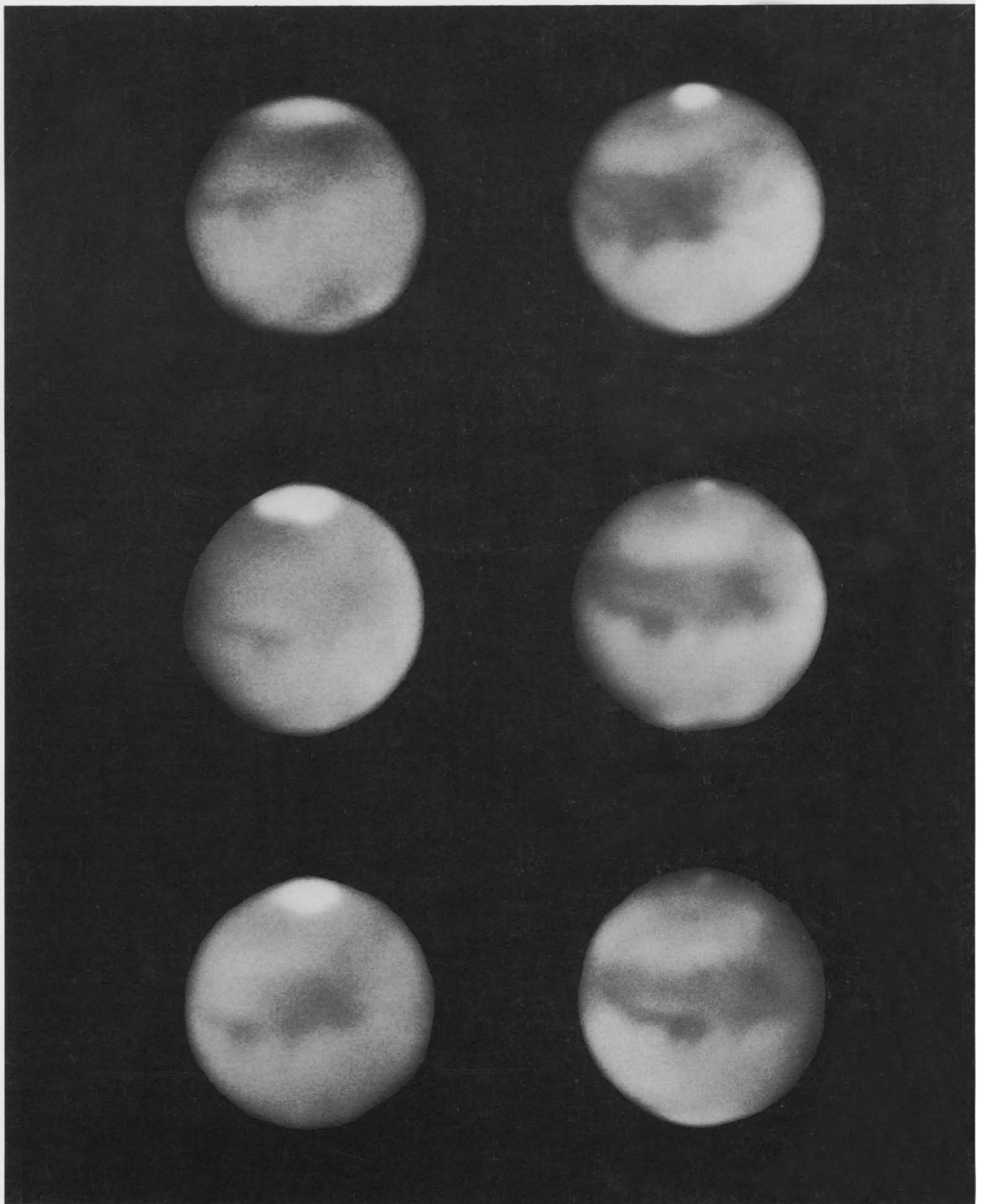


# SCIENCE

6 April 1962

Vol. 136, No. 3510

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE





## NOW—MORE SPEED, MORE FORCE

*...to spin down samples faster  
...to isolate smaller molecules*

Those who use laboratory centrifugation to separate, concentrate, and isolate macromolecules now have at their command nearly 200,000 g's of centrifugal force in the rugged, easy-to-operate Model L Preparative Ultracentrifuge.

These higher forces are possible with an increase in the top speed of current-production Model L's from 40,000 to 50,000 rpm—and with development of a new, higher-speed angle rotor. The new rotor holds 100 ml in ten tubes, and at maximum speed generates 198,000 g at the outer tube edge—54,000 g more than previous Model L angle rotors.

Centrifugal separations thus become an even more powerful laboratory tool . . . work can be completed faster . . . even smaller proteins, viruses, and other molecules can be sedimented.

For more information on the 50,000 rpm Model L and the new Type 50 rotor, please write Beckman Instruments, Inc., Spinco Division, Stanford Industrial Park, Palo Alto, California, for Data File L-5.

**Beckman®**

INSTRUMENTS, INC.

**SPINCO DIVISION**

Palo Alto, California

to encourage student interest in *Microbiology*

give them a text that is

- current
- complete
- pictorially intriguing

such a text is *Frobisher's*

## Fundamentals of MICROBIOLOGY



### *New (7th) Edition*

**Complete Coverage:** This book clearly explains every aspect of the 8 major groups of microorganisms and describes in detail the structure, growth and habitat of each group. The author outlines methods used in the observation, propagation and study of microorganisms, such as: phase and electron microscopy, labeled antibodies, tissue culture, selective methods, phage typing and the use of membrane filter techniques. Practical applications of microbiology provide the student with a sound foundation for future specialization in Agriculture, Industry, Medicine, Home Economics and Pharmacy.

**Up-to-date Coverage:** This *New (7th) Edition* is virtually a new book. Every chapter has been extensively revised or entirely rewritten with a view to modernization, accuracy and clarity. New subjects include: the role of DNA in metabolism and genetics—sexuality of microorganisms—RNA as a vector of DNA impulses—"self" and "not-self" in immunology—interferon—pinocytosis—a new chapter on enzymes—mechanism of photosynthesis—viruses and "infective" heredity—life cycles of viruses—steroid transformations—gibberellin production—role of algae in food production and in space travel.

**Pictorial Coverage:** Dr. Frobisher has exercised great care in the selection of new illustrations, including helpful charts and diagrams designed especially for this edition. All are fully explained in text or legend and each one aids in a clearer understanding of the text.

*This textbook will gladly be sent to teachers on approval.*

By MARTIN FROBISHER, Sc.D., Special Consultant, Laboratory Branch, Communicable Disease Center, U.S. Public Health Service. About 672 pages, 6 $\frac{3}{8}$ " x 9 $\frac{3}{4}$ ", with about 350 illustrations. About \$7.00.  
*New (7th) Edition—Ready in May!*

**W. B. SAUNDERS COMPANY** • West Washington Square, Philadelphia 5

SCIENCE is published weekly by the AAAS, 1515 Massachusetts Ave., NW, Washington 5, D.C. Second-class postage paid at Washington, D.C., and additional mailing office. Annual subscriptions: \$8.50; foreign postage, \$1.50; Canadian postage, 75¢.



*for any application... for every budget*

**NK PRISM SERIES** — The double beam NK-1, with advanced electronics and high energy optics, still offers the highest performance available in a prism instrument. With suitable interchanges it can be extended to 250 millimicrons in the ultra violet region and out to 38 microns in the infrared.

**NK PRISM/GRATING SERIES** — The Model NK-3 is capable of higher photometric accuracy and resolution than any other commercially available infrared spectrophotometer.

New standards of performance are achieved by combining superior energy available from the Baird-Atomic source, photometer and prism

monochromator with the precision of a modified Czerny-Turner grating monochromator.

**SR FILTER/GRATING SERIES** — A new low cost Infrared Spectrophotometer with resolution of 0.01 microns. The spectra can be plotted with extreme photometric and wavelength accuracy.

The SR-1 fills the exacting requirements of research, yet an untrained operator can learn to operate it in less than 15 minutes.

Write today for complete information.

Engineers and scientists: *Investigate challenging opportunities with B/A. Write Industrial Relations Director. An equal opportunity employer.*



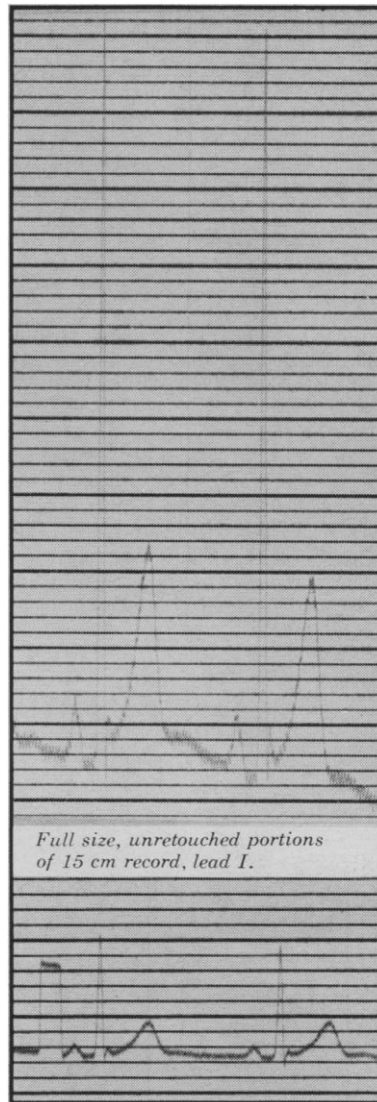
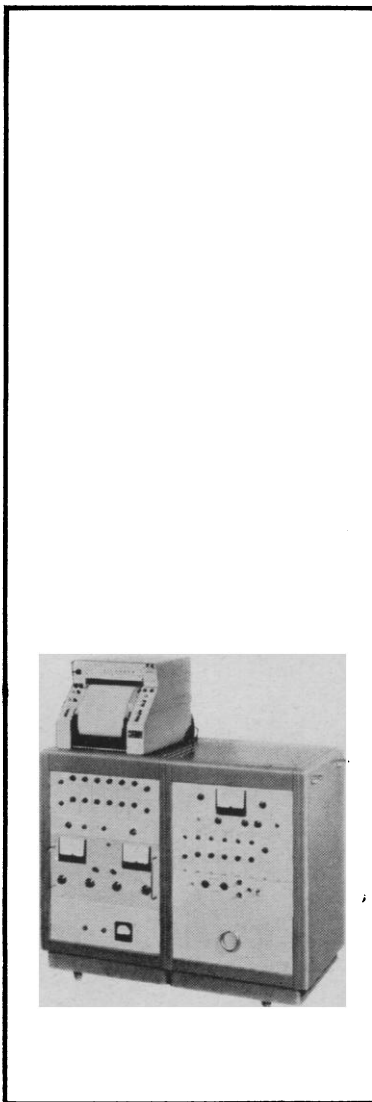
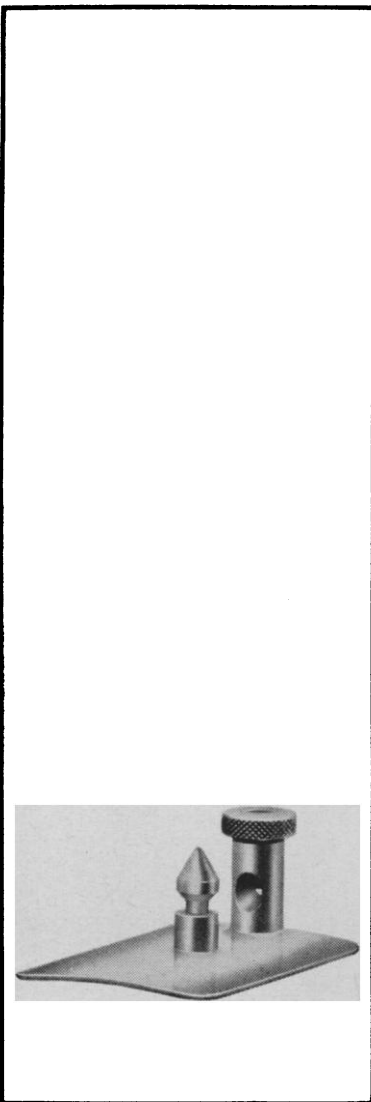
**BAIRD-ATOMIC, INC.**

*33 University Road • Cambridge 38, Mass.*

**ADVANCED OPTICS AND ELECTRONICS...SERVING SCIENCE**

<b>Editorial</b>	A Distinction with a Difference . . . . .	15
<b>Articles</b>	Martian Biology: <i>F. B. Salisbury</i> . . . . .	17
	Accumulating evidence favors the theory of life on Mars, but we can expect surprises.	
	The Federal Laboratories and Science Education: <i>A. M. Weinberg</i> . . . . .	27
	By playing a greater role in education, Big Science can diminish the manpower shortage it has created.	
<b>News and Comment</b>	The Courts and reapportionment . . . . New Office of Science and Technology proposed by Kennedy . . . . .	30
<b>Book Reviews</b>	L. S. Vygotskii's <i>Thought and Language</i> , reviewed by <i>G. A. Miller</i> ; other reviews . . .	36
<b>Reports</b>	Strike-Slip Displacement on Faults in Triassic Rocks in New Jersey: <i>J. E. Sanders</i> . . .	40
	Dehydrogenases of <i>Neurospora crassa</i> : <i>M. U. Tsao</i> . . . . .	42
	Amygdaloid Suppression of Hypothalamically Elicited Attack Behavior: <i>M. D. Egger</i> and <i>J. P. Flynn</i> . . . . .	43
	Iron, Organic Matter, and Other Factors Limiting Primary Productivity in a Marl Lake: <i>C. L. Schelske</i> . . . . .	45
	Probability of Signal Detection in a Vigilance Task: <i>C. H. Baker</i> . . . . .	46
	Action of 1,1-Dichloro-2- <i>p</i> -chlorophenyl-2- <i>o</i> -chlorophenylethane on Dog Adrenal Cortex: <i>A. Cazorla</i> and <i>F. Moncloa</i> . . . . .	47
<b>Departments</b>	Letters from <i>H. Grundfest</i> ; <i>S. K. Ghaswala</i> ; <i>L. Thompson</i> and <i>R. B. Woodbury</i> . . . .	12
	Forthcoming Events . . . . .	52
<b>Cover</b>	Seasonal changes on Mars from March to August (top left to bottom right). See page 17. [E. C. Slipher, Lowell Observatory]	





