

the various sessions of the symposium. More than 60 lectures ranging in theme from classical procedures to the most modern instrumental techniques were presented.

In a biographical sketch Feigl's varied experiences are reviewed. Despite adversities connected with World War II, he maintained a high degree of productivity and published some 350 to 400 papers, books, and patents.

During the symposium there were three plenary lectures, all of which illustrated Feigl's well-known scientific acumen. The first of these was entitled "The applications and implications of specific, selective, and sensitive reactions." The authors who contributed papers highlight the simplicity of most spot tests, the importance of new and effective reagents, and the necessity of considering the reactions associated with these reagents. In reviewing some of Feigl's major contributions to spot tests, they note that chelates were involved in a high proportion of the tests. Although many tests can be applied without a full understanding of the reactions involved, much can be said in favor of the presentation of spot-test chemistry at a senior or graduate level. Spot-test chemistry has made an important contribution in extending our knowledge of specific and selective reactions.

The second plenary lecture is entitled "From spot tests to spot colorimetry." Malissa reviews the various attempts to apply colorimetry and photometry to spot tests and notes that variables in the behavior of the paper used as a base for the spots play an important role. The nonuniformity of spots on paper has been observed, and among the techniques used to solve this problem, the ring oven gives impressively accurate results. With respect to materials other than paper, the favorable aspects of agar-agar are described. In measuring color and intensities, the modern trend toward the use of precise photometers often creates difficulties. The capacity of the human eye to compare standards and unknowns is commonly underestimated. Malissa concludes that "We can hope finally to achieve true quantitative evaluation of spots" and that "the real bottle neck is the paper."

The third plenary lecture, "The development of organic reagents in inorganic analysis," is by Frank Welcher. This is excellent reading for those who are interested in research in this field, not only because Welcher

highlights the importance of Feigl's "Tupfelreactionen," but also because he reviews those topics that have an important bearing on the study of spot tests and color reactions. A few among these topics are chelate compounds and analytical properties, chelate forming structures in organic molecules, specific atomic groupings, the effects of substitution on analytical properties, hydration centers, and the weighting effect.

The other contributions to the symposium have been grouped under the following headings: Spot Tests and Qualitative Analysis; Semiquantitative Spot-test Methods; Organic Reagents and Their Applications; Electrochemical Methods of Analysis; Radiochemical Methods of Analysis; Optical Methods; Separation Processes; Titrimetric Analysis; and Miscellaneous Papers.

Some of the papers are general in scope, but most are contributions to specific areas of modern analytical chemistry. It would be difficult to select specific contributions of outstanding content, because so much would depend on an individual's interest. Suffice it to note that the book deserves careful examination, not only by those who are interested in tests for functional groups, anions, and cations, but also by those who are interested in the special contributions that elaborate chemical reactions. The contents are well organized and easy to read.

VILLIERS W. MELOCHE

*Department of Chemistry,  
University of Wisconsin*

## New Books

### Mathematics, Physical Sciences, and Engineering

**Advances in Chemical Engineering.** vol. 4. Thomas B. Drew and John W. Hoopes, Jr., Eds. Academic Press, New York, 1963. 384 pp. Illus. \$14. Five papers: "Mass-transfer and interfacial phenomena," J. T. Davies; "Drop phenomena affecting liquid extraction," R. C. Kintner; "Patterns of flow in chemical process vessels," Octave Levenspiel and Kenneth B. Bischoff; "Properties of concurrent gas-liquid flow," Donald S. Scott; and "A general program for computing multistage vapor-liquid processes," D. N. Hanson and G. F. Somerville.

**Advances in Heat Transfer.** vol. 1. Thomas F. Irvine, Jr., and James P. Hartnett, Eds. Academic Press, New York, 1964. 471 pp. Illus. \$16. Five papers: "The interaction of thermal radiation with conduction and convection heat transfer," R. D. Cess; "Application of integral methods to transient nonlinear heat transfer,"

Theodore R. Goodman; "Heat and mass transfer in capillary-porous bodies," A. V. Luikov; "Boiling," by G. Leppert and C. C. Pitts; "The influence of electric and magnetic fields on heat transfer to electrically conducting fluids," Mary F. Romig; "Fluid mechanics and heat transfer of two-phase annular-dispersed flow," Mario Silvestri.

**Applications of Neutron Diffraction in Chemistry.** G. E. Bacon. Pergamon, London; Macmillan, New York, 1963. 153 pp. Illus.

**Advances in Organic Geochemistry.** Proceedings of an international meeting (Milan, Italy), September 1962. Umberto Colombo and G. D. Hobson, Eds. Pergamon, London; Macmillan, New York, 1964. 498 pp. Illus. \$17.50. Thirty nine papers presented at the first international meeting of the European Branch of the Organic Geochemistry Group of the Geochemical Society. The O.G.G. was formed in November 1960 at the society's Denver meeting, and the European Branch was organized in the spring of 1961. At this meeting, which was cosponsored by the Lombard branch of the Societa Chimica Italiana, 120 geochemists and others from Europe, America, Africa, and Asia were present "to discuss their research, and to review problems relating to the geochemistry of organic materials in the Earth's crust, such as petroleum and coal, as well as less highly concentrated but more widespread organic matter present in various rocks, soils and waters."

**Alicyclic Compounds.** Douglas Lloyd. Elsevier, New York, 1964. 181 pp. Illus. \$6.50.

**Building Up Mathematics.** Z. P. Dienes. Hutchinson, London; Humanities Press, New York (© 1960), 1964. 124 pp. Illus. \$3.

**Cavitation and Hydraulic Machinery.** F. Numachi, Ed. Proceedings of a symposium (Sendai, Japan), September 1962. Institute of High Speed Mechanics, Tohoku Univ., Sendai, Japan, 1963. 574 pp. Illus. Twenty eight papers presented at a symposium sponsored by the International Association for Hydraulic Research. The papers are subdivided into three sections: Cavitation, Hydraulic Machinery, and Marine Propellers.

**Chemical Bond Approach Project: Investigating Chemical Systems.** Teachers' guide. McGraw-Hill, New York, 1964. Unpaged. Illus. \$5 (laboratory sheets).

**Chemical Thermodynamics.** Basic theory and methods. Irving M. Klotz. Benjamin, New York, revised ed., 1964. 484 pp. Illus. \$9.75.

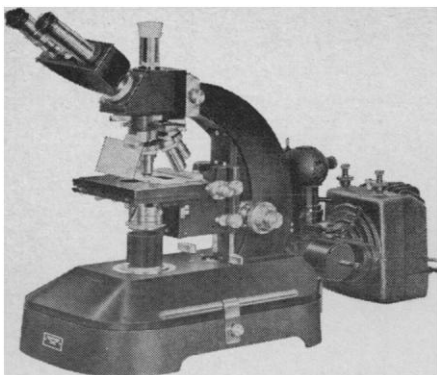
**The Chemistry of Cements.** vol. 1. H. F. W. Taylor, Ed. Academic Press, New York, 1964. 472 pp. Illus. \$14.

