

tors that employ lead sulfide, lead selenide, and other materials.

The part of the book that deals with materials, sources, and detectors contains 290 pages, somewhat less than half of the volume. The remainder deals with probability theory and its application to random fluctuations, electronic noise, space filtering, and information theory. In the final chapter an attempt is made to apply all this material to the general question of design of infrared systems.

The book is well-written, logically arranged, and nicely printed. It achieves unusual unity for a book written by five authors. Thus, it is a "must" for anyone interested in the theory and design of infrared systems.

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## Astronomy

**Space Age Astronomy.** Symposium held at the California Institute of Technology, August 1961. Armin J. Deutsch and Wolfgang B. Klemperer, Eds. Academic Press, New York, 1962. xxi + 531 pp. Illus. \$16.50.

One wonders of what value a book of this sort can be. Into 526 pages are crammed a total of 56 articles, many of which are written by some of the world's most prominent astronomers. By and large, the quality of the writing is good, the illustrations are clear, and the overall format is appealing. The volume ends with an adequate index, which must have been difficult to compile. However, over and over again I found that I was left with a sense of frustration upon completing an article. The subject matter was treated superficially, and seldom was there any opportunity to learn something about the details of work described. Clearly it was not the intention of those who planned this book to go further than skin deep into any one topic.

More and more often today we see volumes of this sort: a collection of write-ups of invited talks given at a symposium sponsored by a large corporation. The Douglas Aircraft Company sponsored this symposium, which took place in August 1961 at the California Institute of Technology. Coming

just before the large meeting of the International Astronomical Union held in Berkeley, the symposium boasted a most impressive roster of participants. The book is divided into three different sections: (i) accomplishments, current projects, and proven techniques; (ii) desiderata for future astronomical observations from stations in space; and (iii) solar system problems. Recorded discussions followed some of the papers; frequently I found these interchanges more stimulating than the preceding article.

Presumably, the sponsor paid the transportation to California for many of the speakers. This is good. I would guess that the sponsor found the symposium worthwhile, too.

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## Note

### Organic Chemistry

Volume 3 of *Absorption Spectra in the Ultraviolet and Visible Region* (Akademiai Kiado, Budapest, 1962; Academic Press, New York, 1963. 424 pp. Illus. \$20), edited by L. Lang, presents 172 ultraviolet and visible spectra, and thus brings the total reported in the series to 521 [vols. 1 and 2 reviewed in *Science* **136**, 519 (1962)]. Results for some inorganic substances and organic complexes of inorganic ions are again included in this predominantly organic collection. The format in which the data are presented is identical with that of previous volumes, as is the information given with respect to the experimental details of the spectral determinations. Some Polish and a few Russian and British contributions are included among those of Hungarian origin, thereby meeting the editor's avowed objective of making the series an international endeavor.

Indexes to the present volume are provided. According to the preface, compilation of volume 4 is in progress; it is to be hoped that, as the series progresses, the editors will consider preparing cumulative indexes, in order to facilitate reference to this useful collection.

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## New Books

### Mathematics, Physical Sciences, and Engineering

**Advances in Electronics and Electron Physics.** vol. 17. L. Marton and Claire Marton, Eds. Academic Press, New York, 1962. 461 pp. Illus. \$14.

**Advances in Mass Spectrometry.** Proceedings of a conference (Oxford, England), September 1961. R. M. Elliott, Ed. Pergamon, London; Macmillan, New York, 1963. 646 pp. Illus. \$20.

**Advances in Organic Chemistry.** Methods and results. vol. 4. Ralph A. Raphael, Edward C. Taylor, and Hans Wynberg, Eds. Interscience (Wiley), New York, 1963. 369 pp. Illus. \$14.50.

**Advances in Upper Atmosphere Research.** Papers presented at the NATO Advance Study Institute (Corfu), July 1960. B. Landmark, Ed. Pergamon, London; Macmillan, New York, 1963. 348 pp. Illus. \$12.25.

**Aerodynamics.** A space-age survey. John E. Allen. Harper and Row, New York, 1963. 128 pp. Illus. \$2.95.

**Air Chemistry and Radioactivity.** Christian E. Junge. Academic Press, New York, 1963. 394 pp. Illus. \$13.50.

**Alternating Current Polarography and Tensammetry.** B. Breyer and H. H. Bauer. Interscience (Wiley), New York, 1963. 308 pp. Illus. \$12.