## HONEYWELL RECORDS EKG PLUS

Honeywell Electronic Medical Systems are supplied complete but for two things: a subject (or patient) and an electrical outlet. When you "plug-in" both, you are ready to make individual or simultaneous measurements of a broad selection of physiological phenomena according to your exact specifications. Your record, of from 1 to 36 channels, is immediately readable. Twenty-eight different EMS channels are now available. In the example above, a standard EKG is presented (in lower part of record) in

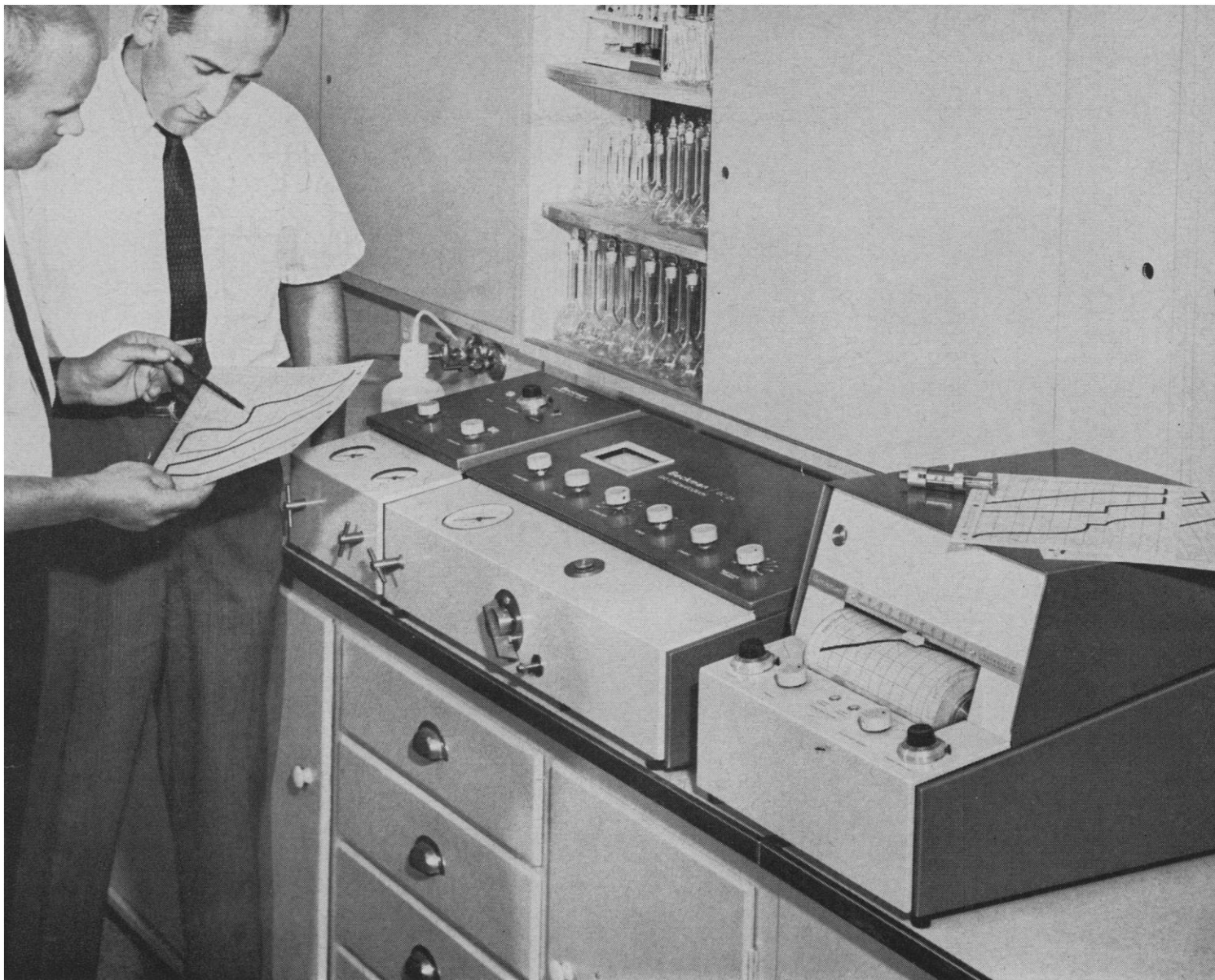
accepted format for clinical interpretation; the upper portion, a wide-amplitude record of the same lead, suggests the great utility of expanded traces for correlation with other data. The illustrated system includes a Honeywell 24-channel Visicorder. Other Honeywell recorders, digital print-out devices, tape recorders, and automatic data reduction equipment are available for incorporation into any Honeywell Electronic Medical System. Write for comprehensive brochure.

*Minneapolis-Honeywell Electronic Medical Systems • 5204 East Evans Avenue, Denver 22, Colorado*

# Honeywell



*Electronic Medical Systems*



*Team the Beckman® GC-2A Gas Chromatograph, ThermotraC,\* and Flame Ionization Detector for greater resolution and faster analyses!*

Combine the Beckman GC-2A, most reliable gas chromatograph—the Beckman Flame Ionization Detector, most sensitive flame ionization detector commercially available—the Beckman ThermotraC, newest, most versatile temperature programmer. You'll get faster, more complete analyses with unmatched sensitivity and resolution. This Beckman threesome can solve any analysis problem in gas chromatography. Learn more about this new team. See your Beckman laboratory apparatus dealer, or write direct for Data File 38-14-04.

**BECKMAN GC-2A GAS CHROMATOGRAPH.** The most sensitive instrument with a thermal conductivity detector—capable of detection to one-half part per million. Features built-in stability, fast response, high resolution—for research work or routine analyses.

**BECKMAN FLAME IONIZATION DETECTOR.** Features a unique electrometer design with Vibrode® stabilization,  $10^{-14}$  amps noise level, attenuation range of 50,000,000 to 1 without zero shift—used with the Beckman burner to permit linear measurements over the concentration range of parts per billion to 100%.

**BECKMAN THERMOTRAC TEMPERATURE PROGRAMMER.** Offers an infinite variety of linear, non-linear, and step function programs, all easily plotted on a Mylar sheet with pencil, ink or black tape. Precise temperature programming means fast elution of high boiling fractions without loss of resolution, reduction of peak broadening, resolution of closely spaced low boilers, and more effective use of columns. In all, greater versatility for your chromatograph.

**Beckman**

INSTRUMENTS, INC.

\*T. M., 811

6 APRIL 1962

SCIENTIFIC AND PROCESS INSTRUMENTS DIVISION • Fullerton, California

7



**PRECISION  
SYRINGES  
FROM  
1ul to 500ul**

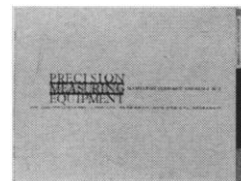
Whether you require quick, minute measurement and delivery for analytical instruments or an accurate small volume injection syringe, Hamilton Microliter Syringes are the finest instruments available for either use. In fact, they are the standard in chromatography, chemistry, biology and medicine. Each syringe is individually fitted with stainless steel plungers in precision bore glass . . . tested leak-proof to 3 atmospheres . . . with accuracy of delivery to  $\pm 1\%$  of calibrated volume . . . and made in types and sizes for every recognized need.

P.S. A syringe **smaller** than 1 ul! We're working on one—a 0.5 ul—deliveries are scheduled for the Spring.

**H**®

**HAMILTON COMPANY, INC.**

*Write for  
the new catalog  
of Hamilton  
Products*



P.O. Box 307-K • Whittier, California



# **NOW FULLY AUTOMATED U.V. SPECTRA OF EACH FRACTION!**

CANALCO's new monochromator analyzer for column chromatography gives you high-resolution curves of U.V. absorption at single wavelengths, two-wavelength ratios or complete spectra within fractions. Write for details.

**SEE IT NEXT WEEK AT  
THE FEDERATION EXHIBIT  
BOOTHS 2 & 3**



**CANAL INDUSTRIAL CORPORATION**  
4935 Cordell Avenue, Dept. E-41  
Bethesda, Maryland

HARSHAW CRYSTALS are

# 1728

## TIMES LARGER

than 25 years ago

*with "Harshaw Quality"  
inherent in each crystal*

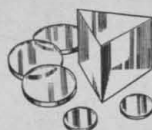
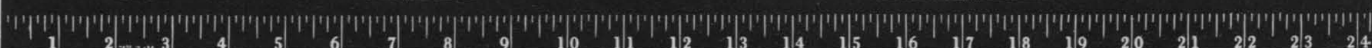
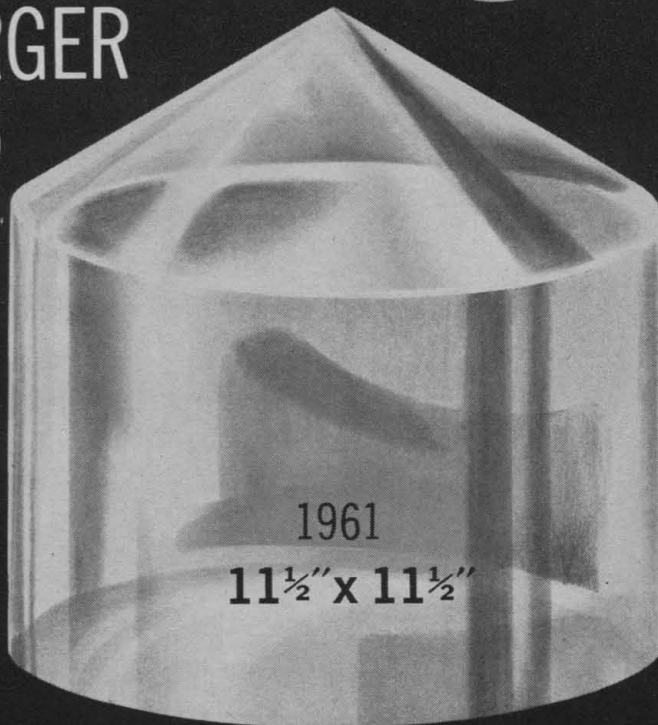
1936  
1" x 1"



1955  
5" x 5"



1961  
11½" x 11½"



This year Harshaw's Crystal Division celebrates its Silver Anniversary. In these 25 years the "art" of growing crystals has given way to scientific procedures. With expanded crystal research and development laboratories, and recently doubled production facilities, Harshaw stands ready to produce your crystals—regardless of technical nature or production magnitude. Our physics, chemistry, and engineering departments enjoy the challenge of increasingly stringent demands from scientists and instrument manufacturers for infrared and ultraviolet optical crystals, and scintillation phosphors.

#### OPTICAL CRYSTALS

*For Infrared and  
Ultra Violet  
Transmitting Optics*

- Sodium Chloride
- Sodium Chloride Monochromator Plates
- Potassium Bromide
- Potassium Bromide Pellet Powder (through 200 on 325 mesh).
- Potassium Chloride
- Optical Silver Chloride
- Thallium Bromide Iodide
- Lithium Fluoride
- Lithium Fluoride Monochromator Plates
- Calcium Fluoride
- Barium Fluoride
- Cesium Bromide
- Cesium Iodide

#### SCINTILLATION

*Mounted NaI (TI) Crystals*

Crystal detectors designed for your most sophisticated counting problems. Our physics and engineering groups are available to assist you.

- Other Phosphors—Rough Cut Thallium Activated Sodium Iodide Crystal Blanks
- Europium Activated Lithium Iodide (Normal)
- Europium Activated Lithium Iodide (96% Li<sup>6</sup> Enriched)
- Thallium Activated Cesium Iodide
- Thallium Activated Potassium Iodide
- Anthracene
- Plastic Phosphors

*Write for our 36-page booklet "Synthetic Optical Crystals"  
or our 44-page booklet "Scintillation Phosphors"*

**The Harshaw Chemical Company**

1945 East 97th Street • Cleveland 6, Ohio

Utrecht, Netherlands — Contact Harshaw-Van Der Hoorn N. V., Juffaseweg 186



**Crystal Division**

Two outstanding series of inexpensive paperback books, from DOUBLEDAY—



## THE SCIENCE STUDY SERIES

Described as "a landmark in science education" when introduced three years ago, The Science Study Series now includes 24 titles in the physical and life sciences. Prepared by the Physical Science Study Committee.

## THE NATURAL HISTORY LIBRARY

"A truly outstanding series," (*New York Times*) published in cooperation with the American Museum of Natural History, introduced last year, and now including 23 titles in the life and earth sciences.