**The Chemistry of Imperfect Crystals.** F. A. Kröger. North-Holland, Amsterdam; Interscience (Wiley), New York, 1964. 1055 pp. Illus. \$33.

**College Chemistry.** Linus Pauling. Freeman, San Francisco, ed. 3, 1964. 856 pp. Illus. \$8.25.

**College Physical Science.** Vaden W. Miles, Everett R. Phelps, G. Ray Sherwood, and Willard H. Parsons. Harper and Row, New York, 1964. 555 pp. Illus. \$7.95.

(Continued on page 1066)



# SIMULTANEOUS CONTRAST FLUORESCENCE MICROSCOPY

exclusively with the

REICHERT  
**Zetopan**

This unique new approach may very well become instrumental in solving some of your intricate microbiological research problems. It can be accomplished with the ingeniously designed Reichert "ZETOPAN" by simultaneous application of white light and ultraviolet illumination supplemented by a newly developed fluorescence contrast condenser.

The combined advantages of Phase or Anoptral Contrast and the fluorescent techniques now appear simultaneously in the microscopic image.

Our constant, self-regulating Power Supplies for operation of the fluorescent light source prolong the lifetime of the Osram burner and insure a steady arc and increased light.

The "ZETOPAN" is a versatile instrument for all microscopic investigations of transmitted, reflected, and mixed illumination. It is a truly universal research microscope.

*Hacker*

For particulars or demonstration, write to:  
**WILLIAM J. HACKER & CO., INC.**  
Box 646, W. Caldwell, N.J., CA 6-8450 (Code 201)

## NEW BOOKS

(Continued from page 990)

**A Correlation Study of Methods of Matrix Structural Analysis.** Richard H. Gallagher, Ivan Rattinger, and John S. Archer. Pergamon, London; Macmillan, New York, 1964. 125 pp. Illus. \$10. A report of the 14th meeting (Paris, July 1962), Structures and Materials Panel, Advisory Group for Aeronautical Research and Development, NATO.

**Cosmic Dust.** A. Dauvillier. Translated from the French edition (Paris, 1961) by Alan Crozy. Philosophical Library, New York, 1964. 175 pp. Illus. \$15. The French edition, *La Poussiere Cosmique*, was reviewed in *Science* [135, 720 (1962)] by G. de Vaucouleurs.

**Crystalline Olefin Polymers.** pt. 2. R. A. V. Raff and K. W. Doak, Eds. Interscience (Wiley), New York, 1964. 689 pp. Illus. \$22.50.

**Discrete and Continuous Boundary Problems.** F. V. Atkinson. Academic Press, New York, 1964. 584 pp. Illus. \$16.50.

**Discretus Calculus.** A variable-metric approach to physical theory. Herbert S. Ingham. Philosophical Library, New York, 1964. 217 pp. Illus. \$6.

**The Dynamic Method in Oceanography.** L. M. Fomin. Translated from the Russian by Scripta Technica. Elsevier, New York, 1964. 224 pp. Illus. \$12.

**The Elastic Constants of Crystals.** H. B. Huntington. Academic Press, New York, 1964. 141 pp. Illus. \$3.95. Reprinted from *Solid State Physics*, vol. 7, 1958.

**Electromagnetic Theory for Engineering Applications.** W. L. Weeks. Wiley, New York, 1964. 764 pp. Illus. \$18.

**Electron Energy Bands in Solids.** Joseph Callaway. Academic Press, New York, 1964. 118 pp. Illus. \$3.95. Reprinted from *Solid State Physics*, vol. 7, 1958.

**Electronic Charges of Bonds in Organic Compounds.** G. V. Bykov. Translated from the Russian edition (Moscow, 1960) by J. T. Greaves. Pergamon, London; Macmillan, New York, 1964. 199 pp. Illus. \$9.

**Electronic Fundamentals and Applications.** John D. Ryder. Prentice-Hall, Englewood Cliffs, N.J., ed. 3, 1964. 711 pp. Illus. \$17.

**Electronic Spectra of Molecules and Ions in Crystals.** pt. 1, *Molecular Crystals*; pt. 2, *Spectra of Ions in Crystals*. Donald S. McClure. Academic Press, New York, 1964. 179 pp. Illus. \$3.95. Two papers, reprinted from *Solid State Physics*, vols. 8 and 9, 1959.

**The Elements and Structure of the Physical Sciences.** J. A. Ripley, Jr. Wiley, New York, 1964. 604 pp. Illus. \$8.95.

**The Elements of Stochastic Processes.** With applications to the natural sciences. Norman T. J. Bailey. Wiley, New York, 1964. 261 pp. Illus. \$7.95.

**Ferroelectrics and Antiferroelectrics.** Werner Känzig. Academic Press, New York, 1964. 201 pp. Illus. \$4.95. Reprinted from *Solid State Physics*, vol. 4, 1957.

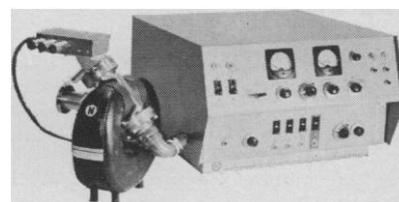
**Filament Winding: Its Development, Manufacture, Applications, and Design.**

CEC's 21-613

# RGA

puts an  
analytical  
window  
in your

vacuum system



CEC's Type 21-613 Residual Gas Analyzer gives you scientific, mass spectrometer data to use at every stage of your vacuum system operation—from  $10^{-4}$  to  $10^{-12}$  Torr.

FOR SYSTEM PUMPDOWN, the RGA differentiates between leakage or outgassing — pinpoints leaks and identifies outgassing components.

FOR MATERIALS RESEARCH, this RGA's interchangeable cycloidal analyzers give qualitative and quantitative analysis of all gases from  $m/e$  2 through  $m/e$  150 — unit resolution to  $m/e$  150, partial pressure measurement to  $5 \times 10^{-12}$  Torr.

FOR PRESSURE MEASUREMENT, the 21-613 provides analyses specific to each component. Total pressure measurements are most accurate because they are independent of gas composition.

FOR ALL THE FACTS, write for Bulletin CEC 21613-X14.

# CEC

Analytical & Control Division

**CONSOLIDATED ELECTRODYNAMICS**

A Subsidiary of Bell & Howell • Pasadena, Calif.

D. V. Rosato and C. S. Grove, Jr. *Inter-science* (Wiley), New York, 1964. 372 pp. Illus. \$15.

**The High Temperature Aspects of Hypersonic Flow.** Proceedings of the AGARD-NATO meeting (Rhode-Saint-Genève, Belgium), April 1962. Wilbur C. Nelson, Ed. Pergamon, London; Macmillan, New York, 1964. 800 pp. Illus. \$42.

**Ion Propulsion for Space Flight.** Ernst Stuhlinger. McGraw-Hill, New York, 1964. 391 pp. Illus. \$17.50.

**Inorganic Reaction Mechanisms.** An introduction. John O. Edwards. Benjamin, New York, 1964. 204 pp. Illus. \$7.

**Introduction to Atomic and Nuclear Physics.** D. E. Caro, J. A. McDonell, and B. M. Spicer. Aldine, Chicago, 1964. 238 pp. Illus. \$6.

