

Needless to say, the average elementary textbook on mathematics is in some respects a hundred years behind the times, each author copying over the errors of the preceding. Thus, Tuites introduces the "axioms" of equality as "self-evident truths," a notion long outmoded but still persisting in the textbook literature. The treatment of number is incomplete, although more of the logic is included than in many comparable works.

It is assumed here that the reader is familiar with the operations of multiplication, division, addition, and subtraction. Many excellent short cuts for performing these operations in special cases are given, such as adjoining two zeros and dividing by 4 instead of multiplying by 25. Although these short cuts are in common use, they are seldom listed for the student. Significant figures, the checking of computations, and other arithmetical topics are brilliantly explained.

The book begins with a discussion of the slide rule, so that if the reader does not reach the chapter on logarithms, he will at least know about this application. From arithmetic the reader is led to polynomials, radicals, and imaginary numbers. The latter are explained geometrically through rotations, a popular viewpoint. With this background the reader is introduced to the solution of algebraic equations. Since this subject is not carried very far, the extremely useful process of synthetic division is not attained. The book closes with some chapters on plane trigonometry which leave little to be desired. Five-place tables of logarithms and trigonometric functions are given at the end.

Written by an instructor at the Rochester Institute of Technology, this book was intended for industrial and extension schools, as well as for technical institutes and junior colleges. The book is particularly well suited to the man who has forgotten his algebra and trigonometry or who has never studied these subjects and wishes a clear, elementary, and practical presentation. Except for questions of rigor, which would normally not bother the average reader, this work is admirably adapted to the purpose for which it was written.

RUFUS OLDENBURGER

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***Physical chemistry.*** H. Hunt. New York: Thomas Y. Crowell, 1947. Pp. x + 610. (Illustrated.) $4.75.

In the preface to this text, the author states, in part: "Since one cannot be sure what the future chemist will need to know, all the fundamental topics of physical chemistry are presented with proper regard to their relative importance." It would be difficult indeed to find a topic of interest to physical chemistry which is not at least mentioned. Many topics are given a more thorough and precise treatment than is customary in the usual text for beginners in physical chemistry. Among these topics are: kinetic properties of gases, crystal structure of solids, atomic spectra and structure, chemical kinetics, and theory of electrolytic solutions. The large number of tables of data, the many illustrations, and numerous problems add much to the value of the book.

Specific objections can be made to details of treatment of some of these topics, but in general a fairly successful compromise is made between a completely rigorous and a descriptive treatment. The compromise would be much more successful if a more orderly presentation had been made. It was the announced plan of the author to make each chapter as nearly as possible an independent unit. As a result of this plan, concepts are frequently introduced which are not explained until several paragraphs or even chapters later. This requires considerable search on the part of the student and instructor to find the necessary background for a given deduction. This search might in itself be a good thing in the case of a large reference work, but in this text it leads to excessive repetition of concepts and equations. Preferably, the material of a text should be presented in a unified, logical order. The extent to which a given topic is to be pursued could be left to the instructor, as it must be in any case.

The treatment of elementary principles of thermodynamics is confusing and is the part of the text most open to criticism. Many formulas which are true only for the ideal gas are given without this qualification. The inexperienced student will no doubt believe that the relations have general validity. An example of this can be seen on page 90, especially the latter part of equation (3–2), and several unnumbered relations near by. Several equations in this section are in error or are misprinted. The statement of the second law as $\Delta F = \Delta H - T\Delta S$ (p. 98) may not be helpful to the student, since the entropy, aside from a complicated "definition" on page 93, is not discussed and explained until page 112. The function $F$ is

defined and extensively used, but the essential reason for its introduction is nowhere clearly stated, or could not be found by this reviewer. An orderly treatment of thermodynamic principles might well have formed the first chapter, since an extensive discussion of fugacity is given in the present first chapter.

This text may prove stimulating to small classes of special students under the direction of experienced instructors. In the case of large, heterogeneous classes, as are usually found today it will be of considerably less value.

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***The electronic theory of acids and bases.*** W. F. Luder and Saverio Zuffanti. New York: John Wiley; London: Chapman & Hall, 1946. Pp. ix + 165. (Illustrated.) $3.00.