### THE SCIENCE STUDY SERIES

- S-1 THE NEUTRON STORY.** Donald J. Hughes. "Rare clarity and simplicity on one of the most esoteric topics in science."—*N.Y. Herald Tribune* 158 pp., 39 line drawings, index. 95¢
- S-2 MAGNETS:** The Education of a Physicist. Francis Bitter, M.I.T. "A masterpiece. This combination of autobiography and popular science exposition is very rare and extraordinarily effective."—B. ALDEN THRESHER, Former Chairman, CEEB. 155 pp. 27 line drawings, index. 95¢
- S-3 SOAP BUBBLES AND THE FORCES WHICH MOULD THEM.** Sir Charles Vernon Boys. "A superb classic . . . can capture the imagination of the young (and the old)." —DEREK J. de SOLLA PRICE, Yale University. 156 pp., 69 line drawings. 95¢
- S-4 ECHOES OF BATS AND MEN.** Donald R. Griffin, Harvard University. "Authoritative and thoroughly scientific, but more fascinating than most novels."—GEORGE GAYLORD SIMPSON. 156 pp., 15 line drawings, bibliog., index.
- S-5 HOW OLD IS THE EARTH?** Patrick M. Hurley, M.I.T. "Highly readable, stimulating, authoritative and inexpensive introduction to the age of the earth, and to the dating of various important events in earth history."—EDWARD H. WATSON, Bryn Mawr College. 160 pp., 27 drawings, 8 photos, index.
- S-7 CRYSTALS AND CRYSTAL GROWING.** Alan Holden, Bell Telephone Laboratories, and Phyllis Singer. "A lucid, penetrating introduction to solid state physics."—SCIENCE. 320 pp., 150 line drawings, 56 photos (13 color), appendices, research suggestions, bibliog., index. \$1.45
- S-8 THE PHYSICS OF TELEVISION.** Donald G. Fink, Philco Corp., and David M. Lutyens. "A masterwork of selection and condensation in explaining how television works . . ."—*N.Y. Herald Tribune*. 160 pp., 44 diagrams, 4 photos, index. 95¢
- S-9 WAVES AND THE EAR.** Willem A. Van Bergeijk, John R. Pierce and Edward E. David, Jr., Bell Telephone Laboratories. "Exceptionally comprehensive for an introductory text."—*Technology Review*. 235 pp., 65 linecuts, 5 photos, bibliog., index. 95¢
- S-10 THE BIRTH OF A NEW PHYSICS.** I. Bernard Cohen, Harvard University. "The development from Copernicus to Newton of the single most important idea in physics—the dynamics of motion . . . an outstanding book."—*Scientific American*. 200 pp., 34 line drawings, 8 photos, bibliog., index. 95¢
- S-11 HORNS, STRINGS, AND HARMONY.** Arthur H. Benade, Case Institute of Technology. "[The] book communicates well his love for both music and physics."—SCIENCE 271 pp., 68 line drawings, 8 photos, bibliog., index. 95¢
- S-12 THE RESTLESS ATOM.** Alfred Romer, St. Lawrence University. "An original and important work."—*Technology Review*. 198 pp., 31 drawings and diagrams, appendices, index. 95¢
- S-13 MICHELSON AND THE SPEED OF LIGHT.** Bernard Jaffe. "A rich supplement to the study of light and optics."—*The Science Teacher*. 197 pp., 14 drawings, 4 photos, bibliog., index. 95¢
- S-14 THE UNIVERSE AT LARGE.** Hermann Bondi, University of London. "The author . . . can be bracketed with George Gamow as having special ability to put difficult ideas into simple language."—*Bulletin of the Atomic Scientists*. 154 pp., 52 drawings, 12 photos, index. 95¢
- S-15 PASTEUR AND MODERN SCIENCE.** René Dubos, Rockefeller Institute. "Deserves great praise for filling a gap in the history of science."—SCIENCE. 159 pp., index. 95¢
- S-16 THE WATERSHED:** A Biography of Johannes Kepler. Arthur Koestler. "A landmark in biography which no student of science or history can afford to postpone reading."—*Science*. 280 pp., 17 illus., index. 95¢
- S-17 ACCELERATORS:** The Machines of Nuclear Physics. Robert R. Wilson and Raphael Littauer, Cornell Univ. From the earliest x-ray tube to the atom smashers of today—"A fine example of the excellence of the series."—*Science*. 196 pp., 16 photos, 36 drawings, appendices, index. 95¢
- S-18 WATER:** The Mirror of Science. Kenneth S. Davis & Hohn A. Day, Linfield College. A discussion of the properties of water as seen by various branches of science. "One of the best: sound and informative."—*N.Y. Herald Tribune*. 195 pp., 22 drawings and diagrams, 4 photos, index. 95¢

- S-19 THE NATURE OF VIOLENT STORMS.** Louis J. Battan, Univ. of Arizona. "An excellent basic text in meteorology, or physics of the atmosphere, covered in easy-to-understand terms."—*U.S. Naval Institute Proceedings*. 158 pp., 22 diagrams and maps, 17 photos, bibliog., index. 95¢
- S-20 NEAR ZERO:** The Physics of Low Temperature. D.K.C. MacDonald, National Research Council of Canada. An expert's clearly-written introduction to one of the most important areas in modern research. 116 pp., 8 halftones, 12 line drawings. 95¢
- S-21 SHAPE AND FLOW:** The Fluid Dynamics of Drag. Ascher H. Shapiro, M.I.T. A visually and scientifically exciting exploration of the phenomena of fluid dynamics. 186 pp., 93 photos, index. 95¢
- S-22 GRAVITY.** George Gamow, Univ. of Colorado. From Galileo to the concepts of Newton and Einstein, an eminent scientist examines the nature of gravity. 157 pp., 29 line drawings, index. 95¢
- S-23 LIFE IN THE UNIVERSE:** A Scientific Discussion. Michael W. Ovenden, Univ. of Glasgow. An examination of such basic questions as what distinguishes living matter from non-living matter; and what might exist on other planets. 160 pp., 23 line drawings, index. 95¢
- S-24 RADAR OBSERVES THE WEATHER.** Louis J. Battan, Univ. of Arizona. How radar is revolutionizing the science of meteorology through its ability to detect everything from a raindrop to the formation of hurricanes. 158 pp., 16 photos, 20 line drawings, index, appendices. 95¢
- S-25 NERVES AND MUSCLES.** Robert Galambos, Yale Univ. A splendid introduction to the field of biophysics in this engaging description of the incredible electrical networks of the human body. 158 pp., 30 line drawings, index. 95¢

### THE NATURAL HISTORY LIBRARY

- N-1 HORSES.** George Gaylord Simpson, Harvard Univ. A classic case history of evolution, which traces the lineage of the horse over the past 60 million years. 32 pp. of photos, 27 drawings, index. \$1.45
- N-2 JOHN AND WILLIAM BARTRAM'S AMERICA.** Edited by Helen Gere Cruickshank. The best writings of the famous father and son naturalists who explored much of the Southeastern U.S. during the 18th century. 8 pp. of illus., 2 maps, index. \$1.45
- N-3 THE OCEAN ISLAND (Inagua).** Gilbert C. Klingel. An award-winning naturalist, shipwrecked in the Bahamas, studies the flora and fauna of shore, sea and sky. Foreword by Charles M. Bogert, A.M.N.H. 17 photos, map. \$1.45
- N-4 SHEARWATERS.** R. M. Lockley. A report of 12 years' field observation of the Manx shearwater, a bird that performs miracles of navigation and endurance. Foreword by Robert Cushman Murphy, A.M.N.H. 7 drawings, map, index. \$1.25
- N-5 WHITE WATERS AND BLACK.** Gordon MacCreagh. "A wonderfully amusing account of an ill-fated scientific expedition into the Amazon."—*New York Times*. Foreword by James A. Oliver, Director, A.M.N.H. 8 photos, map. \$1.45
- N-6 THE WANDERING ALBATROSS (Revised).** William Jameson. "Admirable little study of one of the largest, strangest, and ablest of birds."—*N.Y. Herald Tribune*. Foreword by Robert Cushman Murphy, A.M.N.H. 8 pp. of photos, 6 drawings and diagrams, index. 95¢
- N-8 MODERN SCIENCE AND THE NATURE OF LIFE.** William S. Beck, Harvard Medical School. "Solid in his facts and up to date in his accounting of where biology is going . . . his frankness . . . is both instructive and disarming."—*N.Y. Times*. Foreword by John A. Moore, A.M.N.H. Indexed. \$1.45
- N-9 DWELLERS IN DARKNESS.** S. H. Skafte. "A remarkable study of the black-mound termites of South Africa."—*N.Y. Herald Tribune*. Foreword by Jerome G. Rozen, Jr., A.M.N.H. 16 pp. of photos, 26 drawings, index. 95¢
- N-10 FROM FISH TO PHILOSOPHER.** Homer W. Smith, N.Y.U. School of Medicine. A physiologist's lucid account of man's evolution. "An original, learned and often witty contribution."—*N.Y. Herald Tribune*. Foreword by Evelyn Shaw, A.M.N.H. 12 illus., index. \$1.45
- N-11 THE EXPLORATION OF THE COLORADO RIVER.** John Wesley Powell. The diary of a great 19th-century geologist-ethnologist—a classic of the opening of the West. Foreword by Bobb Schaeffer, A.M.N.H. 8 photos, 2 maps, index. 95¢
- N-12 THE MOUNTAINS OF CALIFORNIA.** John Muir. "A cause for celebration that [this book] long out of print, has been published."—*San Francisco Chronicle*. Foreword by Jack McCormick, A.M.N.H. 8 photos, 2 maps, index. \$1.25
- N-13 JOHN BURROUGHS' AMERICA.** Edited by Farida A. Wiley, A.M.N.H. The finest and most memorable writings of the famous Hudson River naturalist. 8 illus. map, index. \$1.45
- N-14 THE PACIFIC ISLANDS (Revised)** Douglas L. Oliver, Harvard Univ. "A penetrating and sometimes understandably bitter examination."—*N.Y. Herald Tribune*. Foreword by Harry L. Shapiro, A.M.N.H., 25 illus., 5 maps, index. \$1.45
- N-15 THE LAND OF LITTLE RAIN.** Mary Austin. An example of nature writing that remains unsurpassed in the literature on the American Southwest. 53 line drawings. 95¢
- N-16 THE VOYAGE OF THE BEAGLE.** Charles Darwin. With new maps and with annotations and an introduction by Leonard Engel, this is the only modern edition of a classic. 6 pp. of photos, maps, index. \$1.45
- N-17 BETWEEN THE PLANETS.** Fletcher G. Watson. Describes the spectacular phenomena of asteroids, comets, and meteors; discusses the latest theories on their origins and motions. 48 photos, 53 line drawings, index. \$1.25
- N-18 PUFFINS.** R. M. Lockley. The engrossing study-in-life of an oceanic bird's cycle from birth to often violent death. 12 pp. of photos, 6 line drawings; index. \$1.25
- N-19 THE HEATHENS.** William Howells, Harvard Univ. An urbane and informative look at the world of mana, shamans, and diviners and the motivations behind primitive religious practices. 8 pp. of photos, 3 pp. of line drawings, index. \$1.45
- N-20 GRAND CANYON.** Joseph Wood Krutch. Geology, geography, zoology, ecology—a veritable natural history of this most fascinating land formation—landmark. 8 pp. of photos, 2 line drawings; index. \$1.25
- N-21 OBSERVATIONS AND EXPERIMENTS IN NATURAL HISTORY.** Alan Dale. A unique do-it-yourself book of field study and observation by the British teacher and writer. 8 pp. of photos, 28 line drawings, index. 95¢
- N-22 EARLY MAN IN THE NEW WORLD.** Kenneth MacGowan and Joseph A. Hester. Provides the latest evidence and discusses the current hypotheses on the life and habits of early man. Revised and updated. 95 line drawings, index. \$1.45
- N-23 THE HERITAGE OF THE BOUNTY.** Harry L. Shapiro. The story of the famous mutineers who fled to Pitcairn Island, with a discussion of cultural intermixture, inbreeding, and human ecology as observed by the author. 10 pp. of photos, map, index. \$1.25
- N-24 THEODORE ROOSEVELT'S AMERICA.** Theodore Roosevelt, edited by Farida A. Wiley. From his accounts of experiences in the Bad Lands of Dakota to the dense jungles of the Amazon, these excerpts show T. R. as an intrepid and zealous explorer in natural history. 12 pp. of illus., index. \$1.45

Available at your bookstore, or from,

**DOUBLEDAY & CO., INC.**

Dept. 2-JE-4, Garden City, N.Y.

Please send me the books whose code numbers I have indicated . . . . .

NAME . . . . .

ADDRESS . . . . .

CITY . . . . . ZONE . . . . . STATE . . . . .

☐ Bill me, plus shipping charges.

☐ Payment of \$ . . . . . enclosed ☐ Check

☐ Money Order) for pre-paid shipment by publisher.

# COLEMAN



## Photofluorometer®

*Twice the sensitivity  
at half the cost . . .*

The Coleman Photofluorometer® covers the full range of fluorescence analysis — from physiological fluids to industrial and research materials.

Its acute sensitivity permits quantitative determinations of photofluors (quinine, for example) down to 3 parts in 10 billion.

This sensitivity is *multiplied by a factor of 15* if a Coleman spectrophotometer or galvanometer is used for readout.

The Photofluorometer® achieves its sensitivity without photomultipliers and elaborate, trouble-prone circuitry. This forthright simplicity carries over into aspects of the instrument's operation:

- samples are inserted directly into the instrument's optical system,
- readings are taken directly from the meter dial,
- high-intensity UV light and a simple lens-and-aperture system provide optimum excitation while preventing decay of sensitive substances by protecting them from irradiation except during the actual reading.

The Coleman Photofluorometer® is priced at \$480. It gives you twice the sensitivity at half the cost of less forthright instrumentation.

*Write for Bulletin SB-245A*



**COLEMAN INSTRUMENTS, INC.**  
MAYWOOD, ILLINOIS

## Letters

### Professional Education in Russia

If the summary in "Science and the news" is correct [*Science* **135**, 204 (19 Jan. 1962)], Nicholas DeWitt seems to misinterpret Russian scientific and professional education in at least two respects.

1) Charitably, or perhaps optimistically, we include undergraduate colleges among our "institutions of higher education" (*ibid.* Table 1, p. 205). The graduates of Soviet secondary schools, like graduates of the French lycée or German gymnasium, at the age of 18 have reached approximately the same educational level as the American student who enters his junior year in college. Accordingly, 30 percent of Soviet students (Table 1, line 4) had completed what amounts to about 2 years of our college, whereas it appears that only 23 percent of our eligible students entered the freshman year (Table 1, line 5).

2) It is probably true that "no higher educational establishment in the U.S.S.R. offers non-specialized professional instruction such as the general studies or liberal arts programs common in American colleges and universities." However, I think it is wrong to conclude from this that our Soviet colleagues "lack . . . humanistic education and disregard . . . cultural, ethical and social values cherished by the West." The Russians I have met over the years seem to be less well educated in painting and sculpture than many of my colleagues in France or Britain or this country. However, they are perhaps more broadly educated than are most of us in literature and the performing arts. I can cite a Russian neurologist, an illiterate shepherd boy before the Revolution, who could discourse on modern French literature, or a neurosurgeon who could quote Shakespeare as well as Pushkin extensively—though both in Russian. These are older people, but I have met a few young scientists who also seemed to be at least as well cultivated as our own graduate students or young Ph.D.'s—which may not be saying very much, of course.

A significant and perhaps even a more objective measure of the comparative cultural levels of our own and of Soviet students could be provided by figures on attendance at theatres, concerts, and so on, and by an analysis of the reading material, type and number

of literary journals, their circulation, and the use of library facilities. From the few data I have seen on this score, it appears that the cultural level in the U.S.S.R. is not lower than the level in our own country.