**Introduction to Chemical Thermodynamics.** Irving M. Klotz. Benjamin, New York, 1964. 262 pp. Illus. Paper, \$3.95.

**IR: Theory and Practice of Infrared Spectroscopy.** Herman A. Szymanski. Plenum Press, New York, 1964. 389 pp. Illus. \$15.

**Japanese Miniature Electronic Components and Assemblies Data Annual, 1964-65.** G. W. A. Dummer and J. MacKenzie Robertson, Eds. Pergamon, London; Macmillan, New York, 1964. 507 pp. Illus. \$21.

**Kirk-Othmer Encyclopedia of Chemical Technology.** vol. 3, *B to Calcium*. Herman F. Mark, John J. McKetta, Jr., and Donald F. Othmer, Eds. Interscience (Wiley), New York, ed. 2, 1964. 943 pp. Illus. \$45.

**Lectures in Abstract Algebra.** vol. 3, *Theory of Fields and Galois Theory*. Nathan Jacobson. Van Nostrand, Princeton, N.J., 1964. 335 pp. Illus. \$9.75.

**Les Liquides Simples.** M. Arnold Münster. Gauthier-Villars, Paris, 1964. 77 pp. Illus. Paper, F. 14.

**Mathematical Induction.** Bevan K. Youse. Prentice-Hall, Englewood Cliffs, N.J., 1964. 63 pp. Illus. \$2.95.

**Matrices: Their Meaning and Manipulation.** W. G. Bickley and R. S. H. G. Thompson. Van Nostrand, Princeton, N.J., 1964. 182 pp. Illus. \$4.25.

**Matrix Methods of Structural Analysis.** B. Fraeijs de Veubeke, Ed. Pergamon, London; Macmillan, New York, 1964. 349 pp. Illus. \$15. Five papers presented to the Structures and Materials Panel of the Advisory Group for Aeronautical Research and Development, NATO. "Matrix methods of structural analysis—a precis of recent developments," J. H. Argyris, S. Kelsey, and H. Kamel; "Upper and lower bounds in matrix structural analysis," B. M. Fraeijs de Veubeke; "Further development and applications of the stiffness method," M. J. Turner, H. C. Martin, and R. C. Weikel; "Some problems in the discrete element representation of aircraft structures," I. C. Taig and R. I. Kerr; and "Digital analysis of nonlinear structures by the force method," P. H. Denke.

**Mechanical Details for Product Design.** Douglas C. Greenwood, Ed. McGraw-Hill, New York, 1964. 351 pp. Illus. \$9.50.

**The Mechanical Properties of Matter.** A. H. Cottrell. Wiley, New York, 1964. 440 pp. Illus. \$10.

**Mechanisms of Oxidation of Organic Compounds.** W. A. Waters. Methuen, London; Wiley, New York, 1964. 160 pp. Illus. \$5.

**Mécanique Physique.** Jean Mercier. Presses Universitaires de France, Paris, 1963. 669 pp. Illus.

**Meromorphic Functions.** W. K. Hayman. Oxford Univ. Press, New York, 1964. 205 pp. Illus. Paper, \$10.10.

**Methods of Quantitative Inorganic Analysis.** An encyclopedia of gravimetric, titrimetric, and colorimetric methods. Kazunobu Kodama. Interscience (Wiley), New York, 1963. 521 pp. Illus. \$22.

**Nuclear Engineering Fundamentals.** Roy Weinstein, Alvin Boltax, and Giovanni Lanza. McGraw-Hill, New York, 1964. 1064 pp. Illus. \$20.

**Optical Masers.** O. S. Heavens. Methuen, London; Wiley, New York, 1964. 111 pp. Illus. \$3.25.

**Organic Polarographic Analysis.** Petr Zuman. Pergamon, London; Macmillan, New York, 1964. 323 pp. Illus. \$6.50.

**Organoboron Chemistry.** vol. 1, *Boron-Oxygen and Boron-Sulfur Compounds*. Howard Steinberg. Interscience (Wiley), New York, 1964. 982 pp. Illus. \$33.

**Physical Chemistry.** Gilbert W. Castellan. Addison-Wesley, Reading, Mass., 1964. 733 pp. Illus. \$12.50.

**Physics and Chemistry of the Earth.** vol. 5. L. H. Ahrens, Frank Press, S. K. Runcorn, Eds. Pergamon, London; Macmillan, New York, 1964. 402 pp. Illus. \$15. Contents: "The significance of the chemical bond for controlling the geochemical distribution of the elements" (pt. 1), L. H. Ahrens; "Recent information of the earth's interior from studies of mantle waves and eigenvibrations," Bruce A. Bolt; "Geophysical studies of rift valleys," R. W. Girdler; "Geomagnetic micropulsations," J. A. Jacobs and K. O. Westphal; "Chemical thermodynamics in mineral studies," Hans Ramberg; and "The geochemistry of the alkali metals," Knut S. Heier and John A. S. Adams.

**Point Defects in Metals.** A. C. Damask and G. J. Dienes. Gordon and Breach, New York, 1964. 328 pp. Illus. \$19.50.

**The Precambrian.** vol. 1. Kalervo Rankama, Ed. Interscience (Wiley), New York, 1963. 303 pp. Illus. \$8.95.

**Principles of Astronomy.** Stanley P. Wyatt. Allyn and Bacon, Boston, 1964. 573 pp. Illus. \$8.95.

**Problems of the Design and Accuracy of Complex Continuous-Action Devices and Computer Mechanisms.** N. G. Bruyevich, Ed. Translated from the Russian edition (Moscow, 1958) by Gerald Segal. Pergamon, London; Macmillan, New York, 1964. 276 pp. Illus. \$10.

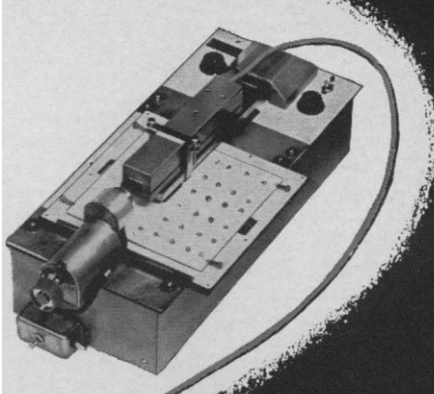
**Progress in Isotope Geology.** Kalervo Rankama. Interscience (Wiley), New York, 1963. 723 pp. \$20.

**Progress in the Science and Technology of the Rare Earths.** vol. 1. LeRoy Eyring, Ed. Pergamon, London; Macmillan, New York, 1964. 538 pp. \$17.50.

