

SCIENCE

8 July 1966

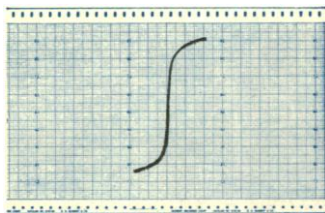
Vol. 153, No. 3732

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

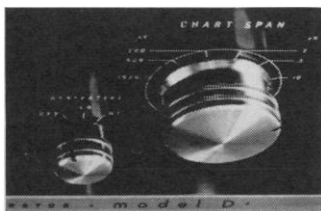


FREETAIL BAT

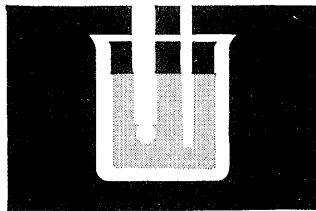
When your work demands a recording titrator



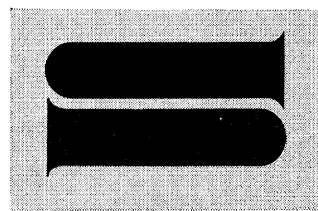
that has to be remarkably accurate (mv or pH accuracy = 0.25%; burette and volume accuracy = 0.1%) and precise (with a 240-mm chart span readable to as little as 0.002 ml and to 0.01 pH units when the 10-ml burette is used),



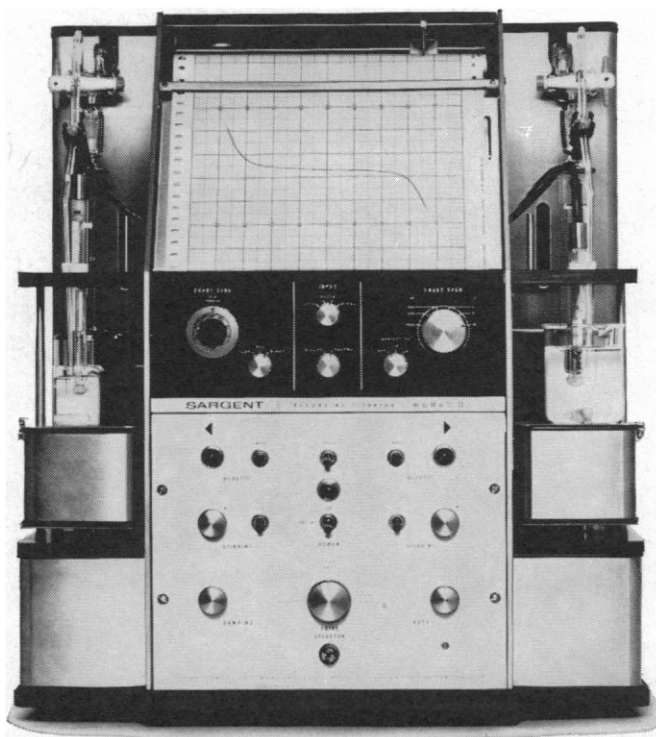
and that is designed for automatic operation (convenient, front-panel settings for chart span, titrant delivery rate, stirring rate, burette rapid flush-and-fill) with built-in titrant deceleration as endpoint is approached,



and that is versatile (accommodating any electrode, for aqueous or nonaqueous media, for semi-micro, micro, or macro work) to perform all potentiometric titrations, including those carried to predetermined endpoints, or indicated by the first derivative of the titration curve,



then the automatic recording titrator for you is the Model D (designed and manufactured by E. H. Sargent & Co.). It has two independent titrating stations and costs \$2850, less electrodes. To see the Model D at work in your lab, call your Sargent man for a demonstration at your convenience.



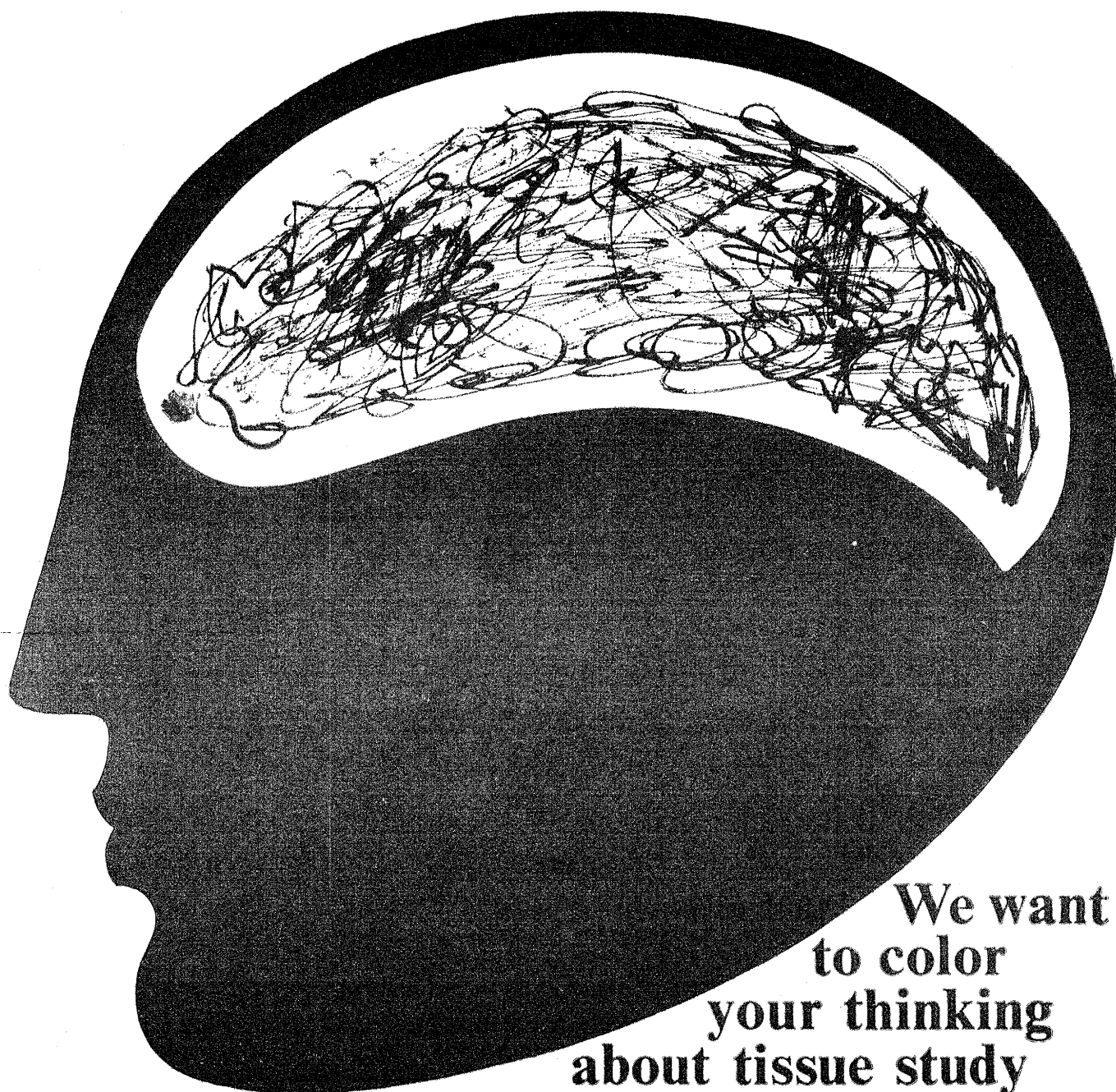
SARGENT®

SCIENTIFIC LABORATORY INSTRUMENTS • APPARATUS • CHEMICALS

E. H. SARGENT & CO.

4647 West Foster Avenue
Chicago, Illinois 60630

Chicago • Anaheim, Calif. • Birmingham • Cincinnati • Cleveland
Dallas • Denver • Detroit • Springfield, N.J. • Toronto, Canada



**We want
to color
your thinking
about tissue study**

Tetrazolium Salts were first described in 1892 but not studied extensively until 1941.

Recent study, however, has confirmed their great value for research investigations in enzymology, histochemistry, bacteriology, plant biology and radiation effects due to their ability to be reduced to an easily identifiable color in viable tissue.

Now, your lab can acquire complete initial stock of all available Tetrazolium Salts in 100 mg. containers for just \$53.50. When ordering, specify NBCo Tetrazolium 32 Kit. Included among the 32 Tetrazolium Salts in the kit are:

Triphenyl Tetrazolium Chloride ■ Blue Tetrazolium ■ Iode NitroTetrazolium Chloride ■ Neotetrazolium Chloride ■ Tetranitro Blue Tetrazolium Chloride ■ Nitro BT ■ M-Nitro Neotetrazolium Chloride (M-Nitra NT) ■ 3 (4,5 Dimethyl Thiazolyl 1 - 2) 2,5 Diphenyl Tetrazolium Bromide ■ Additional salts, derivatives of the preceding, now offered for the first time.

NBCo offers stat service on Tetrazolium Salts. Phone collect, 216-662-0212 (USA only); NBCo will process your order and guarantee shipment within 60 minutes of your call; one-day delivery anywhere in the continental USA, 80 hours anywhere in the world. Send for our free catalog containing more than 3000 items.

**NUTRITIONAL
BIOCHEMICALS
CORPORATION**

21010 Miles Avenue
Cleveland, Ohio 44128 U.S.A.

SCIENCE

LETTERS	Drug Tests: Integrity and Courage: <i>P. Lowinger</i> ; Molecular Biology and the Nature of Man: <i>V. R. Potter</i> ; Ages of Test Animals: A Formula: <i>A. Herschman</i> ; Computer-Time Allocation: <i>H. A. Simon</i> ; Safety: A Parallel: <i>C. Eisenhart</i>	121
EDITORIAL	Stable Federal Support	125
ARTICLES	Cross-Dating the Archeology of Northwestern Alaska: <i>J. L. Giddings</i>	127
	Behavior of Carbon Dioxide and Other Volatiles on Mars: <i>R. B. Leighton</i> and <i>B. C. Murray</i>	136
	Molecular Mechanism of Red Cell "Sickling": <i>M. Murayama</i>	145
NEWS AND COMMENT	NIH: White House Calling—Disarmament: Moon Treaty?—Social Sciences: Overseas Research	149
	<i>Report from Europe: East-West Exchanges of Technology Increase Rapidly: V. K. McElheny</i>	156
BOOK REVIEWS	<i>The Measure of the Universe: A History of Modern Cosmology</i> , reviewed by <i>G. C. McVittie</i> ; other reviews by <i>N. R. E. Fendall</i> , <i>R. G. Fisher</i> , <i>W. D. Clayton</i> , <i>D. R. Smith</i> , <i>F. J. Turner</i> , <i>H. F. Lewis</i> , <i>A. E. Covington</i> , <i>E. D. Pellegrino</i> , <i>A. Balicki</i> , <i>T. Botts</i> , <i>C. T. Wemyss</i> ; New Books	159
REPORTS	Djerfisherite, Alkali Copper-Iron Sulfide: A New Mineral from Enstatite Chondrites: <i>L. H. Fuchs</i>	166
	Mummified Pleistocene Ostracods in Alaska: <i>R. A. M. Schmidt</i> and <i>P. V. Sellmann</i>	167
	Laser as Light Source for Optical Diffractometers: Fourier Analysis of Electron Micrographs: <i>J. E. Berger</i> , <i>C. R. Zobel</i> , <i>P. E. Engler</i>	168
	Kyanite-Andalusite Equilibrium from 700° to 800°C: <i>R. C. Newton</i>	170
	Thermal Conductivity Effect of Carrier Gases on Flame-Ionization Detector Sensitivity: <i>R. L. Hoffmann</i> and <i>C. D. Evans</i>	172
	Oxygen Isotope Studies of Ivory Coast Tektites and Impactite Glass from the Bosumtwi Crater, Ghana: <i>H. P. Taylor, Jr.</i> , and <i>S. Epstein</i>	173
	Olfactory Discrimination in the Rabbit Olfactory Glomerulus: <i>J. Levetau</i> and <i>P. MacLeod</i>	175

BOARD OF DIRECTORS		HENRY EYRING Retiring President, Chairman	ALFRED S. ROMER President	DON K. PRICE President Elect	H. BENTLEY GLASS DAVID R. GODDARD	HUDSON HOAGLAND MINA S. REES
VICE PRESIDENTS AND SECTION SECRETARIES		MATHEMATICS (A) Albert W. Tucker Wallace Givens	PHYSICS (B) Allen V. Astin Stanley S. Ballard	CHEMISTRY (C) Alfred E. Brown Milton Orchin	ASTRONOMY (D) Philip C. Keenan Frank Bradshaw Wood	
		ANTHROPOLOGY (H) Cora Du Bois Anthony Leeds	PSYCHOLOGY (I) Robert M. Gagne Frank W. Finger	SOCIAL AND ECONOMIC SCIENCES (K) Kenneth E. Boulding Eugene B. Skolnikoff	HISTORY AND PHILOSOPHY OF SCIENCE (L) Melvin Kranzberg Norwood Russell Hanson	
		PHARMACEUTICAL SCIENCES (Np) André Archambault Joseph P. Buckley	AGRICULTURE (O) Nyle C. Brady Ned D. Bayley	INDUSTRIAL SCIENCE (P) Ellis A. Johnson Burton V. Dean	EDUCATION (Q) Clarence H. Boeck Frederic B. Dutton	
DIVISIONS		ALASKA DIVISION		PACIFIC DIVISION	SOUTHWESTERN AND ROCKY MOUNTAIN DIVISION	
		A. B. Colyer President	Eleanor Viereck Executive Secretary	Daniel C. Aldrich, Jr. President	Robert C. Miller Secretary	Earl D. Camp President
						Marlowe G. Anderson Executive Secretary

SCIENCE is published weekly on Friday and on the fourth Tuesday in November by the American Association for the Advancement of Science, 1515 Massachusetts Ave., NW, Washington, D.C. 20005. Now combined with *The Scientific Monthly*. Second-class postage paid at Washington, D.C. Copyright © 1966 by the American Association for the Advancement of Science. Annual subscriptions: \$8.50; foreign postage, \$1.50; Canadian postage, 75¢; single copies, 35¢, except *Guide to Scientific Instruments*, which is \$1. School year subscriptions: 9 months, \$7; 10 months, \$7.50. Provide 4 weeks' notice for change of address, giving new and old address and zip numbers. Send a recent address label. SCIENCE is indexed in the *Reader's Guide to Periodical Literature*.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Radioautographic and Electron-Microscopic Evidence of Rapid Uptake of Antigen by Lymphocytes: S. S. Han and A. G. Johnson 176

RNA Composition and Base Pairing: W. Traub and D. Elson 178

Beta-1C-Globulin: Metabolism in Glomerulonephritis: C. A. Alper, A. S. Levin, F. S. Rosen 180

Satellite Deoxyribonucleic Acid from Bacillus cereus strain T: H. A. Douthit and H. O. Halvorson 182

Hypophyseal Control of Genetic Expression during Chick Feather and Skin Differentiation: M. B. Yatvin 184

Lipid Films as Transducers for Detection of Antigen-Antibody and Enzyme-Substrate Reactions: J. del Castillo et al. 185

Diagenesis of Carbonate Sediments: Interaction of Magnesium in Sea Water with Mineral Grains: R. A. Berner 188

Foraminiferal Evidence of a Shallow Calcium Carbonate Solution Boundary, Ross Sea, Antarctica: J. P. Kennett 191

Ambrosia Fungi: Extent of Specificity to Ambrosia Beetles: L. R. Batra 193

Chromosome Aberrations: Increased Incidence in Bone Marrow of Continuously Irradiated Rats: O. Chlebovský, M. Praslička, J. Horák 195

Compound Ocellus of a Starfish: Its Function: M. Yoshida and H. Ohtsuki 197

Precambrian Mollusc-like Fossils from Inyo County, California: M. E. Taylor 198

Mexican Freetail Bats: Photography: H. E. Edgerton, P. F. Spangle, J. K. Baker 201

Mating Speed in Male Drosophila melanogaster: A Psychogenetic Analysis: D. W. Fulker 203

Opposite Responding in Two Sense Modalities: A. Moffett and G. Ettlinger 205

Carotid Body Chemoceptors: Physiological Role in Buffering Fall in Blood Pressure during Sleep: M. Guazzi, G. Baccelli, A. Zanchetti 206

"Sex-Ratio" Condition: Unusual Mechanisms in Bark Beetles: G. N. Lanier and J. H. Oliver, Jr. 208

Evoked Potential Correlates of Generalization: D. S. Ruchkin and E. R. John 209

Cerebral Concussion in the Monkey: An Experimental Model: A. K. Ommaya et al. ... 211

Technical Comments: Myeloma Cells and Immunoglobulin Formation: G. E. Moore, J. T. Grace, Jr., D. Pressman; Protein Conformations in Biological Membranes: J. L. Kavanau; A. H. Maddy and B. R. Malcolm 212

MEETINGS Nucleolus: Structure and Function: R. P. Perry; Forthcoming Events 214

WALTER ORR ROBERTS H. BURR STEINBACH PAUL E. KLOPSTEG DAEL WOLFE
ATHELSTAN F. SPILHAUS JOHN A. WHEELER Treasurer Executive Officer

GEOLOGY AND GEOGRAPHY (E) ZOOLOGICAL SCIENCES (F) BOTANICAL SCIENCES (G)
Joe Webb Peoples Richard B. Roberts Charles E. Olmsted
Richard H. Mahard David E. Davis Warren H. Wagner

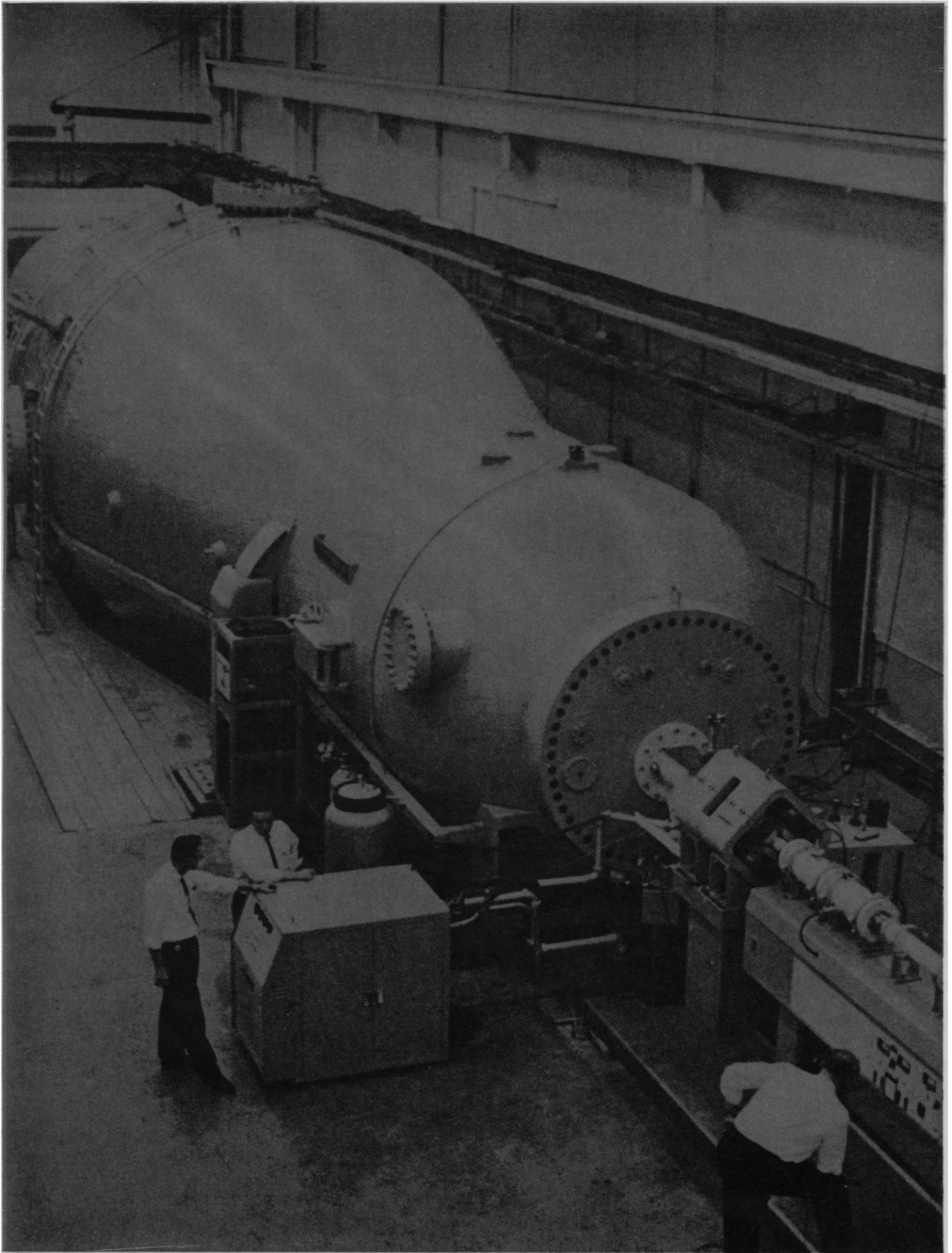
ENGINEERING (M) MEDICAL SCIENCES (N) DENTISTRY (Nd)
Paul Rosenberg Britton Chance C. A. Ostrom
Newman A. Hall Robert E. Olson S. J. Kreshover

INFORMATION AND COMMUNICATION (T) STATISTICS (U)
William C. Steere William G. Cochran
Phyllis V. Parkins Rosedith Sitgreaves

COVER

A Mexican freetail bat (*Tadarida brasiliensis mexicana*) as it emerges from Carlsbad Caverns at dusk. The camera was timed by a signal from a photomultiplier tube when the bat intercepted a beam of light. See page 201. [Harold E. Edgerton, Massachusetts Institute of Technology]

The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.



