

the proceedings volume, *Geophysics: The Earth's Environment* (Gordon and Breach, 1963), edited by DeWitt, Hieblot, and LeBeau.

The monograph is a brief, but clear, exposition of the basic background physics necessary for understanding the motions of energetic charged particles in the earth's magnetic field. The first 12 pages are devoted to Størmer's exact theory of charged-particle motion in a dipole field; here the treatment differs little from that given by Størmer and included in his book *The Polar Aurora*. The second section (15 pp.) covers Alfven's guiding-center approximation and its development in terms of the adiabatic invariants of motion which are so useful in describing motions of particles in the earth's radiation belts. The third section (3 pp.) gives the briefest of introductions to the application of the continuous-fluid relations of hydro-magnetics to particle drifts.

On the whole the book will be useful to workers in the field, since only the most pertinent material is included, and the side issues that tend to befog the issue in more detailed treatments are not included. One could have wished for some mention of the conditions under which the longitudinal and transverse invariants break down, since this may be of major importance in geophysics; I also failed to detect any discussion of the third adiabatic invariant (the flux invariant) whose nonconservation leads to inward diffusion of trapped particles, and is of great importance.

GEORGE C. REID

*Central Radio Propagation Laboratory,
National Bureau of Standards,
Boulder, Colorado*

Astronomy

Reference Catalogue of Bright Galaxies. Being the Harvard Survey of galaxies brighter than the 13th magnitude of H. Shapley and A. M. Ames, revised and enlarged. Gerard de Vaucouleurs and Antoinette de Vaucouleurs. University of Texas Press, Austin 1964. viii + 268 pp. Illus. \$12.50.

This monumental volume provides the long-needed and long-awaited revision and extension of the classical catalog by Shapley and Ames. Com-

parison of the new *Reference Catalog* with its predecessor shows impressively the progress of extragalactic research. In fact, very little remains from the older catalog which gives a few basic data—Hubble type, estimated photographic magnitudes, and apparent diameters—for 1249 galaxies. The new catalog tabulates for 2599 galaxies a wealth of information on types, diameters, magnitudes, colors, radial velocities, and published photographs. Complete references are given. Many of the tabulated values are averages of observed data corrected to a uniform system. To quote the observed data for diameters would not have been practical; to find these data, the references must be used. The observed data on magnitudes and colors are given in appendices. Much information is in an appendix that gives coded descriptions of the galaxies and references to detailed investigations.

To collect the data, to reduce them to uniform systems, and to organize them properly was a tremendous task. The authors must be admired for having undertaken it and for having, on the whole, successfully finished it. One problem with which the authors were faced was that of deciding what was to be tabulated, what was to be placed in the appendices, and what was to be omitted. Such decisions are difficult and cannot be expected to please everybody. One might ask, for instance, whether it was really necessary to include the old galactic coordinates, which can be obtained easily from available conversion tables, and whether it would not have been more useful to include data such as magnitudes corrected for absorption, which are needed to obtain ratios of mass or radio emission to optical brightness. Only colors corrected for absorption are tabulated. The complete suppression of spectral types and the exclusive use of the not yet generally accepted "super-galactic" coordinates for displays of the distribution of galaxies in the sky seem to indicate a tendency to let predilections influence the content. The degree of satisfaction with this catalog will depend somewhat on the specialized interests of the user. But nobody should deny that the *Reference Catalog* is a magnificent source of information and promises to be an indispensable tool for extragalactic research.

R. MINKOWSKI

*Radio Astronomy Laboratory,
University of California, Berkeley*

New Books

Mathematics, Physical Sciences, and Engineering

Investigations into Electrical Discharges in Gases. B. N. Klyarfel'd, Ed. Translated from the Russian edition (Moscow, 1958) by D. Cossutta. T. R. Foord, Translation Ed. Pergamon, London; Macmillan, New York, 1964. 295 pp. Illus. \$12. Contains 12 papers by L. G. Guseva; I. V. Kravivina; B. M. Aleshkov; A. V. Rubchinskii; V. M. Mantrov; Ya. Ya. Udris; F. S. Kovelev; A. A. Timofeev and N. A. Neretina.

Lines and Surfaces in Three-Dimensional Affine Space. L. K. Tutaeu. Translated from the Russian edition (Minsk, 1962). Israel Program for Scientific Translations, Jerusalem; Davey, New York, 1964. 102 pp. Illus. \$3.75.

Low Temperature Techniques. The use of liquid helium in the laboratory. A. C. Rose-Innes. Van Nostrand, Princeton, N.J., 1964. 176 pp. Illus. \$4.75.

Lunar Missions and Exploration. C. T. Leondes and R. W. Vance, Eds. Wiley, New York, 1964. 689 pp. Illus. \$17.50. Lectures presented at the University of California, Los Angeles, in cooperation with the Department of Engineering during the spring of 1963. Contributors: W. R. Laidlaw, M. Eimer, G. P. Sutton, G. H. Stoner, M. S. Agabian, C. G. Pfeiffer, R. K. Cheng, G. C. Szego, E. Reichtin, R. A. Fischer, H. M. Schurmeier, C. W. Frick, E. G. Cole, and H. Hornaby.

Maintainability: A Major Element of System Effectiveness. A. S. Goldman and T. B. Slattery. With contributions by S. Firstman and J. Rigney. Wiley, New York, 1964. 298 pp. Illus. \$12.50.

Mechanical Working of Metals. F. A. A. Crane. Macmillan, London; St. Martin's Press, New York, 1965. 91 pp. Illus. Paper, 13s. 6d.

Mechanics of Solids. Grover L. Rogers. Wiley, New York, 1964. 266 pp. Illus. \$8.95.

Methods in Polyphenol Chemistry. Proceedings, Plant Phenolics Group symposium (Oxford), 1963. J. B. Pridham, Ed. Pergamon, London; Macmillan, New York, 1964. 156 pp. Illus. \$7.50. Twelve papers, by B. R. Brown; J. B. Harborne; H. Wagner; R. J. Abraham; J. W. Bridges; E. C. Bate-Smith; V. Thaller; L. Hörrhammer; H. Weigel; J. B. Pridham; R. O. C. Norman; J. R. Lindsay Smith, and G. K. Radda; and T. Swain and J. L. Goldstein.

Modern Pure Solid Geometry. Nathan Altshiller-Court. Chelsea, New York, ed. 2, 1964. 369 pp. Illus. \$6.