This little book, dedicated to G. N. Lewis and read in manuscript form by him before his death, has as its principal thesis the propagation of Lewis' electronic theory of acids and bases. In reading the book one has the feeling that here are two ardent disciples of Lewis who are attempting enthusiastically to spread the true gospel. The 13 chapters are entitled: "Historical Background," "Atomic Orbitals and Valence," "The Electronic Theory of Acids and Bases," "Electrophilic and Electrodotic Reagents," "Acidic and Basic Radicals," "Neutralization," "Titration With Indicators," "Displacement," "Catalysis," "Acid Catalysis," "Base Catalysis," "Alkoxides as Catalysts," and "Conclusion."

By way of illustrating the points they wish to make, the authors have collected together and organized in a readable fashion a large amount of interesting and instructive data. Every chemist could benefit by reading this book because of its many suggestive and provocative postulates and theories. However, unless one reads critically, he may conclude that the electronic theory of acids and bases constitutes the whole and complete story of the phenomena considered. To test the accuracy of the theories and data presented, the reviewer made a detailed study of the authors' description of one base-catalyzed reaction, the aldol condensation of acetaldehyde (p. 138) (this being picked more or less at random from the large number in the book). Here we are told that the catalysts used are bases such as acetates, carbonates, pyridine, and amines, and the reference given is to a paper by the noted Oxford physical chemist, R. P. Bell. In that paper, however, Bell states specifically that the aldol condensation of acetaldehyde is catalyzed only by the hydroxide ion, and that acetate ions cannot catalyze the reaction by themselves but only to the extent that hydroxide ions are produced by hydrolysis. Luder and Zuffanti give no hint that any other mechanism of aldol condensation is possible, yet at least one other slightly different mechanism which fits all the facts can be imagined. Nor do they indicate that at low hydroxide-ion concentration the simple mechanism is no longer valid.

One is struck by the practically complete lack of quantitative data, graphs, and equations. No rate equations, for example, are given, despite the fact that nearly one-third of the book is devoted to the subject of catalysis. Nevertheless, read critically and with mental reservations, the book has much to contribute to the chemical thought of the day.

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***Analytic geometry and calculus.*** John F. Randolph and Mark Kac. New York: Macmillan, 1946. Pp. ix + 642. (Illustrated.) $4.75.

The authors of this text write in a vigorous, clear, and simple manner, dropping many unnecessary terms, yet pointing out many pertinent facts which are often neglected.

Although the material in the calculus is essentially traditional, the authors break new trails in handling many details. Maclaurin is not mentioned in connection with Taylor's theorem. The inverse trigonometric functions are defined as one-valued (with no reference to principal values). The sections on analytic geometry are reduced to a minimum, but are carefully and effectively handled. The device of leaving some difficult details to more extensive works and of putting much more in small print leaves a consecutive course in large print devoted chiefly to technique and to clarification of the essentials. A more than usual emphasis is placed upon discontinuities and limited domains. Many of the proofs are particularly gratifying in their rigor and simplicity. Duhamel and all his works are ignored. Gauss's rules for approximation are developed, but no section discusses significant figures or Newton's method. The figures are in most cases excellent.

The only serious criticism of items that have been included concerns the authors' random use of "f" (in isolation). This sometimes refers to the whole correspondence, sometimes to the value assumed by the dependent variable. The omissions are not easily condoned. In clearing out the rubbish, the authors have retained subnormals and subtangents, yet nothing is said concerning hyperbolic functions, simple harmonic motion, the catenary, convergence of series, angular velocity and acceleration, orthogonal curves, vectors, or such engineering notions as deflection of a beam or modulus of a spring.

Despite the many unexpectedly good features of this text, the course remains pretty thin in applied content. For most physicists and engineers, one might demand a more nourishing fare.

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***Organic reactions.*** (Vol. III.) Roger Adams. (Ed.-in-Chief.) New York: John Wiley; London: Chapman & Hall, 1946. Pp. viii + 460. (Illustrated.) $5.00.

This volume carries out the plan of the first two volumes of the series, also edited by Roger Adams with the collaboration of Werner E. Bachmann, Louis F. Fieser, John R. Johnson, and H. R. Snyder. It comprises critical discussion of 9 classes of organic reactions. As stated in the preface to the series, "The subjects are presented from the preparative viewpoint, and particular attention is given to limitations, interfering influences, effects of structure, and the selection of experimental techniques. Each chapter includes several detailed procedures illustrating the significant modifications of the method. . . . When all known examples of the reaction are not mentioned in the text, tables are given to list compounds which have been prepared by or subjected to the reaction."

The chapters of the volume are as follows: 1, "The Alkylation of Aromatic Compounds by the Friedel-Crafts Method," by Charles C. Price; 2, "The Willgerodt Reaction," Marvin