MP Tandem Test Facility at High Voltage Engineering Corporation.

**New opportunity for
heavy element research:**

Uranium ions accelerated to 200 MeV by HVEC Emperor Tandem.

Uranium ions have been accelerated to record-high energies exceeding 200 MeV during heavy-ion performance tests of the first completely assembled Model MP "Emperor" Tandem. The tests were carried out at HVEC's MP Tandem Test Facility at Burlington.

Calculations indicate that uranium ions at the energies achieved can create coulomb excitation in the nucleus of stationary uranium atoms. This is the first instance of uranium ion acceleration to energy levels sufficiently high for bombardment and examination of the nuclei of even the heaviest naturally occurring elements.

The MP heavy-ion performance tests were initial. We believe that further optimization of the system will allow demonstration of the machine's capability to accelerate uranium ion beams to energies of several hundred MeV . . . and the possibility of causing other interactions, including nuclear fission.

Such significant achievements are opening up entirely new fields of heavy element research . . . and offer the promising prospect that, with the Tan-

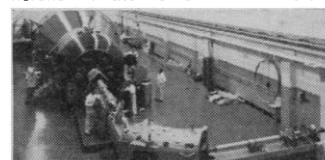
dem Van de Graaff, nuclear scientists will soon be free to choose *any* specific pair of nuclei from among the multitude of possible pairs for controlled collisions and precise experimental examination.

Seven MP Tandems have already been ordered from HVEC. Five are now being installed. They will join the more than 30 Tandem Van de Graaffs now engaged in important research throughout the world. This wide acceptance of the Tandem as a basic tool for nuclear research is due to its inherent precision, versatility and ease of particle choice for nuclear experimentation. The MP Tandem is the most recent embodiment of the Tandem concept. It offers, for the first time, a proven and comprehensive approach to heavy element research.

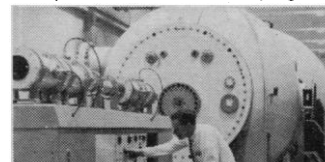
A new booklet describing the MP heavy-ion performance tests contains a number of very interesting photomicrographs of recorded particle tracks. For a free copy and detailed information about HVEC particle accelerator systems and components, write to our offices at Burlington, Massachusetts or Amersfoort, The Netherlands.



500X photomicrograph of uranium ions accelerated by MP Tandem striking photographic emulsion plate at 10 degree incidence. Note frequent collisions with atomic nuclei in emulsion.



MP Tandem accelerator being installed at Yale University has accelerated proton beams of 20 microamperes in the range from 10 to over 20 MeV. Acceptance tests are now in progress.



MP Tandem accelerator being installed at Atomic Energy of Canada Ltd. Chalk River Laboratories achieved 15 MV terminal voltage during initial test of the electrostatic structure.

 **HIGH VOLTAGE
ENGINEERING**



FOR THE LATEST INFORMATION . . .

FIBER OPTICS: Principles and Applications

by **N. S. Kapany**, *Optics Technology, Inc., Palo Alto, Calif.*

Beginning with the basic principles, the text presents a comprehensive discussion of the geometrical and physical optics of fibers with the theoretical development of waveguide effects. Fiber optics technology, fiber drawing, assembly and testing are discussed, and specific applications in the fields of medicine, photography, high-speed photography, photoelectronics, infrared fiber optics, lasing and luminescent fibers are treated extensively in separate chapters.

November 1966, about 400 pp., approx. \$12.50

VOLUME 1: Annual Conferences 1962, 1963, 1964

SOME RECENT ADVANCES IN THE BASIC SCIENCES

edited by **A. Gelbart**, *Yeshiva University, New York*

Contains papers presented at the first three annual science conferences of the Belfer Graduate School of Science. *Sections include:* Foundations of Quantum Mechanics, A Quasar Model Based on Relaxation Oscillations in Supermassive Stars, Harmonic Analysis on Semisimple Lie Groups, Forms of Algebras, High-Energy Scattering, The Interaction of Intense Light Waves and Mechanical Motions in Extended Media, Local Harmonic Analysis With Some Applications to Differential Operators, Geometric Structures on Manifolds and Submanifolds, The Theory of Harmonic Intervals, The Mass Formula of SU_3 , and Equisingular Points on Algebraic Varieties. General Relativity in Contemporary Physics, Appendix: Weather Modification: Prospects and Problems.

September 1966, 228 pp., \$8.50

PRECIS OF SPECIAL RELATIVITY

by **O. Costa de Beauregard**, *Institute Henri Poincaré, Paris*
Translated from the French

A detailed exposition covering all the non-spinorial aspects of the special theory of relativity. Such topics as the physical implications of asymmetric energy tensors and the relationship of the Wheeler-Feynmann emitter-absorber theory to the theories of Dirac and Wigner are included.

August 1966, about 125 pp., approx. \$5.00

VOLUME 2

ADVANCES IN ATOMIC AND MOLECULAR PHYSICS

edited by **D. R. Bates**

The Queen's University of Belfast, Belfast, Northern Ireland
and **Immanuel Estermann**,
The Technion, Haifa, Israel

CONTENTS: A. DALGARNO and W. D. DAVIDSON, The Calculations of Van der Waals Interactions. E. A. MASON, R. J. MUNN, and FRANCIS J. SMITH, Thermal Diffusion in Gases. W. S. GARTON, Spectroscopy in the Vacuum Ultraviolet. JAMES A. R. SAMSON, The Measurement of the Photoionization Cross Sections of the Atomic Gases. R. PETERKOP and V. VELDRE, Theory of Electron-Atom Collisions. F. J. de HEER, Experimental Studies of Excitation in Collisions between Atomic and Ionic Systems. S. N. FONER, Mass Spectrometry of Free Radicals. *Author Index-Subject Index.*

August 1966, about 475 pp., \$16.50

MAGNETISM

A Treatise on Modern Theory and Materials

edited by **George T. Rado** and **Harry Suhl**

VOLUME 4: EXCHANGE INTERACTION AMONG ITINERANT ELECTRONS

by **Conyers Herrings**

Bell Telephone Laboratories, Murray Hill, New Jersey

Presents the most diverse aspects of ferromagnetism, ferrimagnetism, and antiferromagnetism in insulators as well as in metals. Included are discussions on quantum mechanical and abstract statistical models, analysis of actual magnetic structures, theory of spin interactions in solids, phenomenology of ferromagnets, electronic and nuclear resonance effects, and neutron diffraction and optical phenomena in magnetically ordered materials. Both theoretical and experimental points of view are represented.

July 1966, 407 pp., \$14.50

PHYSICAL ACOUSTICS: Principles and Methods

VOLUME 4 A: Applications to Quantum and Solid State Physics

edited by **Warren P. Mason**

ULTRAVIOLET AND VISIBLE ABSORPTION SPECTRA

Index for 1960-1963

by **Herbert M. Hershenson**

DISTRIBUTIONS AND THE BOUNDARY VALUES OF ANALYTIC FUNCTIONS

by **E. J. Beltrami** and **M. R. Wohlers**

Proceedings of the First International Conference on

PHYSICS OF SOLIDS AT HIGH PRESSURES

edited by **C. T. Tomizuka** and **Roy M. Emrick**

VOLUME 1

ADVANCES IN MAGNETIC RESONANCE

edited by **John S. Waugh**

VOLUME 1

ADVANCES IN OPTICAL AND ELECTRON MICROSCOPY

edited by **V. E. Cosslett** and **R. Barer**

APPLIED OPTICS AND OPTICAL ENGINEERING:

A Comprehensive Treatise—in 5 Volumes

edited by **Rudolf Kingslake**

HANDBOOK OF SERIES FOR SCIENTISTS AND ENGINEERS

by **V. Mangulis**

AN INTRODUCTION TO COHERENT OPTICS AND HOLOGRAPHY

by **George W. Stroke**

WAVELENGTH STANDARDS IN THE INFRARED

by **K. Narahari Rao**, **Curtis J. Humphreys**, and **D. H. Rank**

VOLUME 4

ADVANCES IN ASTRONOMY AND ASTROPHYSICS

edited by **Zdenek Kopal**

FOR COMPLETE DETAILS CIRCLE NUMBER 6 ON READER INQUIRY CARD. PLEASE SPECIFY TITLE(S).

ACADEMIC PRESS

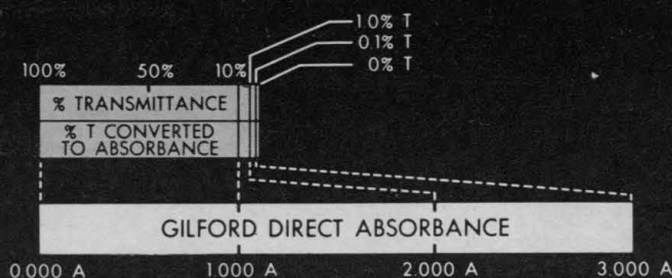


NEW YORK AND LONDON

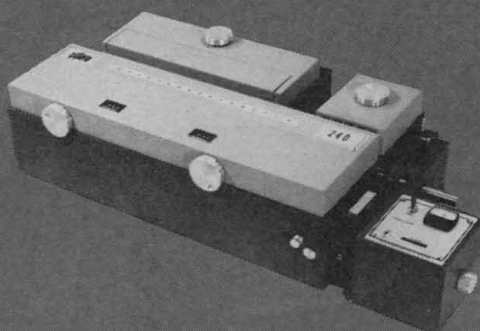
111 FIFTH AVENUE, NEW YORK, N. Y. 10003

gilford

SPECTROPHOTOMETERS

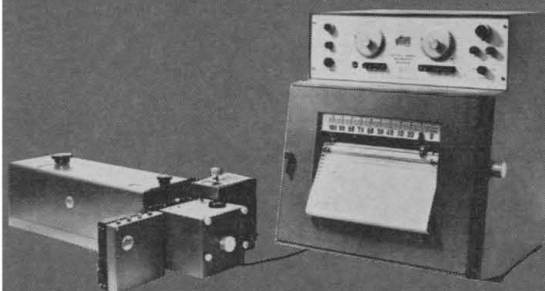


Gilford Spectrophotometers utilize a unique principle to measure Absorbance *directly*. The second and third decades, severely compressed in %—transmittance instruments, are fully expanded in Gilford Instruments—for equal accuracy and resolution throughout the complete range. Absorbance is presented digitally to 0.001 A—from 0.000 A to 3.000 A—or it can be readily recorded. Concentration is measurable directly over a 1000:1 range.



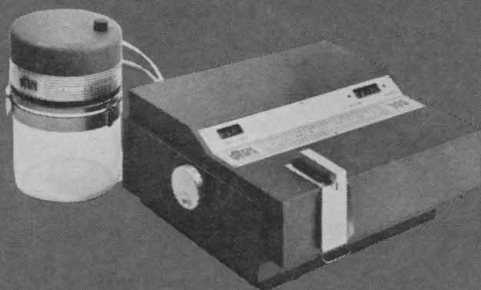
MODEL 240 SPECTROPHOTOMETER

The Model 240 spectrophotometer combines a quality Gilford-designed monochromator with the dependable Gilford photometric system. This combination has produced an instrument of unusual accuracy, range, and versatility—simple to operate and highly productive. The optical system, characterized by low stray light and high UV efficiency, features linear wavelength and slit width controls with numerical indication. A rugged optical-bench accessory mount and clear, uncluttered exit aperture plane promote easy alignment and quick interchange of attachments. The wide range—0.000 to 3.000 A—photometer is a linear absorbance measuring system of high resolution. Stabilizers for the photometer and dual-lamp source are contained in a single solid state supply module. Equipped with a four-position manual cell positioner.



MODEL 2000 AUTOMATIC SPECTROPHOTOMETER

The Model 2000 is a versatile, all-purpose spectrophotometer of superior range, stability, and photometric resolution. It is packaged into two self-contained units: (1) The lamp source, monochromator, automatic cuvette positioner, and photometer/indicator unit. (2) The main console with controls, recorder, power source, photometric circuit, line-voltage regulator, extended cuvette dwell-timer (up to 15 minutes), and circuitry and connections for additional accessories. The Model 2000 is particularly suited for determining time-dependent reaction rates and for automatic, quantitative monitoring of effluents from multiple chromatographic columns or density gradient tubes. Other applications include observation of dissolution and polymerization changes, spectrophotometric titration, precision turbidimetry and colorimetry, large-scale clinical testing, and industrial process and quality control.



MODEL 300 MICRO-SAMPLE SPECTROPHOTOMETER

The Model 300 is a new concept in precision absorbance spectrophotometry. It is a moderately priced, compact, integrated system whose photometric range and accuracy, combined with a unique rapid sampling system, provide a versatility and simplicity of operation unmatched by complex and costly instruments. The unusual capability of the Model 300 is achieved through the use of three new Gilford elements: a solid-state photometer, an excellent optical system, and a vacuum-driven sampling system coupled to a digital absorbance indicator. Accurately metered samples of 500 microliters or less may be analyzed at a rate of 4 to 6 per minute. The sample cell is filled, the absorbance measured, and the cell flushed by means of a single control lever. Absorbance range extends from 0.000 to 2.000A.

Write or call for specifications and quotation.

GILFORD INSTRUMENT LABORATORIES INCORPORATED

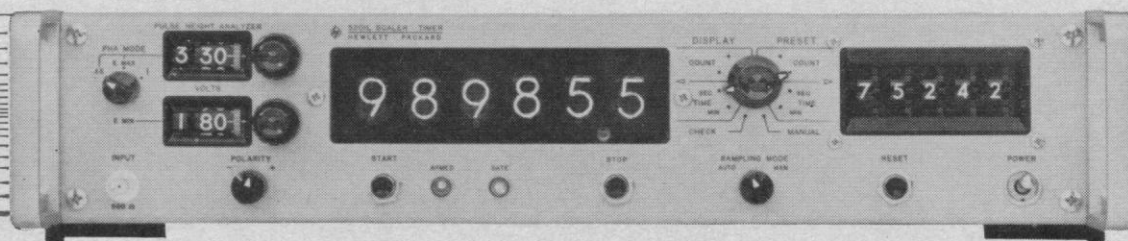
Oberlin, Ohio 44074

• Telephone: (216) 774-1041

• Cable: GILLAB



**UNSURPASSED
ACCURACY
AND RELIABILITY**



IN NUCLEAR INSTRUMENTATION

To nuclear instrumentation, Hewlett-Packard brings over 15 years' experience in electronic counters and other measuring equipment. With nuclear instruments from hp, results are more accurate and repeatable. Unique design and packaging concepts assure reliability, versatility and convenient use in detecting and counting. A wide variety of recording devices are also available.

Scintillation Detectors Premium selected NaI (TI) crystals and photomultiplier tubes permit Hewlett-Packard to be the only manufacturer to guarantee detector stability ($\pm 1\%$ or $\pm 2\%$) and resolution ($\pm 8\%$ or $\pm 10\%$). O-ring seals offer reliable performance in adverse environments. Pre-amp, amplifier and focus control are built in. Series 10600 Scintillation Detectors are priced from \$835. Preamp-amplifier section for assembling special gamma and X-ray detectors available separately (Model 10615A), as is a lead shield (Model 10650).

Scaler-Timer-Pulse Height Analyzers Model 5201L Scaler-Timer allows exceptionally wide flexibility. The instrument has single-channel pulse height analyzer for manual or automatic spectrometry, excellent linearity (0.25%), stability (better

than 0.01%/°C) and settability (to 1 mv by means of odometer-type dials). Instrument has an in-line numerical readout with storage, 200 nsec pulse pair resolution, and wide-range preset count, time controls and printer output. Model 5201L Scaler-Timer, \$1950. Other models available from \$950.

High Voltage Supply Model 5551A, highly regulated, low ripple supply provides output of 170 to 1615 volts. Features both stepped and vernier controls for rapid, accurate voltage setting.

Hewlett-Packard nuclear instrumentation is backed up with expert world-wide service and sales facilities—that offer more services than any other manufacturer of nuclear instrumentation. Write today for complete data, or contact your nearest field sales office. Hewlett-Packard, Palo Alto, California 94304, Tel. (415) 326-7000; Europe: 54 Route des Acacias, Geneva.

Data subject to change without notice. Price f.o.b. factory.

HEWLETT *hp* PACKARD
An extra measure of quality

1532



Calculate the difference B&A® research makes

Our research lab at Morristown keeps the B&A reputation for quality up to snuff. Not only for the hundreds of standard products in our catalog. But for the new ones still in R&D.

