

basic materials, the alloying and diffusion processes, and the surface effects. The third part, written by Professor Beneking, deals with circuit theory. Quite a respectable space is occupied by equivalent circuits of an unspecified transistor. As examples some circuits using European transistors are given. The last part, by Dr. von Münch, gives an introduction to the measuring techniques and helpful curves, which—apart from being shown only for some German transistors—may disclose the principal relationship between transistor parameters and temperature as well as supply and bias voltages. Finally, the author considers briefly special semiconductor elements, i.e., photo- and field-effect transistors, four-layer diodes, unijunction transistors, and tunnel diodes.

References on the subject are given for each part, and the book finishes up with a very helpful index. The difficulty of getting the whole picture of transistors from the opinions of four writers remains with the reader. Nevertheless, by combination of the different parts and by adjusting oneself to the points of view expressed, the picture is quite complete. In the reviewer's opinion, the part on transistor circuits could have been omitted, because the scope of such a monograph differs from a book dealing with applications. For a reader with no profound knowledge of the German language, the book is not easy to understand in all its details, because linguistically it is not simple writing.

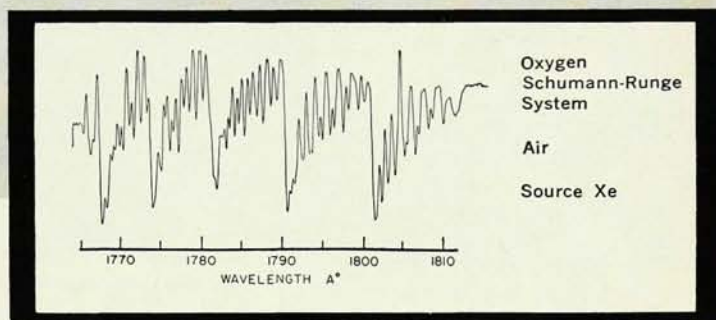
Combustion. Proc. of 9th Internat'l Symp. (Cornell Univ., Aug.-Sept. 1962). 1091 pp. Academic, New York, 1963. \$42.00.

Reviewed by **Henry Wise**, Stanford Research Institute.

This biennial Symposium on Combustion differed somewhat from the preceding ones in format. In addition to the contributed papers on various aspects of combustion, the Symposium included two discussions on detonations and fundamental flame processes, and three colloquia on modeling principles, phase changes in supersonic flow, and reciprocating engine combustion research.

During the discussions on fundamental flame processes, the most recent

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research results were presented on three topics: (1) combustion chemical kinetics involving uncharged particles, (2) mechanism of ionization in flames, and (3) transport properties of high-temperature gases. These areas of research have received considerable attention during the last few years. Various experimental techniques have been brought to bear on the problem of the kinetics and mechanism of flame reactions. The discussions demonstrated the major advances made and the general agreement in the results obtained. The discussion on detonations centered around two topics: (1) structure of the detonation wave, and (2) initiation of detonation of condensed-phase explosives. Specifically, the non-one-dimensionality of the detonation front was examined both from

a theoretical and experimental viewpoint. These sessions served the purpose of promoting an exchange of information among various participants. Indeed, the printed comments by the discussants of the discussion papers offer a valuable addition to the papers.

The colloquia brought together those scientists interested in the subject matter of the particular session. Although these contributed papers were not available as preprints, the label attached to these sessions seemed to encourage informal comments from the audience, as may be judged from the remarks following some of these papers.

In this brief review, it would be difficult to examine in detail the large number of papers presented (over

100) in the fields of laminar and turbulent gas flames, high-temperature spectroscopy, gas-phase reaction kinetics, combustion instability, and heterogeneous combustion. It is apparent that this volume of collected papers, together with the printed comments and discussions by the various participants, offer a valuable compendium to the specialist engaged in combustion research. The editor should be congratulated for having done a masterful job in assembling the material and, even more important, for having transformed it into a bound volume in a relatively short period of time. It is most regrettable that the high cost of this book may limit its distribution and thereby one of its important functions in disseminating information on combustion research.

BOOKS RECEIVED

ACOUSTICS

Fundamentals of Ultrasonics. By J. Blitz. 214 pp. Butterworths, London, 1963. \$6.95.

ASTRONOMY & ASTROPHYSICS

Astrophysics. The Atmosphere of the Sun and Stars (2nd Ed.). By Lawrence H. Aller. 650 pp. The Ronald Press Co., New York, 1963. \$15.00.