It would be much more significant and healthier for our education if we compared commensurable quantities, though this may be difficult and sometimes, perhaps, even unpleasant. Furthermore, it is deplorable to say, as DeWitt does, that Russians show "disregard for the cultural, ethical and social values cherished by the West." The Russians seem to have the same Greco-Judeo-Christian cultural and ethical (though not religious) values that dominate the West. Their social values, undoubtedly, differ from ours, but so do those of many other civilized countries.

HARRY GRUNDFEST

*College of Physicians and Surgeons,  
Columbia University,  
New York, New York*

### Space Research

I was interested as well as intrigued to read Howard Margolis's note "Money for space: The program's managers fear the public does not understand the issue" [*Science* **134**, 1602 (1961)]. The case of the public's not understanding the issue on the reasons why the Administration should spend \$20 billion on space research and extraterrestrial projects does require serious attention. While research in general science and technology is an accepted part of the work of present civilized society, we of the underdeveloped countries fail to fathom and to conceive clearly why such a staggering amount should be spent on space research only. This amount could well-nigh feed, clothe, and shelter Asia's teeming millions. I wonder whether it is really necessary to spend such a large amount *at this stage* on such projects. Could not this amount be more profitably utilized in other fields of research which directly affect humanity on earth?

We of the underdeveloped countries place a high value on research, for it is this very characteristic that has enabled some of the Asian countries to industrialize themselves much more rapidly than would have been possible otherwise. The practical benefits are clearly visible here. However, when it comes to spending staggering amounts to send

(Continued on page 48)



## WHATMAN CELLULOSE ION EXCHANGERS

...ideal physical and chemical media for analytical and preparative work in organic, inorganic, and biochemistry...available in paper, powder and floc for applications from micro techniques in the laboratory to macro techniques in the plant.

**CATION EXCHANGERS:** *Cellulose phosphate*—exhibits many phenomena that are met with in the case of strongly acidic cation-exchange resins. *Carboxymethyl-cellulose*—weakly acidic, therefore functions most readily on the alkali side of the pK, that is at a pH above 4 to 5.

**ANION EXCHANGERS:** *Aminoethyl-cellulose*—exhibits many of the phenomena that are known to occur in weakly basic anion-exchange resins. *Diethyl-aminoethyl-cellulose*—better known as DEAE-cellulose, resembles in base-strength more closely the corresponding tertiary amino anion-exchange resins. *Ecteola cellulose*—another weakly basic derivative, with tertiary amino groups functioning as the exchange sites.

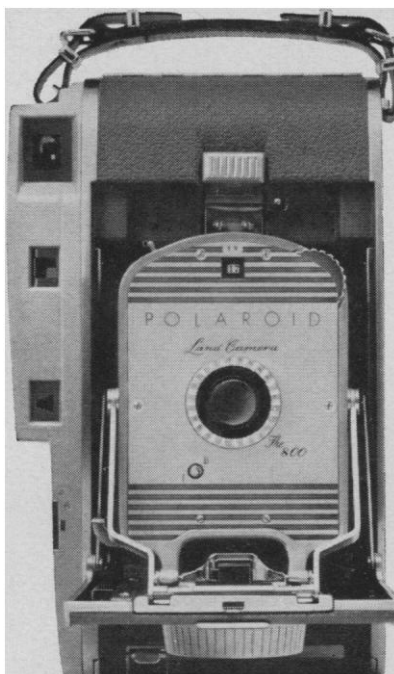
Available through your regular laboratory supply dealer.  
Request technical bulletin 1031.

Sole sales agents:  
REEVE ANGEL  
9 Bridewell Place, Clifton, New Jersey  
9 Bridewell Place, London, EC4

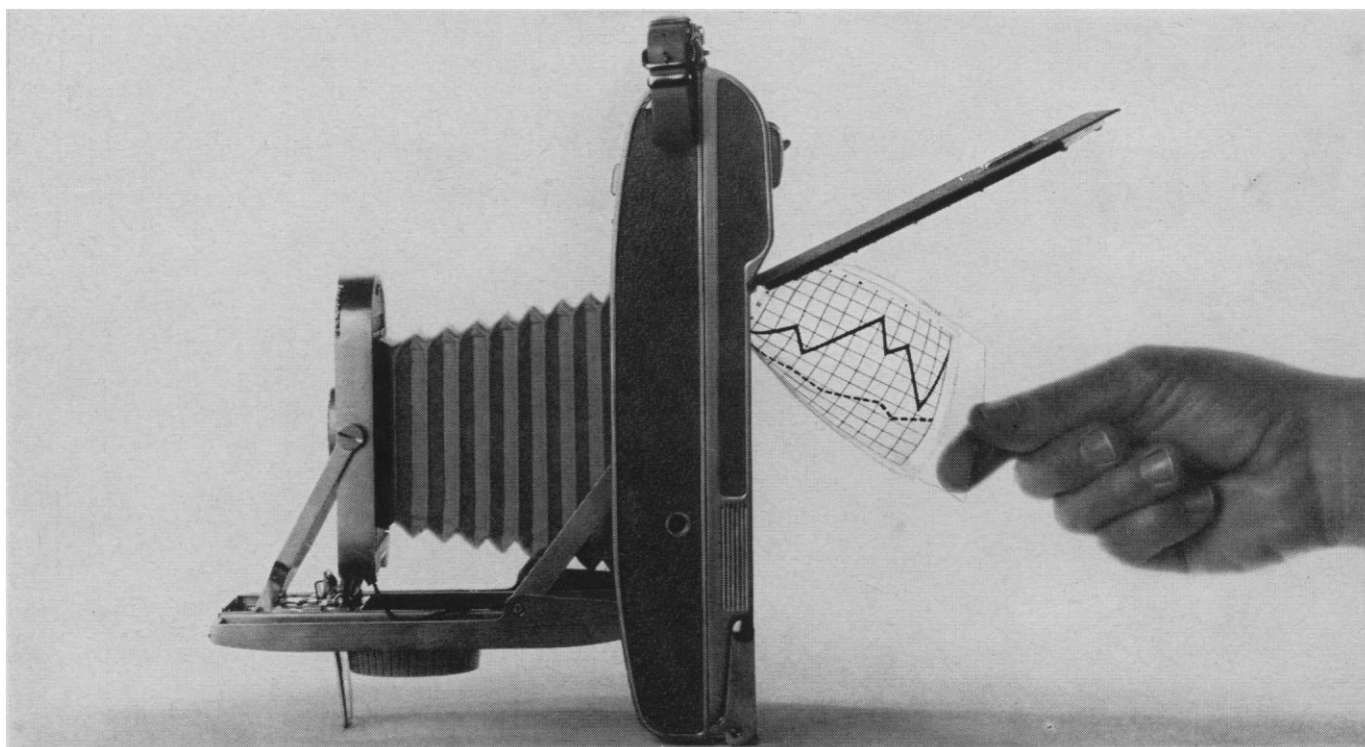
Whatman  
FILTER PAPER



Visit us at the  
46th Annual Meeting  
of The Federation of  
American Societies for  
Experimental Biology  
April 14-19



**This and 55¢**



**gets you a finished slide in less than 90 seconds**

"This" is a regular Polaroid Land Camera. The 55t is the per-exposure cost of special transparency film, including the mount.

All you have to do is load the film into the camera, snap the shutter, pull the tab and wait a moment. Then open the back of the camera and peel off a transparency.

After a quick hardening and mounting in a click-together frame the slide is ready to show. From snap to screen in less than 90 seconds...just about half the time it

takes to cook your morning egg. And at about 1/3 the cost of conventionally processed slides.

A new Polaroid PolaLine Transparency film is especially designed for line copy work. The blacks are really black, the clear areas really clear. These are 3 1/4 x 4 transparencies for standard lantern slide projectors. Development time is 10 seconds.

There's another film for continuous tone work. It comes in two sizes, one for stand-

ard slide projectors and one for use in a complete system that employs 2 1/4 x 2 1/4 slides in a Polaroid Projector. Development time is 2 minutes.

All three projection film types can be used with any Polaroid Land Camera that uses 40-series film except the J-66.

For more information on how this film will help you in your work, write to Technical Sales Dept., Polaroid Corporation, Cambridge 39, Mass.

AMERICAN ASSOCIATION  
FOR THE  
ADVANCEMENT OF SCIENCE

Board of Directors

THOMAS PARK, *Retiring President, Chairman*  
PAUL M. GROSS, *President*  
ALAN T. WATERMAN, *President Elect*  
HARRISON BROWN DON K. PRICE  
HENRY EYRING MINA REES  
H. BENTLEY GLASS ALFRED S. ROMER  
MARGARET MEAD WILLIAM W. RUBEY  
PAUL A. SCHERER, *Treasurer*  
DAEL WOLFLE, *Executive Officer*

Editorial Board

KONRAD B. KRAUSKOPF H. BURR STEINBACH  
EDWIN M. LERNER WILLIAM L. STRAUS, JR.  
PHILIP M. MORSE EDWARD L. TATUM

Editorial Staff

DAEL WOLFLE HANS NUSSBAUM  
*Publisher Business Manager*

GRAHAM DUSHANE  
*Editor*

JOSEPH TURNER ROBERT V. ORMES  
*Associate Editor Managing Editor*

ELLEN E. MURPHY, *Assistant Editor*

NANCY TEIMOURIAN, *Assistant to the Editor*

*News:* HOWARD MARGOLIS, DANIEL S. GREENBERG, PATRICIA D. PADDOCK

*Book Reviews:* SARAH S. DEES

*Editorial Assistants:* SUE E. BERKE, NANCY S. HAMILTON, OLIVER W. HEATWOLE, EDGAR C. RICH, JOHN E. RINGLE, CECIL F. SWEENEY, CONRAD YUNG-KWAI

*Staff Assistants:* LILLIAN HSU, MARION Y. KLINE, KAY E. KROZELY

Advertising Staff

EARL J. SCHERAGO, *Director*

BERNICE SCHWARTZ, *Production Manager*

*Sales:* RICHARD L. CHARLES (New York, N.Y., PE 6-1858); C. RICHARD CALLIS (Old Bridge, N.J., CL 4-3680); HERBERT BURKLUND (Chicago, Ill., DE 7-4973); DILLENBECK-GALAVAN (Los Angeles, Calif., DU 5-3991)

SCIENCE, now combined with THE SCIENTIFIC MONTHLY, is published each Friday by the American Association for the Advancement of Science at National Publishing Company, Washington, D.C. SCIENCE is indexed in the *Reader's Guide to Periodical Literature*.

Editorial correspondence should be addressed to SCIENCE, 1515 Massachusetts Ave., NW, Washington 5, D.C. Manuscripts should be typed with double spacing and submitted in duplicate. The AAAS assumes no responsibility for the safety of manuscripts. Opinions expressed by authors are their own and do not necessarily reflect the opinions of the AAAS or the institutions with which the authors are affiliated. For detailed suggestions on the preparation of manuscripts, see *Science* 125, 16 (4 Jan. 1957).

Advertising correspondence should be addressed to SCIENCE, Room 1740, 11 West 42 St., New York 36, N.Y.

Change of address notification should be sent to 1515 Massachusetts Ave., NW, Washington 5, D.C., 4 weeks in advance. Furnish an address label from a recent issue. Give both old and new addresses, including zone numbers.

Annual subscriptions: \$8.50; foreign postage, \$1.50; Canadian postage, 75¢. Single copies, 35¢. School year subscriptions: 9 months, \$7.00; 10 months, \$7.50. Cable address: Advancesci, Washington.

Copyright © 1962 by the American Association for the Advancement of Science.

## A Distinction with a Difference

Responses have differed to the recommendation by a group of mathematicians that the thesis requirement for the mathematics Ph.D. be broadened. The new requirement would permit not only, as at present, theses that offer new mathematical proofs, but also theses that are expository or critical in character. Dartmouth College responded to the recommendation by incorporating it in its new Ph.D. program in mathematics, while the mathematics department of the University of Chicago responded by vowing that it, at least, would have no part of any effort to relax present standards.

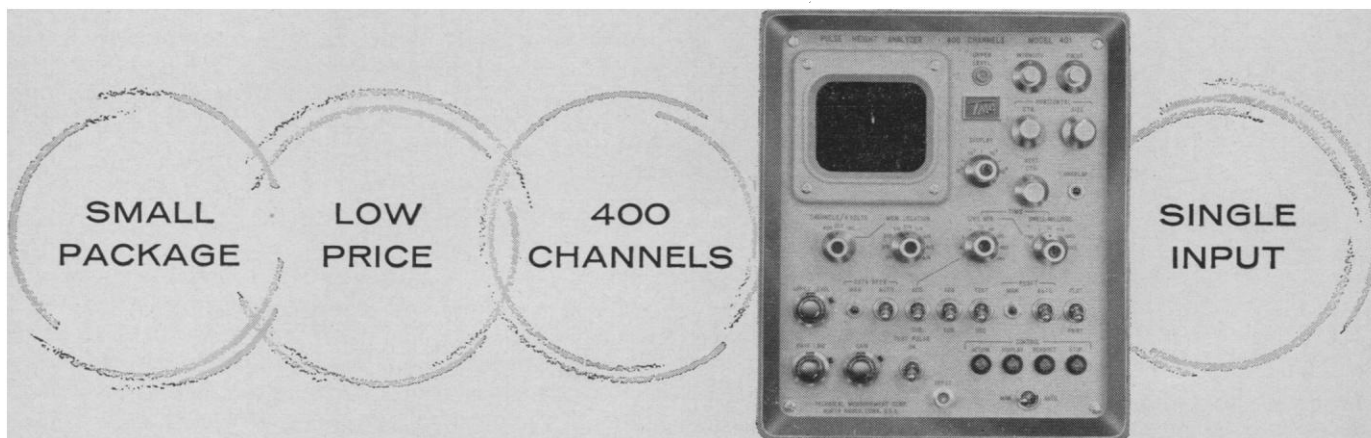
The recommendation was the outcome of a conference held at Yale University last October under the auspices of a joint committee of the American Mathematical Society and the Mathematical Association of America. The conference was called because of the mathematical community's concern with the growing shortage of college teachers of mathematics. Although more Ph.D.'s in mathematics are now being turned out than ever before, they are not rushing into college teaching.