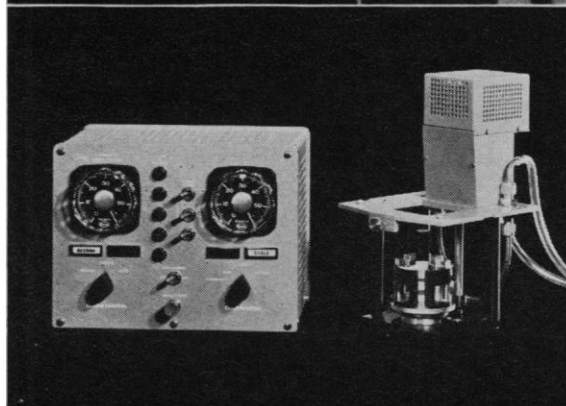
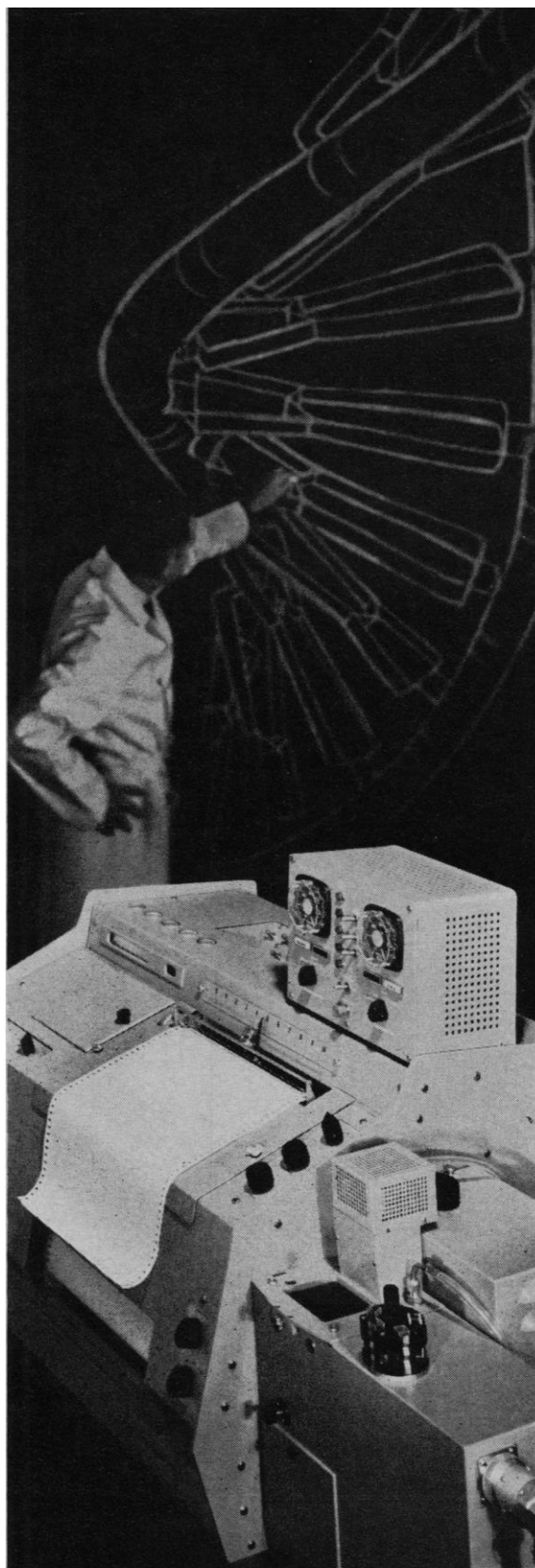
Our new Instrument Grade Solvents are a good illustration. We didn't introduce them until Research was *sure* we had a single grade of solvent you could use with *all three* instrument techniques...gas chromatography, ultra-violet and infrared. And we have! Does anyone else?

B&A research *does* make a difference. In the confidence you can always place in our lab chemicals. You can count on B&A! For information, write to B&A Laboratory Chemicals, Allied Chemical Corporation, P.O. Box 353, Morristown, N.J.



.....
ALLIED CHEMICAL MAKES
B&A® Reagents
AND THAT MAKES A BIG DIFFERENCE
.....

**switch
up to
five
samples,
automatically**



**HOW? WITH THE NEW
CARY AUTOMATIC SAMPLE CHANGER**

Makes the CARY 15 Spectrophotometer even more versatile for life science kinetic studies. Measures or compares up to five samples quickly, easily, accurately. Sample positioning and changing is automatic. Eliminates time-consuming adjustments and tedious sample handling by the operator. Speeds up your research.

About the CARY 15: It features continuous blank compensation. Low stray light (0.001% over most of the range) permits valid readings up to as high as 4 absorbance. Accuracy? Excellent. Even at 2.0 absorbance, photometric accuracy is 0.008 with 3Å resolution.

The CARY 15 couples scan and chart drive, lets you vary scan speed without affecting wavelength presentation. Including the automatic sample changer, the total cost is less than \$14,000.

Equip your lab now with the CARY 15 and automatic sample changer. Your best efforts deserve the best equipment.

For details, request Data File E603-76.

CARY® INSTRUMENTS
APPLIED PHYSICS CORPORATION
2724 S. PECK RD., MONROVIA, CALIF.

UV/VIS/IR/Raman Recording Spectrophotometers
Manual Spectrophotometers • Spectropolarimeters
Vibrating Reed Electrometers & Amplifiers

STEREOSCOPIC MICROSCOPE MSF \$145

KOEHLER RESEARCH ILLUMINATOR LKR \$99

POLARIZING MICROSCOPE MPS \$269

Trans-Illumination Base for MSF \$27

Photomicrography set ACA \$39.95

BINOCULAR PHASE CAMERA MICROSCOPE BU-13 \$1580

BINOCULAR PHASE AUTO-ILLUMINATION BPH \$527

STUDENT AUTO-ILLUMINATION MSA \$90.25

LABORATORY MICROSCOPE MLK \$191

BINOCULAR BRIGHTFIELD RESEARCH BR-BMIC \$775

WIDEFIELD FILAR MICROMETER EYEPIECE \$105

TISSUE CULTURE INCUBATOR \$399

BINOCULAR AUTO-ILLUMINATION BMLU \$414

MORE MICROSCOPE FOR THE MONEY UNITRON

WHY UNITRON MICROSCOPES ARE SEEN IN THE BEST OF CIRCLES

Most brands of microscopes **promise** quality . . . But UNITRON really **delivers** it.

Some other brands **imply** economy . . . UNITRON **proves** it . . . check our prices!

And a few others **claim** both quality and economy . . . But UNITRON is the brand that **guarantees** both.

What's more, this guaranteed UNITRON quality and economy are offered in a complete line of microscopes, to meet the routine and research needs of modern labs. Choose from brightfield, dark-field, and phase contrast models . . . monocular or binocular . . . familiar upright or unique inverted stands . . . with attachable or built-in cameras and illumination systems.

The extraordinary features of many other brands are the ordinary in UNITRON Microscopes. Complete optical and mechanical accessories are standard equipment, rather than hidden extras "at slight additional cost". Coated optics are second to none. Original designs provide easy operation, versatility, lab-proven ruggedness and guaranteed performance. All of these are just routine, normal advantages that customers have learned to expect when they specify UNITRON Microscopes — plus attractive prices which are so easy on your budget.

UNITRON MEANS MORE MICROSCOPE for the MONEY. Leading labs throughout the world know this. It's the reason, really, why "UNITRON Microscopes are seen in the best of circles". But why take our word? It's easy to prove for yourself, the advantages and value that UNITRON can offer you. Borrow any model (or models) for a **free 10 day trial** in your own lab. No cost . . . no obligation to buy . . . not even any shipping charges. Why not use the coupon to ask for a free trial, the chance to try before you decide whether or not to purchase. Or, ask us to send a catalog that will give you full details.

- ☐ Please send UNITRON'S Microscope Catalog. 4-X
☐ I accept (without cost or obligation) your invitation to try UNITRON Model _____ for 10 days.

NAME _____

COMPANY _____

ADDRESS _____

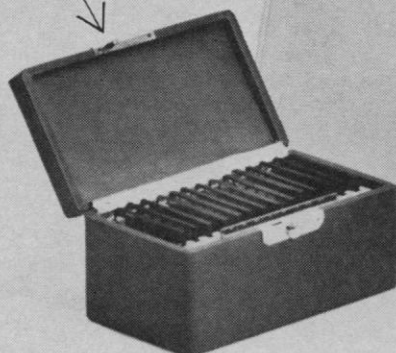
CITY _____

STATE _____

UNITRON

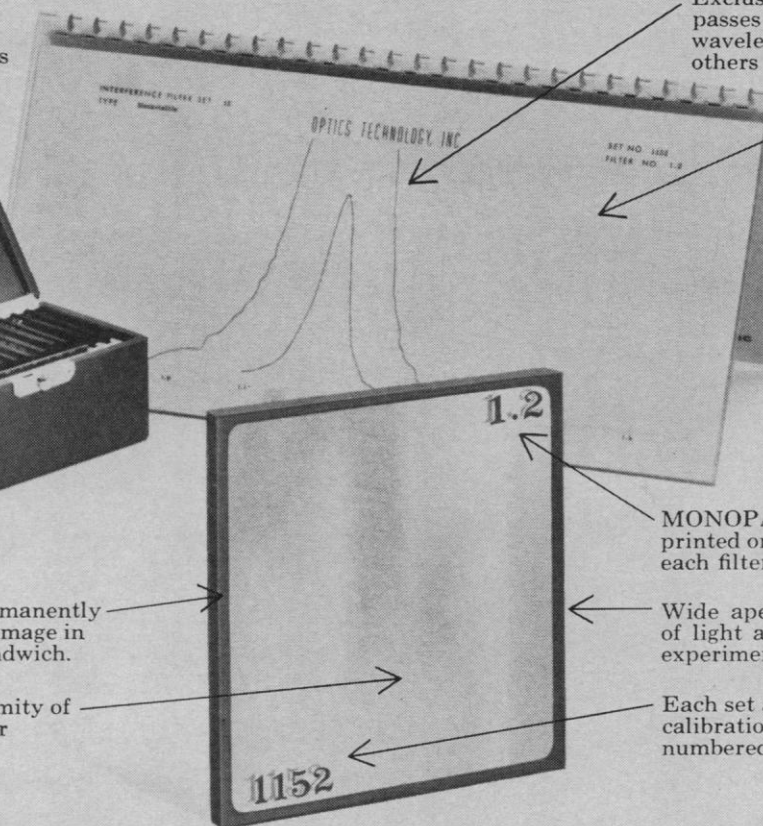
INSTRUMENT COMPANY • MICROSCOPE SALES DIV.
 66 NEEDHAM ST., NEWTON HIGHLANDS 61, MASS.

Every set of these filters comes in a leatherette felt-lined box.



Coatings are permanently sealed against damage in durable glass sandwich.

Excellent uniformity of transmission over entire surface.



Exclusive MONOPASS design passes only a narrow band of wavelengths, rejecting all others from X-band to X-ray.

Calibration charts assure pinpoint accuracy. Spectrophotometer traces include 10:1 scale expansion for each individual filter.

Each chart is laminated in heavy plastic and permanently bound into a rugged volume.

MONOPASS® wavelength printed on front side of each filter.

Wide aperture insures plenty of light available for your experiments.

Each set and its companion calibration charts are numbered for easy reference.

MONOPASS INTERFERENCE FILTER SETS ULTRAVIOLET-VISIBLE-INFRARED

MONOPASS FILTER SETS

SET 8. Ultraviolet Spectrum. A new set of ten filters covering the 2300 Å to 3700 Å range, for filtering the ultraviolet end of the spectrum. \$495.

SET 10. Visible Spectrum. Ten filters which isolate principal lines such as K, Ca, Hg, etc., from 404 to 706 millimicrons. Essential for flame chemical analysis. Also four neutral density filters and a linear spectral "wedge" filter. \$395.

SET 12. Visible Spectrum. Ten filters uniformly spaced from 400 millimicrons to 700 millimicrons, as well as four neutral density filters and a linear spectral "wedge" filter. \$395.

SET 15. Infrared Spectrum. Ten filters spaced 0.1 micron apart between 0.8 and 1.7 microns. \$450.

SET 20. Infrared Spectrum. Ten interference filters on 1" diameter substrates, mounted in convenient plastic holders, spaced at every 0.1 micron between 1.8 and 2.7 microns. These filters are blocked past 3.2 microns (lead sulphide cut-off) on the long end and to X-ray on the short end. \$450.

VISIBLE SPECTRUM ATTENUATOR SET

SET 5. Four neutral density filters covering the entire visible spectrum, with density ratings of 0.5, 1, 2, and 3. \$95.

We also offer complete custom service for LASER technology. Reflectors to your specifications. Coating on your substrates. We're at your service. Delivery normally within two weeks.

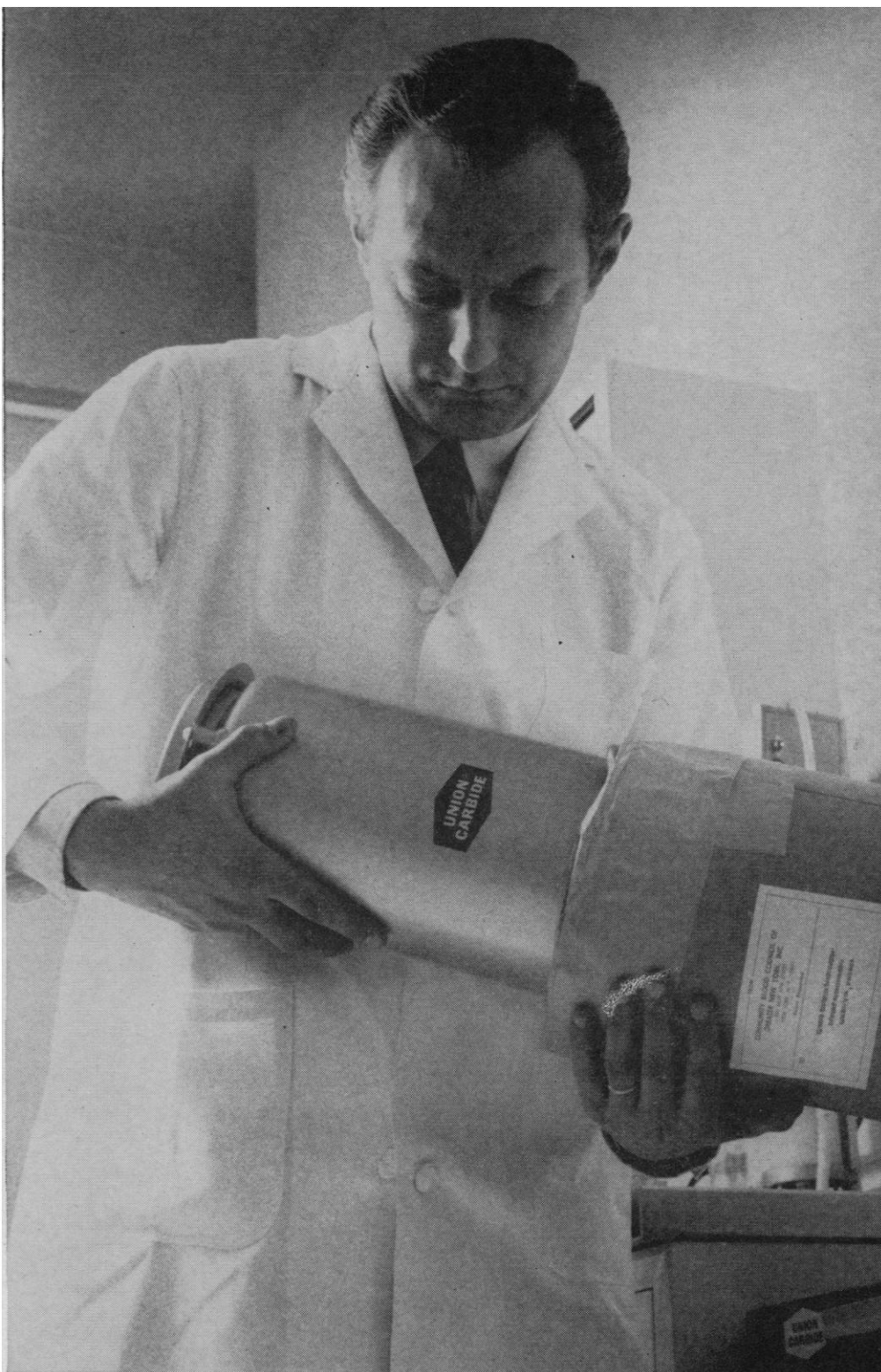


OPTICS TECHNOLOGY INC

901 California Avenue ■ Palo Alto, California ■ 327-6600 (Area Code 415)

In Europe, contact Optics Technology Instruments, Ghent, Belgium

**Inside:
biological
specimens
—completely
frozen
—shipped 3 days
ago from
5,000 miles
away.**



Unusual? Not today! Such shipments are now routine for a number of research and commercial laboratories—thanks to LINDE Biological Transports.

It's easy to see why. A LINDE Biological Transport holds specimens below -130°C up to a week. Rugged, lightweight, the Model BT-3 shown weighs only 11 lb. fully charged with liquid nitrogen. Special porous specimen holder block absorbs liquid nitrogen completely, eliminating spillage during shipment—which can be made via postal service or common carrier. Patented LINDE Super Insulation

assures high thermal efficiency.

LINDE Biological Transports were developed to the exacting requirements of the National Cancer Institute. They were field-proved in tropical New Guinea where, in a search for the cause of the rare neurological disease, Guru, brain specimens had to be shipped frozen to a central location for study.

Want to learn more about these unique Biological Transports—or any of the large family of LINDE brand cryogenic products? Fill out the coupon, attach to your letterhead, and mail to us.

CHECK COUPON—CLIP—ATTACH TO BUSINESS LETTERHEAD

**Dept. SC-72, Linde Division
Union Carbide Corporation
270 Park Avenue, New York, N. Y. 10017**

Please send me information on:

☐ LINDE Biological Transports, (F-2243).

Other cryogenic equipment: _____

☐ PLEASE ADD MY NAME TO
YOUR MAILING LIST.



**CRYOGENIC
PRODUCTS**

LINDE is a registered trade mark of Union Carbide Corporation.

Why Isn't Every Lab Using Ace INSTATHERM?

*U.S. Pats. #2979594, #3050608, #3092704. Other pats. pending.



INSTATHERM: The Heat Without A Mantle!

INSTATHERM is available in self-heating beakers, chromatographic columns, flasks, and custom applications.

...Because *They haven't tried it yet!*



Send for
new Instatherm
Brochure!

Ace INSTATHERM, the heat without a mantle, is a self-heating, fused-to-glass heat source that adds speed, accuracy and convenience to every reaction requiring heat. You will get reproducible results. There is no hot mantle to detach. There is better observation and there is less current used. INSTATHERM provides convenience and assures better results and economy for every lab. Find out all about it—send for the Ace Instatherm Brochure.



ACE GLASS INCORPORATED

Vineland, New Jersey

LOUISVILLE, Ky.

SPRINGFIELD, MASS.

Nikon EFM Microflex brings new ease and versatility to photomicrography

The Nikon EFM will adapt any standard microscope for photography, and will produce high quality, vibration-free photomicrographic negatives, prints and projection slides, as well as movies, in color or black-and-white.

It has a built-in electric eye system which virtually eliminates the uncertainties of exposure determination, reducing the entire operation to an almost automatic procedure.

The "eye," a sensitive CdS cell, measures the aggregate light passing through the specimen. It is coupled to the shutter speed selector ring and a meter needle. As the ring is rotated, the needle moves. The correct setting is indicated when the needle is centered, at which point the exposure is made.

The EFM accepts Nikon F and Nikkormat camera bodies, and the Nikon M-35 camera back. It can be adapted for use with other 35mm cameras, as well. Three large-format camera backs are also available: a Graflok back which accepts 4 x 5 film pack and sheet film holders, a 120 roll film back for 2 1/4 x 3 1/4, and the Polaroid M-100 back for making instant 3 1/4 x 4 1/4 photomicrographs.

Another unique and ingenious accessory for the EFM, known as the EFM Bicam Adapter, permits two 35mm camera bodies on two M-35 camera backs to be mounted in tandem. One may be loaded with color and the other with black-and-white, or with any other two emulsion types desired. A rotating, internal prism reflects the image rays into one camera body or the other, permitting both to be exposed in quick succession with minimum lapse of time.