Tektites. John A. O'Keefe, ed. 228 pp. Univ. of Chicago Press, Chicago, 1963. \$10.95.

Making Friends with the Stars. By Arthur J. Zadde. Revised by Theodore A. Smits. 144 pp. Barnes & Noble, New York, 1963. Paper \$1.25, Cloth \$3.50.

COMPUTATION & COMMUNICATION

Mathematical Theory of Automata, Volume 12. Symp. Proc. (Microwave Research Institute, New York, April 1962). Jerome Fox, ed. 640 pp. Polytechnic Press, Brooklyn. Distr. by Wiley, New York, 1963. \$10.00.

Optimum Design of Digital Control Systems. By Julius T. Tou. 186 pp. Academic Press, New York, 1963. \$7.00.

EDUCATION

Science in the College Curriculum. Conf. Proc. (Oakland U., May 1962). Robert Hoopes, ed. 211 pp. Oakland University, Rochester, Mich., 1963.

ELECTRICITY & MAGNETISM

Magnetic Resonance at High Pressure. By G. B. Benedek. 100 pp. Interscience, New York, 1963. \$4.75.

Field Analysis and Electromagnetics. By Mansour Javid and Philip Marshall Brown. 526 pp. McGraw-Hill, New York, 1963. \$12.75.

Electromagnetic Fields. By Sergei A. Schelkunoff. 413 pp. Blaisdell, New York, 1963. \$9.50.

The Adiabatic Motion of Charged Particles. By Theodore G. Northrop. 109 pp. Interscience, New York, 1963. \$5.95.

EXPERIMENTAL TECHNIQUES

Pressure Vessel Design: Nuclear and Chemical Applications. By John F. Harvey. 274 pp. D. Van Nostrand, Princeton, N. J., 1963. \$9.75.

Cryogenics Research and Applications. By Marshall Sittig. 221 pp. D. Van Nostrand, Princeton, N. J., 1963. \$6.75.

High Pressure Physics and Chemistry. R. S. Bradley, ed. Vol. 1—444 pp, \$15.50. Vol. 2—361 pp, \$12.50. Academic Press, New York, 1963.

HANDBOOKS, TABLES, ETC.

Agard Aeronautical Multilingual Dictionary, First Supplement. A. H. Holloway, ed. 334 pp. (Pergamon, Oxford) Macmillan, New York, 1963. \$10.00.

Tables of Determination of Optical Constants from the Intensities of Reflected Light. By Antonín Vašíček. 113 pp. Nakladatelství Československé Akademie Věd, Prague, 1964. Kčs 28,50.

HISTORY & PHILOSOPHY OF SCIENCE

The Dawn of a New Age. Reflections on Science and Human Affairs. By Eugene Rabinowitch. 332 pp. The University of Chicago Press, Chicago, 1963. \$6.95.

The Nature of the Natural Sciences. By Leonard K. Nash. 406 pp. Little, Brown and Company, Boston, 1963. \$7.50.

NUCLEAR PHYSICS

Nuclear Physics. Proc. of the International School of Physics, "Enrico Fermi", Course 23. (Varenna, August, 1961). V. F. Weisskopf, ed. 186 pp. Academic, New York, 1963. \$7.50.

Contemporary Models of the Atomic Nucleus. By P. E. Nemirowskii. Transl. from Russian by S. and M. Nickolic. Transl. edited by Bernard T. Feld. 332 pp. (Pergamon, Oxford) Macmillan, New York, 1963. \$15.00.

PHYSICS OF FLUIDS

Fluidised Particles. By J. F. Davidson and D. Harrison. 155 pp. Cambridge University Press, New York, 1963. \$6.50.

Field-Coupled Surface Waves. A Comparative Study of Surface-Coupled Electrohydrodynamic and Magnetohydrodynamic Systems. By James R. Melcher. 190 pp. M.I.T. Press, Cambridge, Massachusetts, 1963. \$5.00.

SOLID STATE PHYSICS

Quantum Theory of Solids. By C. Kittel. 435 pp. Wiley, New York, 1963. \$13.50.

SPACE SCIENCES & AERODYNAMICS

Power Systems for Space Flight. Morris A. Zipkin and Russell N. Edwards, eds. 943 pp. Academic Press, Inc., New York, 1963. \$13.50.

Theoretical Evaluation of Chemical Propellants. By Roger Lawrence Wilkins. 436 pp. Prentice-Hall, Englewood Cliffs, N. J., 1963. \$15.00.