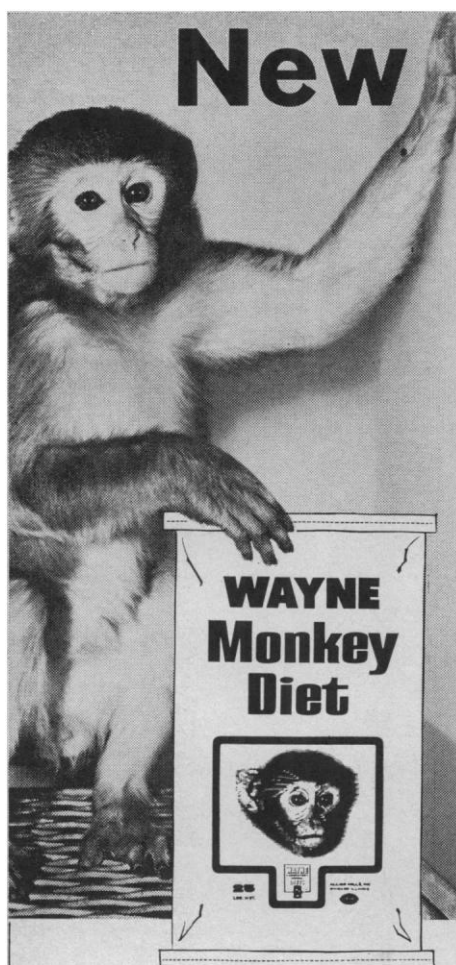
Molecular Complexes in Organic Chemistry. Lawrence J. Andrews and Raymond M. Keefer. Holden-Day, San Francisco, 1964. 204 pp. Illus. \$8.75.

Motion of Charged Particles in the Earth's Magnetic Field. Joseph W. Chamberlain. Gordon and Breach, New York, 1964. 43 pp. Illus. Paper, \$1.95; cloth, \$3.95.

Nuclear Energy in Space. Erik S. Pedersen. Prentice-Hall, Englewood Cliffs, N.J., 1964. 528 pp. Illus. \$19.95.

Periodic Differential Equations. An in-

(Continued on page 1616)



Exclusive Formula Tempting Palatability

Test-fed in leading research laboratories... new Wayne Monkey Diet is pressure cooked... with starches broken down to provide taste-tempting appeal even for finicky eaters. Through the pressure cooking process, more energy is released, palatability is sharpened, digestibility is improved. Wayne Monkey Diet is a quality diet for monkeys of all breeds and ages... gestation, lactation, growth, maintenance. Contains added Vitamin C. Packaged in polyethylene lined multiwall sacks to help assure mill-freshness and prevent outside contamination.

For full details, see your
Wayne Dealer or write:

ALLIED MILLS, INC.
Laboratory Animal Diets Division
110 N. Wacker Drive • Chicago, Ill. 60606
Phone: 312-346-5060

One of the World's Oldest and
Largest Manufacturers of
Poultry and Animal Diets.

NEW BOOKS

(Continued from page 1568)

roduction to Mathieu, Lamé, and allied functions. F. M. Arscott. Pergamon, London; Macmillan, New York, 1964. 291 pp. Illus. \$9.50.

Les Périodotites Serpentinisées en France. Groupe 1, *Péridotites Intracristallines*. pt. 4, *Massif Central Méridien: Bassin du Haut-Allier*. F. H. Forestier. Éditions B.R.G.M., Paris, 1964. 291 pp. Illus. Map.

Perturbation Methods in Fluid Mechanics. Milton Van Dyke. Academic Press, New York, 1964. 239 pp. Illus. \$7.

Photoelectric Effects in Semiconductors. Solomon Meerovich Ryvkin. Translated from the Russian edition (Leningrad, 1963) by A. Tybulewicz. Consultants Bureau, New York, 1964. 417 pp. Illus. \$22.50.

Physicochemical Investigations of Sedimentary Iron and Manganese Ores and Associated Rocks (Oxidation-reduction and acid-alkaline properties of sedimentary ore complexes). E. I. Sokolova. Translated from the Russian edition (Moscow, 1962) by David Shochet. Israel Program for Scientific Translations, Jerusalem; Davey, New York, 1964. 226 pp. Illus. \$7.

Theory of Crystal Dislocations. A. H. Cottrell. Gordon and Breach, New York, 1964. 101 pp. Illus. Paper, \$2.50; cloth, \$4.50.

Thermal Methods of Analysis. Wesley W. Wendlandt. Interscience (Wiley), New York, 1964. 434 pp. Illus. \$16.50.

Three-Dimensional Problems of the Theory of Elasticity. A. (I.) Lur'e. Translated from the Russian edition (Moscow, 1955) by D. B. McVean. J. R. M. Radok, Ed. Interscience (Wiley), New York, 1964. 505 pp. Illus. \$16.

Turbulent Boundary Layers in Compressible Gases. S. S. Kutateladze and A. I. Leont'ev. Translated from the Russian edition (1962) by D. B. Spalding. Academic Press, New York, 1964. 192 pp. Illus. \$8.50.

Ultrasonic Cutting. L. D. Rozenberg, V. F. Kazantsev, L. O. Makarov, and D. F. Yakhimovich. Translated from the Russian edition (Moscow, 1962) by J. E. S. Bradley. Consultants Bureau, New York, 1964. 154 pp. Illus. \$17.50.

Ultrasound: Physical, Chemical, and Biological Effects. Isaak Efimovich El'piner. Translated from the Russian edition (Moscow, 1963) by F. L. Sinclair. Consultants Bureau, New York, 1964. 379 pp. Illus. \$22.50.

Unsaturated Nitro Compounds. V. V. Perekalin. Translated from the Russian edition (Leningrad, 1961) by L. Mandel. Israel Program for Scientific Translations, Jerusalem; Davey, New York, 1964. 342 pp. Illus. \$15.25.

General

The Addict and the Law. Alfred R. Lindesmith. Indiana Univ. Press, Bloomington, 1965. 351 pp. Illus. \$7.50.

Archeological Investigations in the Parita and Santa Maria Zones of Panama (Bureau of American Ethnology, *Bulletin*, No. 193). John Ladd. Smithsonian Institution, Washington, D.C., 1964 (order from

Superintendent of Documents, Washington, D.C.). 303 pp. Illus. \$2.50.

Archeology of the Yakutat Bay Area, Alaska (Bureau of American Ethnology, *Bulletin*, No. 192). Frederica de Laguna, Francis A. Riddell, Donald F. McGeein, Kenneth S. Lane, and J. Arthur Freed. With a chapter by Carolyn Osborne. Smithsonian Institution, Washington, D.C., 1964 (order from Superintendent of Documents, Washington, D.C.). 257 pp. Illus. Maps. \$3.25.

Art and Geometry: A Study in Space Intuitions. William M. Ivins, Jr. Dover, New York, 1964 (reprint of the 1964 edition). 123 pp. Paper, \$1.

Astronomy. Samuel Rapport and Helen Wright, Eds. New York Univ. Press, New York, 1964. 368 pp. Illus. \$4.95. Twenty three topics arranged in the following sections: The Founders of Modern Astronomy; Tools and Techniques; The Solar System; The Sun and Other Stars; and Galaxies, Cosmology, and Relativity.

The Atomic Adventure: Its Political and Technical Aspects. Bertrand Goldschmidt. Translated from the French edition (1962) by Peter Beer. Pergamon, London; Macmillan, New York, 1964. 271 pp. Paper, \$3.75.

Australian Bird Songs. Carl Weismann and Allen Keast. Jacaranda Press, Brisbane, Australia, 1964. 20 pp. Illus. 27s. 6d. A 45-r.p.m. record of the bird songs is included.