The Dartmouth program will permit a thesis which offers new mathematical proofs or which is expository or critical in character or which is some combination of these different kinds of study. The course work will also be different from that offered in traditional preparation in that there will be greater emphasis on mathematical breadth. The principal aim of the program is preparation for an academic career, and, with alternate routes open to the student, the idea in this preparation is to make embarkation on a thesis something less of a gamble. This is the first time Dartmouth has offered a doctorate in mathematics, and the department reports that it is encouraged by the good number of highly qualified students who have applied for admission.

Opponents of the effort to broaden requirements for the doctorate have granted that there is a need to increase the supply of college teachers of mathematics, but have argued that the M.A. could be regarded as a mark of sufficient attainment for this purpose. The difficulties here are that the M.A. stands for a variety of attainments, from 1 or 2 years' work to work just short of a Ph.D. More important is the practical difficulty, given our present system of values, of getting this degree accepted as a form of certification for college teachers.

In an earlier stage of thinking about increasing the supply of teachers, there was a proposal that the broader thesis be honored by a new degree, something to be called a "Doctor of Arts." But the proposal was rejected because it also poses practical difficulties. A university faces administrative and legal problems if it decides to grant such a degree. And there is again the problem of acceptance of the degree once granted. Rejection of the proposal to establish a new degree was also based on the feeling that if the work really qualifies as an alternate, but equally effective, preparation for teaching, then it also qualifies for a Ph.D. In any event, differences in preparation will not be any great secret. One need merely ask a person whether he got his degree at Dartmouth or at the University of Chicago.

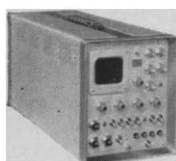
The number of additional teachers that the use of broader requirements at Dartmouth and other interested universities will eventually provide is not known, but the idea, we think, is worth pursuing. Requirements will be lower, of course, in that more people will be able to get the degree. But the whole idea is precisely to get more teachers. The basic argument for the broader requirements is that, while you have to know harmony to be Leonard Bernstein, you do not have to be Bernstein to teach harmony. And no one is going to be upset if you, again like Bernstein, have interests and abilities that include composing, conducting, and popular exposition.—J.T.



## multichannel pulse height analyzer

400 channels for \$9500 . . . unit weight — only 36 lbs. The combination of these advantages makes the new 401 a good choice for *any* laboratory where straight-forward, single input analyses are the rule. As with others in the 400 series, the 401 includes coincidence, anti-coincidence and routing gates; built-in low level amplifiers, high level inverters — all on removable cards for quick access.

Readout for the 401 is accomplished through parallel output to an accessory paper tape printer, the Model 500. (Model 401-A analyzer has parallel *and* serial output to make use of *all* 500 series readout accessories, costs \$9650).



MODEL 401

Other 400 series analyzers include the Model 404 — 4 inputs; Model 402 — 2 inputs.

### KEY SPECIFICATIONS

Gating pulses . . . . . +4 volts, rise time from 0.1 to 0.3  $\mu$ sec.

Address oscillator frequency . . . . . 2.5 mc.

Selectable conversion gains . . 400, 200, 100 channels per 4 volts.

Memory capacity . .  $10^5$  standard ( $10^6$  available).

Memory grouping . . 4 groups of 100, 2 groups of 200, 1 group of 400.

Data transfer . . . . . manual transfer half to half, quarter to quarter in same half. (Auto. during printout).

Size . . . . .  $8\frac{1}{2}$ " wide,  $10\frac{1}{4}$ " high, 21" deep.

New bulletin lists complete specifications, details of operation and available accessories.

Prices f.o.b. New Haven, Conn. and subject to change without notice.

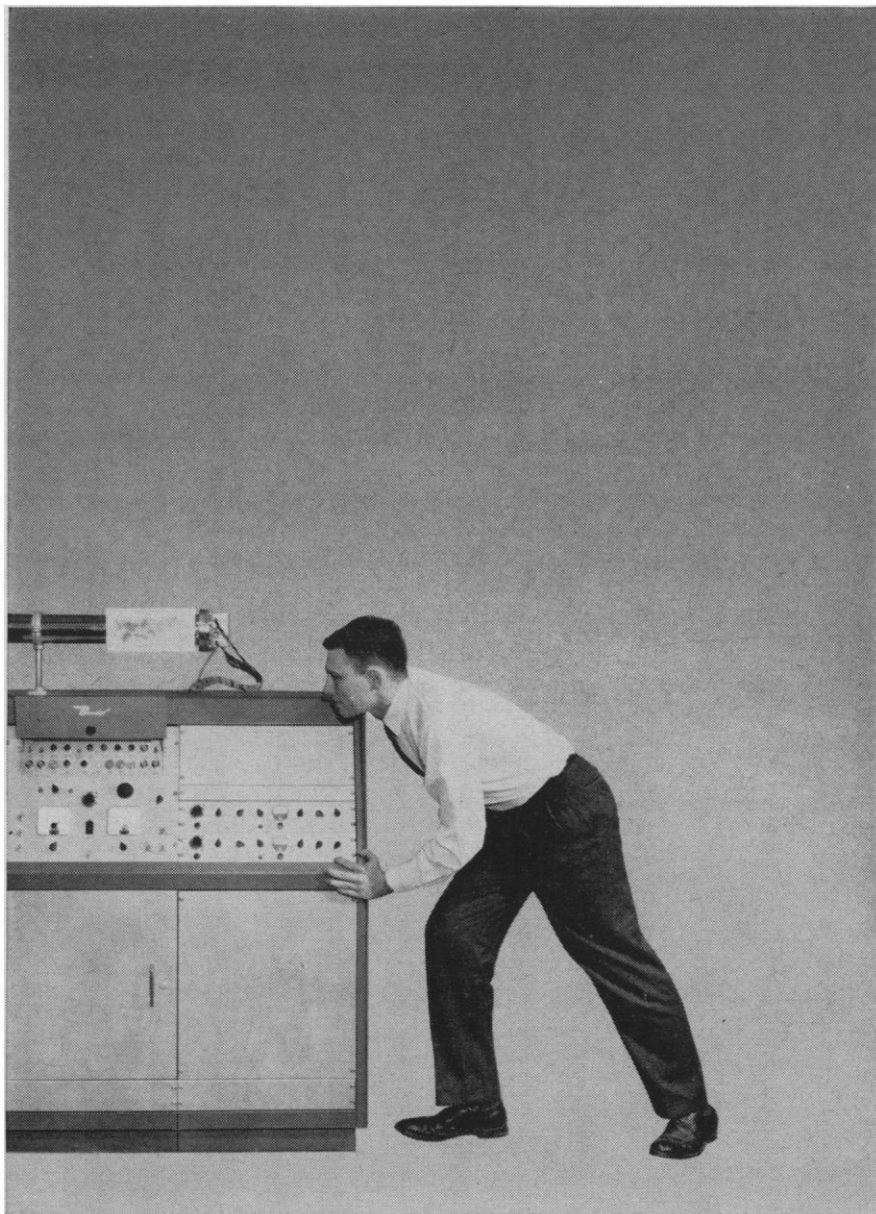


### TECHNICAL MEASUREMENT CORPORATION

441 WASHINGTON AVENUE, NORTH HAVEN, CONN. — CE 9-2501

Sales Offices: BOSTON • DALLAS • DENVER • LOS ANGELES • SAN FRANCISCO





## SHHH! METALLURGY IS "BORROWING" THE MASS SPEC FROM PHYS CHEM

This could happen at your laboratory. Bendix makes the time-of-flight mass spectrometer to do a multitude of research and analytical jobs. It's compact, easy to move, a breeze to maintain, and about as versatile as the user's imagination. Five basic inlet systems help to make this versatility possible: the molecular leak inlet, the fast reaction inlet, the hot filament inlet, the Knudsen cell, and the vapor phase chromatograph. To be more specific, the Bendix® mass spec will do almost any routine analytical problem, plus all of the following:

- Monitoring chromatograph output
- Determination of vapor pressures
- Determination of heats of vaporization
- Free radical studies
- Solids analysis
- Thermal decomposition
- Shock tube research
- Appearance potential measurements
- Fast reaction studies
- Photoionization studies
- Molecular structure studies
- Photochemical reaction studies
- Negative ion analysis
- Pilot plant studies
- Combustion analysis
- Plasma jet analysis
- Rocket jet analysis
- Ion-molecule reactions

Here's versatility that makes a mass spec really pay off. Isn't this what you want in your lab? Write Dept. C-4 at 3130 Wasson Road, Cincinnati 8, Ohio.

**Cincinnati Division**



## Letters

(Continued from page 12)

a man to the moon or Mars, our intellectual capacity gets stratified in trying to conceive the final implications. I submit that, in all fairness, the vast intellectual, scientific, and technical talent possessed by the American nation should be channelized to carry out practical and down-to-earth research of a kind that would alleviate human suffering and misery and make life on earth—rather than on the moon or Mars—more pleasant and happy, not only for the people of the Western nations but for the world at large. The basic object of research would only then be fully justified.

S. K. GHASWALA

97 Queen's Road, Bombay, India

### Applied Anthropology

While the review of my book *Toward a Science of Mankind* (1) by Richard B. Woodbury which appeared in *Science* (2) is friendly and sincere, it so misrepresents both the aims and the thesis of the book as to prejudice the reader not only against it but also against what seems to me to be a very promising recent development in the scientific study of man. I would therefore like to correct some misunderstandings which emerge from the review and at the same time to present very briefly an idea of the purpose of the book.

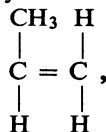
In the first place, *Toward a Science of Mankind* was written partly to try to dispel the notion, widely current among both laymen and social scientists, including anthropologists, that applied anthropology, or indeed applied social science in general, need necessarily involve the manipulation of human beings or groups toward preconceived goals superimposed by administrative agents (not the anthropologist himself as naively stated in the review) from without the group, whether such agents be governors, business executives, or military dictators. Although the role of the human-relations engineer, who commonly places his administrator-employer in a position of "arbiter of mankind's goals," is discussed at some length (1, pp. 17-22), one of the main contributions of the book, I believe, is the fact that in it an alternative role for the anthropologist concerned with applica-

## Kodak reports on:

a mysterious dance that might not interest everybody... a prospective second-best-seller...  
progress for ascetics... a contribution from the axoplasm of squid nerves

### The polyallomeric state

It now appears that an asymmetric molecule like propylene,



can link with other monomers to form high polymers that are quite distinct, quite crystalline, quite stereoregular, and yet show scant respect for Dalton's Law of Definite Proportions, the old law which made an orderly science out of chemistry.

*Tenite* polyallomers are more orderly than they ought to be. Though the proportions of the monomers that go into them are as infinitely variable as the constitution of \$12-a-pound pipe tobacco, our polymerization process strongly discourages molecular randomness of spatial configuration. Somehow the asymmetric units of the chains, whatever their relative numbers, manage to work out a well coordinated geometrical arrangement for themselves. We wish we knew just how this happens. There must be *some* explanation for the distinctiveness of the results.

Scientifically interesting though all this may be, we would have found something else to write about here were not this new class of plastics ready to take its place in industry alongside *Tenite* polypropylene, polyethylene, polyester, butyrate, propionate, and acetate.

The gentlemen of the plastics-molding trade will lay their money on the line for various *Tenite* polyallomers not for the pleasure of seeing molecules do new tricks but for high impact strength, flexibility at low temperatures, desirable color properties, good moldability, good resistance to blushing when bent or stretched, and a very low molded density that's nice when you are buying by the pound and selling by the gross.

To be entered on the list of those interested in *Tenite* polyallomers, write Eastman Chemical Products, Inc., Kingsport, Tenn. (Subsidiary of Eastman Kodak Company).

### 3 for 2

Will everybody who has been using Kodak Spectrum Analysis No. 2 plates or Kodak 33 plates for spectrochemical analysis please get in touch with Eastman Kodak Company, Special Sensitized Products Division, Rochester 4, N. Y.? Thank you.

Nothing bad has happened. In fact, something good has happened. Nevertheless, in spectrography something good can be bad if it comes without warning. Here is warning.

We are thinking very seriously of discontinuing "SA-2" and Kodak 33 plates. Also "SA-2" film, but if you have been using the film this would amount to little more than a change of name except for one thing. The new *Kodak Spectrum Analysis No. 3* film differs from "SA-2" film in that its properties change more slowly during storage before use.

The same improvement will be found in the new *Kodak Spectrum Analysis No. 3* plates; but, in addition, the plates are several times as fast as the now obsolescent "SA-2" plates. How many times as fast, we don't say here. To say twice, thrice, or more would tend to lend sanction to the unsound assumption that spectrographers should use numbers supplied by the manufacturer. In spectrographic sensimetry the only correct numbers are the numbers you determine for yourself under your own conditions.

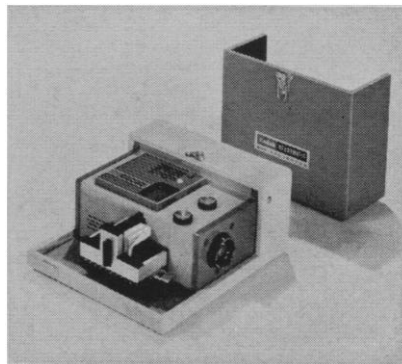
The new "SA-3" plates are even a little faster than Kodak 33 plates.

Unlike the old "SA-2" (where the plates differed from the

films so much it is hard to see why we gave them the same name), *Kodak Spectrum Analysis No. 3* plates and film have almost identical emulsions of medium contrast that changes little from 230m $\mu$  to 500m $\mu$ . Wide exposure latitude permits exposures to cover wide ranges of elemental concentration. This helps when analyzing completely unknown samples. On the other hand, it sacrifices quantitative precision such as is attainable with the higher-contrast *Spectrum Analysis No. 1* plates and film. For all these kind words, we doubt "SA-3" will ever even come close to "SA-1" in sales.

### It projects slides!

Though this simple device is our latest in slide projectors, owners may find it difficult to convince their friends of that fact. Those who prefer to talk of other things and want to pay less than \$70 for a 500-watt 2 x 2 projector, complete with case and 4-inch



lens, from a manufacturer of wide reputation who claims only that the low price sacrifices neither optical performance nor ease of slide-changing nor ruggedness of construction—those ascetics will ask to see a *Kodak Readymatic 500* projector at a camera shop.

### An ion for the élite

Research seems at times more fashion-prone than millinery. It is not for us to judge whether this is good or bad. Rather it is up to us to keep fashionable merchandise on hand.