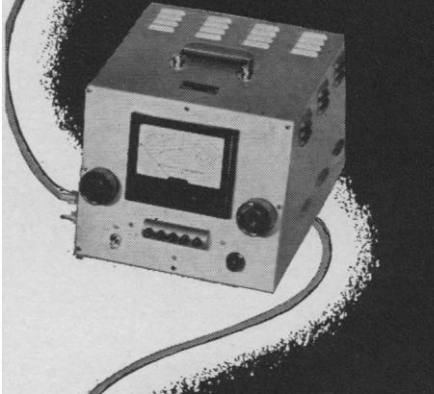
**The Propagation of Electromagnetic Waves in Multiconductor Transmission Lines.** P. I. Kuznetsov and R. L. Stratonovich. Translated from the Russian edition (Moscow, 1958) by R. F. Kelleher. Pergamon, London; Macmillan, New York, 1964. 206 pp. Illus. \$10.

# UNIQUE

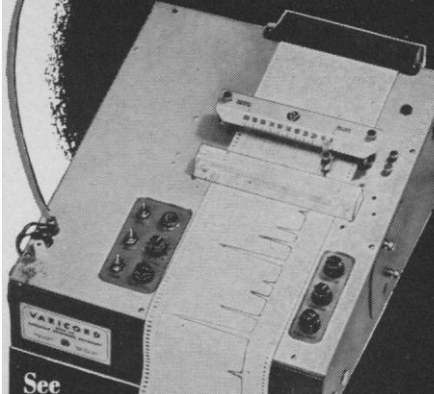
## DENSITOMETER



FOR THIN LAYER



CHROMATOGRAPHY



See Bulletin  
TLC-2

# PHOTOVOLT

CORPORATION  
1115 BROADWAY • NEW YORK 10, N.Y.

**The Properties of Glass Surfaces.** L. Holland. Wiley, New York, 1964. 562 pp. Illus. \$15.

**Pulse Circuits: Switching and Shaping.** Daniel S. Babb. Prentice-Hall, Englewood Cliffs, N.J., 1964. 399 pp. Illus. \$15.35.

**Quantum Electronics.** vols. 1 and 2. Proceedings of the Third International Congress (Paris), February 1963. P. Grivet and N. Bloembergen. Eds. Dunod, Paris; Columbia Univ. Press, New York, 1964. vol. 1, 996 pp.; vol. 2, 957 pp. Illus. 2 vols., \$35.

**Quantum Field Theory and the Many-Body Problem.** T. D. Schultz. Gordon and Breach, New York, 1964. 158 pp. Illus. Paper, \$3.95; cloth, \$5.95.

**Radar System Engineering.** Louis N. Ridenour, Ed. Boston Technical Publishers. Lexington, Mass., 1963. 776 pp. Illus. \$5.50. A reprint of vol. 1 of the M.I.T. Radiation Laboratory Series.

**Recent Advances in Matrix Methods of Structural Analysis.** J. H. Argyris. Pergamon, London; Macmillan, New York, 1964. 211 pp. Illus. \$10. Contents: "Force method"; "Displacement method"; "Matrix force method in non-linear problems"; "Matrix displacement method in non-linear problems." A survey of "some of the progress over the period 1956-62 in extending the matrix theory of structures presented by the author in 1955."

**Relativité Généralisée Gravitation.** Henri Arzelies. vol. 2. J. Moulis. Gauthier-Villars, Paris, 1963. 318 pp. Illus. Paper. \$16.

**Rounding Errors in Algebraic Processes.** J. H. Wilkinson. Prentice-Hall, Englewood Cliffs, N.J., 1964. 167 pp. Illus. \$6.

**Schrödinger - Planck - Einstein - Lorentz: Briefe zur Wellenmechanik.** K. Przibram. Springer, Vienna, Austria, 1963. 74 pp. Illus. \$2.50.

**Space Groups and Their Representations.** G. F. Koster. Academic Press, New York, 1964. 88 pp. Illus. \$3.95. Reprinted from *Solid State Physics*, vol. 5, 1957.

**Space Physics.** Donald P. LeGalley and Alan Rosen, Eds. Wiley, New York, 1964. 772 pp. Illus. \$25.

**Special Ceramics, 1962.** Proceedings of a symposium (Stoke-on-Trent, England), July 1962. P. Popper, Ed. Published for the British Ceramic Research Assoc. by Academic Press, New York, 1963. 496 pp. Illus. \$16.

**The Stabilization of Polyvinyl Chloride.** Fernand Chevassus and Roger de Brouettes. Translated from the second French edition (1963) by C. John R. Eichhorn and Esteban E. Sarmiento. St. Martin's Press, New York, 1964. 397 pp. Illus. \$16.

**Synthetic Fibers in Papermaking.** O. A. Battista, Ed. Interscience (Wiley), New York, 1964. 352 pp. Illus. \$14.

**Telemetry.** R. E. Young. Gordon and Breach, New York, 1963. 86 pp. Illus. \$3.95.

**Tensor Analysis.** Theory and applications to geometry and mechanics of continua. I. S. Sokolnikoff. Wiley, New York, ed. 2, 1964. 383 pp. Illus. \$9.75.

**The Theory of Electromagnetism.** D. S.

Jones. Pergamon, London; Macmillan, New York, 1964. 823 pp. Illus. \$15.

**The Theory of Order-Disorder Transitions in Alloys,** Toshinosuke Muto and Yutaka Takagi; **Order-Disorder Phenomena in Metals,** Lester Guttman. Academic Press, New York, 1964. 173 pp. Illus. \$3.95. Two papers, reprinted from *Solid State Physics*, vol. 1, 1955, and vol. 3, 1956.

**The Theory of Space, Time, and Gravitation.** V. Fock. Translated from the revised Russian version (Moscow, 1961) by N. Kemmer. Pergamon, London; Macmillan, New York, 1964. 460 pp. Illus. \$15.

**University Physics.** Francis Weston Sears and Mark W. Zemansky. Addison-Wesley, Reading, Mass., ed. 3, 1964. 1044 pp. Illus. \$11.50.

**X-Ray Optics and X-Ray Microanalysis.** H. H. Pattee, V. E. Cosslett, and Arne Engström, Eds. Academic Press, New York, 1963. 640 pp. Illus. \$22.

#### Biological and Medical Sciences

**Advances in Biological and Medical Physics.** vol. 9. John H. Lawrence, John W. Gofman, and Thomas L. Hayes, Eds. Academic Press, New York, 1963. 506 pp. Illus. \$16. Seven papers: "Some recent advances in studies of the transcription of the genetic message," Thomas H. Jukes; "Human chromosomal aberration," H. N. Robson; "Tissue transplantation," E. J. Eichwald; "The microbeam as a tool in



## PROPIPETTES®

® registered trade mark

**SPEED**

*i/a propipettes* used in one hand, technique easily mastered

**SIMPLICITY**

*i/a propipettes* have no moving parts, hold liquid until released, accurate to 0.01cc, fit all laboratory pipettes