Beyond the Edge of Certainty. Robert G. Colodny, Ed. Prentice-Hall, Englewood Cliffs, N.J., 1965. 297 pp. Illus. \$8.75. Essays in contemporary science and philosophy by Norwood Russell Hanson, Brian Ellis, Hilary Putnam, David Hawkins, Philip Morrison, Paul K. Feyerabend, and Nicholas Rescher.

Bibliography of the History of Medicine of the United States and Canada, 1939-1960. Genevieve Miller, Ed. Johns Hopkins Press, Baltimore, Md., 1964. 446 pp. \$10.

Billion Dollar Battle. The story behind the "impossible" 727 product. Harold Mansfield. McKay, New York, 1965. 192 pp. Illus. \$4.95.

Biographical Encyclopedia of Philosophy. Henry Thomas. Doubleday, Garden City, N.Y., 1965. 287 pp. \$5.50.

Biographical Memoirs of Fellows of the Royal Society. vol. 10. Royal Society, London, 1964. 394 pp. Illus. \$6.

Biography of an Atom. J. Bronowski and Millicent E. Selsam. Harper and Row, New York, 1965. 43 pp. Illus. \$2.95 (juvenile book).

Bone, Tooth, and Horn Tools of Palaeolithic Man. An account of the osteodontokeratic discoveries in Pin Hole Cave, Derbyshire. James W. Kitching. Manchester Univ. Press, Manchester, England; Humanities Press, New York, 1964. 69 pp. Illus. Plates. \$4.50.

The Breath of Life. Donald E. Carr. Norton, New York, 1965. 175 pp. \$3.95.

Canine Behavior. M. W. Fox. Thomas, Springfield, Ill., 1964. 151 pp. Illus. \$6.75.

Carnegie Institution of Washington Year Book 1963-1964. vol. 63. Carnegie Institution, Washington, D.C., 1964. 673 pp. Illus. \$1.50. Reports on current research from all departments of the Institution, covering the period 1 July 1963 to 30 June 1964.

AGRICULTURAL SCIENCES FOR THE DEVELOPING NATIONS

Editor: A. H. Moseman
AAAS Symposium Volume No. 76
Published October 1964

232 pages, illustrations, references, index.

Price \$6.75. AAAS members' cash orders: \$6.00.

Based on a symposium presented at the Cleveland AAAS Meeting, December, 1963.

Sponsors: AAAS Section on Agriculture, American Society for Microbiology, and AAAS Committee on Desert and Arid Zones Research.

The symposium was devoted to the role of agricultural science and technology in the acceleration of economic progress in newly developing nations. The 12 chapters of this volume comprise an informed summary of the problems and opportunities of technical, economic, and educational assistance in agriculture. The book should also be helpful in furnishing some background experience for the use of agricultural planners in the newly emerging countries.

The viewpoint of the book is that although methods and materials from agriculturally advanced nations can seldom be transferred directly, the developing nations can be aided through the isolation and employment of the principles and procedures which have contributed to agricultural progress in the advanced nations.

Contributors include officers of the Agency for International Development, the U.S. Department of Agriculture, Purdue University, The Ford Foundation, Ohio State University, Cornell University, the University of Chicago, and The Rockefeller Foundation.

CONTENTS

Characteristics of Agricultural Systems in Emerging Nations: "Institutional factors limiting progress in the less developed countries" by Erven J. Long; "Animal agriculture in the emerging nations" by Ralph W. Phillips; and "Plant agriculture in the emerging nations" by J. B. Peterson and R. D. Frazier.

Research to Devise and Adapt Innovations: "Research to improve production of corn in Asia" by Ernest W. Sprague; "Animal and veterinary science programs in developing countries" by Frederick N. Andrews; and "Interactions and agricultural research in emerging nations" by Charles E. Kellogg.

Education and Development of Human Resources: "The role of educated people in agricultural development" by Richard Bradfield; "The rural people of developing countries: Their attitudes and levels of education" by Harold R. Capener; and "The development of effective academic programs for foreign students: Curricular, work experience and social aspects" by David B. Williams.

Establishing Indigenous Institutions to Serve Advancing Agriculture: "Developing agricultural institutions in underdeveloped countries" by F. F. Hill; "New patterns of agricultural research and education in India" by Albert H. Moseman; and "Economic growth from traditional agriculture" by Theodore W. Schultz.

British Agents: Bailey Bros. & Swinfen, Ltd., Warner House,
48 Upper Thames Street, London, E.C.4

American Association for the Advancement of Science
1515 Massachusetts Avenue, NW
Washington, D.C. 20005

Case Studies in Anatomy. Ernest Lachman. Oxford Univ. Press, New York, 1965. 250 pp. Illus. Paper, \$2.95.

Catalogue of Data in World Data Center A: Oceanography. Suppl. No. 1, Data received during the period, 1 January to 30 June 1964. World Data Center A: Oceanography, Washington, D.C., 1964. Unpaged.

Circulation and Respiration: The Evolution of an Idea. Mark Graubard. Harcourt, Brace, and World, New York, 1964. 288 pp. Illus. Paper, \$2.95.

The Clock We Live On. Isaac Asimov. Abelard-Schuman, New York, ed. 2, 1965. 172 pp. Illus. \$3.50 (juvenile book).

The Computer Age: And Its Potential for Management. Gilbert Burck and the editors of *Fortune*. Harper and Row, New York, 1965. 160 pp. Illus. \$3.95.

Contemporary Physics. David Park. Harcourt, Brace, and World, New York, 1964. 185 pp. Illus. Paper, \$2.45.

Current Research and Development in Scientific Documentation. vol. 13. Compiled by the Office of Science Information Service, National Science Foundation. Natl. Science Foundation, Washington, D.C., 1964. 508 pp. Paper, \$1.75 (order from Superintendent of Documents, Washington, D.C.). Reports on research activities in scientific documentation and closely related fields.

Dances of Anáhuac. The choreography and music of precortesian dances. Samuel Martí and Gertrude Prokosch Kurath. Aldine, Chicago, 1964. 271 pp. Illus. \$10.

Darwin's Biological Work: Some Aspects Reconsidered. P. R. Bell, J. Chalmers, J. B. S. Haldane, P. Marler, H. L. K. Whitehouse, and J. S. Wilkie. Wiley, New York, 1964 (reprint of the 1959 edition). 357 pp. Illus. Paper, \$2.25.

The Development of Modern Chemistry. Aaron J. Ihde. Harper and Row, New York, 1964. 862 pp. Illus. \$13.50.

Rudolf Diesel: Pioneer of the Age of Power. W. Robert Nitske and Charles Morrow Wilson. Univ. of Oklahoma Press, Norman, 1965. 328 pp. Illus. \$5.95.

Digest of Literature on Dielectrics. vol. 27. Prepared by the Committee on Digest of Literature of the Conference on Electrical Insulation, Division of Engineering and Industrial Research. Natl. Acad. Sciences-Natl. Research Council, Washington, D.C., 1964. 263 pp. Paper, \$15.

A Directory of Information Resources in the United States: Physical Sciences, Biological Sciences, Engineering. Natl. Referral Center for Science and Technology, Washington, D.C., 1964 (order from Superintendent of Documents, Washington, D.C.). 356 pp. Paper, \$2.25.