The EFM is also applicable to cine-photomicrography. It is equipped with interchangeable relay lenses for the various formats. A finder telescope is furnished for focusing and orienting the specimen image in the picture area.



For complete details, write: Nikon Inc., Instrument Division,
Subsidiary of Ehrenreich Photo-Optical Industries, Inc. Garden City, N.Y. 11533

1 MICRON TO 20,000 PSI



WITH ONE READOUT UNIT!

You now have the convenience of a single instrument for all of your precision pressure measurements. With a small number of easily interchangeable pressure sensing capsules, you can measure the full range from 1 micron to 20,000 psi. The gage's frictionless optical readout gives you resolutions as high as 1 part in 100,000, with repeatabilities to 2 parts in 100,000.

No other instrument is so easy to use, compact or portable. The Precision Pressure Gage is many times faster than mercury manometers or dead weight testers of comparable accuracy. Gages may be used with TI Precision Pressure Controllers, in precision calibration systems—are ideal for laboratory or production line applications. For information, write for Bulletin S-141A.

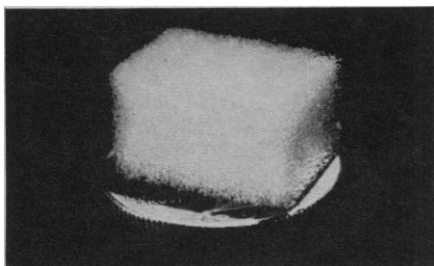
INDUSTRIAL
PRODUCTS
GROUP



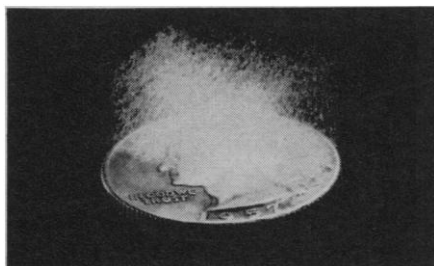
**TEXAS INSTRUMENTS
INCORPORATED**

P. O. BOX 66027 HOUSTON, TEXAS 77006
118 RUE du RHONE GENEVA, SWITZERLAND

cold plasma ashing preserves what you want



before ashing—urethane foam

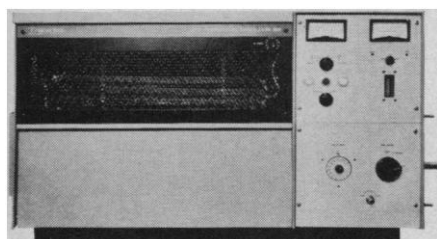


after ashing the delicate inorganic structure remains unaltered for precise quantitative analysis.

Tracerlab's new LTA-600 oxidizes samples with a cold plasma of atomic oxygen to leave inorganic constituents unaltered.

Permits more accurate quantitative elemental and structural analyses of plant and animal tissues, bones, coal, oil well cores, polymers, and radioactive materials. Prepares pure samples for atomic absorption spectrophotometry, mass spectrometry, emission spectroscopy, X-ray diffraction, and electron microscopy.

send for literature on equipment, techniques and services.



LFE | **TRACERLAB**
A Division of Laboratory for Electronics
2030 WRIGHT AVENUE, RICHMOND, CALIFORNIA

(Simpson thinks $R = 100$ is a convenient choice.) The equation is, of course, the same as Calloway's, with the unit of time taken as $A_{\max}/R = A_{\text{std}}$. It can also be put into the familiar form

$$A_n = A_{\text{std}} e^{n\lambda},$$

with $\lambda = (\ln R)/N$. (With Simpson's choice of $R = 100$, $A_n = 0.01 A_{\max} e^{n\lambda}$, $\lambda = 4.605/N$.)

The following table shows the ages of the members of a set for which $A_{\max} = 70$ years, $R = 100$, and $N = 10$. (Note that the Calloway unit of time for this case is 0.70 year.)

n	A_n (yr)	n	A_n (yr)
1	1.10	6	11.0
2	1.75	7	17.5
3	2.80	8	28.0
4	4.40	9	44.0
5	7.00	10	70.0

A. HERSCHMAN

The Physical Review,
Brookhaven National Laboratory,
Upton, Long Island, New York 11973

Computer-Time Allocation

In suggesting that a computation center, like a library, should provide its services free, Anthony Ralston (Letters, 29 April) has oversimplified a complex and increasingly important problem.

The demand for computing on any university campus is virtually unlimited if the service is free. When a university's computing power is multiplied by an order of magnitude, the new facilities are saturated within 2 or 3 years. Therefore, computing services must be allocated—the price mechanism being, of course, only one of several possible mechanisms. To simplify the problem, the “library” principle may be applied up to a limit: say everyone could be allowed \$100 worth of free service per year. Allocation would then limit only large users. Some such policies are already in effect on many campuses.

The real question about large users, however, is not whether the accounting should be done in dollars or hours but who should make the allocations. One alternative is to create a process on the campus for weighing the competing claims of quantum calculations for large molecules, research in artificial intelligence, statistical analysis of

the business cycle, and concordances of Goethe's works. Spare me from participation in that process!

A second alternative is to have the value of computing judged in relation to its value to the research projects it is supposed to serve—that is, as part of the regular foundation and government processes for making research grants. Chemical computing would then be evaluated by chemists, construction of concordances by humanists. There needs to be (and already is, of course) a substantial allocation for the development of computer science itself. This alternative is in the spirit of “program budgeting” or “cost-benefit analysis,” now popular in the federal government.

It may be objected that the problem of balancing the chemist against the humanist simply reappears at a higher level—at the level of the federal budget for NSF and the Humanities Foundation. So it does, but that is unavoidable, and it is better that we make use of existing arrangements for these political decisions than that every campus duplicate such arrangements.

HERBERT A. SIMON

Graduate School of Industrial
Administration, Carnegie Institute of
Technology, Pittsburgh, Pennsylvania

Safety: A Parallel

Many individuals who have been following the accounts in *Science* of the current controversy over automobile and traffic safety will, I believe, be interested in reading “Bursting boilers and the federal power,” by John G. Burke [*Technology and Culture* 7, No. 1, 1–23 (winter 1966)].

The story in a nutshell is this: “Marine boiler explosions . . . provoked a crisis in the safe application of steam power, which led to a marked change in American political attitudes. The change, however, was not abrupt but evolved between 1816 and 1852” and culminated in Congress passing “the first positive regulatory legislation and [creating] the first agency empowered to supervise and direct the internal affairs of a sector of private enterprise.”

I found Burke's detailed account of the story to be fascinating reading against the background of current events.

CHURCHILL EISENHART

9629 Elrod Road, Rock Creek
Hills, Kensington, Maryland

Why no derating?



Derating of ultracentrifuge rotors is a necessity brought about by the development of progressive metal fatigue as a consequence of long-continued or repeated stressing under extremely high centrifugal forces. This is usually expressed as successive limitations in permissible top speeds.

A key factor in derating is the original strength of the rotor which is largely determined by the nature of the material used, manufacturing processes and design.

IEC ultracentrifuge aluminum and titanium rotors represent a technological breakthrough in which optimum design was achieved through computer techniques. Our manufacturing processes involve advanced forging

techniques, stress relieving, specialized alloys, and custom developed machinery.

As a result, IEC rotors withstand repeated stressing over such a protracted period without impairment, derating is eliminated as a factor to consider in use. That's why we say, **no derating**. You buy one of each type you need and that's it. Many years and thousands of use-cycles later, you can still run these rotors at their top rated speed. Just keep them free from corrosion — IEC guarantees them unconditionally without time limit.

No derating. One more significant reason why, if you work anywhere in the ultracentrifuge spectrum you should be prepared to change basic thinking about equipment. Send for brochures on Models B-35 and B-60.

INTERNATIONAL  EQUIPMENT CO.

300 SECOND AVENUE, NEEDHAM HEIGHTS, MASSACHUSETTS 02194



Measure...Check...Calibrate...Test... with L&N's new Panel-Mounted Bridges and Potentiometers.

We've just developed a new line of 19-inch-wide rack- or panel-mounted instruments—13 in all.

They combine the basic circuit features of our widely-used potentiometers and bridges (resistance and temperature) with convenience features for panel-mounting.

Line-operation, for example, to eliminate the need for batteries or standard cells. Detector terminals to provide the choice of an external galvanometer, null detector, null-balance recorder or control amplifier. Rear-mounted terminals to permit neat back-of-panel connections. Multi-point switching (and multiple input terminals) on potentiometers. Accessories (shunt, volt box, run-up box) redesigned for rack mounting—three to a rack.

The result? A new family of instruments that offer unusual possibilities in

combination. We can suggest a few:

Process Measurements: For differential measurements, using a zero-center recorder or a digital voltmeter as continuous "readout" of the difference from input. For supervisory measurements—selected periodic indications from one or more remote locations. For production measurements—in plating, molding, mixing, drying, baking, etc.

Check-out and Calibration: For transducer calibration and thermocouple checking. For recorder check-out. For wattmeter, ammeter, and voltmeter calibration. In calibration stands for amplifiers, power supplies and oscilloscopes.

Research and Development: For highly precise laboratory temperature control. For auxiliary, supplementary or ambient measurements in physical, chemical and biological research. As ranging devices for AZAR (adjustable-

zero, adjustable range) recorders.

Testing: As elements of pilot-plant instrumentation. For dynamic measurements in mobile vehicles. For efficiency measurements in heat exchangers and cryogenic installations. For motor, generator and bearing temperature measurements. For life tests of electronic components. For repetitive product testing (of resistors, etc.) by percent deviation.

Sound interesting? We think so. If you agree, just call your nearby L&N Field Office for full information...or write us directly for descriptive literature, at 4926 Stenton Avenue, Philadelphia, Pa., 19144.



LEEDS & NORTHRUP
Philadelphia 44 • Pioneers in Precision

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Science serves its readers as a forum for the presentation and discussion of important issues related to the advancement of science, including the presentation of minority or conflicting points of view, rather than by publishing only material on which a consensus has been reached. Accordingly, all articles published in *Science*—including editorials, news and comment, and book reviews—are signed and reflect the individual views of the authors and not official points of view adopted by the AAAS or the institutions with which the authors are affiliated.

Editorial Board

ROBERT L. BOWMAN	EVERETT I. MENDELSON
JOSEPH W. CHAMBERLAIN	NEAL E. MILLER
JOHN T. EDSALL	JOHN R. PIERCE
EMIL HAURY	KENNETH S. PITZER
ALEXANDER HOLLAENDER	ALEXANDER RICH
WILLARD F. LIBBY	DEWITT STETTEN, JR.
GORDON J. F. MACDONALD	CLARENCE M. ZENER

Editorial Staff

Editor

PHILIP H. ABELSON

Publisher

DAEL WOLFLE

Business Manager

HANS NUSSBAUM

Managing Editor: ROBERT V. ORMES

Assistant Editors: ELLEN E. MURPHY, JOHN E. RINGLE

Assistant to the Editor: NANCY TEIMOURIAN

News and Comment: DANIEL S. GREENBERG, JOHN WALSH, ELINOR LANGER, LUTHER J. CARTER, MARION ZEIGER, JANE AYRES

Europe: VICTOR K. McELHENY, Flat 3, 18 Kensington Court Place, London, W.8, England (Western 5360)

Book Reviews: SYLVIA EBERHART

Editorial Assistants: ISABELLA BOULDIN, ELEANORE BUTZ, BEN CARLIN, GRAYCE FINGER, NANCY HAMILTON, OLIVER HEATWOLE, ANNE HOLDSWORTH, KONSLYNNIETTA HUTCHINSON, KATHERINE LIVINGSTON, DIRGHAM SALAH, BARBARA SHEFFER

Advertising Staff

Director

EARL J. SCHERAGO

Production Manager

RAYMONDE SALAMA

Sales: New York, N.Y., 11 W. 42 St. (212-PE-6-1858): RICHARD L. CHARLES, ROBERT S. BUGBEE
Scotch Plains, N.J., 12 Unami Lane (201-889-4873): C. RICHARD CALLIS

Chicago, Ill. 60611, 919 N. Michigan Ave., Room 426 (312-DE-7-4973): HERBERT L. BURKLUND

Los Angeles 45, Calif., 8255 Beverly Blvd. (213-653-9817): WINN NANCE

EDITORIAL CORRESPONDENCE: 1515 Massachusetts Ave., NW, Washington, D.C. 20005. Phone: 202-387-7171. Cable: Advancesci, Washington. Copies of "Instructions for Contributors" can be obtained from the editorial office. ADVERTISING CORRESPONDENCE: Rm. 1740, 11 W. 42 St., New York, N.Y. 10036. Phone: 212-PE 6-1858.

Stable Federal Support

Has the Federal Government acquired any responsibility for the continuing and general support of higher education in the United States? The answer may be debatable, but the amount of federal money going to institutions of higher education has reached a level that makes it necessary to consider the question.

Federal assistance provides research support, new equipment, building aid, library improvements, student assistance, and other forms of help to a college or university that can qualify. Other federal money flows to universities that assist federal agencies in meeting their obligations for training programs, demonstrations, assistance to other countries, and other services or action programs.

Despite important differences, the financing of all these activities comes in the form of individual grants or contracts that are made for specific purposes, for a limited period, without commitment for the future, and with some restrictions on use. Such funds have often had an emergency character and have been appropriated to meet needs that were considered temporary. The result is that a university often includes a substantial number of independently planned and temporarily financed extensions or "subagencies" of a variety of federal agencies.

This kind of financing is in marked contrast with the reasonably stable funds that colleges and universities have traditionally counted on for most of their annual budgets. State appropriations, student fees, and income from endowment, in varying proportions, have provided the solid core of academic budgets. Although none of these sources has been fully guaranteed for the future, all have been sufficiently stable to permit long-term commitments and planning. Moreover, the nature of these sources has encouraged prudent use of the funds. Income from fees and endowment can be used where needed most, and if not spent this year is available next. Many state colleges and universities receive lump-sum appropriations, and those states which require more detailed budgets usually allow appropriations to be used quite flexibly.

These more flexible funds now provide for about three-fourths of higher-education expenditures. The more inflexible federal grants and contracts supply about a quarter of the national total. The percentage varies greatly from one institution to another, however. In some it is close to zero; in others it is far more than half.

Higher education and the Federal Government have both benefited greatly from their financial and intellectual collaboration. The partnership will continue. But the amount of money now involved and its highly segmental character strain the ability of many institutions to plan and use their other resources most constructively, and these strains are most acute in the institutions that receive the most federal dollars.

The question therefore arises: has the Federal Government acquired a responsibility for contributing to the continuing and general support of higher education? The institutional grant programs of some agencies indicate a limited acceptance of such responsibility. But no general policy decision has been made, and no very effective one can be made by individual agencies. Decision at a higher level will be necessary, and that decision will be difficult, for constitutional, religious, regional, and educational issues are all involved in a matter of national policy. This whole problem is likely to become more vexatious before it is settled.

—DAEL WOLFLE

THIS PACKARD
APPLICATIONS ENGINEER IS
EXPLAINING THE OPERATION
OF THE GAS CHROMATOGRAPH
HE HAS JUST INSTALLED



Every customer gets this service, free

We want every one of our customers to get the most from his Packard Gas Chromatograph. No instruction manual—not even the very complete one we supply—can tell him everything. That's why every gas chromatograph we deliver is installed by a trained specialist who then explains its features. ■ Features such as the easily-removable column/detector assembly that permits column changes outside the heated oven; electronically programmed temperature control, *separate* heat controls at inlet, outlet and detector; interchangeable detectors, and the water-cooled oven. ■ Dual-column Packard Gas Chromatographs are ready to use for simultaneous analysis of different samples . . . or for stream splitting with different types of detectors to give general and specific responses from the same sample. Modular design of all systems allows choice of detector and expansion from single to dual channel, or isothermal to programmed temperature operation. For complete information ask your Packard Sales Engineer for Bulletin 1058, or write to Packard Instrument Company, Inc., 2200 Warrenville Road, Downers Grove, Illinois 60515.

Packard



A user 3,250 miles from London comments :

'With modern methods of air express transport..... consignments are almost invariably punctual to the hour from the Radiochemical Centre at Amersham'.

Last year the Radiochemical Centre made over 56,000 consignments of radioactive material and more than 30,000 were despatched via London Airport. The Centre's proximity to an international airport enables it to maintain a swift, thoroughly dependable, truly world-wide delivery service for radiopharmaceuticals and research radiochemicals.

A comprehensive catalogue 'Radioactive Products' is available free to radioisotope users. For details of our carbon-14 and tritium compounds, U.S. users should write to: Nuclear-Chicago Corporation, 333 East Howard Avenue, Des Plaines, Illinois, 60018.

THE RADIOCHEMICAL CENTRE

Amersham, Buckinghamshire, England

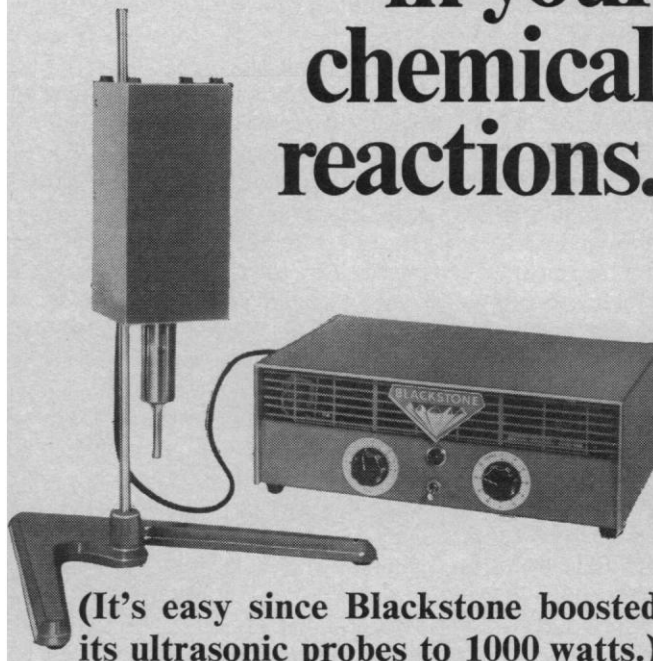
Tel: Little Chalfont 2701 Telex: 83141 Active Amersham

Cables: Activity Amersham Telex

THE WORLD CENTRE FOR DEPENDABLE RADIOCHEMICALS

TAS/RE.143

Put some zip in your chemical reactions.



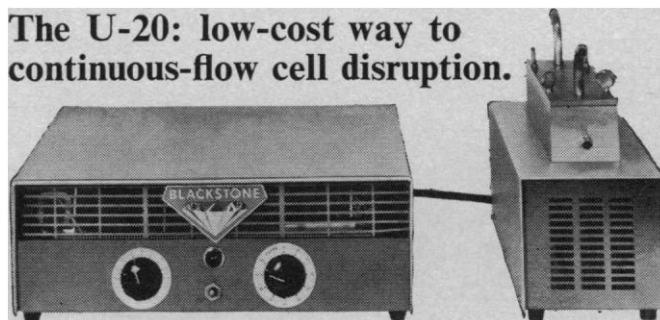
(It's easy since Blackstone boosted its ultrasonic probes to 1000 watts.)

Blackstone introduces a new series of ultrasonic probes with a tremendous increase in power ranging from 100 to 1000 watts output for a broader research and production potential in emulsification, dispersion, degassing and acceleration of chemical reactions.

Available with a wide variety of accessories ranging from various size tips to sealed processing chambers and cups with cooling arrangements, Blackstone probes can also be used for processing pathogenic and non-pathogenic organisms by batch or continuous flow.