**SAFETY**

*i/a propipettes* eliminate unpleasant, dangerous mouth pipetting

AVAILABLE IN FIVE COLORS FOR LABORATORY CODING  
black, red, green, yellow, blue

IN STOCK AT YOUR LABORATORY DEALER

Write for additional information



PRICE  
\$7.60 each

sent on approval

**INSTRUMENTATION ASSOCIATES, INC.**

17 West 60th Street, New York 23, N.Y. Circle 5-0840

## AAAS

### Symposium Volume

## SYSTEM OF UNITS— NATIONAL AND INTERNATIONAL ASPECTS

Edited by Carl F. Kayan

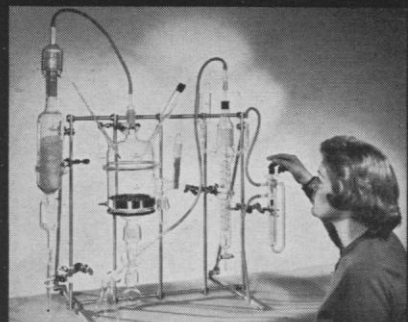
"This book is a compilation of papers on the subject of measurement standardization and should contribute much to helping each of us reach a position regarding this problem." *Journal of Engineering Education*, Oct. 1962

308 pages, 1959 ..... **\$6.75**  
 AAAS members discount price ..... **\$5.75**

Order from

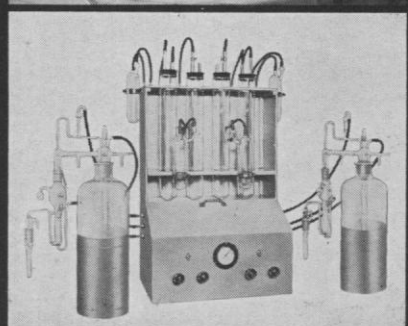
**AMERICAN ASSOCIATION FOR THE  
ADVANCEMENT OF SCIENCE**  
 Room 103 1515 Massachusetts Ave., NW  
 Washington, D.C. 20005

# Delmar Biological Apparatus



## Roth Metabolism Cages

For Carbon 14 tracer studies in rats and mice. The original apparatus, designed by Dr. L. J. Roth, for total control of input and collection for metabolic processes. Unique method separates feces and urine . . . virtually total absorption of CO<sub>2</sub>. Complete systems in 3 cage sizes: 3" for mice, 6" for rats, 8" for guinea pigs.



## Chemostat

A continuous, automatic culture apparatus for growing microorganisms with controlled density and growth rates. Full control is offered by variation of growth factor in nutrient and a timer that feeds nutrient at selected rates. Complete with control cabinet and all glassware. Available in single and double units.

For full details, and reprints ask for Biological Bulletin 235



**Delmar**

SCIENTIFIC LABORATORIES, INC.  
317 MADISON ST., MAYWOOD, ILL.

A SUBSIDIARY OF COLEMAN INSTRUMENTS CORPORATION

## STERILE OR CONTAMINATED?

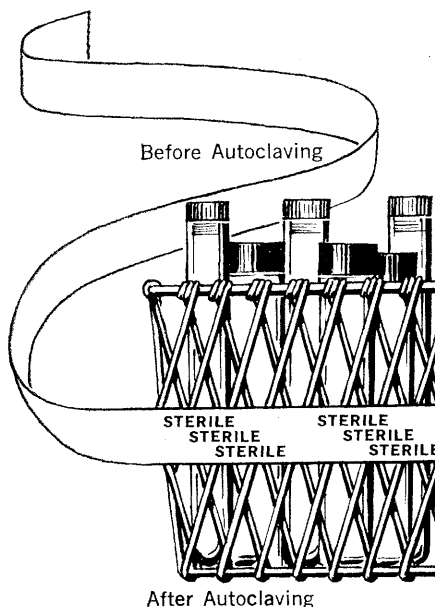
### TSI TAPE

identifies the condition!

Protect laboratory personnel from contamination and assure **STERILE** glassware for each test by following this simple procedure:

1. Place all glassware in basket marked with TSI Tape.
2. After glassware has been autoclaved for 15 minutes at 250° F., TSI Tape will show a color change indicating "STERILE."
3. Following use, and before disposing of dangerous material, place glassware in basket marked with a new tape and autoclave.

TSI is the *only* tape which shows a color change after 15 minutes in the autoclave at 250° F. TSI Tape leaves no sticky residue when removed.



See your laboratory or hospital supplier for TSI (Time Sterile Indicator) Tape.

For samples and complete description write to:

**PROFESSIONAL TAPE CO., INC.**  
365-L Burlington Avenue • Riverside, Illinois 60546

radiobiology," Howard J. Curtis; "Electron paramagnetic resonance studies of biological interest," Bernard Smaller; "Polarimetric analysis of protein structure," Don Ridgeway; and "The analysis of biological similarity," Walter R. Stahl.

**Advances in Lipid Research.** vol. 1. Rodolfo Paoletti and David Kritchevsky, Eds. Academic Press, New York, 1963. 432 pp. Illus. \$14. Ten papers: "The structural investigation of natural fats," M. H. Coleman; "Physical structure and behavior of lipids and lipid enzymes," A. D. Bangham; "Recent developments in the mechanism of fat absorption," John M. Johnston; "The clearing factor lipase and its action in the transport of fatty acids between the blood and the tissues," D. S. Robinson; "Vitamin E and lipid metabolism," Roslyn B. Alfin-Slater and Rosemary S. Morris; "Atherosclerosis—spontaneous and induced," Thomas B. Clarkson; "Chromatographic investigations in fatty acid biosynthesis," M. Pascaud; "Carnitine and its role in fatty acid metabolism," Irving B. Fritz; "Present status of research on catabolism and excretion of cholesterol," Henry Danielsson; and "The plant sulfolipid," A. A. Benson.

**Advances in Metabolic Disorders.** vol. 1. Rachmiel Levine and Rolf Luft, Eds. Academic Press, New York, 1964. 380 pp. Illus. \$12. Eight papers: "Glycogen storage disease," H. G. Hers; "The parathyroids," G. D. Aurbach and John T. Potts, Jr.; "Mitochondrial respiratory control: biochemical, physiological, and pathological aspects," Lars Ernster and Rolf Luft; "Osteoporosis," B. E. C. Nordin; "Basal metabolic rate and thyroid hormones," J. R. Tata; "Insulin antagonists and inhibitors," J. Vallance-Owen; "Aldosterone: its biochemistry and physiology," John H. Laragh and William G. Kelly; "Folic acid deficiency in man and its interrelationship with vitamin B<sub>12</sub> metabolism," A. Leonard Lubby and Jack M. Cooperman.

**Advances in Protein Chemistry.** vol. 18. C. B. Anfinsen, Jr., M. L. Anson, and John T. Edsall, Eds. Academic Press, New York, 1963. 345 pp. Illus. \$14. Four papers: "Recent studies on the structure of tobacco mosaic virus," F. Alfred Anderer; "Assembly and stability of the tobacco mosaic virus particle," D. L. D. Caspar; "The dissociation and association of protein structures," F. J. Reithel; and "The amino acid composition of some purified proteins," G. R. Tristram and R. H. Smith.

**Amino Acids and Serum Proteins.** Based on the Richard J. Block Memorial Symposium, sponsored by the Division of Biological Chemistry (Atlantic City, N.J.). September 1962. Jacob A. Stekol, Ed. American Chemical Soc., Washington, D.C., 1964. 178 pp. Illus. \$5.50.