The Discovery of Radioactivity and Transmutation. Alfred Romer, Ed. Dover, New York, 1964. 247 pp. Illus. Paper, \$1.65. A collection of essays by Henri Becquerel, Sir William Crookes, P. Curie, S. Curie, A. Laborde, William Ramsey, E. Rutherford, and Frederick Soddy.

Education of Vision. Gyorgy Kepes, Ed. Braziller, New York, 1965. 241 pp. Illus. \$12.50. The contributors are Rudolf Arnheim, Wolfgang Metzger, Anton Ehrenzweig, Gerald Holton, Will Burtin, William J. J. Gordon, Johannes Itten, Tomás Maldonado, Paul Rand, Mirko Basaldella, Julian Beinart, Bartlett H. Hayes, Jr., Robert Preusser, and Robert Jay Wolff.

Everyday Miracle. Gustav Eckstein. Harper and Row, New York, 1965. 160 pp. Illus. \$3.50 (juvenile book).

Explaining the Atom. Selig Hecht. With revisions and additional material by Eugene Rabinowitch. Viking Press, New York, ed. 2, 1964. 255 pp. Illus. Paper, \$1.45.

The Fabric of Geology. Claude C. Albritton, Jr., Ed. Freeman, Cooper, Stanford, Calif., 1964 (© 1963). 384 pp. Illus. \$8. Sixteen papers contributed by Charles A. Anderson, Frederick Betz, Jr., W. H. Bradley, James Gilluly, Arthur F. Hagner, J. M. Harrison, Mason L. Hill, David B. Kitts, Walter B. Langbein, Robert F. Legget, Luna B. Leopold, J. Hoover Mackin, Donald B. McIntyre, V. E. McKelvey, George Gaylord Simpson, and A. O. Woodford.

The Flight of Thunderbolts. Sir Basil Schonland. Oxford Univ. Press, New York, ed. 2, 1964. 192 pp. Illus. \$4.80. The Gregynog Lectures, delivered in 1960 at the University College of Aberystwyth, are included.

The Foraminifera of the Tropical Pacific Collections of the "Albatross," 1899-1900. pt. 4, *Rotaliform Families and Planktonic Families.* Ruth Todd. Smithsonian Institution, Washington, D.C., 1965 (order from Superintendent of Documents, Washington, D.C.). 145 pp. Plates. Paper, \$1.

Foundations of Engineering. Cornell College of Engineering Lectures, Spring 1963. Philip Sporn. Pergamon, London; Macmillan, New York, 1964. 149 pp. \$3.75.

Galileo Galilei: A Biography and Inquiry into His Philosophy of Science. Ludovico Geymonat. Translated from the Italian edition (1957) by Stillman Drake. McGraw-Hill, New York, 1964. 272 pp. \$6.50.

Halftone Printing. Proceedings, Seventh International Conference of Printing Research Institutes (London), June 1963. W. H. Banks, Ed. Pergamon, London; Macmillan, New York, 1964. 435 pp. Illus. \$15. 27 papers.

A Handbook on Evolution. Gavin de Beer. British Museum (Natural History), London, ed. 3, 1964. 142 pp. Illus. Paper, 5s.

Heredity and Evolution in Human Populations. L. C. Dunn. Atheneum, New York, ed. 2, 1965. 165 pp. Illus. Paper, \$1.95.

A History of Science: Hellenistic Science and Culture in the Last Three Centuries B.C. George Sarton. Wiley, New York, 1965. 576 pp. Illus. Paper, \$2.65 (reprint of 1959 edition).

The Human Brain: Its Capacities and Functions. Isaac Asimov. New American Library, New York, 1965. 377 pp. Illus. Paper, 75¢.

Human Engineering Guide for Equipment Designers. Wesley E. Woodson and Donald W. Conover. Univ. of California Press, Berkeley, ed. 2, 1964. Unpaged. Illus. \$10.

Hydrospace. Martin Caidin. Dutton, New York, 1964. 320 pp. Illus. \$5.95.

The Image and Appearance of the Human Body: Studies in the Constructive Energies of the Psyche. Paul Schilder. Wiley, New York, 1964 (reprint of 1950 edition). 353 pp. Paper, \$1.65.

Index to Reviews, Symposia Volumes,

26 MARCH 1965

THIS IS THE WILD* INSTRUMENT SERVICE CENTER



Its Mission: To assure WILD* instrument owners of prompt service and return of their instruments. Same day service available when necessary and feasible.

Its Equipment: The WILD Service Center is stocked and equipped to provide full factory services on any WILD instrument.

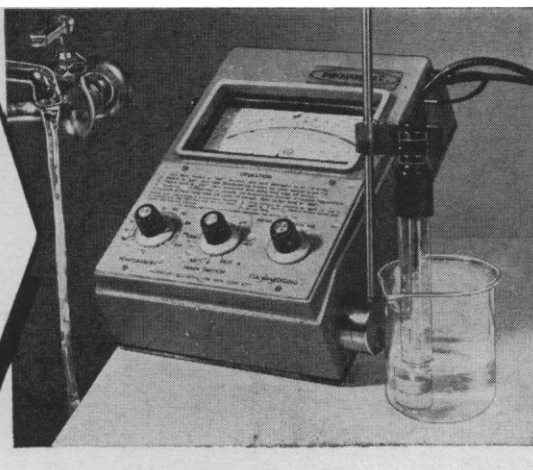
And most important, its personnel: Only carefully selected WILD trained technicians with many years experience in WILD construction, assembly and repair are permitted to service your WILD instrument.

*The first name in Surveying Instruments, Photogrammetric Equipment and Microscopes.

WILD®
HEERBRUGG

WILD HEERBRUGG INSTRUMENTS, INC.
PORT WASHINGTON, NEW YORK
Full Factory Services
In Canada: Wild of Canada Ltd.,
881 Lady Ellen Place, Ottawa 3, Ontario

**NEW...portable
pH Meter
that's completely
SPLASH
PROOF**



If you use your pH Meter around water or chemicals—indoors or outdoors—then you should have the new Photovolt pH Meter, Model 126. It's completely sealed—shock resistant...resists fumes, corrosion and mildew. No warm up time necessary—has remarkable stability. Convenient carrying handle allows for 3-position operation.

Ask your Laboratory Supply Dealer or write to

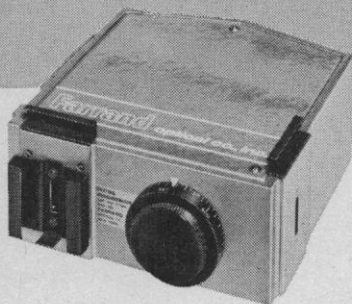
PHOTOVOLT

PHOTOVOLT CORP. 1115 Broadway, New York, N. Y. 10010

take a
good
look...

at Farrand Grating
MONOCHROMATORS

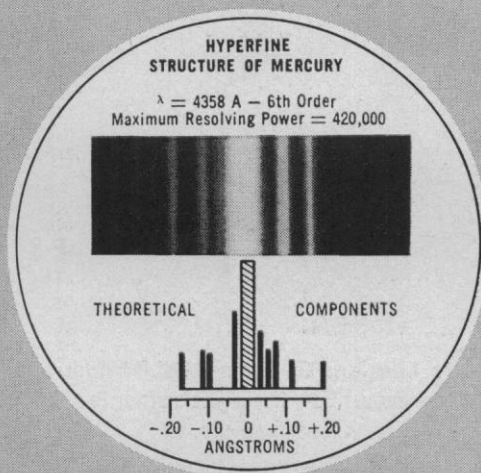
- Efficient
- Compact
- Precise
- Rugged
- Versatile
- Inexpensive



Write for descriptive literature

Farrand OPTICAL CO., INC.

