

SCIENCE

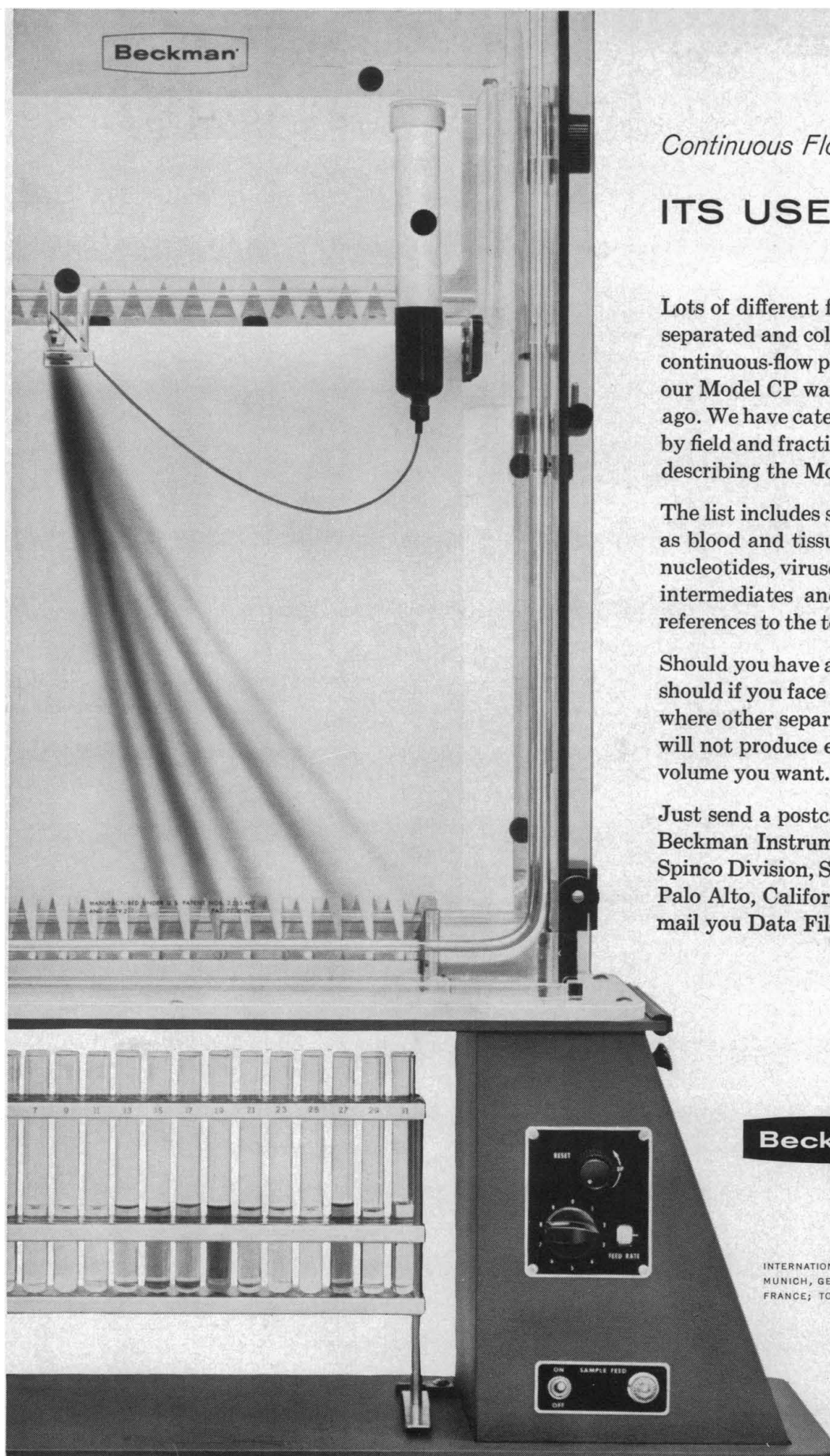
24 July 1964

Vol. 145, No. 3630

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



CORAL



Continuous Flow Electrophoresis

ITS USES GROW

Lots of different fractions have been separated and collected in quantity by continuous-flow paper electrophoresis since our Model CP was introduced six years ago. We have categorized them, both by field and fractions, in a new publication describing the Model CP.

