

book is brought out, the author might very well extend its usefulness for such students by including problems which are as provocative as his text. This lack, however, in no way detracts from the extremely successful presentation of the contents.

Rarefied Gas Dynamics. Symp. Proc. (Paris, June 1962). J. A. Laurmann, ed. Supplement 2 of *Advances in Applied Mechanics*, edited by H. L. Dryden, Th. von Kármán, et al. Vol. 1, 541 pp.; vol. 2, 529 pp. Academic Press New York, 1963. \$16.00 per volume. Reviewed by R. Bruce Lindsay, Brown University.

The statistical theory of gases is a very old discipline, much cultivated by both physicists and chemists, who have used it in trying to learn about transport and other properties of such fluids. In fairly recent times it has taken on renewed life in view of the practical problems provided by the

high-speed flow of low-density gases encountered in high-flying aircraft and in the ballistic-missile and artificial-satellite field. The flow of ionized gases has also posed a new challenge to the statistical theory. It is, therefore, not surprising that considerable research activity has developed, leading to international symposia for the discussion of the results. The two volumes under review contain 55 papers from the Third International Symposium on Rarefied Gas Dynamics held in Paris in June 1962.

Rarefied gas dynamics deals with the flow of gases in which the mean free path of the molecules is not negligible compared with some length associated with the structure of the flow, e.g., channel width in tube flow or the boundary-layer thickness in external flow. Its normal field of study is the transition region between the effectively continuous flow handled by the Navier-Stokes equation (very small

mean free path) and the other extreme of collisionless molecular motion. Much of the mathematical complexity of the subject is connected with the difficult physical conditions encountered in this region.

The articles in these volumes are grouped in six sections dealing respectively with: (1) fundamental kinetic theory (Boltzmann equation); (2) molecular beams and surface interactions; (3) ionized gas flows; (4) transition flow-theory; (5) transition flow-experiment; and (6) experimental methods in rarefied gas flows. Each article is accompanied by a brief bibliography and in many cases by a summary of the discussion it elicited at the symposium. Most of the articles are in English, though there are a few in French. The figures and typography are excellent. The whole constitutes a compendium of useful up-to-date information in a most important field of fluid dynamics.

BOOKS RECEIVED

ACOUSTICS

Acoustique sous-marine. By L. Guieysse and P. Sabathé. 251 pp. Dunod, Paris, 1964. 64 F.

ASTRONOMY & ASTROPHYSICS

Astronomy. By R. H. Baker. (8th ed.) 557 pp. Van Nostrand, Princeton, N.J., 1964. \$8.25.

Elements of Astromechanics. By P. van de Kamp. 140 pp. W. H. Freeman, San Francisco, 1964. Cloth \$4.00, Paper \$2.00.

ATOMIC & MOLECULAR PHYSICS

The Atom. By Charles Hatcher. 107 pp. (Macmillan, London) St Martin's Press, New York, 1964. \$3.95.

BIOPHYSICS & MEDICAL PHYSICS

Introduction to Biophysical Chemistry. By R. Bruce Martin. 365 pp. McGraw-Hill, New York, 1964. \$11.50.

CHEMISTRY & CHEMICAL PHYSICS

Crystallization of Polymers. By Leo Mandelkern. 359 pp. McGraw-Hill, New York, 1964. \$13.50.

Classics in the Theory of Chemical Combination. O. Theodor Benfey, ed. 191 pp. Dover, New York, 1963. Paper \$1.85.

Uranium. By J. H. Gittus. 623 pp. Butterworths, Washington, D.C., 1963. \$24.75.

Vapour Pressure of the Elements. By An. N. Nesmeyanov. Transl. from Russian and edited by J. I. Carasso. 469 pp. Academic, New York, 1963. \$14.50.

COMPUTATION & COMMUNICATION

The Art of Simulation. By K. D. Tocher. 184 pp. Van Nostrand, Princeton, N.J., 1964. \$5.95.

Automat und Mensch (2nd ed.) Kybernetische Tatsachen und Hypothesen. By Karl Steinbuch. 392 pp. Springer-Verlag, Berlin, 1963. DM 36.

IBM 1620 Programming. For Science and Mathematics. By Irving Allen Dodes. 276 pp. Hayden Book Co., New York, 1963. \$9.95.

An Introduction to Digital Computing. By Bruce W. Arden. 389 pp. Addison-Wesley, Reading, Mass., 1963. \$9.75.

EDUCATION

The Writing Requirements for Graduate Degrees. By Paul E. Koefod. 268 pp. Prentice-Hall, Englewood Cliffs, N.J., 1964. \$4.50.

ELECTRICITY & MAGNETISM

Charge Storage in Solid Dielectrics. A Bibliographical Review on the Electret and Related Effects. By Bernhard Gross. 153 pp. Elsevier, Amsterdam, 1964. \$8.00.

ELECTROMAGNETIC WAVES & ELECTRONS

Lectures on the Many-Electron Problem. By R. Brout and P. Carruthers. 204 pp. Interscience, New York, 1963. \$9.50.

Radio Ray Propagation in the Ionosphere. By J. M. Kelso. 408 pp. McGraw-Hill, New York, 1964. \$17.50.

ELECTRONICS

Transistor Circuit Theory and Design. By John Franklin Pierce. 418 pp. Charles E. Merrill, Columbus, Ohio, 1963. \$13.00.

Semiconductor Particle Detectors. By J. M. Taylor. 180 pp. Butterworths, Washington, D.C. 1963. \$8.25.

Electronic Circuits. A Unified Treatment of Vacuum Tubes and Transistors (2nd ed.). By E. J. Angelo, Jr. 652 pp. McGraw-Hill, New York, 1964. \$11.50.

EXPERIMENTAL TECHNIQUES

Elements of Pulse Circuits. By F. J. M. Farley. (2nd ed.) 159 pp. (Methuen, London) Wiley, New York, 1962. \$3.50.

Application of Ultrasonics in Molecular Physics. By V. F. Nozdrev. Transl. from Russian by Scripta Technica, Inc. 527 pp. Gordon and Breach, New York, 1963. \$27.50.

Laboratory and Workshop Notes 1959-1961. Ruth Lang, ed. 249 pp. (Edward Arnold, London, 1963) St Martin's Press, New York, 1964. \$10.00.