Think of Farrand first... for the finest scientific instruments



Theoretical resolving power of a Farrand Master Diffraction Grating reflecting the efficiency of Farrand Replicas.

Farrand Grating Monochromators utilize the famous Farrand grating replicas and associated precision optical components... resulting in unusually high efficiency, excellent spectral purity and extremely low scatter. A number of models are available to cover various spectral ranges from 200 mμ to 3000 mμ. These Monochromators are ideally suited for a wide range of uses including such applications as microscope illumination, monochromatic projection and spectral measurements.

See us at Booth D-8, Federation Conf. Convention Hall, Atlantic City

4405 Bronx Blvd. at E 238th St.
Bronx, N. Y. 10470 • 212 FA 4-2200

and Monographs in Organic Chemistry: For the Period 1961-1962. Compiled and edited by Norman Kharasch and Walter Wolf. Pergamon, London; Macmillan, New York, 1964. 272 pp. \$10.

Infinity: An Essay in Metaphysics. José A. Benardete. Oxford Univ. Press, New York, 1964. 299 pp. \$7.20.

Insight and Responsibility. Lectures on the ethical implications of psychoanalytic insight. Erik H. Erickson. Norton, New York, 1964. 256 pp. Illus. \$5.

Institute in Technical and Industrial Communications. *Proceedings*, July 1964. Herman M. Weisman, Ed. Colorado State Univ., Fort Collins, 1965. 136 pp. Illus. Paper, \$6. The contributors are Shirleigh Silverman and Charles DeVore; C. O. Neidt; Harold F. Osborne; Herbert B. Michaelson; H. N. Hubbs; George T. Vardaman; Melvin S. Day; Waldo T. Boyd; Israel Light; Roy Davison; Roy C. Nelson; William E. DeSmith; John B. Haney; A. M. I. Fiskin; Arthur Dreyer; Julius Frome; J. W. Perry; Herman M. Weisman; and B. M. Oliver.

Internal Factors in Evolution. Lancelot Law Whyte. Braziller, New York, 1965. 128 pp. \$4.

An Introduction to Patents for Inventors and Engineers. C. D. Tuska. Dover, New York, 1965 [reprint of *Patent Notes for Engineers* (1956)]. 204 pp. Illus. Paper, \$1.50.

Investigations in Southwest Yukon (Peabody Foundation Papers for Archaeology, vol. 6, Nos. 1 and 2). No. 1, *Geobotanical and Archaeological Reconnaissance*, Frederick Johnson and Hugh M. Raup; No. 2, *Archaeological Excavations, Comparisons, and Speculations*, Richard S. MacNeish. Peabody Foundation, Phillips Acad., Andover, Mass., 1964. 520 pp. Illus. Map. Paper, \$9.

Issaquena: An Archaeological Phase in the Yazoo Basin of the Lower Mississippi Valley (Memoirs, No. 18). Robert E. Greengo. Soc. American Archaeology, Salt Lake City, Utah, 1964. 148 pp. Illus. Paper.

Kepler's Dream. John Lear. Translated by Patricia Frueh Kirkwood. Univ. of California Press, Berkeley, 1965. 190 pp. \$5.

The Land and Wildlife of North America. Peter Farb and the editors of *Life*. Time Inc., New York, 1964. 200 pp. Illus. \$3.95.

The Language of Nature: An Essay in the Philosophy of Science. David Hawkins. Freeman, San Francisco, 1964. 384 pp. Illus. \$7.50.

Legumes in Human Nutrition. W. R. Aykroyd and Joyce Doughty. Food and Agriculture Organization of the United Nations, Rome, 1964 (order from Columbia Univ. Press, New York). 150 pp. Paper, \$3.

Life in Deserts. J. L. Cloudsley-Thompson and M. J. Chadwick. Dufour, Philadelphia, 1964. 236 pp. Illus. \$8.95.

Man and the World of Science. Harry A. Kuljian. Barnes, New York; Yoseloff, London, 1964. 142 pp. Illus. \$6.50.

Mathematics and Logic in History and in Contemporary Thought. Ettore Carruccio. Translated by Isabel Quigley. Aldine, Chicago, 1965. 398 pp. Illus. \$8.75.

Mathematics and Science: Last Essays (Dernières Pensées). Henri Poincaré.

Translated from the French (1913) by John W. Bolduc. Dover, New York, 1963. 125 pp. Paper, \$1.25.

Mathematics in Western Culture. Morris Kline. Oxford Univ. Press, New York, 1964 (reprint of 1953 edition). 512 pp. Illus. Plates. Paper, \$2.25.

The Lifeline of America. Development of the food industry. Edward C. Hampe, Jr., and Merle Wittenberg. McGraw-Hill, New York, 1964. 400 pp. Illus. \$6.95.

The Lives of Desert Animals in Joshua Tree National Monument. Alden H. Miller and Robert C. Stebbins. Univ. of California Press, Berkeley, 1964. 459 pp. Illus. \$10.

The Magic of Molecules. Herbert W. Franke. Translated from the German by H. F. Brookes. Abelard-Schuman, New York, 1964. 275 pp. Illus. \$6.

Magnetic Materials Digest. The literature of 1963. A. H. Morrish, R. J. Rosen, and S. M. Rubens. Lads, Philadelphia, 1964. 268 pp. Illus.

Medical School Admission Requirements: U.S.A. and Canada. Compiled by E. Shepley Nourse. Assoc. of American Medical Colleges, Evanston, Ill., ed. 15, 1964. 263 pp. Paper, \$4.

Meet the Reptiles. C. H. Keeling. Watts, New York, 1965. 158 pp. Illus. \$3.95 (juvenile book).

Modern Science A and B for Second Year. F. T. Barrell. Jacaranda Press, Brisbane, Australia, 1965. 296 pp. Illus. Textbook for grade 9.

The Mysterious Senses of Animals. Vitus B. Dröschner. Translated from the German edition (Oldenburg, 1962) by Eveleen Huggard. Dutton, New York, 1965. 255 pp. Illus. \$5.95.

National Advisory Committee on Research in the Geological Sciences. A report. Geological Survey of Canada, Ottawa, 1965. 199 pp. Paper, 50¢. The 14th annual report of the committee, giving a review of the period 1 September 1963 to 31 August 1964, subcommittee reports, research grants awarded in 1964 and 1965, and current research in the geological sciences in Canada 1963 and 1964.