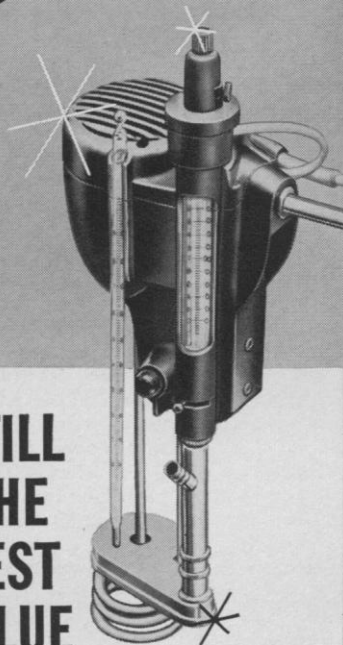
**Anatomy and the Problem of Behaviour.** G. E. Coghill. Hafner, New York (reprint of 1929 edition), 1964. 125 pp. Illus. \$4.75.

**Animal Biology.** Michael F. Guyer and Charles E. Lane. Harper and Row, New York, ed. 5, 1964. 807 pp. Illus. \$8.95.

**Animal Body Fluids and Their Regulation.** A. P. M. Lockwood. Harvard Univ. Press, Cambridge, Mass., 1964. 185 pp. Illus. \$2.75.



## THE BRONWILL CONSTANT TEMPERATURE CIRCULATOR...



## STILL THE BEST VALUE FOR YOUR MONEY

Here is just the right laboratory temperature control unit. Lightest weight (only 5 lbs.), compact and portable . . . so that any container can be converted quickly and easily to an efficient constant temperature bath. Extremely accurate (to  $\pm 0.01^\circ\text{C}$ ). Wide range ( $0^\circ\text{--}100^\circ\text{C}$ ). Operates safely even in a very shallow immersion depth ( $3\frac{1}{2}''$ ). Direct and simple setting of precise temperature (utilizes very sensitive Mercury contact controls—not bi-metal). Adjustable rate of flow from a few drops per minute to a remarkable 12L/minute . . . And priced sensibly . . . compare features with less expensive units which are much less rugged, less accurate, less dependable. Just drop us a note and we'll send complete details.

**BRONWILL  
SCIENTIFIC**

A DIVISION OF WILL SCIENTIFIC, INC.  
1329 N. Goodman St., Rochester 1, N.Y.

**Animal Diversity.** Earl D. Hanson. Prentice-Hall, Englewood Cliffs, N.J., ed. 2, 1964. 128 pp. Illus. Paper, \$1.75; cloth, \$3.95.

**Animal Genetics.** Frederick B. Hutt. Ronald, New York, 1964. 560 pp. Illus. \$12.

**Annelids.** R. Phillips Dales. Hillary House, New York, 1963. 200 pp. Illus. \$3.

**Annual Review of Entomology.** vol. 9. Ray F. Smith and Thomas E. Mittler, Eds. Annual Reviews, Palo Alto, Calif., 1964. 400 pp. Illus. \$8.50. Sixteen papers, of which nine are contributed by workers outside the United States: L. B. Barton-Browne (Australia) on water regulation in insects; D. Schneider (Germany) on insect antennae; G. P. Holland (Canada) on evolution, classification, and host relationships of Siphonaptera; H. Klomp (Netherlands) on intraspecific competition and the regulation of insect numbers; E. Rivnay (Israel) on the influence of man on insect ecology in arid zones; F. Wilson (Australia) on the biological control of weeds; W. Fy (Switzerland) on anomalies and diseases of the queen honey bee; J. F. B. Edeson and T. Wilson (England) on the epidemiology of filariasis due to *Wuchereria bancrofti* and *Brugia malayi*; and G. M. Saccà (Italy) on comparative bionomics in the genus *Musca*.

**Bibliographie der Pflanzenschutz-Literatur.** vol. 2, 1958. J. Bärner. Parey, Berlin, 1963. 329 pp. Paper, DM. 68.

**Bioastronautics.** Karl Schaefer, Ed. Macmillan, New York, 1964. 416 pp. Illus. \$16.

**The Biochemistry of Clinical Medicine.** William S. Hoffman. Yearbook Medical Publishers, Chicago, ed. 3, 1964. 824 pp. Illus. \$12.50.

**The Biology of Plant Parasitic Nematodes.** H. R. Wallace. St. Martin's Press, New York, 1964. 288 pp. Illus. \$9.50.

**Brain Mechanisms and Intelligence.** A quantitative study of injuries to the brain. K. S. Lashley. Hafner, New York (reprint of 1929 edition), 1964. 200 pp. Illus. Plates. \$5.50.

**Brains of Rats and Men.** A survey of the origin and biological significance of the cerebral cortex. C. Judson Herrick. Hafner, New York (reprint of 1926 edition), 1963. 401 pp. Illus. \$6.

**Cell Physiology and Biochemistry.** William D. McElroy. Prentice-Hall, Englewood Cliffs, N.J., ed. 2, 1964. 128 pp. Illus. Paper, \$1.75; cloth, \$3.95.

**Cellular Membranes in Development.** A symposium (Storrs, Conn.), June 1963. Michael Locke, Ed. Academic Press, New York, 1964. 398 pp. Illus. \$12.

**Cerebral Function in Infancy and Childhood.** Albrecht Peiper. Translated from the third revised German edition (Leipzig, 1961) by Benedict Nagler and Hilde Nagler. Consultants Bureau, New York, 1963. 695 pp. Illus. \$25.

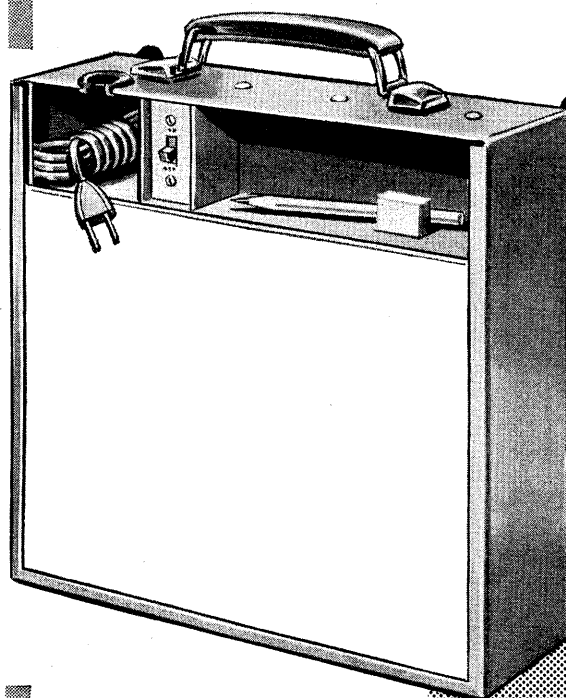
**Chelation Therapy.** Alfred Soffer, Maynard Chenoweth, Gunther L. Eichhorn, Betty Rosoff, Martin Rubin, and Herta Spencer. Thomas, Springfield, Ill., 1964. 173 pp. Illus. \$8.

