
BOOK REVIEWS

Kinetic Theory of Gases, By R. D. PRESENT, Professor of Physics, University of Tennessee. McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York 36, N. Y. 1958. xiv + 280 pp. 16 × 23.5 cm. Price, \$7.75.

The text purports "to provide an introduction to the kinetic theory of gases for students of physics which will also be useful to students of chemistry and engineering sciences. The book is an outgrowth of a lecture course for advanced undergraduates and beginning graduate students. The author feels that a brief course in kinetic theory at this level furnishes important physical concepts and elementary mathematical techniques which should early enter into the training of a physicist."

Summarizing further the gist of the author's ideas, the book is intended to supplement the early courses in physics, which, in his belief, dealt mainly with phenomenology and were based primarily on macroscopic world experience and in his own words, by a non-phenomenological introducing of the student to a hypothetical speculative approach to complex phenomena.

As indicated above, the book in principle represents a quite rigorous and theoretical mathematical approach to the subject based on what might be called axioms and postulates leading to an exceedingly compact, well-ordered, systematic, rather complete organization of the subject matter of kinetic theory. Starting with certain basic hypotheses, definitions and mathematical techniques, it covers in a sequential and progressive fashion, the Distribution Function and Perfect Gas Law, Mean Free Path Methods and Transport Phenomena, Diffusion and the Maxwell-Boltzmann Distribution Law, all on a relatively simplified level. From there on, the subjects of Imperfect Gases and Intermolecular Forces, Thermal Diffusion, Collision Dynamics, Cross Sections, Mutual Diffusion, Chemical Kinetics, Brownian Motions and Density Fluctuations, Introduction to Advance Transport Theory and Intermolecular Forces are treated with increasing complexity of approach.

The text is exceptionally well and clearly written and the mathematical portions are clear, concise, and presented in a fashion easily read. The rather unorthodox approaches and arrangement of subject matter in which the subjects are separately treated in successive chapters at differing levels of difficulty and sophistication and the inclusion of only the essential description and phenomenological data permit a very useful, easily followed, and complete coverage of the theory in a bare 270 pages for a reader with proper background.

There is indeed in this age, need for just such a book as Present has written. It will, at its level, easily supersede any current texts and will be invaluable in the library of all those who must have access to and use the valuable methods of analysis. One of its most valuable features is that it is written in such fashion that one can read any one section without recourse to reading all that precedes.

On the other hand, the book is entirely too sophisticated as a text for senior undergraduates as well as about half of the run of the first year graduate students, contrary to the implications of the Preface. This reviewer, on the basis of his experience in examining large numbers of graduate students of nationwide scope drawn to his institution, disagrees with the author's postulate that at present, the preceding undergraduate study has been entirely on the experimental and phenomenological level. In fact, owing to the rapid growth and extent of material to be covered in a limited time in undergraduate courses as well as increased printing costs, the recent trend in texts and in the teaching of physics has been more and more toward the dogmatic and axiomatically based inductive approach to a subject. This omits from the students' training the very important lessons concerning the significance of the newer physics as derived by an operational physical approach and is depriving our students of the basic feeling for physics and the way in which progress is made. Such a trend of modern teaching in this reviewer's experience is much more in the direction of producing high grade technicians and engineers

who apply relations rather than training them to extend knowledge as basic research physicists.

Thus the text under review extends this type of instruction rather than supplementing a more phenomenological approach. With the text's very meagre chapter on experimental techniques, its only passing reference to the establishment by experimental findings, and with too few illustrative line drawings for those with visual type memories, this excellent text should be preceded in the upper division undergraduate instruction by a thoroughly good senior course in heat, kinetic theory and thermodynamics developed on an operational basis, including classical, simpler and more conventional derivations than those which are so elegantly but axiomatically deduced in the book under review.

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Gas Chromatography. A Symposium held under the Auspices of the Analysis Instrumentation Division of the Instrument Society of America, August, 1957. Edited by VINCENT J. COATES, The Perkin-Elmer Corporation, Norwalk, Conn., HENRY J. NOEBELS, Beckman Instruments, Inc., Fullerton, Calif., and IRVING S. FAGERSON, University of Massachusetts, Amherst, Mass. Academic Press, Inc., 111 Fifth Avenue, New York 3, N. Y. 1958. xii + 323 pp. 16 × 23.5 cm. Price, \$10.00.

Not the least important result of bringing together a group of scientists working in a field is the adoption of a common language. Among those active in research in the relatively new field of gas chromatography, there remain some disagreements as to fundamental definitions and the most satisfactory forms of data presentation, but progress toward consistency is being made.

This collection of twenty-eight papers offers a variety of subjects. Of a theoretical nature are sections on GLPC with coated capillaries, elution processes in the linear approximation, aspects of continuous GC systems, and selection and operation of thermistors for katharometers. General papers discuss the relationship between elution area and concentration of a component, the effect of particle size of the solid support on column behavior, column efficiency and resolving power for several systems, and column performance as a function of the ratio of partition liquid to inert support. C. Phillips presents an interesting preview of new methods and applications. Several apparatus developments are reported: high temperature units, an inexpensive integrator, the copper oxide combustor, a micro-sampling device for liquids, and an apparatus for preparative scale separations. Sections on experimental application include analysis of light hydrocarbons (three papers), chlorofluoroalkanes and ester-type plasticizers; GC together with mass spectrometry in determination of trace products of organic reactions; GC as an aid in solving commonly encountered analytical problems; analytical uses in kinetics studies; and process applications (three papers). Everyone will enjoy reading the text of the address by A. J. P. Martin.

The bibliography is excellent. The nearly 450 references give good coverage to the end of 1957 of the literature and papers presented at meetings. The "Chemical Abstracts" reference is included for most papers.

The general absence of typographical errors in the bulk of the volume makes "Gas-Liquid Partition Chromatography" in the index particularly unfortunate.

Everyone interested in gas chromatography will want to have this book readily available.

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