Native Vegetation of Nebraska. J. E. Weaver. Univ. of Nebraska Press, Lincoln, 1965. 191 pp. Illus. \$4.75.

The Nature and Art of Motion. Gyorgy Kepes, Ed. Braziller, New York, 1965. 207 pp. Illus. \$12.50. The contributors are Gyorgy Kepes, Gerald Holton, James S. Ackerman, Gillo Dorfles, Hans Walthach, James J. Gibson, Stanley W. Hayter, George Rickey, Katharine Kuh, Karl Gerstner, Hans Richter, Robert Gessner, Gordon B. Washburn, and Donald Appleyard.

Orchids of the Western Great Lakes Region. Frederick W. Case, Jr. Cranbrook Inst. of Science, Bloomfield Hills, Mich., 1964. 159 pp. Illus. \$7.

The Origins of Modern Science 1300-1800. Herbert Butterfield. Free Press (Macmillan), New York, ed. 2, 1965. 255 pp. Paper, \$1.95.

The Outer Fringe. Faculty benefits other than annuities and insurance. Mark H. Ingraham with the collaboration of Francis P. King. Univ. of Wisconsin Press, Madison, 1965. 316 pp. \$7.50.

Peaceful Coexistence: Its Theory and Practice in the Soviet Union. John and

Margrit Pittman. International Publishers, New York, 1964. 156 pp. Paper, 95¢.

Philosophical Problems of Natural Science. Dudley Shapere. Macmillan, New York, 1965. 128 pp. Paper, \$1.50. Eight papers: "The theoretician's dilemma: A study in the logic of theory construction" by Carl G. Hempel; "What is a law of nature?" by Arthur Pap; "Probability and inductive logic" by Rudolf Carnap; "An introduction to simplicity" by Richard Rudner; "Paradigms and some misinterpretations of science" by Thomas Kuhn; "Physical theory, mathematics, and experiment" by Pierre Duhem; "The role of models in scientific theory" by Mary Hesse; and "Ideals of natural order" by Stephen Toulmin.

The Philosophy of Science. A systematic account. Peter Caws. Van Nostrand, Princeton, N.J., 1965. 366 pp. Illus. \$6.75.

A Philosophy of Science. W. H. Werkmeister. Univ. of Nebraska Press, Lincoln, 1965 (reprint of the 1940 edition). 565 pp. Illus. Paper, \$1.85.

Physics. Samuel Rapport and Helen Wright, Eds. New York Univ. Press, New York, 1964. 349 pp. Illus. \$4.95. Eighteen essays presented in three sections: Foundations; The Atom; and Relativity.

The Pleasure of Math. A. W. Goodman. Macmillan, New York, 1965. 224 pp. Illus. \$4.50.

Polyominoes. Solomon W. Golomb. Scribner, New York, 1965. 182 pp. Illus. \$5.95.

Pregnancy: Conception and Heredity. Eric Weiser. Translated from the German edition (Frankfurt, 1959) by Therese Pol. Blaisdell (Ginn), New York, 1965. 156 pp. Illus. Paper, \$1.50.

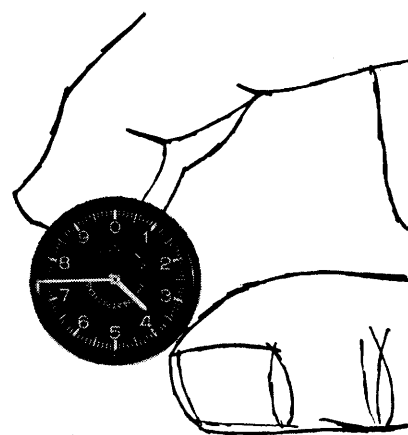
Problems of the Aged. Compiled by Clyde B. Vedder and Annette S. Lefkowitz. Thomas, Springfield, Ill., 1964. 277 pp. \$7.50. The contributors are Edward R. Annis, Manuel Bastos Ansart, Edwin T. Arnold, Jr., Kathryn Ann Beatty, Francis J. Braceland, Edward Brecher, Ruth Brecher, Don C. Charles, Nila Kirkpatrick Covalt, Victor A. Gilbertsen, Mark P. Hale, Barbara M. Henley, M. K. Horwitt, Robert C. Lonergan, Lawrence J. Rossi, Zachary Sagal, Doris Schwartz, Richard P. Shapera, William F. Sheeley, Marvin L. Silverblatt, Robert Sommer, S. L. Sparks, Owen H. Wangenstein, and Frederick A. Whitehouse.

Progress in Oceanography. vol. 2. Mary Sears, Ed. Pergamon, London; Macmillan, New York, 1964. 277 pp. Illus. \$12. Four papers: "The Major deep-sea expeditions and research vessels 1873-1960: A contribution to the history of oceanography" by G. Wüst; "On the vertical distribution of zooplankton in the sea" by K. Banse; "The distribution of phosphorus and oxygen in the Atlantic Ocean as observed during the I.G.Y., 1957-1958" by D. A. McGill; and "A survey of marine bottom samplers" by T. L. Hopkins.

Proteins: Their Chemistry and Politics. Aaron M. Altschul. Basic Books, New York, 1965. 351 pp. Illus. \$7.50.

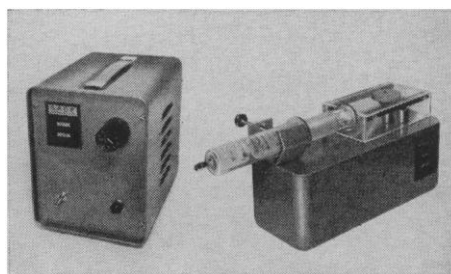
Public Relations in Natural Resources Management. Douglas L. Gilbert. Burgess, Minneapolis, 1964. 241 pp. Illus. \$4.50.

Public Water Supplies of the 100 Largest Cities in the United States, 1962. Charles N. Durfor and Edith Becker. U.S. Geological Survey, Washington, D.C.,



DIAL YOUR FLOW RATE

and Get Guaranteed
 $\pm 0.5\%$ Reproducibility



Continuously variable Sage Syringe Pumps permit you to **pin-point** the flow rate you want — at the setting of a dial. For example, selectable flow rate ranges for the 255 Series are:

0.02 μ l/day to 118 ml/day (255-3)
0.02 μ l/hr to 98 ml/hr (255-2)
0.005 μ l/min to 29 ml/min (255-1)

Sage Syringe Pumps are also available in models which offer a number of discrete rates. Pumps are designed for accurate, reproducible infusion of fluids with syringes ranging from 0.5 μ l to 100 cc capacity. Pumps operate reproducibly regardless of changes in back pressure or $\pm 10\%$ variations in line voltage.

Whatever your application, you can count on Sage pumps to deliver dependable, accurate, and reproducible performance. Each of the series types listed below is available in specific models to meet your particular flow rate range requirement. Write, wire or call for data or ask your Sage labware dealer for a demonstration.

Constant Speed Models

Series 234 (10 cc max.)\$145
Series 249 (100 cc max.)\$215

Variable Speed Models

Series 237 (10 cc max.)\$325
Series 255 (100 cc max.)\$395

SAGE INSTRUMENTS, INC.