We have been advised by volunteers scouting for us in the fashionable circles of physiology that the thing to do this season is to substitute bulky anions for Cl<sup>-</sup> in physiological salt solutions. The smart set recognizes, for example, that since frog muscle cell membranes are highly permeable to chloride ions, not just Na<sup>+</sup> and K<sup>+</sup>, one can't count on measurements of currents carried through the cell membranes of muscles by the cations without allowing for the chloride conductance of the membrane. This they avoid by replacing Cl<sup>-</sup> with some anion that is too big to get through, has a sodium salt soluble enough to permit at least 0.15M solutions, doesn't complex with Ca<sup>++</sup> or Mg<sup>++</sup>, and is stable and non-toxic at pH 7 to 8.

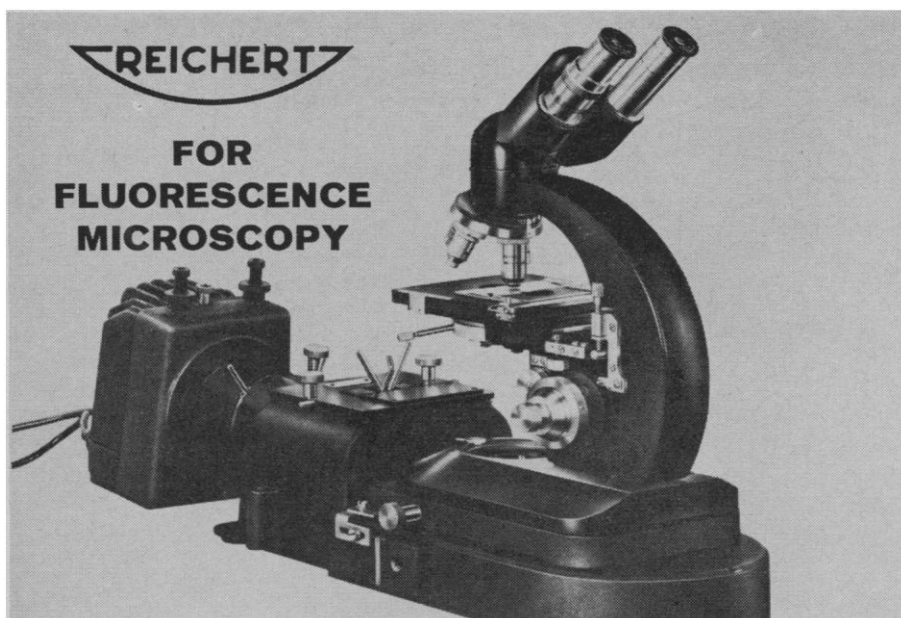
Many of them use the methylsulfate ion for the purpose, and we are now in a position to supply them with *Methylsulfuric Acid Sodium Salt* (Eastman P809) if they want it. Our scouts, who are very smart, point out, however, that even Beilstein, way back in Volume 1, is gloomy about the stability of organic sulfate esters. They have reported to us that the really clever ones are going to the isethionate ion, (HOCH<sub>2</sub>CH<sub>2</sub>SO<sub>3</sub>)<sup>-</sup>, which is a normal constituent of the axoplasm of squid nerves.

We hope we are not spoiling it for anybody by making this anion readily available as *Isethionic Acid Sodium Salt* (Eastman 8541). \$3.30 buys 100 grams, from Distillation Products Industries, Rochester 3, N. Y. (Division of Eastman Kodak Company).

Prices subject to change without notice.

**Kodak**  
TRADE MARK

This is another advertisement where Eastman Kodak Company probes at random for mutual interests and occasionally a little revenue from those whose work has something to do with science



The REICHERT "FLUOREX" is the most convenient, efficient and safest ultraviolet light source since its ingenious design is based on nearly fifty years of experience of Reichert in this field.

Note these advantages: The completely enclosed light path is a safeguard against exposure to stray UV light ★ Compensating Power Packs prolong the life of Mercury Arc Burner ★ AC input DC output power packs

increase light intensity ★ Transitions to routine microscopy are accomplished in seconds ★ FLUOREX and microscope are quickly aligned to form one integral unit ★ Complete instrumentation for the fluorescent-antibody technique.

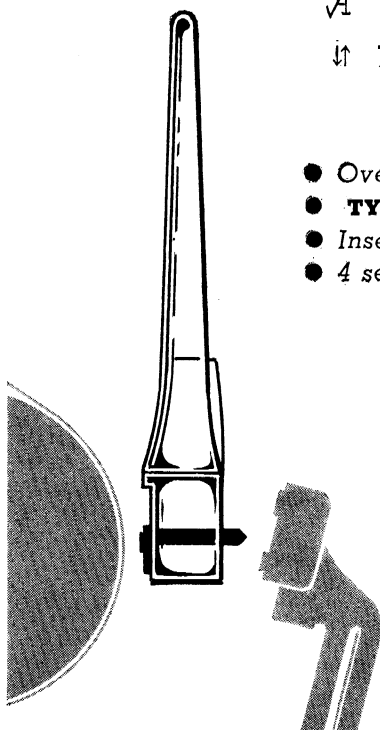
Write for literature or request a demonstration of the "FLUOREX" unit and other REICHERT instruments for fluorescence microscopy.

**WILLIAM J. HACKER & CO., INC.**  
P. O. Box 646 / West Caldwell, N. J.

## TYPIT®

FOR  $\Phi$   $\propto$   $\mathbb{R}_B$   $\mathbb{H}$   $\angle \Theta$   $\mathbb{R}$   $\ll$   $\gg$   $\$$   $\neq$   $\Pi$   $\div$   $\Sigma$   
 $\sqrt{A}$   $\mathfrak{L}$   $\%$   $\frac{7}{8}$   $\mathfrak{H}$   $\diamond$   $\sigma$   $\mathfrak{M}$   $\mathfrak{U}$   $|$   $\mathfrak{Z}$   $\tilde{n}$   
 $\uparrow$   $\mathbb{B}$   $\mathfrak{P}$   $\mathfrak{S}$   $\frac{1}{8}$   $\mathfrak{Z}$   $\infty$   $\alpha$   $\mp$   $\int$   $\downarrow$   $[$   $]$   $\acute{e}$

- Over 450 special characters available
- **TYPIT** fits any standard typewriter
- Insert symbols as you type
- 4 seconds per symbol



Call your local **TYPIT** dealer for a demonstration and a current catalog. See *Science* 19 Jan. 1962 for the **TYPIT** dealer near you, or write to us.

**TYPIT** a product of...  
**mechanical enterprises, inc.**  
3127 Colvin Street, Alexandria 7, Virginia

tions is described—namely, multidiscipline community analysis and social-action research (1, pp. 52–71, 223–229). This alternative role aims, one might say, to foster a group situation wherein the wisdom of the community's unconscious and conscious energy may be harnessed by its human components for the benefit of the local community, the nation, and the world. The main relevant point about "social-action research" in this context is that the community or group engaging in this type of social-planning endeavor defines its own practical problems and "arbitrates" its own goals, and the group also solicits and hires the anthropologist. The latter's main role becomes that of aiding the group to solve its practical problem by means of all its available resources, including his own professional and technical skills and know-how. In no way does the social-action researcher determine on or "arbitrate" goals for his employers—namely, the group with a problem.

Here should be mentioned another misstatement in the review, illustrating a belief commonly held by laymen and even anthropologists: "In general, the proposals [of applied anthropologists] have met with skepticism from administrators." While such a statement might have been partially correct 25 years ago when applied anthropology was in its infancy in the United States, it is most misleading today. The fact that there are many more well-paid jobs in applied anthropology than there are qualified, first-class anthropologists to fill them may be noted in this connection. The basic reason applied anthropology has burgeoned in recent years is, I believe, this: Due to the built-in clinical test which all findings undergo as soon as they are applied, the failures as well as the successes of the scientist concerned with applications are highlighted. This situation has given impetus to the development by anthropologists of a clinical method of predicting group behavior under certain circumstances—a method whereby such predictions, necessary in helping to resolve practical problems in a given situation, may be immediately tested for degree and kind of accuracy. Thus, applied anthropology has become the testing ground for anthropological theory and generalizations, a relatively recent and exceedingly significant development for all the disciplines that deal with man.

Limitations of space permit only one final point. The basic purpose of *Toward a Science of Mankind* was to

formulate a heuristic, unified theory of mankind, adequate to the needs of a mature science of mankind, which might be applied successfully toward the solution of practical community problems, and to outline a multidiscipline methodology whereby, through fundamental research, anthropologists might test the theory. The book attempts throughout to dispel another stereotype regarding applied anthropology, also voiced in the review—that successful applied anthropology can be and is pursued at the expense of fundamental research. On the contrary, successful applied anthropology requires far greater theoretical and methodological sophistication on the part of its practitioners than academic or “pure” research ever has. Hence, this field of specialization, like medicine, is not for amateurs.

LAURA THOMPSON

*Department of Anthropology,  
Southern Illinois University,  
Carbondale*

#### References

1. L. Thompson, *Toward a Science of Mankind* (McGraw Hill, New York, 1961).
2. R. B. Woodbury, *Science* 134, 1516 (1961).

Laura Thompson's letter is a helpful supplement to her book, expressing more concisely and clearly some of her viewpoints.

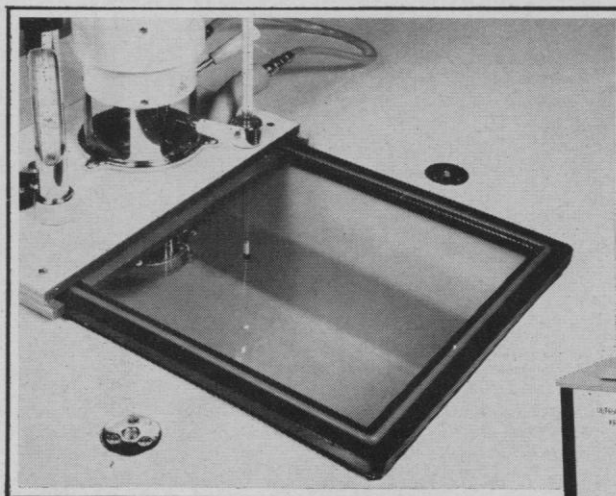
The question of the degree to which administrators have accepted applied anthropology or “social-action research” is, of course, difficult to define. My impression of their skepticism was strongly reinforced by some of the comments at the closing plenary session of the American Anthropological Association's 60th annual meeting in Philadelphia, in November 1961. It was made embarrassingly clear that anthropologists have frequently failed to win the confidence or respect of administrators of overseas programs. There have also been notable successes, of which Thompson unfortunately discusses very few. Those who are interested can find numerous case histories candidly evaluated in recent issues of *Human Organization*. For anyone hopeful that applied anthropology will avoid excessive claims and will apply rigorous tests to each new approach, in order to merit increasing support and gain wider applications, Laura Thompson's book will remain disappointing.

RICHARD B. WOODBURY

*Department of Anthropology,  
University of Arizona, Tucson*

# LOW TEMPERATURE BATHS AND CIRCULATORS

NOW AVAILABLE FOR CONTROLLED  
TEMPERATURES TO **−85°C**



Lauda low temperature baths and circulators are available for controlled cooling and heat removal applications between +40 and −85°C. Various models, sizes and cooling capacities are offered.

Both the design of the direct coil cooling Ultra Kryomats, featuring maximum heat removal at temperature constancies of  $\pm 0.5^\circ\text{C}$ , and the design of the Ultra Kryostats, featuring temperature constancies to  $\pm 0.02^\circ\text{C}$ , are exclusive and singular in this field. For example, rates of cooling are much faster than previously offered — from +20 to −60°C in just 35 minutes — due entirely to newly engineered mechanical refrigeration design. Yet, compressors available either as single units or as cascade systems are fully protected.

Multiple bath units covering a wide range of temperatures (−60 to +300°C) for thermal shock treatment, thermometer calibration, etc. can be delivered in a single console.

Insulation, bath materials and pumps have been selected and designed specifically for this application under continuous operation at temperatures to −110°C. Pumps are available in two versions for operation under pressure/suction control or a combination of pressure and suction simultaneously.

For less demanding requirements, four table model designs may be used.

# LAUDA

*Instruments, Inc.*

*P.O. Box 422 Great Neck, N.Y.*



# Meetings

## Forthcoming Events

### April

10-12. American Industrial Health Conf., Chicago, Ill. (M. E. Fairbank, Eastman Kodak Co., Rochester 4, N.Y.)

10-13. European Symp. on Size Reduction, European Federation of Chemical Engineering-Processing Technology Soc., Frankfurt am Main, Germany. (Verfahrenstechnische Gesellschaft im V.D.I., Rheingau-Allee 25, Frankfurt am Main 7)

10-14. International Conf. on Stress Analysis, Paris, France. (Secretary, 10, rue Vauquelin, Paris 5°)

11-13. Institute of Environmental Sciences, annual meeting and equipment exposition, Chicago, Ill. (J. P. Monroe, Lear, Inc., Grand Rapids, Mich.)

11-13. Institute of Radio Engineers, southwest conf. and electronic show, Houston, Tex. (IRE, 1 E. 79 St., New York 21)

12. Symposium on Non-Conventional Nuclear-Engineering Lubricants and Bearing Materials, symp., London, England. (Institution of Mechanical Engineers, 1 Birdcage Walk, London, S.W.1)

12-13. Histochemical Soc., annual, Atlantic City, N.J. (M. Wachstein, St. Catherine's Hospital, Bushwick Ave., Brooklyn 6, N.Y.)

12-13. International Assoc. for Dental Research, British Div., annual, Sheffield,

England. (C. H. Tonge, c/o Dept. of Anatomy, King's College Medical School, New-castle-upon-Tyne, England)

12-14. Association of Southeastern Biologists, Winston-Salem, N.C. (H. J. Bennett, Dept. of Zoology, Louisiana State Univ., Baton Rouge 3)

12-14. Experimental Arithmetic, symp., American Mathematical Soc., Chicago, Ill. (N. C. Metropolis, Inst. for Computer Research, Univ. of Chicago, Chicago)

13-14. American Soc. for Artificial Internal Organs, annual, Atlantic City, N.J. (E. C. Peirce, II, ASAIO, 514 W. Church Ave., Knoxville 1, Tenn.)

