

spectra, but the major aspects of these structures appear to a first approximation to be dominated by the localization of  $M^{+n}-O^{-2}$  bonding.

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## Book Review

**Mathematical Methods of Physics.** By JON MATHEWS and ROBERT L. WALKER. W. A. Benjamin, Inc., 1 Park Ave., New York, N. Y. 1964. x + 475 pp. 16 × 24 cm. Price, \$12.50.

This book has evolved from the notes on a course which is intended primarily for first-year physics graduate students. As the authors put it in the preface, it is a book *about mathematics for physicists*. It contains chapters on "Ordinary Differential Equations," "Infinite Series," "Evaluation of Integrals," "Integral Transformations," "Application of Complex Variables," "Vectors and Matrices," "Special Functions," "Partial Differential Equations," "Eigenfunctions," "Eigenvalues and Green's Functions," "Perturbation Theory," "Integral Equations," "Calculus of Variations," "Numerical Methods," "Probability and Statistics," "Tensor Analysis and Differential Geometry," and "Introduction to Groups and Group Representations." There is a brief appendix on "Some Properties of Functions of a Complex Variable," a bibliography, and an index, the latter sufficiently detailed to make the book suitable as a reference to many definitions and equations although that is not its primary purpose. The reader is supposed to have some acquaintance with simultaneous linear equations and determinants, vector analysis (including differential operations in curvilinear coordinates), elementary differential equations, and complex variables (through Cauchy's theorem).

The above should make it very clear that this is not a book for the average chemist. On the other hand, this reviewer can strongly recommend it to students of chemical physics even if some sections will lie outside their field of interest and comprehension. The level of presentation is by no means uniform. Thus, the chapter "Vectors and Matrices" starts off immediately with the definition of linear vector spaces, with little or no mention of "ordinary" vector algebra. Later, in the same chapter, matrices are introduced "from scratch." The choice of material has generally been a fortunate one. Many of the mathematical aspects of quantum mechanics are particularly clearly presented. Of course there are omissions; for example, we have looked in vain for some topics from the mathematics of thermodynamics such as

the Pfaff differential equation in conjunction with the Carathéodory derivation of the second law. But, as the authors point out, this book is intended as a text, not as a reference work. In this connection the inclusion of a considerable number of problems at the end of each chapter is to be lauded. It is to be hoped that in a future edition answers to these problems may be provided in an appendix, so that the book will be even more suitable for self study.

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### BOOKS RECEIVED

November 1964

- ARTHUR W. ADAMSON. "Understanding Physical Chemistry." Parts I and II. W. A. Benjamin, Inc., 1 Park Ave., New York, N. Y. 1964. xix + 489 pp. Clothbound \$10; paperback (in two parts), \$3.95 each.
- N. F. MOTT and R. W. GURNEY. "Electronic Processes in Ionic Crystals." Dover Publications, Inc., 180 Varick St., New York 14, N. Y. 1964. xii + 275 pp. \$2 (paperbound).
- D. D. PERRIN. "Organic Complexing Reagents." John Wiley and Sons, 605 Third Ave., New York, N. Y. 1964. xi + 365 pp. \$12.
- LASZLO ERDEY. "Theorie und Praxis der Gravimetrischen Analyse." III. Band. Akademiai Kiado, Publishing House of the Hungarian Academy of Sciences, Budapest V. Alkotmány U. 21, Hungary. 1964. 340 pp. \$13.
- Y. K. SYKRIN and M. E. DYATKINA. "Structure of Molecules and the Chemical Bond." Dover Publications, Inc., 180 Varick St., New York 14, N. Y. ix + 509 pp. \$2.75 (paperbound).
- JOEL H. HILDEBRAND and ROBERT L. SCOTT. "The Solubility of Nonelectrolytes." Dover Publications, Inc., 180 Varick St., New York 14, N. Y. 1964. xiv + 488 pp. \$2.50 (paperbound).