Blackstone probes are portable and are provided with support stands and clamps for operation in any position.

The U-20: low-cost way to continuous-flow cell disruption.



Blackstone's U-20 ultrasonic cell disrupter is a highly flexible unit designed for continuous or batch routine processing of cell suspensions, chemicals and solutions common to research in biochemistry, microbiology and related fields.

Laboratory tests show that employing a 70 ml. volume of a 20% suspension of *Escherichia coli*, 98% disruption was achieved by the U-20 unit in 12 minutes with no loss of activity of enzyme Beta Galactosidase.

Both the Probe and U-20 allow 0 to 100% power control.

Here's another Blackstone exclusive that permits researchers to process any sample regardless of the organism, percentage of suspension or desired percentage of disruption. It's worth looking into.



BLACKSTONE ULTRASONICS, INC.

600 Howard St. • Sheffield, Pa.

or contact your local laboratory supply distributor

cycle and during development. Brown summarized data from a variety of developmental systems in which early stages of embryogenesis are characterized by the absence of a nucleolus and lack of synthesis of ribosomal RNA. In these systems there appears to be a sufficient supply of maternal ribosomes to satisfy the early metabolic needs of the embryos. When nuclei from later stages are transplanted into unfertilized eggs, there is a disappearance of nucleoli and no further synthesis of ribosomal RNA until the embryo again reaches the later stage. Such experiments are believed to constitute evidence of a cytoplasmic control over the expression of the ribosomal cistrons. H. Barr (Wisconsin) speculated that this might be related to the much higher concentration of magnesium ions in unfertilized eggs as compared to the later stages. Adrienne Ficq (Brussels) described how the synthesis of cytoplasmic RNA, presumed to be predominantly ribosomal, occurs in the nucleolus of echinoderm oocytes prior to maturation and dissolution of the germinal vesicle.

Evidence that the nucleolus is active in RNA synthesis throughout most of interphase, with the possible exception of a brief period in early S phase, was provided by F. Kasten (Pasadena Foundation for Medical Research). N. Das (Berkeley) found that in certain organisms nucleoli continued to actively synthesize RNA well into mitotic or meiotic prophase.

In the closing session C. H. Waddington (Edinburgh) provided an incisive and much appreciated summary of the symposium. Swift presented the report of a special nomenclature committee who undertook the task of attempting to assimilate the totality of morphological and biochemical data into a unified terminology. Final remarks were made by A. Hollaender (Oak Ridge) and F. Saez (Montevideo), president and vice president of the symposium.

This conference was the fifth in a series of biological meetings sponsored by various Latin American institutions with the cooperation of the Biology Division of the Oak Ridge National Laboratory. Sponsors for the Montevideo meeting were the Departmental Council of Montevideo, National Council of Scientific and Technical Research of Uruguay, Organization of American States, United States Atomic Energy Commission, United States National Science Foundation, and the

University of Pittsburgh. Proceedings of the conference, including a full transcript of the discussions, will be published as a monograph of the National Cancer Institute. It is intended that this volume, which is scheduled to appear before the end of the year, will serve as a valuable reference source and guide for present and future generations of nucleolophiles.

ROBERT P. PERRY

*Institute for Cancer Research,
Philadelphia, Pennsylvania 19111*

Forthcoming Events

August

10-11. European Assoc. for **Animal Production**, study commissions, mtgs., Edinburgh, Scotland. (K. Kállay, Corso Trieste 67, Rome, Italy)

10-12. Applications of **X-ray Analysis**, 15th annual conf., Denver, Colo. (J. B. Newkirk, Metallurgy Div., Denver Research Inst., Univ. of Denver, Denver)

11-18. **Animal Production**, 9th intern. congr., Edinburgh, Scotland (Congress Secretary, 5 Hope Park Sq., Edinburgh 8)

14-17. **Cryobiology**, intern. conf., Sapporo, Japan. (Z. Yosida, Inst. of Low Temperature Science, Hokkaido Univ., Sapporo)

14-17. **Soil Conservation Soc. of America**, Albuquerque, N.M. (H. W. Pritchard, 7515 NE Ankeny Rd., Ankeny, Iowa)

14-18. Canadian **Pharmaceutical Assoc.**, 59th conv., St. John, New Brunswick. (P. W. Bell, 175 College St., Toronto 2B, Ont.)

14-19. American Inst. of **Biological Sciences**, 17th annual, Univ. of Maryland, College Park. (AIBS, 3900 Wisconsin Ave., Washington, D.C.)

The following societies will meet in conjunction with the AIBS. Additional information is available from AIBS or from the program chairmen listed below.

American **Bryological Soc.** (W. B. Schofield, Dept. of Botany, Univ. of British Columbia, Vancouver, Canada)

American **Fern Soc.** (I. Knobloch, Dept. of Botany and Plant Pathology, Michigan State Univ., East Lansing)

American **Fisheries Soc.** (L. E. Cronin, Natural Resources Inst., Administration Bldg., Univ. of Maryland, College Park)

American **Genetic Assoc.** (S. Burhoe, American Univ. Graduate School, Washington, D.C.)

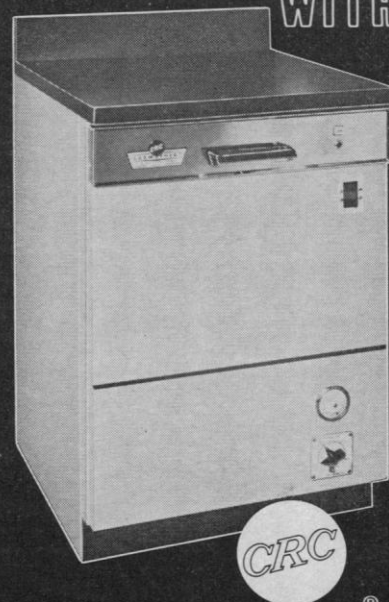
American **Microscopical Soc.** (R. M. Cable, Dept. of Biological Sciences, Purdue Univ., Lafayette, Ind.)

American Soc. for **Horticultural Science** (A. H. Thompson, Dept. of Horticulture, Univ. of Maryland, College Park)

American Soc. of **Plant Physiologists** (R. S. Loomis, Dept. of Agronomy, Univ. of California, Davis)

American Soc. of **Plant Taxonomists** (L. R. Heckard, Dept. of Botany, Univ. of California, Berkeley)

DIAL OPTIMUM LABWARE CLEANING EFFICIENCY WITH



LABWASHER

CRC variable programing guarantees you economical, automated glassware washing and drying tailored to your lab's needs. Labwasher® pays for itself in only a few weeks with man-hours saved, reduced labware breakage and improved morale.

- Fully automated . . . set it and forget it.
- Low operating costs.
- Authorized service men in your area.

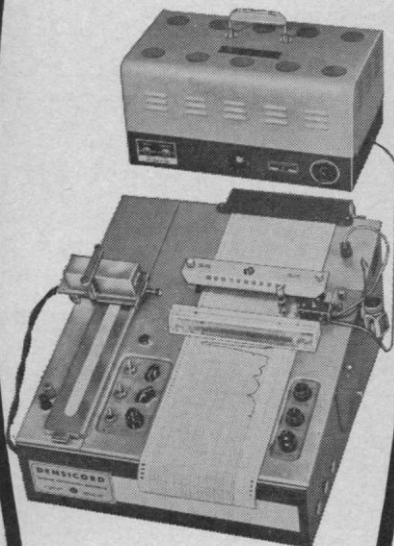
REQUEST BULLETIN NO. 238

THE
**CHEMICAL
RUBBER**
CO.

2310 Superior Ave.
Cleveland, Ohio 44114

UNIQUE DENSITOMETER for all ELECTRO- PHORESIS

Model 542
for
Electrophoresis
on:
PAPER
CELLULOSE ACETATE
GELS
including Disc
electrophoresis patterns



Write for bulletin

Stocked by
Laboratory
Supply
Houses

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

American Soc. of Professional Biologists
(A. Dickman, 1415 W. Erie Ave., Philadelphia, Pa.)

American Soc. of Zoologists (L. E. DeLanney, Wabash College, Crawfordsville, Ind.)

Animal Behavior Soc. (E. M. Banks, Dept. of Zoology, Univ. of Illinois, Urbana)

Biometric Soc.-ENAR (J. Meade, Univ. of Arkansas Medical School, Fayetteville)

Botanical Soc. of America (W. A. Jensen, Dept. of Botany, Univ. of California, Berkeley)

Ecological Soc. of America (G. M. Woodwell, Dept. of Biology, Brookhaven Natl. Lab., Upton, L.I., N.Y.)

Mycological Soc. of America (P. L. Lentz, Crops Research Div., USDA, Beltsville, Md.)

Natl. Assoc. of Biology (W. K. Stephenson, Earlham College, Richmond, Ind.)

Nature Conservancy (Local Representative: W. Van Eck, Dept. of Agronomy and Genetics, West Virginia Univ., Morgantown)

Phi Sigma (Local Representative: R. G. Stross, Dept. of Zoology, Univ. of Maryland, College Park)

Phycological Soc. of America (B. C. Parker, Dept. of Botany, Washington Univ., St. Louis, Mo.)

Society for Industrial Microbiology (J. Coats, Upjohn Co., Kalamazoo, Mich.)

Society of Protozoologists (R. W. Hull, Dept. of Biological Sciences, Florida State Univ., Tallahassee)

Tomato Genetics Cooperative (Local Representative: F. Angell, Dept. of Horticulture, Univ. of Maryland, College Park)

Wildlife Disease Assoc. (C. Herman, Patuxent Wildlife Disease Assoc., Laurel Md.)

15-19. **American Statistical Assoc.**, Los Angeles, Calif. (D. C. Riley, The Association, 810 18th St. NW, Washington, D.C. 20006)

16. **International Assoc. for the Prevention of Blindness**, general assembly, Munich, West Germany. (J. P. Baillart, 47, rue de Bellechasse, Paris 7, France)

16-17. **Central Nervous System Effects of Analgesic Drugs**, symp., Santiago, Chile. (J. Mardones, Inst. of Pharmacology, Univ. of Chile, Casilla 12967, Santiago)

16-19. **International Assoc. of Milk, Food, and Environmental Sanitarians**, Minneapolis, Minn. (H. L. Thomasson, P.O. Box 437, Shelbyville, Ind. 46176)

16-26. **Mathematicians**, intern. congr., Moscow, U.S.S.R. (V. G. Karamanov, Acad. of Sciences of the U.S.S.R., Lenin Prospekt, Moscow)

17-19. **Joint Automatic Control Conf.**, 7th annual, Univ. of Washington, Seattle. (G. Kovatch, NASA, Electronics Research Center, 575 Technology Sq., Cambridge, Mass. 02139)

19-26. **Applied Geography**, symp., Intern. Geographical Union Commission on Applied Geography, West Greenwich, R.I. (P. H. Nash, Graduate School, Univ. of Rhode Island, Kingston 02881)

19-28. **Geology**, 23rd intern. congr., Prague, Czechoslovakia. (Organizing Committee, Ústřední ústav geologický, Malostranské náměstí 19, Prague 1)



Syringe injections at the push of a button

This unique syringe will deliver a precisely pre-determined quantity at the push of a button. And it will deliver the exact quantity again and again. Volume is adjustable in one microliter units. Spring driven. Fast, accurate, and easy to use. Hamilton's CR700, 1 to 20 μ l or 10-200 μ l capacities.

Write for Syringe Innovation Brochure

HAMILTON
HAMILTON COMPANY

P. O. Box 307-K
Whittier, Calif.

20-24. American **Phytopathological** Soc., Denver, Colo. (C. J. R. Shay, Dept. of Botany and Plant Pathology, Purdue Univ., Lafayette, Ind. 47907)

20-25. **Diseases of the Chest**, 9th intern. congr., Copenhagen, Denmark. (M. Kornfeld, American College of Chest Physicians, 112 E. Chestnut St., Chicago, Ill. 60611)

21-24. **Free Radicals in Solution**, intern. symp. Ann Arbor, Mich. (R. C. Elderfield, Dept. of Chemistry, Univ. of Michigan, Ann Arbor 48104)

21-25. American Soc. of **Agronomy**, Oklahoma State Univ., Stillwater. (M. Stelly, The Society, 677 S. Segoe Rd., Madison, Wis. 53711)

21-25. **Electron Microscopy** Soc. of America, San Francisco, Calif. (G. Thomas, Dept. of Mineral Technology, Univ. of California, Berkeley)

21-26. **Hematology**, 11th intern. congr., Sydney, Australia. (F. P. Walsh, 1 York St., Sydney)

21-26. **Illuminating Engineering** Soc., natl. technical conf., Minneapolis, Minn. (A. D. Hinckley, The Society, 345 E. 47 St., New York 10017)

21-7. British Assoc. for the **Advancement of Science**, 128th annual mtg., Nottingham, England. (Secretary, 20 Great Smith St., 3 Sanctuary Bldg., London S.W.1)

22-24. **Computer and Information Sciences**, symp., Columbus, Ohio. (J. T. Tou, Communication Science Research Center, Columbus Laboratories, Battelle Memorial Inst., 505 King Ave., Columbus, Ohio 43201)

22-24. **Physiology**, 12th Scandinavian congr., Turku, Finland. (K. Hartiala, Dept. of Physiology, Turku Univ., Turku)

22-26. Society of **Photo-Optical Instrumentation** Engineers, 11th annual technical symp., St. Louis, Mo. (R. T. Hedden, 16 Harneywold Dr., St. Louis 63136)

22-26. **Poultry Science** Assoc., Utah State Univ., Logan. (C. B. Ryan, Dept. of Poultry Science, Texas A&M Univ., College Station 77843)

22-27. **Food Science and Technology**, 2nd intern. congr., Warsaw, Poland. (A. Borys, Inst. Przemyslu Miesnego, Rakowiecka 36, Warsaw 12)

22-27. **History of Medicine**, 20th intern. congr., Berlin, Germany. (Secretariat, Augustastr. 37, 1 Berlin 45)

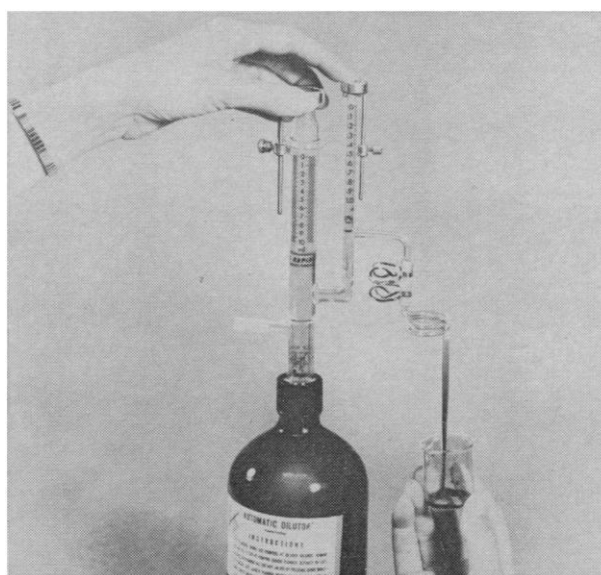
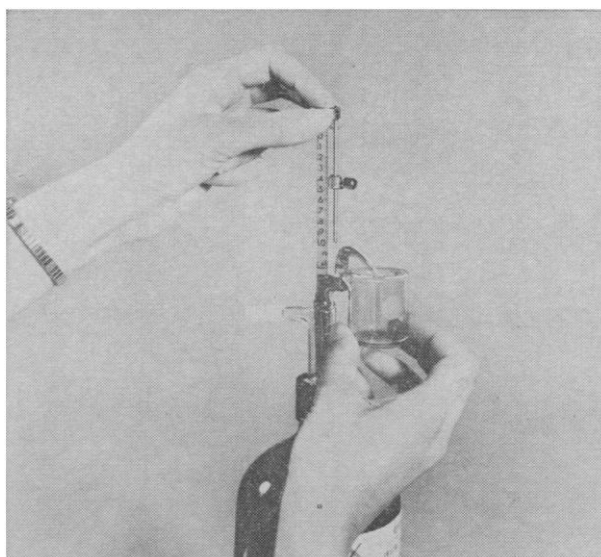
22-27. Pan American Federation of Associations of **Medical Schools**, 1st general assembly, Bogota, Colombia. (E. Braga, Caixa Postal 26-ZC-39, Rio de Janeiro, GB, Brazil)

22-10. **Science**, 11th Pacific congr., Tokyo, Japan. (Pacific Science Assoc., Bishop Museum, Honolulu, Hawaii 96819)

23-25. **Biological Photographic** Assoc., 36th annual mtg., Lexington, Ky. (P. Brook, The Association, Cornell Univ. Medical College, 1300 York Ave., New York, N.Y.)

23-26. **Electronics**, western show and conv., Los Angeles, Calif. (S. Sensiper, WESCON, 3600 Wilshire Blvd., Suite 1920A, Los Angeles 99005)

23-30. **Luminescence**, intern. congr., Budapest, Hungary. (G. Szigeti, Research Inst. for Technical Physics, Hungarian Acad. of Sciences, P.O. Box Ujpest 1, No. 76, Budapest)



CUT YOUR LAB COSTS 50-95%

Our customers say L/I Automatic REPIPETS* and Dilutors save 50-95% of the time required for their determinations. It's logical, because these instruments dispense, transfer, mix, aspirate or dilute in seconds instead of minutes. Use them to automate any test with no change in procedures and complete freedom from contamination. Economical for 1 or 1,000 tests!

L/I REPIPETS and Dilutors handle any reagent, hot or cold, with a guaranteed accuracy of 1%, reproducibility $\pm 0.1\%$. Volumes? From microliters to deciliters. L/I's new micropipets extend the range of Dilutors to such procedures as red and white cell dilutions. Cleanup? None.

Dilutors \$89.50, including complete set of tips for highest precision in all ranges. REPIPETS \$47.50. Immediate delivery in 1, 10, 20 and 50 ml sizes.

Write for details on REPIPETS and new extended range Dilutors.

*Trademark (REpetitive PIPETS)

LABINDUSTRIES

1802M Second St., Berkeley, California 94710, TH3-0220, Cable LABIND

DISPENSE ACIDS & SOLVENTS WITH

mini-pet™

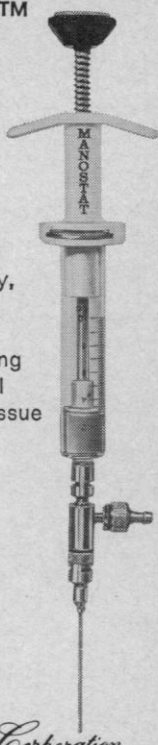
non-sticking
syringe-type, repeating
dispenser

Chloroform, toluene, xylol... a wide variety of acids... **MINI-PET** dispenses them all quickly, simply, with one-handed ease. And **MINI-PET's** Teflon plunger and "O" ring eliminate "freezing." Ideal for automatic pipetting, tissue culture dispensing from remote containers: completely autoclavable, easily disassembled. Interchangeable syringe barrel to federal specification. From \$21.50 complete. Available in 1 cc, 2 cc, and 10 cc sizes.



MANOSTAT Corporation

Available through your laboratory supply dealers
20 N. MOORE ST., DEPT. 524, N. Y. 13, N. Y.



PRECISION PIPETTING INSTRUMENT

digi-pet®

DIGI-PET is a precision liquid dispensing instrument for the laboratory. No calculations are required! Counter gives quick, highly accurate direct reading of volume dispensed. High precision and sensitivity lets you perform repeated titrations with a single filling.

ACCURACY. Up to 0.1% of dispensed volume!

SENSITIVITY. Four digit direct readout gives you sensitivity of .01%!