The list includes such materials as blood and tissue proteins, amino acids, nucleotides, viruses, dyes, organic intermediates and metal ions – with references to the technical literature.

Should you have a copy? You certainly should if you face fractionating problems where other separation methods will not produce either the purity or volume you want.

Just send a postcard or letter to Beckman Instruments, Inc., Spinco Division, Stanford Industrial Park, Palo Alto, California, and we will mail you Data File CP-7.

Beckman®

INSTRUMENTS, INC.

SPINCO DIVISION

Palo Alto, California

INTERNATIONAL SUBSIDIARIES: GENEVA, SWITZERLAND;
MUNICH, GERMANY; GLENROTHES, SCOTLAND; PARIS,
FRANCE; TOKYO, JAPAN; CAPE TOWN, SOUTH AFRICA.

SAUNDERS BOOKS

New! Cheng—The Biology of Animal Parasites

Biology students will appreciate this new textbook of introductory parasitology. In it the primary emphasis is placed on parasitology as a basic science, apart from medical or veterinary aspects of the field. In presenting basic concepts, the author omits lengthy discussions of clinical symptoms, epidemiology, chemotherapy and field eradication. Dr. Cheng carefully describes such fundamentals as taxonomy, chemical composition, development, life cycles, physiology and ecology for all of the animal-host parasites. The parasitic animals are discussed from the phylogenetic standpoint—each group is presented in a separate

chapter or section, permitting the emphasis of particular taxa by the instructor. Full consideration is given to morphology, both gross and microscopic, of the various parasites studied. This serves to guide the beginning student in basic laboratory work and provides a quick reference for advanced students being introduced to research. The book is lavishly illustrated with line drawings, many by Dr. Cheng.

By THOMAS C. CHENG, Parasitologist, Northeast Shellfish Sanitation Research Center, U.S.P.H.S., Narragansett, R.I.; Adjunct Professor of Zoology, University of Rhode Island, Kingston, R.I. About 736 pages, 7¼" x 10¼", with about 330 figures. About \$13.00. *New—Ready August!*

New! Popp and Schultz— Organic Chemical Preparations

Here is a new lab manual for a "solid" first course in organic chemistry. It will be particularly valuable to college students preparing for professional careers in science, engineering or medicine. This highly flexible manual provides faultlessly clear and explicit directions for 77 experiments. They are designed to illustrate every class of compound and functional group—aliphatic and aromatic; semimicro and macro; classical and very recent; preparatory, analytical and quantitative. A number of experiments involve the application of recent developments in organic chemistry, such as new preparations illustrating

epoxide chemistry, free radicals and new reagents and ring closure. Each exercise is prefaced by an excellent discussion of its nature and purpose. A series of questions follow each experiment, stressing techniques and helping the student to correlate mechanistic, quantitative and theoretical aspects. All of the experiments have been tested in the authors' classes so that students can perform them with a minimum of procedural difficulty.

By FRANK D. POPP, Ph.D., Associate Professor of Chemistry, Clarkson College of Technology, Potsdam, N.Y.; and HARRY P. SCHULTZ, Ph.D., Professor of Chemistry, University of Miami, Coral Gables, Florida. 392 pages, 7¼" x 10¼", illustrated. \$5.25.

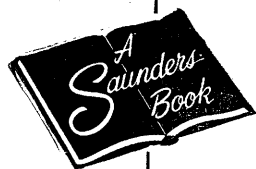
New! Hazen—Readings in Population and Community Ecology

This new book offers a superb collection of 25 significant papers on varied aspects of ecology carefully chosen from the literature (1935 to 1963). Intended for use by third and fourth year students in conjunction with text and lectures, this handy manual contains most of the classic articles on ecology students are required to read. The content of the book is organized under four headings: *Single Species Populations*, *Relationships Between Species*, *Community Metabolism*, and *Community Structure*. Titles of papers

in these groups include: Studies of the Population Dynamics of the Salamander Genus *Desmognathus* in Virginia—Beetles, Competition and Populations—The Daily Energy Requirements of a Wild Anna Hummingbird—Species Abundance and Community Organization—Behavior of Mixed Populations and the Problem of Natural Selection.