13-14. Iowa Acad. of Science, Waverly. (P. F. Romberg, Iowa State Univ., Ames)

13-14. Nebraska Acad. of Sciences, Lincoln. (C. B. Schultz, Univ. of Nebraska, Lincoln 8)

13-15. Alabama Acad. of Science, Inc., Troy. (W. B. DeVall, Forestry Dept., Auburn Univ., Auburn, Ala.)

13-15. American Assoc. for Cancer Research, annual, Atlantic City, N.J. (H. J. Creech, Inst. for Cancer Research, Fox Chase, Philadelphia 11, Pa.)

14-16. Kinetics, Equilibria, and Performance of High Temperature Systems, 2nd conf., Los Angeles, Calif. (G. S. Bahn, 16902 Bollinger Dr., Pacific Palisades, Calif.)

14-18. Federation of American Societies for Experimental Biology, Atlantic City, N.J. (M. O. Lee, 9650 Wisconsin Ave., Washington 14)

14-19. American Inst. of Nutrition, Atlantic City, N.J. (A. E. Schaefer, Bldg.

16-A, Natl. Institutes of Health, Bethesda 14, Md.)

14-19. American Soc. of Biological Chemists, Inc., Atlantic City, N.J. (F. W. Putnam, Dept. of Biochemistry, Univ. of Florida College of Medicine, Gainesville)

15-18. American College Personnel Assoc., Chicago, Ill. (B. A. Kirk, Counseling Center, Univ. of California, Berkeley)

15-18. National Education Assoc., Council of Mathematics Teachers, San Francisco, Calif. (Chief of Information, Dept. of the Army, Washington 25)

16-18. Flight Test Instrument Symp., intern., Cranfield, England. (College of Aeronautics, Cranfield)

16-18. Spins and Phonons, conf., Bristol, England. (P. M. Llewellyn, H. H. Sills Physics Laboratory, Royal Fort, Bristol 8)

16-19. American Personnel and Guidance Assoc., annual, Chicago, Ill. (J. Fishbein, Science Research Associates, 259 E. Erie St., Chicago 11)

16-19. Interactions between Mathematical Research and High-Speed Computing, symp., American Mathematical Soc.-Assoc. for Computing Machinery, Atlantic City, N.J. (E. Pitcher, AMS, 190 Hope St., Providence 6, R.I.)

16-19. Paleoclimatology and Paleopedology, symp., International Soc. for Plant Geography and Ecology, Stolzenau, Germany. [R. Tüxen, Intern. Vereinigung für Vegetationskunde, Stolzenau (Weser)]

16-19. Vacuum Ultraviolet Radiation Physics, intern. conf., Los Angeles, Calif. (G. L. Weissler, Univ. of Southern California, Los Angeles 7)

16-20. American Physiological Soc., Atlantic City, N.J. (R. G. Daggs, APS, 9650 Wisconsin Ave., Washington 14)

16-20. American Soc. for Pharmacology and Experimental Therapeutics, Atlantic City, N.J. (H. G. Mandel, George Washington Univ. School of Medicine, 1337 H St., NW, Washington 5)

16-20. Reactor Safety and Hazards Evaluation Techniques, symp., Vienna, Austria. (Intern. Atomic Energy Agency, 11 Kaerntnerring, Vienna 1)

17-18. Conference on Permafrost, Ottawa, Ont., Canada. (R. J. E. Brown, Div. of Building Research, Natl. Research Council, Ottawa 2)

17-20. International Mineralogical Assoc., Washington, D.C. (D. J. Fisher, Dept. of Geology, Univ. of Chicago, Chicago 37, Ill.)

17-20. Sector-Focused Cyclotrons, conf., Los Angeles, Calif. (B. T. Wright, Dept. of Physics, Univ. of California, Los Angeles 24)

18-20. American Inst. of Electrical Engineers, Fort Wayne, Ind. (R. S. Gardner, AIEE, 33 W. 39 St., New York 18)

18-20. Information Retrieval in Action, conf., Cleveland, Ohio. (Center for Documentation and Communication, Western Reserve Univ., 10831 Magnolia Dr., Cleveland 6)

18-28. World Seed Congr., Rome, Italy. (Intern. Agency Liaison Branch, Office of the Director General, Food and Agriculture Organization of the U.N., Viale delle Terme di Caracalla, Rome)

19. Southern California Acad. of Sciences, Los Angeles. (G. Sibley, Los Angeles County Museum, 900 Exposition Blvd., Los Angeles 7)



**laboratory  
tapes and  
labels**

Use Time Tapes and Labels in your lab. Eliminate errors and confusion. Time labels are quick and easy to use. These clean, white tapes accept any kind of pen or pencil marking — or they can be pre-printed to your specifications.

Acid, water, dirt, grease or heat will not affect them. Withstand temperatures from 250° to -70°.

Also available in a variety of colors.

**Cut costs and save time with  
TIME Tapes and Labels**

**PROFESSIONAL TAPE CO., INC.**  
365K BURLINGTON AVE. • RIVERSIDE, ILL.

NAME \_\_\_\_\_  
SPECIMEN \_\_\_\_\_  
Rm. No. \_\_\_\_\_ Date \_\_\_\_\_

**PATHOLOGY SPEC.**

NAME	SEX	AGE
ROOM	NUMBER	
DOCTOR		
SPECIMEN		

**TIME**  
SELF-ADHESIVE  
LABELS  
VINYL COATED



$H^3/C^{14}$

IMMEDIATE DELIVERY

2-Nitrofluorene-9- $C^{14}$   
 2-Acetylaminofluorene-9- $C^{14}$   
 N-Hydroxy-2-Acetylaminofluorene-9- $C^{14}$

Ask for catalog of complete line of TRACER-LAB RADIOACTIVE CHEMICALS. For personalized service call TWINBROOK 4-6600 or write Tracerlab, 1601 Trapelo Rd., Waltham 54, Mass.

*Tracerlab*  
 A DIVISION OF LABORATORY FOR ELECTRONICS, INC.

## LINEAR/LOG RECORDER

A versatile Linear-Log Servo-Recorder for general laboratory use



**VARICORD 43 \$885**

- Multi-range, potential and current recorder.
- Choice of per cent transmission or absorbance indication in spectrophotometry.
- For gas chromatography by conductivity or ionization.
- True potentiometric input.
- 1 second pen speed—10 millivolt full scale sensitivity.
- Output connector for integrating and telemetering.

Write for Bulletin # 1130

## PHOTOVOLT CORP.

1115 BROADWAY • NEW YORK 10, N.Y.

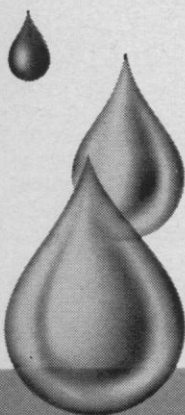
Also available: Densitometers ■ Photometers ■ Fluorescence Meters ■ pH Meters

beside the **STILL** waters...  
 there's always the **LOUGHBOROUGH**  
 ALL GLASS WATER STILL

Two highly productive  
 models available:

▶ **4 LITERS PER HOUR**  
 and **8 LITERS PER HOUR**

**COMPACT • INGENIOUS • EFFICIENT**

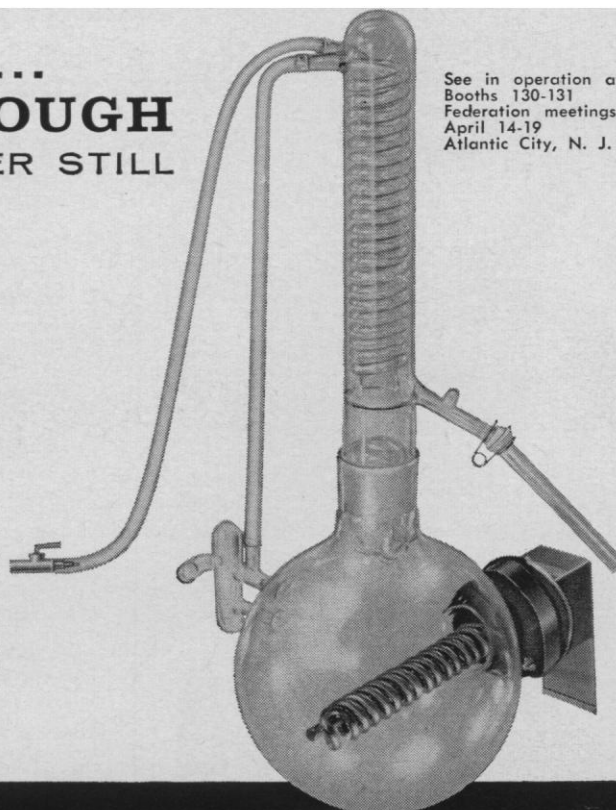


**COMPACT:** Only 3 components: condenser, boiling reservoir, immersion heater (automatic overload protected).

**INGENIOUS:** Reservoir fills from tap and automatically maintains constant water level. Cooling water in condenser recycles to boiling reservoir . . . *preheated*. Steam trap allows only vapor to enter condenser — no solids.

**EFFICIENT:** Distillate produced is pyrogen free and analyses have shown it to contain less than one part in 10 millions of iron, copper, chromium or nickel.

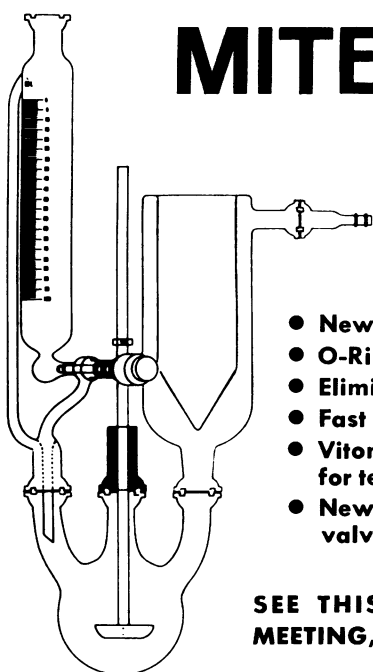
Write for brochure LSI— S



See in operation at  
 Booths 130-131  
 Federation meetings  
 April 14-19  
 Atlantic City, N. J.

**Bellco** GLASS INC. VINELAND, N.J.

**new concepts in scientific glassware**



# MITE-O-WARE

## GREASE FREE MICRO-GLASS LAB WARE

- New unique joints are leakproof
- O-Rings made of Buna N or Viton A
- Eliminates contamination
- Fast easy assembly . . . no joints to grease
- Viton O-Rings hold pressures as low as  $10^{-6}$ , for temperatures from  $-40^{\circ}\text{F}$  to  $+500^{\circ}\text{F}$ .
- New design for O-Ring needle valve stop cocks

**SEE THIS EQUIPMENT AT THE FASEB MEETING, BOOTH 51, APRIL 16 THRU 19**



**Delmar**  
SCIENTIFIC LABORATORIES  
317 MADISON ST., MAYWOOD, ILL.  
A SUBSIDIARY OF COLEMAN INSTRUMENTS, INC.

For full details  
on Delmar's new  
MITE-O-WARE line  
ask for Catalog 61-MS.



**UNITRON'S Model MSA**  
makes teaching easier  
... learning faster!

Here is a teaching microscope with built-in features to aid the instructor and student, yet priced for school budgets.

- Comfortably inclined eyepiece rotates  $360^{\circ}$  permitting two persons to share the same instrument, make comparisons, discuss results
- High intensity illuminating system with built-in transformer base
- Substage condenser with aperture iris diaphragm assures correct and brilliant illumination at all powers
- Low positioned coarse and fine focusing controls with protective stops to prevent damage to objectives or slides
- Large stage projects beyond objective preventing accidental damage
- Three parfocal achromatic objectives 4X, 10X, 40X of professional quality with full numerical aperture and resolving power . . . three eyepieces 5X, 10X, 15X . . . gives magnifications from 20X to 600X
- 10X widefield eyepiece now optionally available . . . gives large, flat field of view and desirable magnification

**\$107**  
Only (\$96.30 each in lots 5-10)

**FREE 10-DAY TRIAL**  
Even higher discounts on quantities more than 10.

**UNITRON**

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

Please rush UNITRON's Microscope Catalog 4A-I

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_

## New, 1961 AAAS Symposium Volumes

### SCIENCES

#### in Communist China

Editor: Sidney H. Gould. 884 pages. 23 illustrations. Author, subject and geographical index. Cloth. June, 1961.

Price: \$14.00\*

\$12.00 prepaid, for AAAS members

### OCEANOGRAPHY

Editor: Mary Sears. 665 pages. 146 illustrations. Index. Cloth. May, 1961.

Price: \$14.75\*

\$12.50 prepaid, for AAAS members

### GERM PLASM RESOURCES

Editor: Ralph E. Hodgson. 394 pages. 59 illustrations. Index. Cloth. April, 1961.

Price: \$9.75\*

\$8.50 prepaid, for AAAS members

\* If you are not a member of the AAAS, you may join now, and order any of these volumes at the special member price. Enclose \$8.50 dues for your first year of membership, along with payment for the volumes you want.

Membership in the AAAS offers many benefits in addition to savings on AAAS volumes. It includes *Science* and the quarterly *AAAS Bulletin*.

Order Today From

**American Association for the  
Advancement of Science**  
1515 Mass. Ave., NW Washington 5, D.C.

19-20. Southern Municipal and Industrial Waste Conf., Chapel Hill, N.C. (Dept. of Sanitary Engineering, Univ. of North Carolina, Box 899, Chapel Hill)

19-21. Southern Soc. for Philosophy and Psychology, Memphis, Tenn. (D. R. Kenshalo, Dept. of Psychology, Florida State Univ., Tallahassee)

20-22. Czechoslovak Soc. of Arts and Sciences in America, 1st natl. congr., Washington, D.C. (M. Rechcigl, Jr., 1703 Mark Lane, Rockville, Md.)

21. Pennsylvania Acad. of Science, Pittsburgh. (K. B. Hoover, Messiah College, Grantham, Pa.)

21-21 Oct. World's Fair of Science, Century 21 Exposition, Seattle, Wash. (J. Rocky, c/o Seattle World's Fair, Seattle)

22-26. Association of American Geographers, Miami Beach, Fla. (M. F. Burrill, AAG, 1785 Massachusetts Ave., NW, Washington, D.C.)