**Applications of Graph Theory to Group Structure.** Claude Flament. Translated from the French by Maurice Pinard, Raymond Breton, and Fernand Fontaine. Prentice-Hall, Englewood Cliffs, N.J., 1963. 136 pp. Illus. \$6.95.

**Basic Astronomical Data.** K. Aa. Strand, Ed. Univ. of Chicago Press, Chicago, 1963. 513 pp. Illus. \$12.50.

**Basic Electronics.** Royce Gerald Kloeffler, Maurice Wilson Horrell, and Lee E. Hargrave, Jr. Wiley, New York, ed. 2, 1963. 653 pp. Illus. \$11.

**Basic Mathematics for the Physical Sciences.** Haym Kruglak and John T. Moore. McGraw-Hill, New York, 1963. 368 pp. Illus. Paper, \$3.95.

**Chemical Concepts.** Jay A. Young. Prentice-Hall, Englewood Cliffs, N.J., 1963. 166 pp. Illus. Paper, \$2.95.

**Chemistry: A Survey of Principles.** Galen W. Ewing and E. Gerald Meyer. Wiley, New York, 1963. 249 pp. Illus. \$4.95.

**The Chemistry of Wood.** B. L. Browning, Ed. Interscience (Wiley), New York, 1963. 699 pp. Illus. \$25.

**Chromatographic Reviews.** Progress in chromatography, electrophoresis, and related methods. vol. 5. Michael Lederer, Ed. Elsevier, New York, 1963. 254 pp. Illus. \$11.

**Coordination Chemistry.** Seventh international conference (Stockholm and Uppsala, Sweden), June 1962. Butterworth, Washington, D.C., 1963. 129 pp. Illus. \$5.

**A Course of Mathematical Analysis.** pt. 2. A. F. Bermant. Translated from the Russian edition (1959) by Ian N. Sneddon. Pergamon, London; Macmillan, New York, 1963. 386 pp. Illus. \$9.

**Cryogenic Technology.** Robert W. Vance, Ed. Wiley, New York, 1963. 603 pp. Illus. \$19.50.

**Crystal Orientation Manual.** Elizabeth A. Wood. Columbia Univ. Press, New York, 1963. 85 pp. Illus. Paper.

**The Design of Gas-Cooled Graphite-Moderated Reactors.** D. R. Poulter, Ed. Oxford Univ. Press, New York, 1963. 704 pp. Illus. \$13.45.

**Direct Interactions and Nuclear Reaction Mechanisms.** Proceedings of a conference (University of Padua), September 1962. E. Clementel and C. Villi, Eds. Gordon and Breach, New York, 1963. 1236 pp. Illus. \$39.50.

**Electron Probe Microanalysis.** L. S. Birks. Interscience (Wiley), New York, 1963. 263 pp. Illus. \$9.25.

**Electrons in Atoms.** G. F. Lothian. Butterworth, Washington, D.C., 1963. 206 pp. Illus. \$6.95.

**Elements of General Topology.** D. Bushaw. Wiley, New York, 1963. 174 pp. Illus. \$6.95.

**The Encyclopedia of X-Rays and Gamma Rays.** George L. Clark, Ed. Reinhold, New York; Chapman and Hall, London, 1963. 1177 pp. Illus. \$35.

**Experimental Nucleonics.** B. Brown. Iliffe, London; Prentice-Hall, Englewood Cliffs, N.J., 1963. 245 pp. Illus. \$8.95.

**Fast Neutron Physics.** pt. 2, *Experiments and Theory*. J. B. Marion and J. L. Fowler, Eds. Interscience (Wiley), New York, 1963. 1119 pp. Illus. \$45.

**Fracture of Solids.** Proceedings of a conference (Maple Valley, Wash.), August 1962. D. C. Drucker and J. J. Gilman, Eds. Interscience (Wiley), New York, 1963. 718 pp. Illus. \$28.

**Gas Chromatography, 1962.** Proceedings of a symposium (Hamburg, Germany), June 1962. M. van Swaay. Butterworth, Washington, D.C. 1962. 463 pp. Illus. \$19.95.