By WILLIAM E. HAZEN, Ph.D., Assistant Professor of Zoology, San Diego State College. 388 pages, 7¼" x 10¼", illustrated. \$4.75. *New!*

Gladly sent to teachers on approval



W. B. SAUNDERS COMPANY West Washington Square, Phila. 5, Pa.

Please send and bill me:

- ☐ Cheng—Biology of Animal Parasites, about \$13.00
- ☐ Popp & Schultz—Organic Chemical Preparations, \$5.25
- ☐ Hazen—Readings in Population & Community Ecology, \$4.75

Discount accorded to full time teachers listing affiliation.

Teaching Position: _____

Name

Address

SCIENCE

LETTERS	History as Social-Scientific Data: <i>N. G. Hawkins</i> ; New Biology Curriculum: Questions: <i>T. F. Mitchell</i> and <i>B. Glass</i> ; Grants: Nothing for the Neediest: <i>C. A. MacKenzie</i> ; "Cultural Divide" in Japan: <i>K. Higasi</i> 343
EDITORIAL	Only One Side of the Question 347
ARTICLES	Search for the "Thresher": <i>F. N. Spiess</i> and <i>A. E. Maxwell</i> 349 Assistance to the Navy by the scientific community in this search effort proved to be essential. Binocular Depth Perception without Familiarity Cues: <i>B. Julesz</i> 356 Random-dot stereo images with controlled spatial and temporal properties clarify problems in stereopsis. Problems of Drug Development: <i>L. Lasagna</i> 362 The government, the drug industry, the universities, and the medical profession: partners or enemies?
NEWS AND COMMENT	Space Program Poll; Cleveland—University Circle; Negro Colleges—Out of the Wilderness 368
BOOK REVIEWS	The Two Ethics: Ultimate Ends or Ethical Responsibility: <i>R. Gilpin</i> 374 <i>The Experimental Earthwork on Overton Down, Wiltshire, 1960</i> , reviewed by <i>C. W. Meighan</i> ; other reviews by <i>M. E. Shils</i> , <i>A. G. Richards</i> , <i>J. P. Stapp</i> , <i>R. Galambos</i> , <i>D. E. Sanderson</i> , <i>J. W. Hedgpeth</i> 377
REPORTS	Faraday Rotation on Decametric Radio Emissions from Jupiter: <i>J. W. Warwick</i> and <i>G. A. Dulk</i> 380 Mass Expulsion of Zooxanthellae from Jamaican Reef Communities after Hurricane Flora: <i>T. F. Goreau</i> 383 Silica Source in Soil Solutions: <i>R. O. Gifford</i> and <i>D. M. Frugoli</i> 386 Accuracy of Bone Mineral Measurement: <i>R. B. Mazess</i> et al. 388 Radio Map of the Andromeda Galaxy: <i>J. M. MacLeod</i> 389