23-25. Canadian Inst. of Mining and Metallurgy, annual, Ottawa, Ont. (C. Gerow, CIMM, 1117 St. Catherine St., W. Montreal 2, Quebec, Canada)

23-25. Meteorological Uses of Rockets and Satellites, symp., Washington, D.C. (World Meteorological Organization, 41, Avenue Giuseppe Motta, Geneva, Switzerland)

23-25. Pan American Congr. of Gastroenterology, New York, N.Y. (C. A. Flood, 180 Fort Washington Ave., New York 32)

23-26. American Physical Soc., Washington, D.C. (K. K. Darrow, APS, Columbia Univ., New York 27)

23-27. International Conf. on Palynology, Tucson, Ariz. (G. O. W. Kremp, Geochronology Laboratories, Univ. of Arizona, Tucson)

23-27. Problems in Education and Research in Tropical Biology, conf., San Jose, Costa Rica. (J. M. Savage, Dept. of Biology, Univ. of Southern Calif., Los Angeles 7)

23-5. Television Arts and Sciences, intern. symp. and festival, Montreux, Switzerland. (Intern. Television Symp., 8, Grand-Rue, Montreux)

24-25. Building Research Inst., spring conf., Washington, D.C. (M. C. Coon, Jr., BRI, 2101 Constitution Ave., NW, Washington 25)

24-25. Managing Petroleum and Petrochemical Operations, conf., San Antonio, Tex. (J. Harmon, Southwest Research Inst., 8500 Culebra Rd., San Antonio 6)

24-26. Mathematical Theory of Automata, intern. symp., New York, N.Y. (Symposium Committee, Polytechnic Inst. of Brooklyn, 55 Johnson St., Brooklyn 1, N. Y.)

25. Rocket Propulsion, symp., Cranfield, Bletchley, England. (Secretary, British Interplanetary Soc., 12 Bessborough Gardens, London, S.W.1, England)

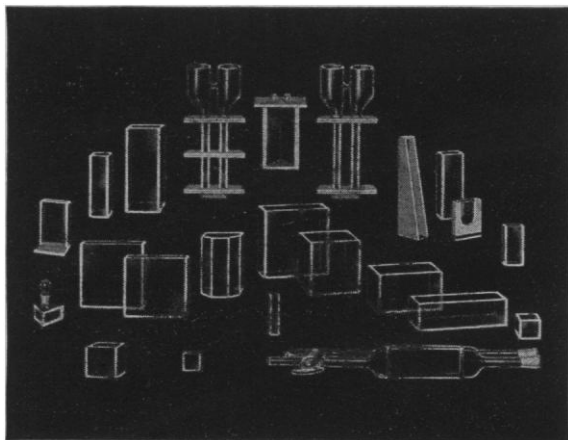
25-27. International Federation of Associations of Textile Chemists and Colorists, annual, Amsterdam, Netherlands. (J. Boulton, Dean House, 19, Piccadilly, Bradford 1, Yorks, England)

25-27. Present Status and Future Prospects of Television and Motion Pictures as Media for Medical Education, intern. conf., Milan, Italy. (L. L. Leveridge, Medical Television Unit, New York Univ. Medical Center, 550 First Ave., New York 16)

25-27. Pulp and Paper Instrumentation

# GLASS ABSORPTION CELLS

made by **KLETT**



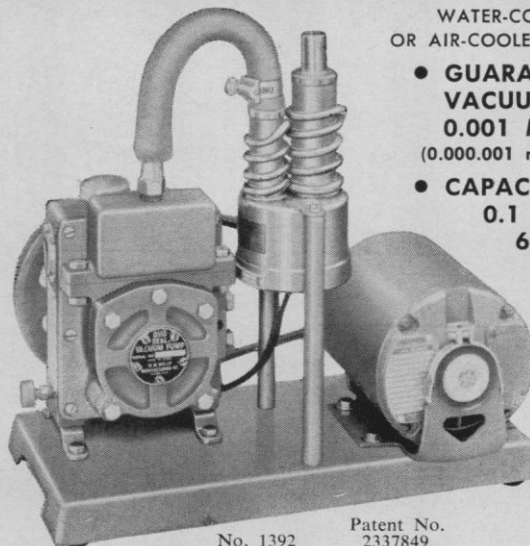
## SCIENTIFIC APPARATUS

Klett-Summerson Photoelectric Colorimeters—  
Colorimeters—Nephelometers—Fluorimeters—  
Bio-Colorimeters—Comparators—Glass Stand-  
ards—Klett Reagents.

**Klett Manufacturing Co.**  
179 East 87 Street, New York, New York

# DUO-SEAL® MECHANICAL AND DIFFUSION PUMP ASSEMBLY

EACH ELEMENT WITH TWO-STAGE CONSTRUCTION



WATER-COOLED  
OR AIR-COOLED MODELS

- **GUARANTEED VACUUM**  
0.001 Micron  
(0.000.001 mm Hg)
- **CAPACITY AT 0.1 MICRON**  
600 Liters  
Per Min.

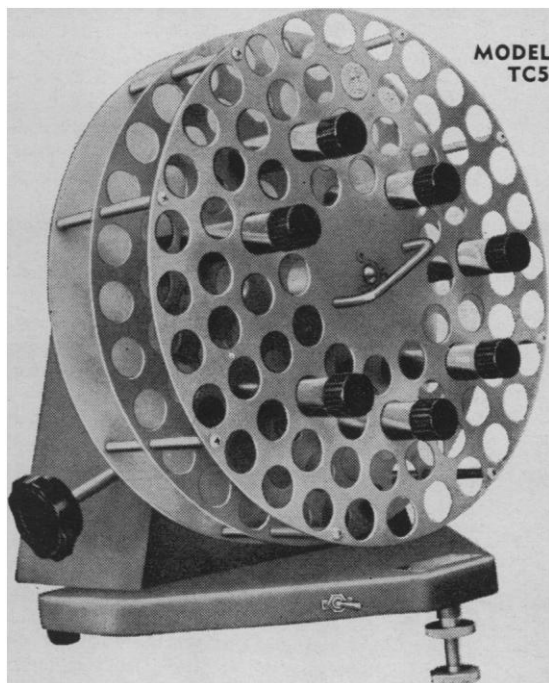
No. 1392 Patent No. 2337849

1392. MECHANICAL AND DIFFUSION PUMP, Water Cooled.  
For 115 Volts, 60 Cycles, A.C.  
Each, \$310.00

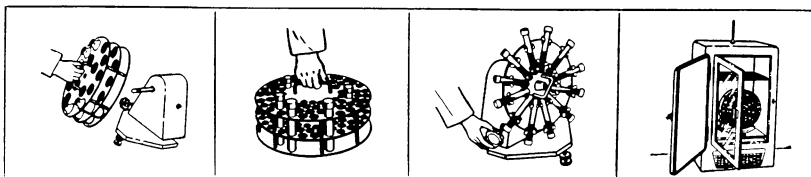
1392A. MECHANICAL AND DIFFUSION PUMP, Air Cooled.  
Each, \$310.00  
For 115 Volts, 60 Cycles, A.C.  
For attached Belt Guard, add \$15.00 to above prices.

## THE WELCH SCIENTIFIC COMPANY

ESTABLISHED 1880  
1515 SEDGWICK STREET, DEPT. E, CHICAGO 10, ILLINOIS, U.S.A.  
Manufacturers of Scientific Instruments and Laboratory Apparatus



# TISSUE CULTURE ROLLORDRUM



For Bottles and Eggs Used as Carrying Tray For Tumble-Tube Technique Designed for Incubator Use

## APPLICATIONS

Growth of tissues and viruses.  
Used in cytotoxicity assays.  
Growth of virus in chick embryonic tissue.  
Hormone production by selected tissues.  
Extraction and dialysis of blood samples for analysis.

**UNCONDITIONAL  
1-YEAR WARRANTY**

The NBS Rollordrum is a rugged instrument for growing tissue cultures by the roller tube method. A choice of operating speeds is offered in several, continuous-duty models: 1/5 rpm, 1 rpm, and 20-60 rpm.

Test tubes, eggs, and centrifuge bottles of various sizes can be accommodated on six interchangeable drums. A tumble-tube turntable is also available for rotating tubes over their vertical axes.

The heavy-duty drive mechanism is quiet in operation, achieving smooth, uniform rotary motion during prolonged investigations. Powered by a heavy-duty, totally enclosed ball-bearing motor, the apparatus gives many years of continuous service under incubation temperatures.



**NEW BRUNSWICK SCIENTIFIC CO., INC.**  
PRECISION LABORATORY APPARATUS  
P.O. BOX 606, NEW BRUNSWICK, NEW JERSEY

**WRITE FOR  
CATALOG  
TCS/462**



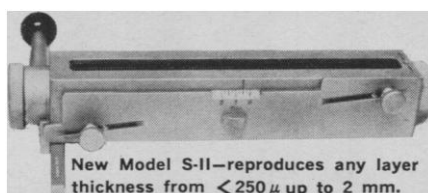
# Thin Layer Chromatography Advanced With Introduction of Improved Variable Thickness Applicator

## Desaga Delivers First New Instruments GUARANTEEING Uniform Layers

by Klaus P. Brinkmann

Since its commercial introduction in the United States, by Brinkmann, in the fall of 1960, Thin Layer Chromatography has become the fastest growing analytical method and has been installed in more than 500 U. S. laboratories. However, the ability to develop a versatile apparatus, to improve it and to provide new accessories to expand the application of a technique, is directly related to experience in a particular field.

While the original Desaga apparatus, according to Stahl, has become the most widely used equipment, a substantial advance over the first adjustable applicator is now available. In addition, a number of unique and exclusive accessories are offered for the first time. These include:



- 1) **An improved adjustable applicator—model S-II.** This instrument permits the user to select and reproduce any layer thickness from less than  $250\mu$  up to 2 mm. The novel parallel sliding design completely eliminates the possibility of a layer whose thickness is not uniform across the entire plate—a problem which is inherent in a variable thickness model unless both sides of the exit gate are individually supported for rigidity and centrally regulated by a common thickness control to assure a uniform calibrated height.
- 2) **Removal of layers**—a major technological breakthrough in TLC now permits the user to remove complete layers from the glass plate with our new adhesive film. This technique facilitates preservation, elution and photometry.
- 3) **Chamber for small quantities of solvent**—a special unit consisting of a plate holder and liquid chamber permits separations on individual plates with a minimum of solvent material.
- 4) **Utility "kit" for TLC**—provides an inexpensive complete TLC apparatus for smaller laboratories and occasional requirements.
- 5) **Pyrex brand glass plates**—new high temperature glass plates for scorching techniques and for obtaining a high activity stage with alumina.
- 6) **Improved Silica Gel G**—now produces even better results through manufacturing techniques which result in an even more uniform particle size.
- 7) **New Cellulose Powders**—ion exchange and acetylated cellulose powders are now available.
- 8) **New indicator sprays**—in aerosol container are now available.

For complete information and new Bibliography of almost 300 references, please request "TLC Bulletin #5."

# BRINKMANN

**INSTRUMENTS, INC.** 115 Cutter Mill Road, Great Neck, N.Y.  
PHILADELPHIA • CLEVELAND • HOUSTON • MIAMI • MENLO PARK, CAL. • ST. LOUIS

Symp, natl., Jacksonville, Fla. (L. G. Good, Systems Service Corp., P.O. Box 952, Charlotte, N.C.)

27-28. Idaho Acad. of Science, annual, Moscow. (L. M. Stanford, College of Idaho, Caldwell)

27-29. Oklahoma Acad. of Science, Woodward. (A. D. Buck, Northern Oklahoma Junior College, Tonkawa)

27-29. West Virginia Acad. of Science, Bethany. (J. D. Draper, Dept. of Chemistry, West Virginia Univ., Morgantown)

28. Mississippi Acad. of Sciences, Inc., Jackson. (C. Q. Sheely, Mississippi State Univ., State College)

29-2. International Acad. of Pathology—American Assoc. of Pathologists and Bacteriologists, Montreal, Canada. (F. K. Mostofi, c/o Armed Forces Inst. of Pathology, Washington 25)

29-2. National Workshop on Aging, American Home Economics Assoc., Lafayette, Ind. (A. J. Bricker, AHEA, 1600 20th St., NW, Washington 9)

29-3. American Ceramic Soc., annual, New York, N.Y. (C. S. Pearce, ACS, 4055 N. High St., Columbus 14, Ohio)

29-4. Society of Motion Picture and Television Engineers, annual, Los Angeles, Calif. (H. Teitelbaum, SMPTE, 55 W. 42 St., New York 36)

30-1. International Acad. of Pathology, annual, Montreal, Canada. (M. Davis, Intersociety Committee on Pathology Information, 1785 Massachusetts Ave., NW, Washington 6)

30-1. International Acetylene Assoc., annual, Toronto, Canada. (L. Matthews, 30 E. 42 St., New York 17)

30-2. American Soc. of Mechanical Engineers, Design Engineering Div., Philadelphia, Pa. (A. B. Conlin, Jr., ASME, 29 W. 39 St., New York 18)

30-2. Association of Iron and Steel Engineers, Detroit, Mich. (T. J. Ess, AISE, 1010 Empire Bldg., Pittsburgh 22, Pa.)

30-2. Instrumental Methods of Analysis, natl. symp., Instrument Soc. of America, Pittsburgh, Pa. (E. E. Buckston, Works Engineering Dept., Union Carbide Chemicals Co., P.O. Box 8004, S. Charleston 3, W.Va.)

30-2. Role of Food in World Peace, intern. symp., Columbus, Ohio. (R. M. Kottman, College of Agriculture, Ohio State Univ., Columbus 10)

30-3. Mid-America Spectroscopy, annual symp., Soc. for Applied Spectroscopy, Chicago, Ill. (J. R. Ferraro, Argonne, Natl. Laboratory, 9700 S. Cass Ave., Argonne, Ill.)

30-4. Compressed Air and Hydraulics, intern. conf. and exhibition, London, England. (W. G. H. Chesher, c/o John Trundell and Partners Ltd., St. Richard's House, Eversholt St., London, N.W.1)

30-5. Automobile Technical Congr., intern., London, England. (Automobile Div., Institution of Mechanical Engineers, 1 Birdcage Walk, London, S.W.1)

### May

1-3. Biologistics for Space Systems, symp. and workshop, Dayton, Ohio. (Col. A. I. Karstens, Aerospace Medical Research Laboratories, Aeronautical Systems Div., Wright-Patterson AFB, Ohio)