**Handbook of High Vacuum Engineering.** H. A. Steinherz. Reinhold, New York; Chapman and Hall, London, 1963. 368 pp. Illus. \$11.75.

**An Introduction to Clay Colloid Chemistry.** For clay technologists, geologists, and soil scientists. H. van Olphen. Interscience (Wiley), New York, 1963. 317 pp. Illus. \$10.

**Introduction to Econometrics.** Oskar Lange. Pergamon, London; Macmillan, New York. ed. 2, 1963. 433 pp. Illus. \$7.

**An Introduction to Molecular Kinetic Theory.** Joel H. Hildebrand. Reinhold, New York; Chapman and Hall, London, 1963. 117 pp. Illus. Paper, \$1.95.

**An Introductory Course of Mathematics and Theoretical Mechanics.** vol. 2, *Pure Mathematics*. C. Plumpton and W. A. Tomkys. Pergamon, London; Macmillan, New York, 1963. 416 pp. Illus. \$4.50.

**Introductory Nuclear Reactor Theory.** Herbert S. Isbin. Reinhold, New York; Chapman and Hall, London, 1963. 640 pp. Illus. \$22.50.

**Ionic Equilibria in Analytical Chemistry.** Henry Freiser and Quintus Fernando. Wiley, New York, 1963. 348 pp. Illus. \$4.95.

**Laminar Boundary Layers.** L. Rosenhead, Ed. Oxford Univ. Press, New York, 1963. 710 pp. Illus. \$14.40.

**Lattice Theories of the Liquid State.** J. A. Barker. Pergamon, London; Macmillan, New York, 1963. 143 pp. Illus. \$8.50.

**Lectures on Modern Mathematics.** vol. 1. T. L. Saaty, Ed. Wiley, New York, 1963. 185 pp. Illus. \$5.75.

**Linear Differential Equations.** In the real domain. Kenneth S. Miller. Norton, New York, 1963. 201 pp. Illus. \$5.75.

**Linear Programming and Extensions.** George B. Dantzig. Princeton Univ. Press, Princeton, N.J., 1963. 643 pp. Illus. \$11.50.

**A Manual of Experiments in Reactor Physics.** Frank A. Valente. Macmillan, New York; Collier-Macmillan, London, 1963. 351 pp. Illus. \$7.50.

**Masers and Lasers.** Molecular amplification and oscillation by stimulated emission. Gordon Troup. Methuen, London; Wiley, New York, ed. 2, 1963. 200 pp. Illus. \$4.50.

**Mass Spectrometry of Organic Ions.** F. W. McLafferty, Ed. Academic Press, New York, 1963. 744 pp. Illus. \$24.

**Mathematical Models in Physical Sciences.** Proceedings of a conference (Notre Dame, Ind.), April 1962. Stefan Drobot and Paul A. Vierbrock, Eds. Prentice-Hall, Englewood Cliffs, N.J., 1963. 203 pp. Illus. \$5.

**Mathematical Theories of Traffic Flow.** Frank A. Haight. Academic Press, New York, 1963. 254 pp. Illus. \$9.

**The Mathematical Theory of Communication.** Claude E. Shannon and Warren Weaver. Univ. of Illinois Press, Urbana (© 1949), 1963. 125 pp. Illus. Paper, 95c.

**The Mathematical Theory of Viscous Incompressible Flow.** O. A. Ladyzhenskaya. Translated from the Russian edition (1961) by Richard A. Silverman. Gordon and Breach, New York, 1963. 198 pp. Illus. \$9.50.

**Mathematics for Science and Engineering.** Philip L. Alger. McGraw-Hill, New York (© 1957), 1963. 378 pp. Illus. Paper, \$2.95.

**Metallurgy of Advanced Electronic Materials.** vol. 19. Proceedings of a conference (Philadelphia, Pa.), August 1962. Geoffrey E. Brock, Ed. Interscience (Wiley), New York, 1963. 365 pp. Illus. \$15.

**Methods in Computational Physics.** Advances in research and applications. vol. 1, *Statistical Physics*. Berni Alder, Sidney Fernbach, and Manuel Rotenberg, Eds. Academic Press, New York, 1963. 316 pp. Illus. \$10.

**Modern Approach to Inorganic Chemistry.** A textbook for higher national certificate and general degree students. C. F. Bell and K. A. K. Lott. Butterworth, Washington, D.C., 1963. 303 pp. Illus. \$8.95.