UNIQUE PUSH-BUTTON RESET. You can dispense and reset with one hand!

EASY GRIP. Specially designed for comfortable hand operation!

INTERCHANGEABLE TIPS. Straight, luer, or right angle bend available!

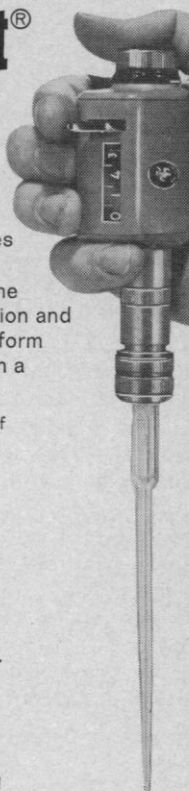
WIDE RANGE OF SIZES. Available in 0.01 ml, 0.1 ml, 1.0 ml and 10.0 ml sizes.

LOW PRICE. From \$139.50!



MANOSTAT Corporation

Available through your laboratory supply dealers
20 N. MOORE ST., DEPT. 524, N. Y. 13, N. Y.



23-1. **Radio Astronomy** and the Galactic System, symp., Noordwijk, Netherlands. (J. H. Oort, University Observatory, Leiden, Netherlands)

24-26. **Principles of Radiation Protection**, conf., Oak Ridge, Tenn. (Special Projects Office, Oak Ridge Associated Univs., P.O. Box 117, Oak Ridge, Tenn. 37830)

24-29. **International Soc. of Blood Transfusion**, 11th biennial congr., Sydney, Australia. (G. T. Archer, 1 York St., Sydney)

24-29. **Prehistoric and Protohistoric Sciences**, 7th intern. congr., Prague, Czechoslovakia. (S. J. De Laet, Seminaire d'Archéologie de l'Université, 2 Blandijnberg, Ghent, Belgium)

25. **Scandinavian Pharmacologists**, mtg., Turku, Finland. (K. Hartiala, Dept. of Physiology, Turku Univ., Turku)

25-27. **Inter-Union Commission on Solar and Terrestrial Relationships**, mtg., Belgrade, Yugoslavia. (C. W. Allen, Univ. of London Observatory, Mill Hill Park, London N.W.7, England)

26-29. **Low Temperature Calorimetry**, conf., Otaniemi, Finland. (O. V. Lounasmaa, Dept. of Technical Physics, Inst. of Technology, Otaniemi)

26-29. **Rural Sociological Soc.**, annual mtg., Miami, Fla. (J. A. Beegle, Dept. of Sociology and Anthropology, Michigan State Univ., East Lansing)

26-2. **Biometeorology**, 4th intern. congr., Rutgers Univ., New Brunswick, N.J. (F. Sargent, II, 524 Burrill Hall, Univ. of Illinois, Urbana 61801)

27. **American Assoc. of Electromyography and Electrodiagnosis**, San Francisco, Calif. (M. K. Newman, 16861 Wyoming Ave., Detroit 21, Mich.)

27-28. **Society for the Study of Social Problems**, annual mtg., Miami Beach, Fla. (F. F. Lee, Dept. of Sociology and Anthropology, Northeastern Univ., Boston, Mass. 02115)

28-1. **Association of American Geographers**, Toronto, Ont., Canada. (J. K. Hart, 1146 16th St., NW, Washington, D.C. 20036)

28-2. **Hormones**, Laurentian conf., Mont Tremblant, P.Q., Canada. (J. Sanford, 222 Maple Ave., Shrewsbury, Mass. 01545)

28-4. **Electron Microscopy**, 6th intern. congr., Kyoto, Japan. (Chairman of the Organizing Committee, Inst. for Virus Research, Kyoto Univ., Kyoto)

29-1. **Technical Information Center Administration**, 3rd annual conf., Philadelphia, Pa. (M. Warrington, Graduate School of Library Science, Drexel Inst. of Technology, Philadelphia 19104)

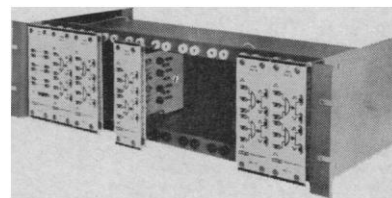
29-31. **Preparation and Properties of Electronic Materials for Control of Radiative Processes**, conf., Boston, Mass. (E. P. Warekois, MIT Lincoln Laboratory, Lexington, Mass. 02173)

29-31. **Electronic Materials**, conf., Boston, Mass. (American Inst. of Mining, Metallurgical and Petroleum Engineers, 345 E. 47 St., New York 10017)

29-31. **Instrumentation in Aerospace Simulation Facilities**, 2nd intern. congr., Stanford Univ., Stanford, Calif. (P. L. Clemens, VKF/AP, Arnold Air Force Base Station, Tenn.)

29-31. **Mathematical Assoc. of America**,

BRS solid state logic modules



Sure Cure for Electronic Frustration

Through solid state digital logic packages (called DigiBits) we have taken a great deal of the old frustration out of electronics in the research lab. Reliability is a prime example. Once a DigiBit system is properly programmed it just goes and goes and goes. No moving parts, no points to burn out and most important, no equipment failure midway through an experiment. What could be more frustrating than seeing a whole experiment washed out due to faulty equipment?

Consider versatility too. With DigiBit logic modules you decide what the equipment should do to fit **your** experiment. Using techniques borrowed from the computer field, an infinite variety of networks can be established quickly by interchanging or plugging in different modules. In fact by utilizing a certain amount of permanent pre-wiring, networks can be changed in seconds. How many new horizons does that open up? Used to be you'd have to settle for solutions governed by the capability of the equipment. With DigiBits you're restricted only by your own imagination.

Looking for a new way of life? Ask BRS to give you the complete story on DigiBit Systems. Ask too about the BRS free Design Assistance Service—valuable advice that's appreciated by the engineer and non-engineer alike.

BRS electronics

Dept. 505

5451 HOLLAND DRIVE

BELTSVILLE, MARYLAND 20705

Rutgers Univ., New Brunswick, N.J. (H. M. Gehman, State Univ. of New York at Buffalo, Buffalo 14214)

29-31. **Metallurgists**, 5th annual conf., Toronto, Ont., Canada. (Canadian Inst. of Mining and Metallurgy, 906 Drummond Bldg., 117 St. Catherine St., W., Montreal 2, P.Q.)

29-31. **Physical Chemistry of Solids**, symp., Univ. of Montreal, Montreal, P. Q., Canada. (W. C. Cooper, Noranda Research Centre, 240 Hymus Blvd., Pointe Claire, P.Q., Canada)

29-31. **Solvent Extraction Chemistry**, intern. conf., Göteborg, Sweden. (The Conference, Dept. of Chemistry, Gibraltargatan 5 H, Göteborg S)

29-31. **Textiles**, Canadian seminar, Queens Univ., Kingston, Ont. (Textile Technical Federation of Canada, 4795 St. Catherine St., W. Westmount, Montreal, P.Q.)

29-1. American **Sociological Assoc.**, Miami Beach, Fla. (E. H. Volkart, 1001 Connecticut Ave., NW, Washington, D.C. 20036)

29-2. **Internal Medicine**, Czechoslovak Congr., Prague, Czechoslovakia. (O. Riedl, 4th Medical Clinic, Faculty of General Medicine, Charles Univ., U Nemocnice 2n, Prague 2)

29-2. American **Mathematical Soc.**, Rutgers Univ., New Brunswick, N.J. (G. L. Walker, The Society, P.O. Box 6248, Providence, R.I.)

29-2. **Neutron Monitoring** for Radiological Protection, symp., Vienna, Austria. (S. Somasundaram, Div. of Health, Safety, and Waste Disposal, Intern. Atomic Energy Agency, Vienna)

29-2. **Operations Research**, 4th intern. conf., MIT, Cambridge, Mass. (K. D. Tocher, United Steel Co., Cybor House, 1-5 Tipton Hall Rd., Sheffield, England)

29-2. American **Physiological Soc.**, fall mtg., Baylor Univ., Houston, Tex. (The Society, 9650 Wisconsin Ave., Washington, D.C. 20014)

29-2. **Solar-Terrestrial Physics**, inter-Union symp., Belgrade, Yugoslavia. (E. Herbays, Intern. Scientific Radio Union, 7, pl. Emile Danco, Brussels 18, Belgium)

29-3. **Problems of Animal Nutrition and Feed Production**, symp., Brno, Czechoslovakia. (Vlad. Sevcik, Research Inst. for Animal Nutrition, Feed Science and Technology, Ministry of Agriculture, Pohorelice, Czechoslovakia)

29-3. **Palynology**, 2nd intern. conf., Utrecht, Netherlands. (F. P. Jonker, State Univ., Botanical Museum and Herbarium, Lange Nieuwstraat 106, Utrecht)

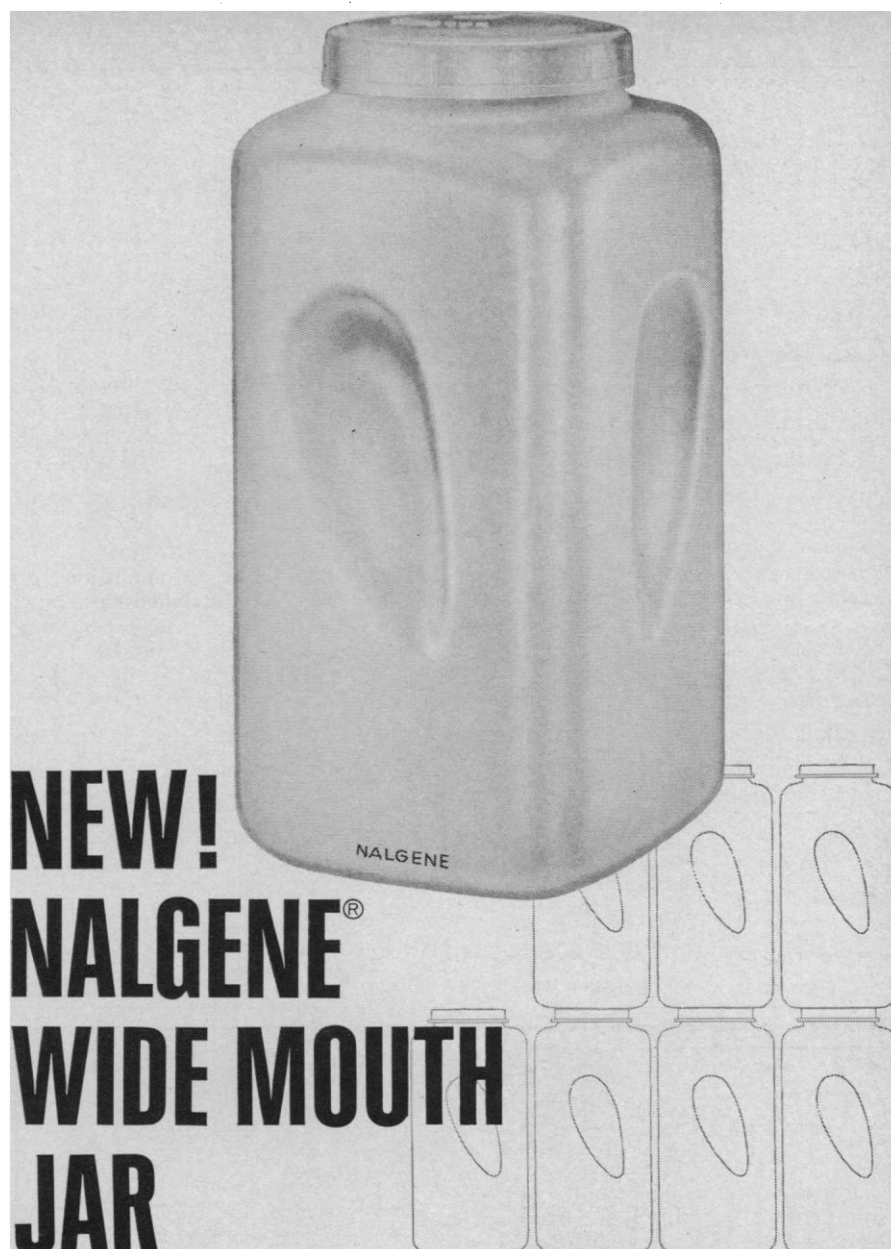
29-23. **Photogrammetry in the Measurement of the Earth's Surface**, symp., Prague, Czechoslovakia. (L. Skladal, Intern. Soc. for Photogrammetry, Hyberniska 2, Prague 1)

30-1. Association for **Computing Machinery**, 21st natl. conf., Los Angeles, Calif. (B. R. Parker, P.O. Box 4233, Panorama City, Calif. 91412)

30-1. Society of **General Physiologists**, Marine Biological Laboratory, Woods Hole, Mass. (E. E. Clark, Box 43 Pupin, Columbia Univ., New York 10027)

30-2. **Collection and Processing of Field Data**, symp., Canberra, Australia. (E. F. Bradley, Div. of Plant Industry, P.O. Box 109, Canberra)

8 JULY 1966



• **SPACE-SAVER SQUARE DESIGN!**

• **EXCLUSIVE MOLDED HANDGRIPS!**

Now, a better wide mouth jar from Nalge! Store a series of these "space saver" square jars in close order... save valuable shelf space! Exclusive molded-in handgrips are designed for safe, easy one hand operation—even at full 1-gallon capacity.

Precision blow-molded of polypropylene, these new wide mouth jars are unbreakable, autoclavable and easy to clean. Use them for solid chemicals and specimens, as well as liquids.

Assortable with other Nalgene Labware for maximum discounts. Order from your lab supply dealer or write for our new Catalog P-166. Department 2731, The Nalge Co., Inc., Rochester, New York 14602. **Another product of Nalge Research.**

 **NALGENE
LABWARE**

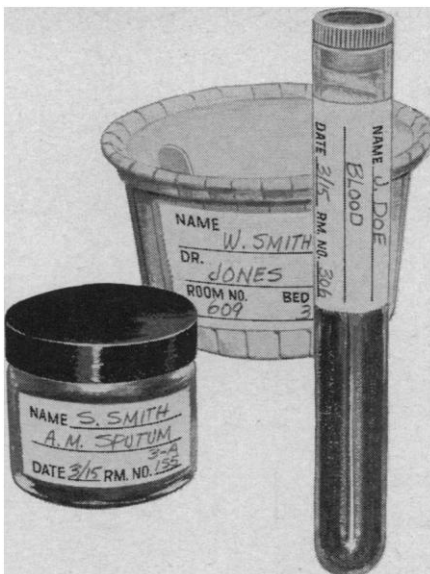
Leader in quality plastic labware since 1949

Visit our Booth #A5, FASEB show, Atlantic City, April 12-16.

MINIMUM CONTACT—MAXIMUM SAFETY

with self-sticking TIME LABORATORY TAPES and LABELS

Self-sticking tapes and labels eliminate a direct source of personal contamination in laboratories. Pre-printed or plain tapes and labels provide a quick means of marking laboratory equipment. Just write necessary data on label (use pencil, pen or grease marker) and place it on any surface—glass, metal or plastic. Labels stick tight through autoclave (up to 250°), deep freeze (to -70°), or water bath. When no longer needed these tapes and labels can be quickly removed leaving no sticky residue. Vinyl Coated—available in white or colors.



See your laboratory or hospital supplier for a complete selection of Time Tapes and Labels.

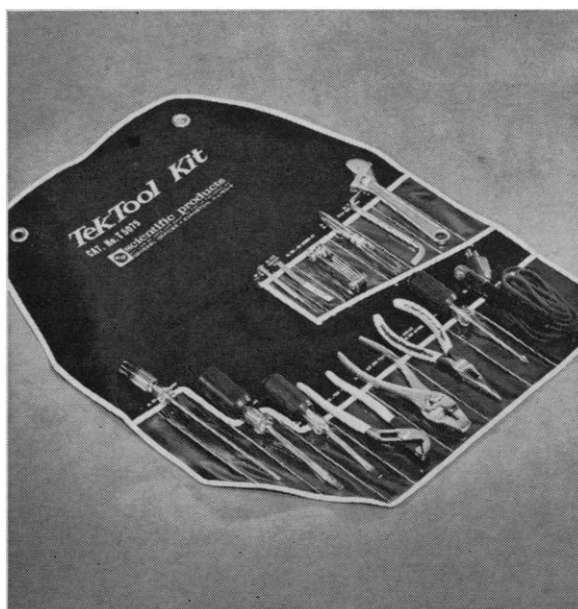
PROFESSIONAL TAPE CO., INC.
365 E. Burlington Avenue • Riverside, Illinois 60546

When little things mean a lot



**scientific
products**

GENERAL OFFICES:
1210 LEON PLACE
EVANSTON, ILLINOIS



Because they mean a lot to you, they mean a lot to us. That's why S/P maintains 16 distribution centers, offers more than 30,000 items. For example—new S/P TekTool Kits for simple instrument adjustment. These routinely used tools, selected after consultation with S/P instrument service specialists, meet the need for on-the-spot maintenance and adjustments as described in instrument manuals. They can mean a lot in your laboratory.

No. T5075X—S/P TekTool Kit. Set. \$29.50
Order today—satisfaction guaranteed

30-2. Institute of **Mathematical Statistics**, annual mtg., Rutgers Univ., New Brunswick, N.J. (J. R. Rosenblatt, A337 Admin., Gaithersburg, Natl. Bureau of Standards, Washington, D.C. 20234)

30-3. International **Mineralogical Assoc.**, 5th general mtg., Cambridge, England. (C. E. Tilley, Dept. of Mineralogy and Petrology, Downing Pl., Cambridge)

31-2. **Synthesis**, symp., Chemical Inst. of Canada, organic div., Banff, Alta. (R. W. Bachelor, Dept. of Chemistry, Univ. of Alberta, Calgary)

31-3. German Soc. for the History of **Medicine, Physical Science, and Technology**, 49th annual mtg., Braunschweig, West Germany. (A. Hermann, The Society, Deutsches Museum, 8 Munich 26, West Germany)

31-3. Society of **General Physiologists**, annual mtg., Marine Biological Laboratory, Woods Hole, Mass. (Miss E. E. Clark, The Society, Marine Biological Lab., Woods Hole 02543)

31-6. **Low Temperature Physics**, 10th intern. conf., Moscow, U.S.S.R. (V. P. Peshkov, Inst. for Physical Problems, Acad. of Sciences of the U.S.S.R., Lenin Prospekt, Moscow)

31-7. **High Energy Physics**, 13th intern. conf., Univ. of California, Berkeley. (T. H. Chenoweth, Lawrence Radiation Laboratory, Univ. of California, Berkeley 94720)

September

1-3. **Genetics Soc. of America**, Chicago, Ill. (R. P. Wagner, Dept. of Zoology, Univ. of Texas, Austin)

1-5. International College of **Angiology**, 8th annual mtg., Madrid, Spain. (H. E. Shaftel, 50 Broadway, New York, N.Y. 10004)

2-4. **Czechoslovak Soc. of Arts and Sciences in America**, 3rd congr., New York, N.Y. (R. Sturm, Skidmore College, Saratoga Springs, N.Y. 12866)

2-6. American **Psychological Assoc.**, 74th annual mtg., New York, N.Y. (A. H. Brayfield, 1200 17th St., NW, Washington, D.C. 20036)

2-6. **Psychometric Soc.**, mtg., New York, N.Y. (W. G. Mollenkopf, Procter and Gamble Co., Box 599, Cincinnati, Ohio 45201)

3-5. International Soc. for the **History of Pharmacy**, 40th conf., Heidelberg, Germany. (W. Luckenbach, Friederich-Ebert-Anlage 23a, Postfach 1109, 69 Heidelberg 1 West Germany)

3-7. **Solid State Science**, intern. conf., American Univ., Cairo, Egypt. (A. Bishay, Dept. of Physical Sciences, American Univ. in Cairo, 113 Kasr El Aini St., Cairo, UAR)

4-9. American **Phytopathological Soc.**, Caribbean Div., 6th annual mtg., Maracay, Venezuela. (G. Malaguti, Centro de Investigaciones Agronomicas Apartado Postal 4690, Maracay)

4-11. **Sociology**, 6th world congr., Evian, France. (G. G. Reader, Dept. of Medicine, Cornell Univ. Medical College, 1300 York Ave., New York 10021)

5-7. **Rare Earths**, conf., Inst. of Physics and the Physical Soc., Univ. of Durham, Durham, England. (Meetings Officer, Inst. of Physics and the Physical Soc., 47 Belgrave Sq., London S.W.1)



New Environmental Rooms & Incubators

For cultures, biologicals, animal rearing, food sampling, etc., Tenney space age technology now produces a new line of environmental rooms and incubators. These new rooms and incubators give precise temperature control from -40°C to $+60^{\circ}\text{C}$ in one of four ranges. They range in size from $2' \times 3' \times 5'$ to $12' \times 18' \times 7'$. Write today for complete information.