**Chemical and Biological Aspects of Pyridoxal Catalysis.** Proceedings of symposium of the International Union of Biochemistry (Rome), October 1962. E. E. Snell, P. M. Fasella, A. Braunstein, and A. Rossi Fanelli, Eds. Pergamon, London;

## Portable Cool...

# Glow Box

THE SCIENTIST'S LIGHT BOX



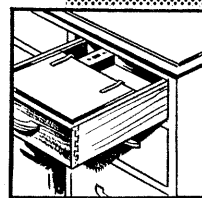
### TILTS EASILY FOR TABLE-TOP USE

Model 12-12D-2X for charts  
curves, spectra, X-ray film  
 $8\frac{1}{2}'' \times 11''$  ..... \$35.50  
Model 12-20E-2X for double  
size sheets  $11'' \times 18''$  .. \$60.00



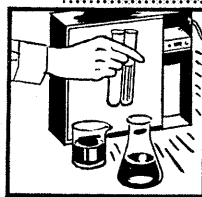
### FITS STANDARD DESK DRAWER FOR STORAGE OR USE

Keep GLOW BOX in your  
desk drawer immediately  
available whenever you wish  
to examine, compare, or  
trace. It's so convenient!



### STANDS UPRIGHT FOR DEMONSTRATIONS

The uniform, diffuse light  
focuses attention on displays  
of samples for lectures,  
demonstrations, etc.

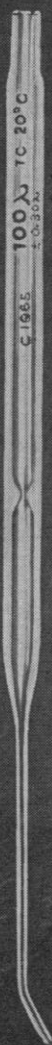


SEND CARD FOR LITERATURE

**I<sup>2</sup>R**

INSTRUMENTS for  
RESEARCH and  
INDUSTRY

## DANISH TYPE AMERICAN MADE LAMBDA



**EASY SIZE IDENTIFICATION** — all markings, including serial numbers, size, tolerances, and company name, are permanently fused into each pipette.

**ACCURATE** calibrated twice to assure stated accuracy.

**ECONOMICAL** considerably less than comparable imported product.

For further information concerning prices and sizes, detach and return coupon below.



### LAMBDA PIPETTES

Name .....  
Firm .....  
Address .....  
.....  
Position .....

Macmillan, New York, 1963. 616 pp. Illus. \$20.

**A Chemical Background to Nursing and Other Paramedical Programs.** Gerald F. Grillot. Harper and Row, New York, 1964. 412 pp. Illus. \$5.75.

**Chemical Protection of the Body Against Ionizing Radiation.** V. S. Balabukha, Ed. Translated from the Russian edition (Moscow, 1960) by J. T. Greaves. J. H. Barnes, Ed. Pergamon, London; Macmillan, New York, 1963. 180 pp. Illus. \$8.50.

**Cold Spring Harbor Symposia on Quantitative Biology.** vol. 28, *Synthesis and Structure of Macromolecules*. Biological Laboratory, Long Island Biological Assoc., Cold Spring Harbor, N.Y., 1963. 630 pp. Illus. \$15.

**Comparative Anatomy and Embryology.** William W. Ballard. Ronald, New York, 1964. 626 pp. Illus. \$10.

**Comparative Neurochemistry.** Proceedings, Fifth International Neurochemical Symposium (St. Wolfgang, Austria), 1962. Derek Richter, Ed. Pergamon, London; Macmillan, New York, 1964. 503 pp. Illus. \$14.

**Cosmetics and the Skin.** F. V. Wells and Irwin I. Lubowe. Reinhold, New York; Chapman and Hall, London, 1964. 698 pp. \$22.

**Craigie's Neuroanatomy of the Rat.** Revised and expanded by Wolfgang Zeman and James Robert Maitland Innes. Academic Press, New York, 1963. 240 pp. Illus. \$8.50.

**The Cytology and Genetics of Barley 1951-1962.** Robert A. Nilan. Washington State Univ. Press, Pullman, 1964. 288 pp. Illus. Paper, \$4. This compendium presents information gathered from more than 1200 articles published between 1951 and 1962.

**Data Acquisition and Processing in Biology and Medicine.** vol. 2. Proceedings of the 1962 Rochester conference. Kurt Enslein, Ed. Pergamon, London; Macmillan, New York, 1964. 377 pp. Illus. \$11.50.

**Electronic and Computer-Assisted Studies of Biomedical Problems.** Otto H. Schmitt and Cesar A. Caceres, Eds. Thomas, Springfield, Ill., 1964. 344 pp. \$12.50.

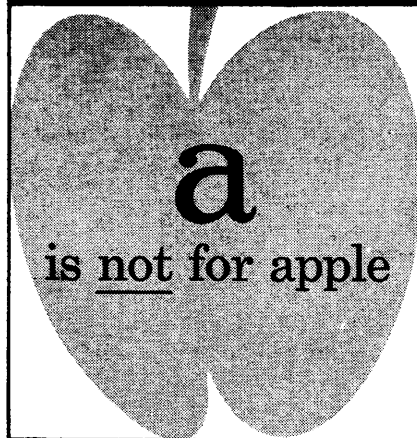
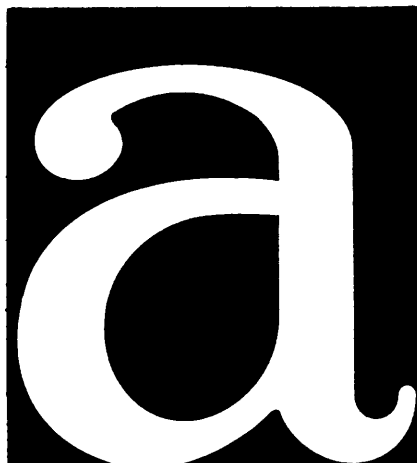
**The Enzymes of Lipid Metabolism.** Proceedings of the Sixth International Conference on the Biochemistry of Lipids (Marseilles), 1960. P. Desnuelle, Ed. Pergamon, London, 1961; Macmillan, New York, 1964. 324 pp. Illus. \$10.

**Evolution of the Atherosclerotic Plaque.** Richard J. Jones, Ed. Univ. of Chicago Press, Chicago, 1964. 374 pp. Illus. \$6.75. A collection of papers given at an international symposium held at Chicago, Ill., in March 1963, under the joint sponsorship of the Chicago Heart Association and the Council on Arteriosclerosis of the American Heart Association.

**Evolutionary and Genetic Biology of Primates.** vol. 2. John Buettner-Janusch, Ed. Academic Press, New York, 1964. 342 pp. Illus. \$12.50.

**Experimental Surgery.** Including surgical physiology. J. Markowitz, J. Archibald, and H. G. Downie. Williams and Wilkins, Baltimore, Md., ed. 5, 1964. 671 pp. Illus. \$13.