**Micromagnetics.** William Fuller Brown, Jr. Interscience (Wiley), New York, 1963. 153 pp. Illus. \$5.95.

**Modern Chemical Processes.** vol. 7. By the editors of *Industrial and Engineering Chemistry*. Reinhold, New York; Chapman and Hall, London, 1963. 128 pp. Illus. \$7.50.

**Multistage Inventory Models and Techniques.** Herbert E. Scarf, Dorothy M. Gilford, and Maynard W. Shelly, Eds. Stanford Univ. Press, Stanford, Calif., 1963. 235 pp. Illus. \$7.50.

**Naturally Occurring Oxygen Ring Compounds.** F. M. Dean. Butterworth, Washington, D.C., 1963. 669 pp. Illus. \$24.50.

**New Directions in Mathematics.** Conference papers (Hanover, N.H.), November 1961. Robert W. Ritchie, Ed. Prentice-Hall, Englewood Cliffs, N.J., 1963. 128 pp. Illus. \$6.60.

**Nonstoichiometric Compounds.** A symposium (141st meeting, American Chemical Soc.), March 1962. Roland Ward, Chairman. American Chemical Soc., Washington, D.C., 1963. 261 pp. Illus. Paper.

**The Nucleon-Nucleon Interaction.** Experimental and phenomenological aspects. Richard Wilson. Interscience (Wiley), New York, 1963. 259 pp. Illus. \$6.

**The Optical Model in Nuclear and Particle Physics.** P. B. Jones. Interscience (Wiley), New York, 1963. 126 pp. Illus. \$4.50.

**Organic Functional Group Analysis.** F. E. Critchfield. Pergamon, London; Macmillan, New York, 1963. 195 pp. Illus. \$6.50.

**Organic Reactions.** vol. 13. Arthur C. Cope, Ed. Wiley, New York, 1963. 390 pp. Illus. \$12.50.

**Printed and Integrated Circuitry.** Materials and processes. T. D. Schlabach and D. K. Rider. McGraw-Hill, New York, 1963. 430 pp. Illus. \$13.50.

**Problems of Low Temperature Physics and Thermodynamics.** vol. 3. Proceedings of the International Institute of Refrigeration Commission (London), 1961. A. Van Itterbeek, Ed. Pergamon, London; Macmillan, New York, 1962. 196 pp. Illus. \$9.

**Quantum Mechanics.** vols. 1 and 2. Albert Messiah. North-Holland, Amsterdam; Wiley, New York (vol. 1, 520 pp., 1961, \$8; vol. 2, 647 pp., 1962, \$8.50). Illus.

**Radiation and Optics.** An introduction to the classical theory. John M. Stone. McGraw-Hill, New York, 1963. 560 pp. Illus. \$11.75.

**Radio Astronomical and Satellite Studies of the Atmosphere.** Proceedings, Corfu Summer School, June 1962. Jules Aarons, Ed. North-Holland, Amsterdam; Interscience (Wiley), New York, 1963. 569 pp. Illus. \$17.50.

**Radioactivation Analysis.** H. J. M. Bowen and D. Gibbons. Oxford Univ. Press, New York, 1963. 301 pp. Illus. \$8.

**Selected Values of Thermodynamic Properties of Metals and Alloys.** Ralph Hultgren, Raymond L. Orr, Philip D. Anderson, and Kenneth K. Kelley. Wiley, New York, 1963. 975 pp. Illus. \$12.50.

**Solar Flares.** Henry J. Smith and Elske v. P. Smith. Macmillan, New York; Collier-Macmillan, London, 1963. 334 pp. Illus.

**Solvents Guide.** Compiled and edited by C. Marsden and Seymour Mann. Interscience (Wiley), New York, ed. 2, 1963. 649 pp. Illus. \$18.50.

**Some Cosmochemical Problems.** Notes on the 37th annual Priestley lectures. Harold C. Urey. Edited and sponsored by Mu Chapter, Phi Lambda Upsilon. Pennsylvania State Univ., University Park, 1963. 191 pp. Illus. Paper, \$3.25.

**University Mathematics.** Robert C. James. Wadsworth, Belmont, Calif., 1963. 938 pp. Illus.