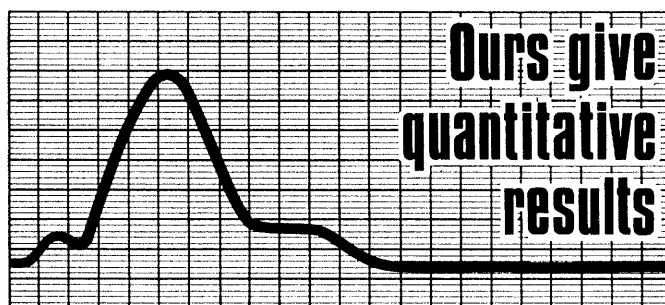
Relialab

by **Tenney**

ENGINEERING, INC.

1090 Springfield Road • Union, New Jersey 07083

225



GALILEO SCIENTIFIC INSTRUMENTS

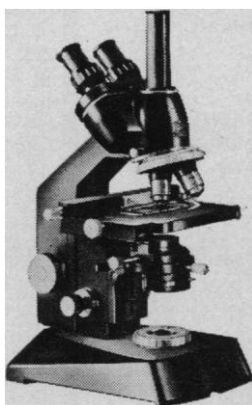
RESEARCH MICROSCOPE AT LABORATORY INSTRUMENT PRICE



The Model LN microscope has a pre-aligned 6V-15W illumination system built into the base. The inclined binocular head is an integral part of the arm assuring alignment at all times. A straight tube is provided for observation or photography and accepts cameras of different types.

Standard optics are: Achromatic objectives 3X, 10X, 40X and 100X corrected for flatness of field and high resolution. Paired Huyghenian compensated eyepieces 5X and 10X.

Optical accessories available for phase contrast, dark field illumination, polarization, fluorescent microscopy and photomicroscopy.



\$680.00 F.O.B. New York

Some territories available for sales representatives

Write for catalog S-7

Known world-wide since 1866
for precision scientific instruments

GALILEO CORPORATION OF AMERICA

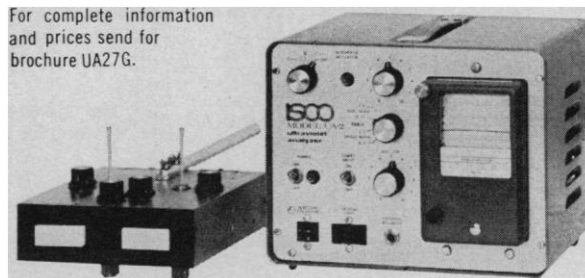
18 East 53rd Street • New York, N.Y. 10022

The quantitative peaks we refer to are those recorded by our ultraviolet flow stream monitors. ISCO's monochromatic Model UA-2 and Model 222 are the only low cost UV monitors which conform rigorously to Beer's absorption law. Other analyzers are sensitive to adjacent mercury vapor spectral lines but with ISCO analyzers precise quantitative results will be obtained if the flow stream absorbs any light at 254 mμ, regardless of the wavelength of maximum absorption.

The Model UA-2 has a built-in recorder which monitors true linear absorbance (not percent transmittance) at 254 mμ in two ranges; 0 to 0.5 and 0 to 2.5. An interchangeable dual-beam optical unit operates at both 254 and 280 mμ. The Model UA-2 will also actuate an associated fraction collector at the beginning and end of each UV-absorbance peak, depositing each UV-absorbing fraction in a separate collecting tube.

Prices for a complete ISCO absorbance monitoring, narrow bandwidth analyzer start at \$650.00.

For complete information
and prices send for
brochure UA27G.



ISCO INSTRUMENTATION SPECIALTIES COMPANY, INC.

5624 SEWARD AVE.
LINCOLN, NEBRASKA 68507, U.S.A.

PHONE (402) 434-8265
CABLE ADDRESS: ISCOLAB LINCOLN



S&S MICRO-FILTER APPARATUS

for vacuum filtration
of small volumes and
collection of cells, etc.
on small surface areas

This new apparatus is also recommended for the new, faster and more quantitative method for detection of RNA-DNA complexes using S&S Membrane Filter Type B-6 (formerly designated as Type A-Coarse).

The entire unit is precision made, and designed for convenience and speed in use. A complete seal is quickly obtained by a simple turn of the threaded glass funnel and a special Halon plastic base connector. The filter unit itself is made of Teflon, with a built-in fritted glass disc.

Distinct Advantages of the S&S Design

The new S&S Micro-Filter Apparatus is easier to disassemble, change filters and reassemble than other designs. No hooks, springs or clamps are used. Funnel and stem are replaceable. The entire unit is sturdy, durable, and of neat, modern design.

We'd like to send you an illustrated data sheet on the new S&S Micro-Filter Apparatus, complete with all specifications. Just mail the coupon below.



**FREE
DATA SHEET
MAIL COUPON
TODAY!**

Carl Schleicher & Schuell Co.
Keene, New Hampshire — Dept. S-67
Please send your new Micro-Filter
Apparatus data sheet.

Name _____
Company _____
Address _____
City _____
State _____ Zip Code _____

NEW BOOKS

(Continued from page 165)

pp. Illus. Paper, \$3.50. The Commonwealth and International Library.

Dynamic Programming and Modern Control Theory. Richard Bellman and Robert Kalaba. Academic Press, New York, 1966. 126 pp. Illus. Paper, \$2.95; cloth, \$5.50.

Electronics Reliability—Calculation and Design. Geoffrey W. A. Dummer and Norman B. Griffin. Pergamon, New York, 1966. 248 pp. Illus. Paper, \$4.50. The Commonwealth and International Library.

Essays in Geomorphology. G. H. Dury, Ed. Elsevier, New York, 1966. 416 pp. Illus. \$14. Nine papers: "Pleistocene shorelines" by N. Stephens and F. M. Synge; "Slope failure and morphogenetic regions" by R. Common; "Landforms of the western Macdonnell Ranges" by J. A. Mabbutt; "The landforms of low latitudes" by J. C. Pugh; "Stratigraphical geomorphology: A review of some East African landforms" by W. W. Bishop; "The weathering of limestones, with particular reference to the carboniferous limestones of Northern England" by M. M. Sweeting; "The concept of grade" by G. H. Dury; "Morphometry from maps" by John I. Clarke; and "The application of statistical methods to geomorphology" by Richard J. Chorley.

FORTRAN II and IV for Engineers and Scientists. Hellmut Golde. Macmillan, New York, 1966. 240 pp. Illus. Paper, \$4.50.

Foundations of Algebra and Analysis: An Elementary Approach. Anthony R. Lovaglia and Gerald C. Preston. Harper and Row, New York, 1966. 516 pp. Illus. \$8.95.

Fundamentals of Geology. John J. W. Rogers and John A. S. Adams. Harper and Row, New York, 1966. 446 pp. Illus. \$9.75. Harper's Geoscience Series, edited by Carey Croneis.

General College Chemistry. Charles W. Keenan and Jesse H. Wood. Harper and Row, New York, ed. 3, 1966. 826 pp. Illus.

Handbook of Physical Constants. Sydney P. Clark, Jr., Ed. Geological Soc. of America, New York, ed. 2, 1966. 595 pp. Illus. \$8.75. The twenty-nine chapters were contributed by thirty authors.

Hydrogeology. Stanley N. Davis and Roger J. M. DeWiest. Wiley, New York, 1966. 475 pp. Illus. \$12.50.

Integral, Measure and Derivative: A Unified Approach. G. E. Shilov and B. L. Gurevich. Translated from the Russian by Richard A. Silverman. Prentice-Hall, Englewood Cliffs, N.J., 1966. 247 pp. Illus. \$11.35.

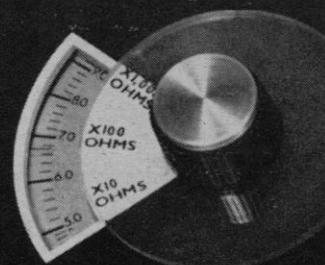
An Introduction to Electron Paramagnetic Resonance. Malcolm Bersohn and James C. Baird. Benjamin, New York, 1966. 286 pp. Illus. \$13.75. Frontiers in Chemistry, edited by Ronald Breslow and Martin Karplus.

Introduction to Electronics. Theodore Korneff. Academic Press, New York, 1966. 557 pp. Illus. \$11.75.

Introduction to Nuclear Reactor Theory. John R. Lamarsh. Addison-Wesley, Reading, Mass., 1966. 597 pp. Illus. \$15. Addison-Wesley Series in Nuclear Engineering.



**a new
easy to use
direct reading
laboratory
conductivity
bridge**



The YSI Model 31 Conductivity Bridge is brand new and specifically designed for laboratory use. Measure conductivity and resistivity with convenience, speed, and accuracy at 60 cycles or 1 kc. Use it over the entire range of electrolytic conductance from demineralized water to strong acids.

A unique multiplier scale, overlapping the basic scale, permits fast, easy direct reading. A high intensity parallel bar electron ray tube provides easy, exact determination of null. Line cord and electrodes are located out of the way.

Specifically designed for the laboratory, the YSI Model 31 is the most easy to use conductivity bridge available. Three new laboratory designed precision conductivity cells also are available. Ask us for full details.

YELLOW SPRINGS INSTRUMENT CO.
YELLOW SPRINGS, OHIO

Introduction to Soil Behavior. Raymond N. Yong and Benno P. Warkentin. Macmillan, New York, 1966. 463 pp. Illus. \$12.95. Macmillan Series in Civil Engineering, edited by Gene Nordby.

Introduction to Topological Groups. Taqdir Husain. Saunders, Philadelphia, 1966. 230 pp. Illus. \$7.50.

Introductory Calculus: With Algebra and Trigonometry. Stoughton Bell, J. R. Blum, J. Vernon Lewis, and udah Rosenblatt. Holden-Day, San Francisco, 1966. 335 pp. Illus. \$8.50.

The Investigation of Organic Reactions. Ross Stewart. Prentice-Hall, Englewood Cliffs, N.J., 1966. 139 pp. Illus. Paper, \$2.50; cloth, \$4.50. Prentice-Hall Foundations of Modern Organic Chemistry Series, edited by Kenneth L. Rinehart, Jr.

Laboratory Studies in Geology. John P. Miller and Robert Scholten. Freeman, San Francisco, ed. 2, 1966. 202 pp. Illus. Map. Paper, \$3.75. A Series of Books in Geology, edited by James Gilyuly and A. O. Woodford.

Laminated Plastics. D. J. Duffin. Chapman and Hall, London; Reinhold, New York, ed. 2, 1966. 259 pp. Illus. \$12. Reinhold Plastics Applications Series, edited by Herbert R. Simonds.

Lectures on Choquet's Theorem. Robert R. Phelps. Van Nostrand, Princeton, N.J., 1966. 136 pp. Illus. Paper, \$2.50. Van Nostrand Mathematical Studies, edited by Paul R. Halmos and Frederick W. Gehring.

Liquid Mixing and Processing in Stirred Tanks. F. A. Holland and F. S. Chapman. Reinhold, New York, 1966. 325 pp. Illus. \$15.

La Lune à Père spatiale. Jean Coulomb. Ed. Presses Universitaires de France, Paris, 1966. 197 pp. Illus. Paper.

Methoden der Organischen Chemie (Houben-Weyl). vol. 6, pt. 4, *Sauerstoffverbindungen I.* G. Baumeyer, G. Dittus, R. Fikentscher, H. Kröper, W. Lürken, E. Müller, J. Sand, H. D. Spanagel, and B. Zeeh. Thieme, Stuttgart, 1966. 835 pp. Illus. DM. 220.

Les Minéraux Uranifères Français. vol. 3. Marcel Roubault, Ed. Institut national des Sciences et Techniques nucléaires, Saclay; Presses Universitaires de France, Paris, 1965. 354 pp. Illus. Contributors are A. Carlier, L. Cariou, J. Garric, and F. Kervella.

Mining Geophysics. D. S. Parasnis. Elsevier, New York, 1966. 372 pp. Illus. \$18. Methods in Geochemistry and Geophysics Series, vol. 3.

Miscellaneous ASTM Standards for Petroleum Products. Sponsored by ASTM Committee D-2 on Petroleum Products and Lubricants. American Soc. for Testing and Materials, Philadelphia, ed. 6, 1966. 942 pp. Illus. \$13.50; members, \$9.45.

Modern Physics for Engineers. Otto Oldenberg and Norman C. Rasmussen. McGraw-Hill, New York, 1966. 489 pp. Illus. \$9.95.

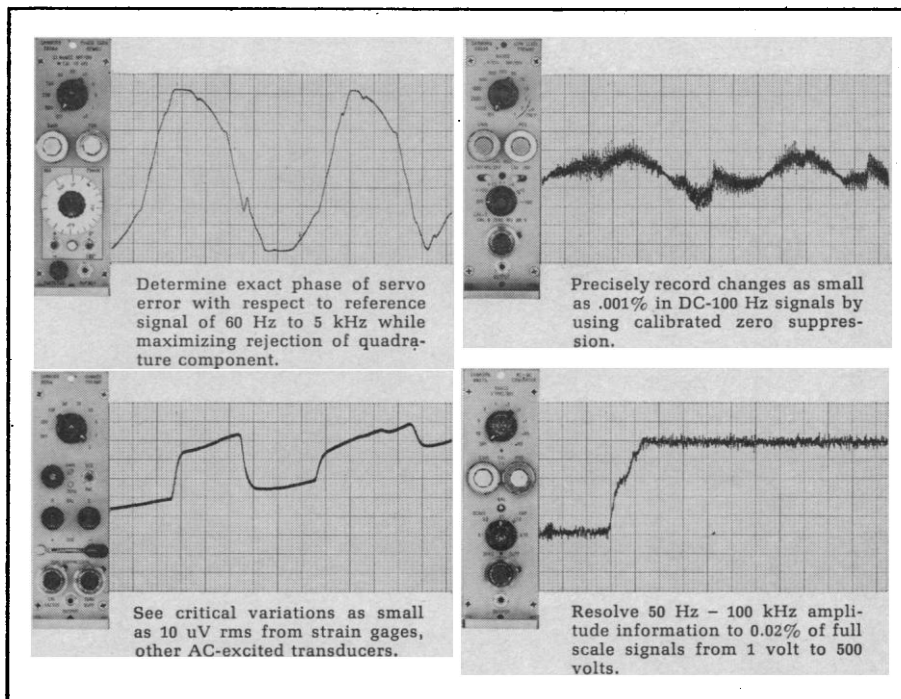
Modern Principles of Organic Chemistry: An Introduction. John L. Kice and Elliot N. Marvell. Macmillan, New York, 1966. 461 pp. Illus. \$8.95.

Modern Textbook of Organic Chemistry. G. P. Ellis. Butterworth, Washington, D.C., 1966. 478 pp. Illus. \$10.95.

8 JULY 1966

Bring on your complex, small, noisy, difficult signals.

We'll give you traces that show them for what they really are.

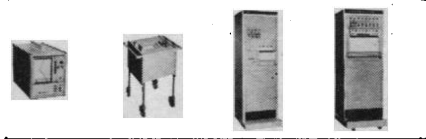
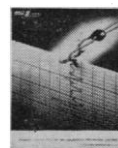


When you need the greatest possible degree of signal-conditioning precision and operational control, Sanborn 7700 Series oscilloscopes with solid-state "8800" plug-ins will give you chart recordings of maximum resolution and intelligibility.

Seven highly versatile signal conditioners offer unique performance capabilities: three DC types with a 1 uV-250 V dynamic range, floating differential input and calibrated zero suppression... an AC-DC Converter with calibrated zero suppression and scale expansion permitting resolution better than 0.1%, 10 ms response and isolated, 1 meg. input... a phase-sensitive demodulator with calibrated reference phase shift, 90° calibrated dial with four quadrant selections, and a frequency range of 60 Hz to 5 kHz... a carrier preamplifier with 2400 Hz internal transducer excitation supply, calibrated zero suppression, cal. factor control and conversion gain of 10,000... and a general-purpose DC preamp particularly useful for 100 mm wide chart recording.

Use any of these "8800" plug-ins in the 7700 thermal writing oscillograph matched to your packaging and channel requirements—4-, 6- and 8-channel 7704A, 7706A and 7708A console types... 2-channel 7702A system in rack-mount or mobile cart versions... single-channel 7701A wide chart (100 mm) portable system. Every one of these thermal writers will give you permanent, rectangular-coordinate recordings whose resolution and accuracy make all your measurements more useful.

For a new brochure describing the advantages and wide choice of Sanborn thermal writing oscillographs, write Hewlett-Packard Company, Sanborn Division, 175 Wyman Street, Waltham, Mass. 02154.



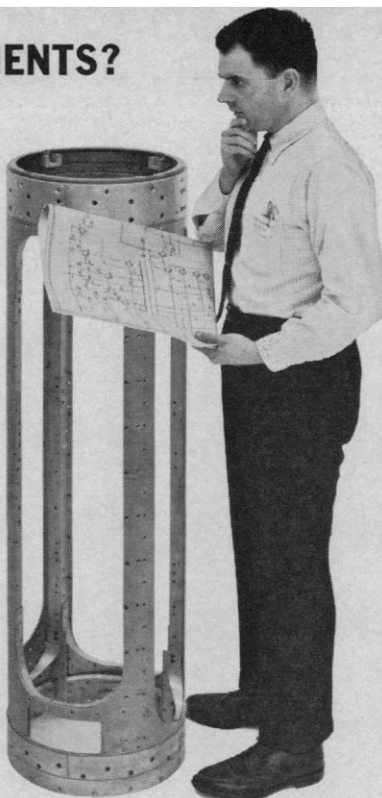
HEWLETT
PACKARD  SANBORN
DIVISION

BUILDING SPACE INSTRUMENTS?

AS&E offers you a complete service in transforming your breadboards and ideas for scientific instrumentation into flight qualified hardware. We will design, construct, test and integrate your instrument using our facilities under the direction of a senior scientist knowledgeable in your scientific objectives. Thus, you are assured of finished hardware that will perform the experiment you want and meet the most stringent government quality requirements. We have extensive experience in designing and building instruments for sounding rockets and satellites in the fields of particle and photon physics, geophysics and weapons effects. For further information write or call:



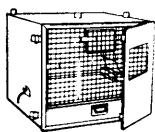
AMERICAN SCIENCE AND ENGINEERING, INC.
11 Carleton Street, Cambridge, Massachusetts 02142
Telephone (617) 868-1600



New concepts in
animal cage systems
become a reality
at Harford.