BOARD OF DIRECTORS

ALAN T. WATERMAN,
Retiring President, Chairman

LAURENCE M. GOULD,
President

HENRY EYRING,
President Elect

JOHN W. GARDNER
H. BENTLEY GLASS

DAVID R. GODDARD
DON K. PRICE

VICE PRESIDENTS AND SECTION SECRETARIES

MATHEMATICS (A)
R. W. Hamming
Wallace Givens

PHYSICS (B)
Ralph A. Sawyer
Stanley S. Ballard

CHEMISTRY (C)
Roland Rivest
S. L. Meisel

ASTRONOMY (D)
Walter Orr Roberts
Frank Bradshaw Wood

ANTHROPOLOGY (H)
Anthony F. C. Wallace
Eleanor Leacock

PSYCHOLOGY (I)
Lorin A. Riggs
Frank W. Finger

SOCIAL AND ECONOMIC SCIENCES (K)
Harold D. Lasswell
Ithiel de Sola Pool

HISTORY AND PHILOSOPHY OF SCIENCE (J)
John Murdoch
N. Russell Hanson

PHARMACEUTICAL SCIENCES (Np)
Lee H. MacDonald
Joseph P. Buckley

AGRICULTURE (O)
Edward F. Knipling
Howard B. Sprague

INDUSTRIAL SCIENCE (P)
Allen T. Bonnell

EDUCATION (Q)
Herbert S. Conrad
Frederic B. Dutton

DIVISIONS

ALASKA DIVISION

Charles J. Eagan
President

George Dahlgren
Executive Secretary

PACIFIC DIVISION

Phil E. Church
President

Robert C. Miller
Secretary

SOUTHWESTERN AND ROCKY MOUNTAIN DIVISION

Edwin R. Helwig
President

Marlowe G. Anderson
Executive Secretary

SCIENCE is published weekly 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 © 1964 by the American Association for the Advancement of Science. Annual subscription: \$8.50; foreign postage, \$1.50; Canadian postage, 75¢; single copies, 35¢. 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. SCIENCE is indexed in the Reader's Guide to Periodical Literature.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

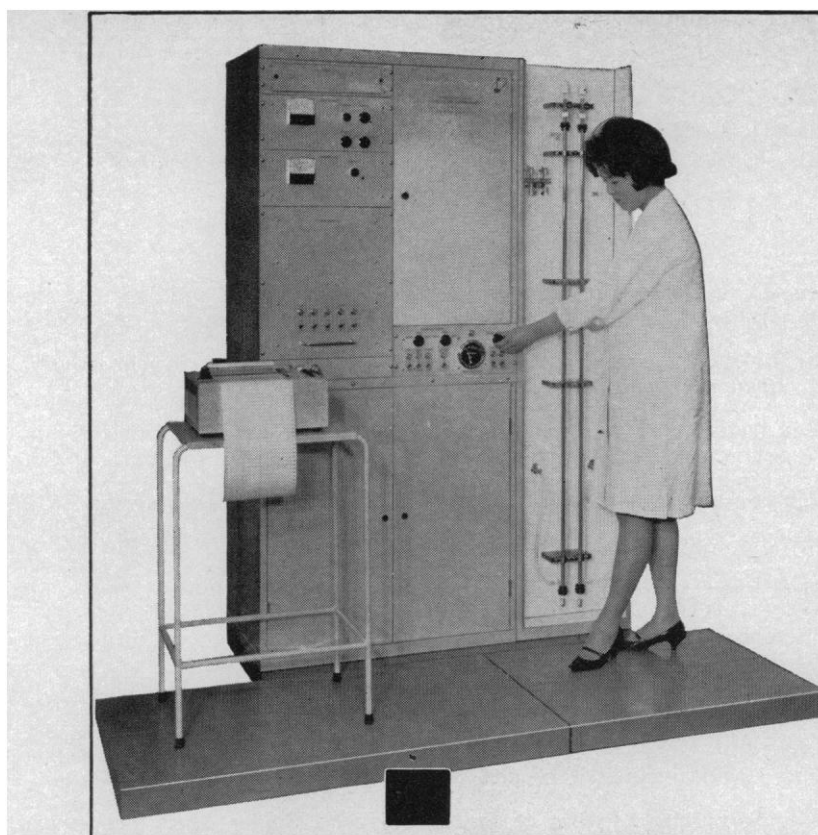
Genetics of Isoniazid Metabolism in Caucasian, Negro, and Japanese Populations: <i>A. P. Dufour, R. A. Knight, H. W. Harris</i>	391
Ultraviolet Inactivation of Chloroplast Formation in Synchronously Dividing <i>Euglena gracilis</i> : <i>S. F. Petropulos</i>	392
Homografts in Thymectomized, Irradiated Mice: Responses to Primary and Secondary Skin Grafts: <i>W. E. Davis, Jr., M. L. Tyan, L. J. Cole</i>	394
Inhibition of 19S Antibody Synthesis by 7S Antibody: <i>K. Sahiar and R. S. Schwartz</i> ..	395
Alkylation of Synthetic Polynucleotides: <i>D. B. Ludlum, R. C. Warner, A. J. Wahba</i> ..	397
Independent Action of Allele-Specific Suppressor Mutations: <i>S. Brody and C. Yanofsky</i>	399
Differences in Complement Titers of Serums from Spaced Bleedings in Guinea Pigs: <i>L. J. Brenner and E. E. Ecker</i>	400
Poliovirus: Growth in Non-Nucleate Cytoplasm: <i>T. T. Crocker, E. Pfendt, R. Spendlove</i>	401
Allotypic Specificities of A- and B-Chains of Rabbit Gamma Globulin: <i>G. W. Stemke</i>	403
Daily Sensitivity Rhythm of the Two-Spotted Spider Mite, <i>Tetranychus urticae</i> , to DDVP: <i>B. Polcik, J. W. Nowosielski, J. A. Naegele</i>	405
Gastric Erosions in the Rat: Effects of Immobilization at Different Points in the Activity Cycle: <i>R. Ader</i>	406
Homograft Sensitivity Induction by Group A Streptococci: <i>F. T. Rapaport and R. M. Chase, Jr.</i>	407
Intracellular Transport Apparatus of Phloem Fibers: <i>J. W. Mitchell and J. F. Worley</i>	409
Reinforcement as Input: Cyclic Variable-Interval Schedule: <i>J. E. R. Staddon</i>	410
Visual Hallucinations during Sensory Deprivation: A Problem of Criteria: <i>P. Suedfeld and J. Vernon</i>	412
Primate Retinal Responses: Slow Changes during Repetitive Stimulation with Light: <i>P. Gouras and R. E. Carr</i>	413
Vestibular Nuclei: Activity of Single Neurons during Natural Sleep and Wakefulness: <i>E. Bizzi, O. Pompeiano, I. Somogyi</i>	414
MEETINGS Radioisotope Scanning: <i>R. M. Kniseley</i> ; Human Factors in Electronics: <i>W. E. Woodson and M. Freitag</i> ; Forthcoming Events	416
DEPARTMENTS New Products	433