2 Spring Street, White Plains, N. Y. 10601
914 949-4121

1964 (order from Superintendent of Documents, Washington, D.C.). 374 pp. Illus. Paper, \$2.

Realms of Philosophy. William S. Sahakian and Mabel Lewis Sahakian. Schenkman, Cambridge, Mass., 1965. 624 pp. Illus. \$8.95.

The Relevance of Science: Creation and Cosmogony. Gifford Lectures, 1959-60. C. F. von Weizsäcker. Harper and Row, New York, 1964. 192 pp. \$5.

The Rise of the American Chemistry Profession, 1850-1900. Edward H. Beardsley. Univ. of Florida Press, Gainesville, 1964. 84 pp. Paper, \$2.

The Run. John Hay. Published in cooperation with the American Museum of Natural History by Doubleday, New York, ed. 2, 1965. 200 pp. Illus. Paper, 95¢.

Russia and the Soviet Union. A bibliographic guide to western-language publications. Paul L. Horecky, Ed. Univ. of Chicago Press, Chicago, 1965. 497 pp. \$8.95.

Schools in an Age of Mass Culture. An exploration of selected themes in the history of 20th-century American education. Willis Rudy. Prentice-Hall, Englewood Cliffs, N.J., 1965. 384 pp. \$6.95.

Science and Contemporary Social Problems. A report. University Relations Division, Oak Ridge Institute of Nuclear Studies, Oak Ridge, Tenn., 1964. 128 pp. The report of a conference, 15 June to 15 July 1964, at which a group of 30 specialists from the natural and social sciences, the humanities, and the legal profession considered the social consequences of scientific and technical behavior. Norwood Russell Hanson was chairman of the conference. Among those who attended were Robert B. Brode, James L. McCamey, David Riesman, L. Pearce Williams, David Hawkins, and Eric Larabee.

Science as a Cultural Force. Harry Woolf, Ed. Johns Hopkins Press, Baltimore, Md., 1964. 120 pp. \$3.95. Essays originally delivered at Johns Hopkins University as the Shell Companies Foundation Lectures on Science, Technology, and Society. The essays are: "Toward a research-reliant society: Some observations on government and science" by James R. Killian, Jr.; "Technology and society" by Jerome B. Wiesner; "Science and man's place in the universe" by Michael Polanyi; "Presupposition in the construction of theories" by Gerald Holton, and an introductory essay "Science in society" by Harry Woolf.

La Science Contemporaine: Les Sciences Physiques et leurs Applications. vol. 1. Louis Leprince-Ringuet, Ed. Librairie Larousse, Paris, 1964. 368 pp. Illus. The contributors are Jacques Clavier, Gabriel de Clavière, Robert Collongues, Maurice Françon, Jean Heidmann, Dominique Leprince-Ringuet, Louis Leprince-Ringuet, Georges Parreins, Jacques Parrod, Claude Picard, Anne-Marie Rozis-Saulgeot, and Maurice Vernet-Lozet.

A Selected Guide to the Literature on the Flowering Plants of Mexico. Ida Kaplan Langman. Univ. of Pennsylvania Press, Philadelphia, 1964. 1015 pp. \$25.

La Sélection Végétale. Robert Diehl. Presses Universitaires de France, Paris, 1965. 126 pp. Illus. Paper.

Sexual Reproduction. Susan Michel-

PLENUM PRESS / CONSULTANTS BUREAU

DEVELOPMENTS IN APPLIED SPECTROSCOPY, Volume 3

Edited by John E. Forrette and Elma Lanterman. Proceedings of the Fourteenth (1963) Mid-America Spectroscopy Symposium sponsored by the Society for Applied Spectroscopy, Chicago Section. This volume contains both applied and theoretical studies on x-ray, infrared, Raman, visible, ultraviolet, nuclear-magnetic and electron magnetic resonance, flame, and arc-spark spectroscopy. As in previous volumes, the closely allied field of gas chromatography is represented by papers contributed by the Chicago Gas Chromatography Discussion Group. Plenum 419 pages \$17.50

BIOMEDICAL APPLICATIONS OF GAS CHROMATOGRAPHY

Edited by Herman A. Szymanski. A collection of authoritative reports on current usage of gas-liquid chromatography in biomedical analyses, this volume is the most comprehensive work yet to appear on this important topic. Studies are included on the application of GLC to the following types of organic compounds: amines, alkaloids, and amino acids; steroids; bile acids; carbohydrates; urinary aromatic acids; fatty acids and derivatives; and volatile organic anesthetics in blood. Plenum 328 pages \$12.50

IR—THEORY AND PRACTICE OF INFRARED SPECTROSCOPY

By Herman A. Szymanski and Nelson L. Alpert. The major part of this book deals with spectroscopic theory (fineline structure of absorption bands, inversion doubling, group theory, Coriolis forces, etc.), quantitative analysis methods, laboratory techniques, and interpretation of spectra. With its thorough treatment of the essential aspects of the theory, instrumentation, and laboratory technique, and with its all-new examples of spectra, this book will be of use to all who need a single ready reference to the technology of infrared spectroscopy. Plenum 389 pages \$15.00

BIOMEDICAL SCIENCES INSTRUMENTATION, Volume 2

Edited by William E. Murry and Peter F. Salisbury. Proceedings of the Second (1964) National Biomedical Sciences Instrumentation Symposium, sponsored by Instrument Society of America. This volume elucidates several important and specific areas in the borderland between engineering and physics on the one hand and physiology and medical science on the other; it presents comprehensive, authoritative, up-to-the-minute information not available from any other source—information useful in the medical supervision of astronauts, test pilots, and patients who require constant surveillance, etc. The data included describe new instruments designed for these purposes, or principles tested to the point where immediate and concentrated development appears feasible. Plenum 486 pages \$12.50

SUPPLEMENTS 1 and 2 to the INFRARED BAND HANDBOOK

Edited by Herman A. Szymanski. The range of coverage of the IBH (2 to 15 microns) is extended to the 15 to 25 microns region in these Supplements to the Handbook, which are bound as a single volume for maximum convenience. Further, 4543 band positions of organic and inorganic compounds are tabulated according to wavelength of the IR absorption spectra. Essential as additions to the original Handbook, the Supplements are also important in their own right, since the range from 15 to 25 microns is a region becoming increasingly important in compound identification. Because of the scarcity of group frequencies in this range which might normally be used for compound identification, the use of absorption band positions as reported in the Supplements will be very valuable to the analyst. Plenum 250 pages \$15.00

ULTRASOUND: Physical, Chemical and Biological Effects

By I. E. El'piner. Written by an internationally celebrated Soviet researcher, this comprehensive review of progress in the understanding and application of the effects of ultrasonic waves on living objects and biologically active substances presents a lucid exposition of the elementary physics of ultrasonic waves and the basic concepts of the mechanism of their action. It is a valuable contribution to chemists and biologists working in the advanced field of ultrasonic biophysics. The review, which covers the world literature on the subject, contains 1,100 literature citations organized chapter by chapter. The author has updated the work exclusively for the English edition.