- Primate cages • Poultry cages
- Dog cages • Rodent cages
- Cat cages • Rabbit cages

Custom-Engineered animal
cage systems



Harford

Metal Products, Inc.
Building 101
Aberdeen, Md. 21001
272-3400 (301)

SPORES—FERNS MICROSCOPIC ILLUSIONS ANALYZED

• • •

Book now available

580 pages, approx. 1150
illustrations including
color plates

Fern leaves—cell patterns

Basic 3-D spore and
tetrad structures,
their paths of development
Focal levels organized
for easy reference

Background research includes
photomicrographs, models,
silhouette shadows,
line drawings

• • •

MISTAIRE LABORATORIES
152 Glen Avenue
Millburn, N.J. 07041

Modern Trigonometry. Kaj L. Nielsen. Barnes and Noble, New York, 1966. 287 pp. Illus. Paper, \$1.75. College Outline Series.

The New Math Made Simple. Albert F. Kempf. Doubleday, Garden City, N.Y., 1966. 159 pp. Illus. Paper, \$1.45.

Number Theory. Z. I. Borevich and I. R. Shafarevich. Translated from the Russian edition (Moscow, 1964) by Newcomb Greenleaf. Academic Press, New York, 1966. 447 pp. Illus. \$7.50.

Optimal Adaptive Control Systems. David Sworner. Academic Press, New York, 1966. 199 pp. Illus. \$8.50. Mathematics in Science and Engineering, vol. 25, edited by Richard Bellman.

Organic Chemistry. Henry Rakoff and Norman C. Rose. Macmillan, New York, 1966. 893 pp. Illus. \$11.95.

Organic Chemistry. L. Oliver Smith, Jr., and Stanley J. Cristol. Reinhold, New York, 1966. 982 pp. Illus. \$12.50.

The Origin and Evolution of the Universe. Evry Schatzman. Translated from the French edition (1957) by Bernard Pagel and Annabel Pagel. Basic Books, New York, 1965. 288 pp. Illus. \$8.50.

Oxidation in Organic Chemistry. pt. A. Kenneth B. Wiberg, Ed. Academic Press, New York, 1965. 455 pp. Illus. \$14. Organic Chemistry: A Series of Monographs, vol. 5, edited by Alfred T. Blomquist. Six papers: "Oxidation by permanganate" by Ross Stewart; "Oxidation by chromic acid and chromyl compounds" by Kenneth B. Wiberg; "Oxidation by vanadium (V), Cobalt (III), and Manganese (III)" by W. A. Waters and J. S. Littler; "Ceric ion oxidation of organic compounds" by William H. Richardson; "Oxidations with lead tetraacetate" by Rudolf Criegee; and "Glycol cleavage and related reactions" by C. A. Bunton.

Photo-Elastic Analysis. A. W. Hendry. Pergamon, New York, 1966. 163 pp. Illus. Paper, \$3.50. The Commonwealth and International Library.

Physics of High Temperature Plasmas: An Introduction. George Schmidt. Academic Press, New York, 1966. 350 pp. Illus. \$12.95.

Polyamide Resins. Don E. Floyd. Chapman and Hall, London; Reinhold, New York, ed. 2, 1966. 237 pp. Illus. \$10.50.

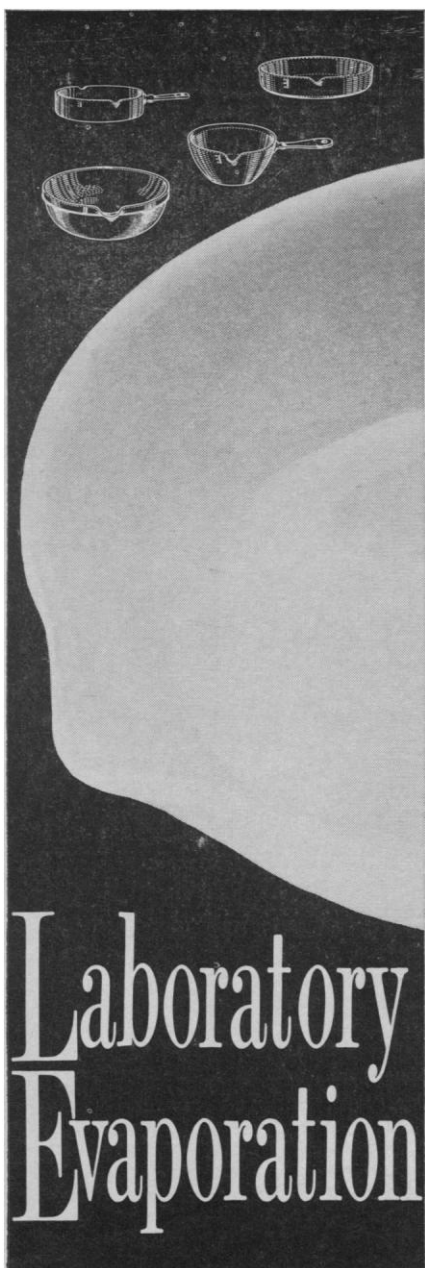
Principles of Magnesium Technology. E. F. Emley. Pergamon, New York, 1966. 1033 pp. Illus. \$38.

Principles of Modern Organic Chemistry. James Cason. Prentice-Hall, Englewood Cliffs, N.J., 1966. 688 pp. Illus. \$10.95.

Principles of Polarography. Jaroslav Heyrovský and Jaroslav Kůta. Translated from the Czech edition (Prague, 1962) by Jiří Volke. Czechoslovak Acad. of Sciences, Prague; Academic Press, New York, 1966. 581 pp. Illus. \$19.50.

Problems in Mathematical Physics. N. N. Lebedev, I. P. Skaf'skaya, and Ya. S. Uflyand. Translated from the Russian edition (Moscow) by A. R. M. Robson. J. Reinfelds, Translation Ed. Pergamon, New York, 1966. 414 pp. Illus. \$10. International Series of Monographs in Pure and Applied Mathematics.

Progress in Materials Science. Bruce Chalmers, Ed. vol. 13, No. 1, *The Mechanical Properties of Ordered Alloys*. N. S. Stoloff and R. G. Davies. Pergamon,



Coors offers a complete range of casseroles, dishes, capsules and plates for laboratory evaporation. These pieces have been created to match the exacting requirements of working chemists who require especially high quality, uniformity and reliability. Standard items include flat bottomed dishes, such as the #160 capsules, #182 casseroles, #431 and #470 dishes. A wide variety of shallow, curved bottom dishes are also available. These include the #430 regular evaporation dishes, #170 capsules, #180, #181, #190 casseroles, and the #440 and #450 dishes. For dry organic precipitates by evaporation and absorption, the #760 porous plate is offered. A complete selection of Coors laboratory evaporation equipment is immediately available through your laboratory dealer.

INSIST THAT YOUR LABORATORY PORCELAIN
WARE CARRY THIS MARK OF DEPENDABILITY

**COORS
U.S.A.**

COORS PORCELAIN COMPANY, GOLDEN, COLORADO

8 JULY 1966

New York, 1966. 90 pp. Illus. Paper, \$4.

Qualitative Analysis and Chemical Equilibrium. T. R. Hogness, Warren C. Johnson, and Alfred R. Armstrong. Holt, Rinehart, and Winston, New York, ed. 5, 1966. 602 pp. Illus. \$9.50.

Quantum Theory of Angular Momentum. L. C. Biedenharn and H. van Dam. Academic Press, New York, 1965. 342 pp. Illus. Paper, \$4.95; cloth, \$8.50. Nineteen original and reprinted papers contributed by W. Pauli, E. P. Wigner, P. Güttinger, G. Racah, L. C. Biedenharn, J. M. Blatt, M. E. Rose, J. P. Elliott, J. Schwinger, H. A. Jahn, J. Hope, A. Arima, H. Horie, Y. Tanabe, T. Regge, and V. Bargmann.

River Engineering and Water Conservation Works. Roland Berkeley Thorn, Ed. Butterworth, Washington, D.C., 1966. 534 pp. Illus. \$27. The twenty-eight chapters were contributed by twenty-four authors.

The Safe Transport of Radioactive Materials. R. Gibson, Ed. Pergamon, New York, 1966. 302 pp. Illus. \$12.50. Nineteen papers.

Semiconductors and Semimetals. vol. 2, *Physics of III-V Compounds.* R. K. Willardson and Albert C. Beer, Eds. Academic Press, New York, 1966. 446 pp. Illus. \$18. Fourteen papers contributed by F. G. Allen, E. Antončík, J. R. Drabble, M. Gershenzon, G. Giesecke, G. W. Gobeli, Bernard Goldstein, M. G. Holland, A. U. Mac Rae, Robert Lee Mieher, T. S. Moss, S. I. Novikova, P. S. Pershan, U. Piesbergen, Frank Stern, and J. Tauc.

Semiconductors and Their Circuits. vol. 1, *Selected Semiconductor Theory.* N. F. Moody. English Universities Press, London, 1966. 375 pp. Illus.

Sequential-Circuit Synthesis: State Assignment Aspects. Donald R. Haring. M.I.T. Press, Cambridge, Mass., 1966. 364 pp. Illus. \$12.

Silicate Science. vol. 5, *Ceramics and Hydraulic Binders.* Wilhelm Eitel. Academic Press, New York, 1966. 632 pp. Illus. \$24.

Solid State Chemistry. R. L. Myuller and faculty of the Leningrad State University. Z. U. Borisova, Ed. Translated from the Russian edition (Leningrad, 1965). Consultants Bureau, New York, 1966. 268 pp. Illus. Paper, \$25.

Special Relativity. W. Rindler. Oliver and Boyd, London; Interscience (Wiley), New York, ed. 2, 1966. 208 pp. Illus. \$2.95. University Mathematical Texts Series, edited by A. C. Aitken and D. E. Rutherford.

The Statistical Analysis of Series of Events. D. R. Cox and P. A. W. Lewis. Methuen, London; Wiley, New York, 1966. 293 pp. Illus. \$7.75. Methuen's Monographs on Applied Probability and Statistics, edited by M. S. Bartlett.

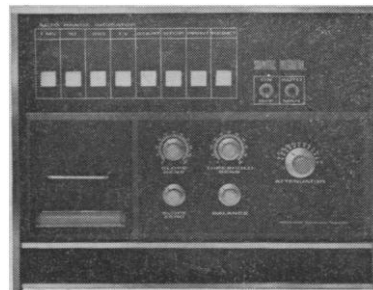
The Structure of Number Systems. Francis D. Parker. Prentice-Hall, Englewood Cliffs, N.J., 1966. 151 pp. Illus. \$3.95. Teachers' Mathematics Reference Series, edited by Bruce E. Meserve.

Synthesis of Filters. Jose Luis Herrero and Gideon Willoner. Prentice-Hall, Englewood Cliffs, N.J., 1966. 208 pp. Illus. \$10.50. Prentice-Hall Electrical Engineering Series, edited by William L. Everitt.

Synthetic Analgesics. pt. 2A, *Morphinans*, J. Hellerbach, O. Schnider, H. Bes-

Summatic Integrator

The Summatic Integrator is a new tool to automatically compute and present on printed tape, in digital form, peak areas which are a function of mass, concentration or structure.



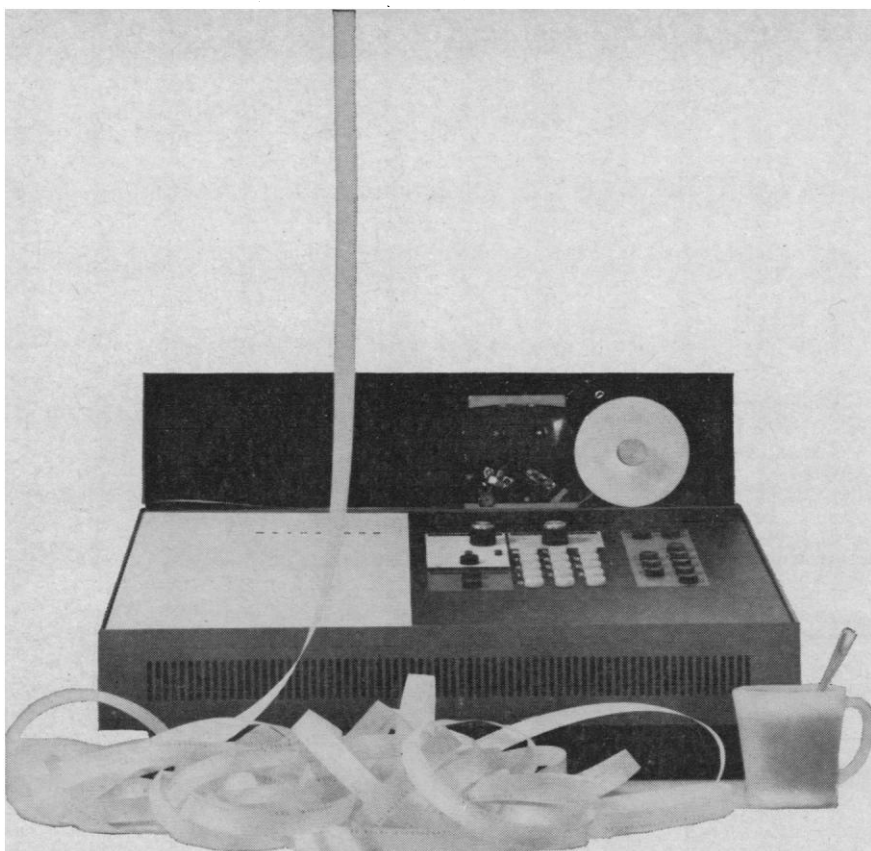
The Summatic Integrator incorporates small peak accuracy, wide dynamic range and low cost. These three desirable requirements have not been available in competitively priced integrators until now. Nester/Faust's Summatic assures you of the following:

- I Automatic count of each peak at a rate which gives approximately the same high statistical reliability—regardless of peak height up to a maximum signal of one volt.
- II Proven and reliable voltage to frequency conversion technique to convert the input signal to a number of pulses that is proportional to the area. This technique in conjunction with a novel Auto-Ranging* device gives good statistics on small peaks ($\pm 3\%$ on $100\mu\text{v}$ peaks of 3 seconds duration) and a dynamic range of 0 to 1 volt DC automatically. Precision on larger peaks is about $\pm 0.7\%$ for 20 mv peaks 10 seconds long.
- III Low cost since the Summatic's Auto-Ranger allows the use of a narrow range 0 to 1 mv stabilized amplifier, a narrow range 0 to 100 cps voltage to frequency converter, and a fast mechanical counter-printer that does not require provision for memory. The Auto-Ranging circuit attenuates the input signal by a factor of ten at 3 decades of signal amplitude (1, 10 and 100 mv) and directs the output from the converter to the next higher counting wheel in the counter-printer.

A recorder output with attenuator is supplied. It operates through the Auto-Ranger so that the pen of a 1 mv recorder will remain on scale with signals into the Summatic up to 1 volt DC.

Electronic construction is all solid state for long life and reliability. The cost of the Summatic Integrator is under \$2500. Write for full technical literature. **Nester/Faust Instruments Products Division, 2401 Ogletown Rd., Newark, Delaware.** *Patents pending.

**NESTER
FAUST**



This
\$5,000
Mathatron digital computer
uses a new
computer language...
...algebra

Tap in the problem, digit by digit, sign by sign, with decimal points and parentheses and power of 10 exponents, just as if you were writing it out. The Mathatron prints the problem on paper tape, then prints out the answer. As simple as that.

Four or eight independent storage registers, 24 or 48 step ferrite core memory, 100 column number capacity, 8 to 9 significant digit accuracy, automatic decimal placement, electronic speeds, optional pre-wired programs, all solid state logic and circuitry. It won't solve everything, of course.

If you already have a large data processor, consider this: 80% of the Mathatron owners have big computers, too.

But they can't stand the time lag, or the hourly cost, or the gaff. The Mathatron is twice the size of a typewriter and is accessible, immediately, to the whole department.

Write for further information.

MATHATRONICS, INC.

257 Crescent St., Waltham, Mass. 02154 (617) 894-0835

endorf, and B. Pellmont; pt. 2B, 6,7 *Benzomorphans*, Nathan B. Eddy and Everette L. May, Pergamon, New York, 1966. 198 pp. Illus. \$12. International Series of Monographs in Organic Chemistry, vol. 8, edited by D. H. R. Barton and W. von Doering.

Theory of Cyclic Accelerators. A. A. Kolomensky and A. N. Lebedev. Translated from the Russian edition (Moscow, 1962) by M. Barbier. North-Holland, Amsterdam; Interscience (Wiley), New York, 1966. 419 pp. Illus. \$15.50.

Theory of Groups in Classical and Quantum Physics. vol. 1, *Mathematical Structures and the Foundations of Quantum Theory*. Théo Kahan. Translated from the French edition (Paris, 1960) by H. Ingram. A. R. Edmonds, Translation Ed. Elsevier, New York, 1966. 590 pp. Illus. \$37.50.

Thermal Neutron Scattering. P. A. Egelstaff, Ed. Academic Press, New York, 1965. 539 pp. Illus. \$17.50. Ten papers.

Thermodynamics of Certain Refractory Compounds. vol. 1, *Discussion of Theoretical Studies*. Harold L. Schick, Ed. Academic Press, New York, 1966. 684 pp. Illus. \$21. Contributors are D. F. Anthrop, R. J. Barriault, R. E. Dreikorn, R. C. Feber, M. Griffel, C. H. Leigh, M. B. Panish, H. L. Schick, and C. H. Ward.

Thin Film Microelectronics. The preparation and properties of components and circuit arrays. L. Holland, Ed. Wiley, New York, 1965. 296 pp. Illus. \$9. Six papers: "The properties of passive circuit elements" by G. Siddall; "Properties of thin film active elements" by L. Pensak; "Semiconductor integrated circuits" by A. A. Shepherd; "Vacuum deposition apparatus and techniques" by L. Holland; "Thin film monitoring techniques" by W. Steckelmacher; and "The layout of microcircuits, masking and etching techniques" by D. I. Gaffee.

Time-Lag Control Systems. M. Namik Oguztoreli. Academic Press, New York, 1966. 335 pp. Illus. \$13.50. Mathematics in Science and Engineering Series edited by Richard Bellman.

Topological Methods in Algebraic Geometry. F. Hirzebruch. Translated from the second German edition (Berlin, 1962) by R. L. E. Schwarzenberger. Springer-Verlag, New York, ed. 3, 1966. 244 pp. Illus. \$9.50. Die Grundlehren der mathematischen Wissenschaften Series, vol. 131, edited by J. L. Doob, E. Heinz, F. Hirzebruch, E. Hopf, H. Hopf, W. Maak, S. MacLane, W. Magnus, F. K. Schmidt, and K. Stein.

Wavelength Standards in the Infrared. K. Narahari Rao, Curtis J. Humphreys, and D. H. Rank. Academic Press, New York 1966. 246 pp. Illus. \$10.

Weak Interaction of Elementary Particles. L. B. Okun'. Translated from the Russian edition (Moscow, 1963) by S. Nikolic and M. Nikolic. J. Bernstein, Translation Ed. Pergamon, London; Addison-Wesley, Reading, Mass., 1966. 302 pp. Illus. \$9.75.

The World of the Atom. vols. 1 and 2. Henry A. Boorse and Lloyd Motz, Eds. Basic Books, New York, 1966. vol. 1, 885 pp.; vol. 2, 1033 pp. Illus. \$35. Ninety-six papers.