**The Formation of Wood in Forest**



a  
is for accuracy  
in  
amino  
acid  
analysis

The people at Phoenix have nothing against apples, in fact they might even keep the doctor away, but to us the letter "a" automatically stands for accuracy. The new Model K-8000-B Amino Acid Analyzer has an accuracy of better than plus or minus 3%. It represents the most advanced instrumentation for automatic separation, identification, and quantitation of amino acids, small peptides, ammonia, urea, creatinine and amines, etc. If your research operations require accuracy in analysis, you need the Phoenix K-8000-B Amino Acid Analyzer. Write for Bulletin K-8000-B for complete information.



**PHOENIX PRECISION INSTRUMENT CO.**  
A subsidiary of CENCO INSTRUMENTS CORP.

3803-05 N. 5TH ST., PHILA., PA., 19140, U.S.A.

**Trees.** A symposium (Harvard Forest, Petersham, Mass.), April 1963. Martin H. Zimmerman, Ed. Academic Press, New York, 1964. 578 pp. Illus. \$16.

**Fortschritte der Zoologie.** Max Hartmann, Ed. vol. 16, pt. 2. Hansjochem Autrum and Friedrich Seidel. Fischer, Stuttgart, Germany, 1963. 146 pp. Illus. Paper, DM. 34. Two papers: "Physiologie des Stoffwechsels" by Klaus Urich and "Vergleichende Physiologie der mechanischen Sinne" by Christian Hoffmann.

**Function of the Human Body.** Arthur C. Guyton. Saunders, Philadelphia, ed. 2, 1964. 441 pp. Illus. \$7.75.

**The Genetics of Bacteria and Their Viruses.** Studies in basic genetics and molecular biology. William Hayes. Wiley, New York, 1964. 752 pp. Illus. \$13.75.

**Growth and Maturation of the Brain.** A series of lectures delivered during a workshop (Amsterdam, Netherlands), September 1962. Dominick P. Purpura and J. P. Schade, Eds. Elsevier, New York, 1964. 299 pp. Illus. \$14.50.

**Handbook of Physiology.** Section 4, *Adaption to the Environment*. D. B. Dill, E. F. Adolph, and C. G. Wilber, Eds. Published for American Physiological Soc., Washington, D.C., by Williams and Wilkins, Baltimore, 1964. 1066 pp. Illus. \$32.

**Heat and Life.** The development of the theory of animal heat. Everett Mendelsohn. Harvard Univ. Press, Cambridge, Mass., 1964. 222 pp. \$4.50.

**The Hormones.** Physiology, chemistry, and applications. vol. 4. Gregory Pincus, Kenneth V. Thimann, and E. B. Astwood, Eds. Academic Press, New York, 1964. 702 pp. Illus. \$22.

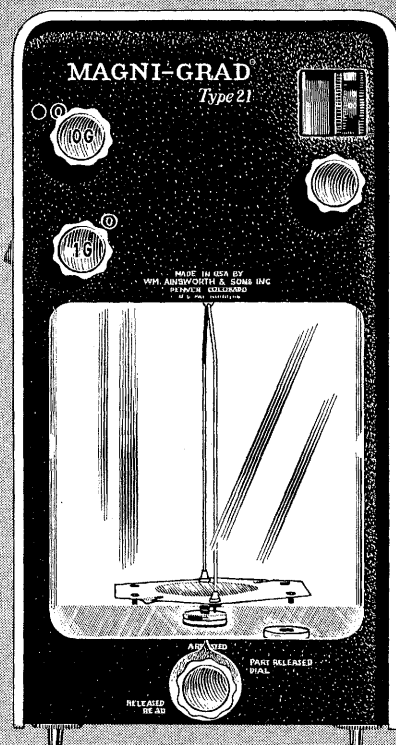
**International Review of Experimental Pathology, 1963.** vol. 2. G. W. Richter and M. A. Epstein, Eds. Academic Press, New York, 1963. 460 pp. Illus. \$16. Eight papers: "Cellular recognition of foreign matter," Stephen Boyden; "The nucleic acids of viruses as revealed by their reactions with fluorochrome acridien orange," Heather D. Mayor; "Cytochemical aspects of experimental leukemia," Bo Thorell; "The use of statistics in the etiologic study of malignant neoplasms," Johannes Clemmesen; "A lymphoma syndrome in Tropical Africa," Denis Burkitt; "Microscopic morphology of injured living tissue," Ian K. Buckley; "Melanin granules," P. Drochmans; and "Biological effects of ionizing radiations," Arthur C. Upton.

**International Review of Neurobiology.** vol. 6. Carl C. Pfeiffer and John R. Smythies, Eds. Academic Press, New York, 1964. 488 pp. Illus. \$15. Seven papers: "Protein metabolism of the nervous system," Abel Lajtha; "Patterns of muscular innervation in the lower chordates," Quentin Bone; "The neural organization of the visual pathways in the cat," Thomas H. Meikle, Jr., and James M. Sprague; "Properties of afferent synapses and sensory neurons in the lateral geniculate nucleus," P. O. Bishop; "Regeneration in the vertebrate central nervous system," Carmine D. Clemente; "Neurobiology of phencyclidine (sernyl), a drug with an unusual spectrum of pharmacological activity," Edward F. Domino, and "Free behavior and brain stimulation," José M. R. Delgado.

22 MAY 1964

get  
**AINSWORTH**  
quality  
in one-pan  
balances

a type and  
price to meet  
your needs



New Analytical  
Magni-Grad Type 21, with simplified  
design for lower cost.

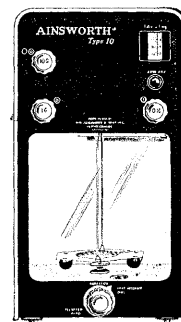
*speed/accuracy/convenience*

Patented compensated beam

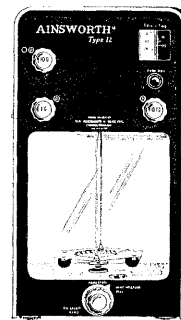
"Add weight" and "remove weight" signals

All metal case

Eye-level, unobstructed readout

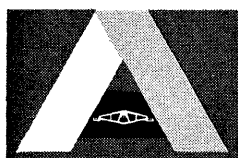


Type 10 Analytical



Type 12 Semi-Micro

|                               | TYPE 21   | TYPE 10   | TYPE 12   |
|-------------------------------|-----------|-----------|-----------|
| Capacity                      | 160 gr.   | 160 gr.   | 80 gr.    |
| Total load                    | —         | 220 gr.   | 120 gr.   |
| Sensitivity                   | ·0.1 mg.  | 0.1 mg.   | 0.01 mg.  |
| Readability,<br>by estimation | 0.05 mg.  | 0.05 mg.  | 0.005 mg. |
| Reproducibility               | ±0.05 mg. | ±0.03 mg. | ±0.01 mg. |
| Price                         | \$550.    | \$670.    | \$875.    |



A BALANCE FOR EVERY NEED

The name Ainsworth is your guarantee

**WM. AINSWORTH & SONS, INC.**

2151 LAWRENCE STREET • DENVER, COLORADO 80205

Telephone Area Code 303 255-1723