

some form of double or multiple magnetic resonance, where two or more high-frequency fields are applied, either simultaneously or successively.

The ENDOR (electron nuclear double resonance) technique is described by Feher, and also by Bleaney. Abragam's method of dynamic polarization is reported on by Solomon and by Combrisson. Kaplan and Hahn describe a pulse experiment in which the change in the relaxation time of a nuclear spin species is observed when a second nuclear species is excited. There are several papers concerned with optical pumping and optical detection by Bloom, Cagnac, Kruger, and others. The effect of multiple successive oscillatory fields on molecular beam magnetic resonances is described by Ramsey.

Although most of the work presented has already been published elsewhere, the usefulness of the colloquium report is enhanced by the discussion by the participants after nearly every paper.

The volume is paperbound but the printing is clear. A group photograph of the conferees is reproduced.

Matrix Calculus (2nd Revised Ed.). By E. Bodewig. 452 pp. (North-Holland) Interscience Publishers, Inc., New York, 1959. \$9.50. Reviewed by George Weiss, *Institute for Fluid Dynamics and Applied Mathematics, University of Maryland.*

THIS is the second edition of a work which is almost encyclopedic in its cataloguing of numerical methods for matrix problems. The present edition differs from the first only in the addition of new material which includes a discussion of Rutishauser's LR-algorithm for the determination of eigenvalues, Wilkinson's method for the speeding up of iteration procedures for the eigenvalue problems, and other, smaller discussions. The new material enhances the value of this book for those who have to deal in a practical way with matrix calculations. A review of the first edition is to be found in the March 1957 edition of *Physics Today*.

Combustion and Propulsion: Third AGARD Colloq. (Palermo, Sicily, March 1958). Edited by M. W. Thring, J. Fabri, O. Lutz, A. H. Lefebvre. 614 pp. Pergamon Press, London & New York, 1958. \$20.00. Reviewed by R. E. Street, *University of Washington.*

THE Combustion Panel of AGARD (Advisory Group for Aeronautical Research and Development, North Atlantic Treaty Organization) continues to hold these colloquia at a two- or three-year interval in order to enable different research workers in the aeronautical aspects of combustion and propulsion to present critical surveys of progress in their specialized fields. The proceedings are published both as a permanent record and to enable workers in the field who were not in attendance to learn of the progress reported. In many ways these collected surveys are similar to the *Reviews of Modern Physics*; they also serve

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to inform workers in related aeronautical fields of advances in specialties other than their own. The present volume is even more valuable in this respect than its predecessors since the scope of the papers read was broadened to include heat transfer, shock tubes, and noise. All are by acknowledged authorities in their fields and each author was allowed enough space to give a clear and extended exposition. The titles and authors are as follows:

Development Problems in Large Liquid Rocket Engines (Levine), Propulsion by Air Breathing Engines (Lombard), Effects on Turbojet Combustors and Afterburners of Other Engine Components (Childs), Le Problème du Stato-fusée (Le Grivz), Recent Work on Mixing at the Polytechnic Institute of Brooklyn (Napolitano, Libby, Ferri), Shock Wave and Flame Interactions (Rudinger), Jet Engine Noise Reduction (Sanders, North), Noise Suppression Nozzle Design (Richards), L'Insonorisation des Bancs d'Essais de Moteurs d'Aviation (Ducrot, Riehn, Roumilhac, Souvras), Thoughts on Flame Theory (Spalding), Some Recent Combustion Experiments (Gerstein), L'Etude des Foyers d'Aviation (Foure), Studies of . . . Solid Composite Propellants (Schultz, Green, Penner), Radiation Heat Transfer to Hypersonic Vehicles (Meyerott), Convective Heat Transfer with Mass Addition and Chemical Reaction (Lees), High Temperature Shock Waves (Laporte), On Magneto-fluid-dynamics (Schlüter), Flame Stabilization by Means of Gaseous Jets (Cambel), Etude d'un Procédé aérodynamique de Combustion (Bertin, Salmon), Flame Stabilization in Boundary Layers (Toong), and Graphical Method for Problems of Gasdynamic Mixing (Lutz). Discussions of each paper are included and contribute considerably more material.

Introduction to the Theory of Sound Transmission: With Application to the Ocean. By C. B. Officer. 284 pp. McGraw-Hill Book Co., Inc., New York, 1958. \$10.00. *Reviewed by Philip M. Morse, Massachusetts Institute of Technology.*

THIS is a treatment of sound propagation in ocean water, using the theoretical techniques of the geophysicist, both by "ray acoustics" using the eikonal equation and by wave acoustics using the Fourier transform. The linear wave equation, for small amplitude waves, is used except for a short section on shock waves. After a detailed derivation of the equations there is a chapter on propagation in a medium with constant velocity gradient, then a chapter on transmission in shallow water. A fourth chapter deals with transmission in deep water, considering the rather complicated velocity dependence on depth which actually obtains and discussing the practical problems this engenders. Then there is a long chapter on reflection from a plane interface between media, and finally a short chapter on attenuation from viscosity and porosity. It is useful for specialists in the field but of