extensive bibliographies. The book contains an ample number of good illustrations and an adequate index.

In this age when scientific information multiplies so rapidly (a fact fully reflected in this book), one may justifiably ask whether the publication of a symposium of this type serves as a good method for rapid and wide communication to students and scientists. Because of the tenuous organization of the subject matter, the answer is not an unequivocal yes, but the papers are excellent and the book provides invaluable information on a number of current topics.

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Free Radicals. An introduction. A. F. Trotman-Dickenson. Methuen, London; Wiley, New York, 1959. 142 pp. $2.50.

When I reviewed Trotman-Dickenson's book *Gas Kinetics* [*Science*, **123**, 639 (1956)], I praised it because it gave "a useful summary of working equations . . . a critical review and tabular summaries of experimental results . . . a detailed description and evaluation of several recently developed experimental methods." *Gas Kinetics* is a useful monograph on a technical corner of the field of chemical reactions; the present book, *Free Radicals*, is a highly personal exposition in the broad area of physical and organic chemistry where, in either gaseous or liquid systems, one encounters free radicals. The treatment is so personal that I need to heed *"de gustibus non disputandum est,"* and any statements I make are necessarily a comparison of my tastes with those of the author.

The book consists of three short introductory chapters (24 pages) on the general aspects, history, production, and properties of free radicals; a long chapter (94 pages) on the reactions of monoradicals; a short chapter (13 pages) on biradicals; a very short list (37 references) of books and review articles; and a short subject index. A bibliography is not given, although a few names and dates and a few references are given at various points in the book.

Because it is a personal account of the broad field, this book has the same purpose and follows the same pattern as Semenov's *Some Problems in Chemical Kinetics* (translated by M. Boudart; Princeton University Press, 1958); yet the treatments differ as much as the personalities of the authors. Of the two books, Semenov's is more original. Surprisingly enough, in the list of references given in Trotman-Dickenson's book, (Chapter 6), no mention is made of Semenov's.

In *Gas Kinetics*, the exposition of theories of reaction rates was very weak. This weakness is carried over into the present book, and many specific examples could be pointed out. One example occurs in the discussion of the rate of radical recombinations (pages 38–39) where we are told ". . . the rate constants . . . approach the collision rate . . . and are two or three orders of magnitude above the value predicted by transition state theory." Using transition state theory, E. Gorin predicted the rate constant for recombination of methyl radicals to be 1.5×10^{13} cm^3/mole-sec [*J. Chem. Phys.* **7**, 643 (1939)]; the observed value is 2.2×10^{13} cm^3/mole-sec [A. Shepp, *J. Chem. Phys.* **24**, 639 (1956)]. For recombination of trifluoromethyl radicals, transition state theory predicts 1.7×10^{13}; the observed rate is 2.3×10^{13} [P. Ayscough, *J. Chem. Phys.* **24**, 944 (1956)]. Obviously Trotman-Dickenson has not taken the pains to follow the literature or to understand the methods of activated complex theory. Of course, he is not the only one who has erred in this respect. The physical chemists' education usually includes too little mathematics and theoretical physics for understanding the main current of theoretical developments. Too often chemists, frustrated because they do not understand a theory, misapply the theory and then proclaim its "failure."

The unique advantage of this book is the author's conscious attempt to unify and cover two or three fields which are usually treated separately. Who might profitably read this book? Certainly not novices in chemical kinetics (one should disregard the subtitle, "an introduction"). However, the portions based on gas phase photochemistry could profitably be read by solution kineticists; and gas phase kineticists could well review the items on the chemistry of reactions in solution. The role of this book, then, is to widen the horizon of narrow specialists in chemical reaction kinetics.

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Fallacies in Mathematics. E. A. Maxwell. Cambridge University Press, New York, 1959. 95 pp. $2.95.

Almost everyone who has studied high-school mathematics has been confronted with proofs that $0 = 1$ and that every triangle is isosceles. This book is concerned with these and many more fallacies, defined by the author as proofs which lead by guile and plausible reasoning to a wrong conclusion. Some of the fallacies are of a trivial nature; others lead to a deeper understanding of the mathematics involved. Examples of both kinds are given, but much more emphasis is placed on the nontrivial fallacies, most of which come from the domain of geometry.

Maxwell first gives a number of fallacious proofs from some discipline of mathematics such as geometry, algebra, differentiation, or integration, and asks the reader to discover the fallacious step in the argument. Then he provides a commentary on each fallacy; this may consist of a few words or a long discussion. Several of the discussions on the geometrical fallacies presuppose a sound knowledge of geometry, which an English college freshman may already have but which an American student acquires only if he takes college geometry.

The book ends with a series of howlers which are almost the opposite of fallacies; here we find solutions of problems by incorrect methods that lead to correct results. These howlers were taken from real life and provide a certain amount of amusement. However, much more enjoyment as well as enlightenment is provided by trying to detect the fallacies, or at least by reading the solutions given by the author of this lovely little work.

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The Thirteen Steps to the Atom. Charles-Noël Martin. Franklin Watts, New York 1959 (translation of *Horizons de France*, 1958). 256 pp. Illus. + plates. $4.95.

The thirteen steps of the title are the thirteen successive divisions by ten from 1 centimeter to 1^{-13} centimeter. The best part of the book is a collection of 118 superb photographs of such small objects as snowflakes, through such very