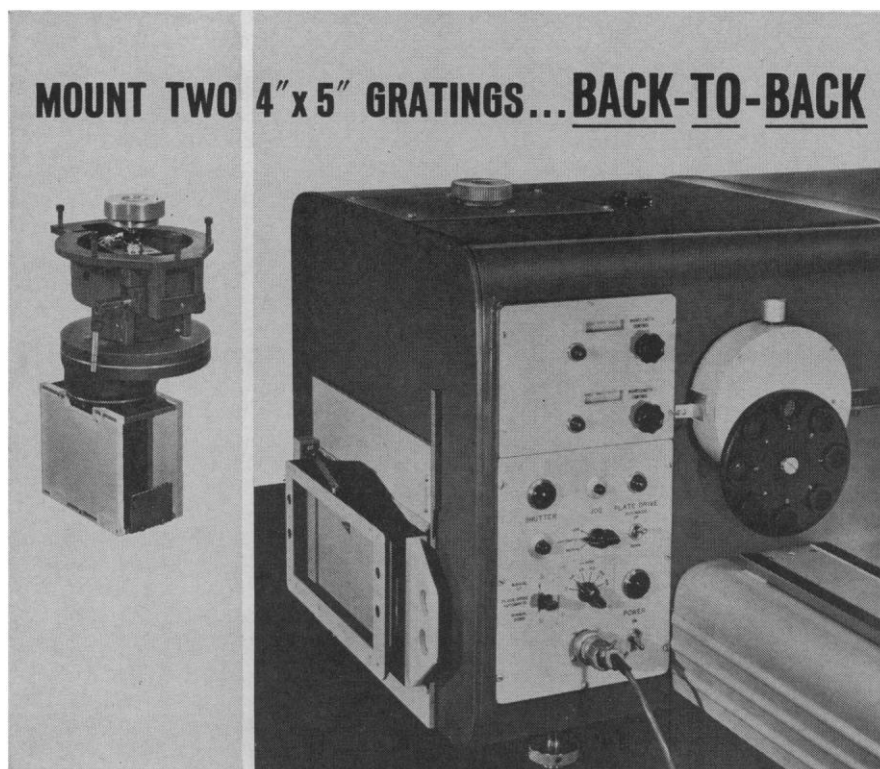
CB 380 pages \$22.50

Contents on request

 PLENUM PRESS /  CONSULTANTS BUREAU
227 W. 17th St., New York, N. Y. 10011


BRIGHT IDEA

FOR A BRIGHTER SPECTROGRAPH:



The new Bausch & Lomb RESEARCH DUAL GRATING SPECTROGRAPH has a numerical aperture of $f/15.5$... higher intensity than ever before. Choose the gratings that suit your work... we offer a complete variety that covers the full range of currently available photographic emulsions or detectors. Each pair of gratings is mounted in a convenient turret. All gratings are interchangeable *without recalibration*. The correct grating, tailored to your custom needs, gives outstanding performance for any particular spectrum region. Our large grating engine produces gratings that minimize ghosts... give cleaner spectra. Determinations are faster, easier, more dependable. If you require ultra speed, we can provide a single $4'' \times 8''$ echelle type grating for a normal incidence f ratio of $f/12.1$. Using a 300 groove/mm echelle at an incidence angle of 65° , photographs up to the 28th order may be taken. The B&L RESEARCH DUAL GRATING SPECTROGRAPH can be used for isotope work and laser applications.

Bausch & Lomb also offers the regular DUAL GRATING SPECTROGRAPH with two separate $2'' \times 4''$ gratings for routine chemical analyses and the 1.5 METER STIGMATIC GRATING SPECTROGRAPH with choice of 4 gratings—famous for fine line quality at lowest price. Whatever your problems in illumination and analysis, let our experts recommend the most efficient spectrographic methods and equipment. Write for Catalog 33-2102, and tell us your problems, Bausch & Lomb Incorporated, 77415 Bausch Street, Rochester, New York 14602.

BAUSCH & LOMB 

more. Published for the American Museum of Natural History by Natural History Press, Garden City, N.Y., 1965. 239 pp. Illus. \$4.50.

Shore and Sea Boundaries. With special reference to the interpretation and use of Coast and Geodetic Survey data. vol. 2, *Interpretation and Use of Coast and Geodetic Survey Data*. Aaron L. Shalowitz. U.S. Department of Commerce, Washington, D.C., 1964 (order from Superintendent of Documents, Washington, D.C.). 775 pp. Illus. \$5.25.

Shore Wildflowers of California, Oregon, and Washington. Philip A. Munz. Univ. of California Press, Berkeley, 1964. 126 pp. Illus. Plates. Paper, \$2.95; cloth, \$4.75.

The Sign of the Flying Goose. A guide to the national wildlife refuges. George Laycock. Published for the American Museum of Natural History by the Natural History Press, Garden City, N.Y., 1965. 311 pp. Illus. \$5.95.

The Small World of Khanh Hau. James B. Hendry. Aldine, Chicago, Ill., 1964. 324 pp. Illus. \$6.

Social Approaches to Mental Patient Care. Morris S. Schwartz, Charlotte Green Schwartz, and others. Columbia Univ. Press, New York, 1964. 351 pp. \$8.75.

Social Organization of the Mongol-Turkic Pastoral Nomads. Lawrence Krader. Mouton, The Hague, Netherlands; Indiana Univ., Bloomington, 1963. 422 pp. Tables. Paper.

So You Want To Be a Teacher. Paul J. Gelinis. Harper and Row, New York, 1965. 192 pp. \$3.50.

Solid-Earth Geophysics: Survey and Outlook. Panel on Solid-Earth Problems, Geophysics Research Board and Division of Earth Sciences. Natl. Acad. Sciences—Natl. Research Council, Washington, D.C., 1964. 210 pp. Paper, \$4.

Space Flight: Countdown for the Future. Eugen Sänger. Translated from the German edition (Düsseldorf, 1963) and edited by Karl Frucht. McGraw-Hill, New York, 1965. 311 pp. \$6.95.

Stars and Planets. Pincus Feld and Eta Richman. Vantage Press, New York, 1965. 135 pp. Illus. \$3.50.

Statistics. An introduction for students in the behavioral sciences. Dorothy C. Adkins. Merrill, Columbus, Ohio, 1964. 383 pp. Illus. Paper, \$6.95; cloth, \$8.95.

Strategy for Mobility. Wilfred Owen. Brookings Institution, Washington, D.C., 1964. 261 pp. \$5.

Thinking: From Association to Gestalt. Jean Matter Mandler and George Mandler. Wiley, New York, 1964. 312 pp. Illus. \$4.95.

The Transition from Childhood to Adolescence. Yehudi A. Cohen. Aldine, Chicago, 1964. 254 pp. \$5.75.

Yearbook of Physical Anthropology, 1962. Jack Kelso and Gabriel W. Lasker, Eds. Published for the American Association of Physical Anthropologists by Instituto de Investigaciones Historicas, Universidad Nacional Autonoma de Mexico and Instituto Nacional de Antropología e Historia, 1964 (available from Instituto Nacional de Antropología e Historia, Córdoba 45, Mexico 7, D.F.). 383 pp. Illus. Paper.