INA REES ALTER ORR ROBERTS	ATHELSTAN F. SPILHAUS H. BURR STEINBACH	PAUL E. KLOPSTEG Treasurer	DAEL WOLFLE Executive Officer
ECOLOGY AND GEOGRAPHY (E) Levor Lloyd Richard H. Mahard	ZOOLOGICAL SCIENCES (F) Arthur D. Hasler David W. Bishop	BOTANICAL SCIENCES (G) Harriet B. Creighton Warren H. Wagner	
ENGINEERING (M) James F. Savage Roy K. Wheelock	MEDICAL SCIENCES (N) James Ebert Oscar Tauster	DENTISTRY (Nd) James A. English S. J. Kreshover	
INFORMATION AND COMMUNICATION (T) Wallace R. Brode Phyllis V. Parkins		STATISTICS (U) Morris B. Ullman	

COVER

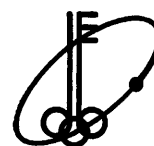
Agaricia undata, the dominant reef coral of the fore-reef slope environment in Jamaica, West Indies. This photograph, taken at a depth of 50 meters, shows only the central whorl, which is about 20 centimeters across. The colony as a whole was about 3 meters across. This species, though extremely abundant, prefers very steep, rugged marine slopes below the reef. It is rarely exhibited in museum collections. See page 383. [Thomas Goreau]

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 method's of science in human progress.



unique!

The JLC-01, manufactured by Japan Electron Optics Laboratory Co., Ltd. (JEOL) is similar to conventional automatic recording liquid column chromatographs — **except for one important difference.** Heat evolved during the separation process in the column system is measured by a sensitive, stable detector. Consequently, elution of any sample can be observed and be recorded automatically by detecting absorption-adsorption reaction, ion exchange reaction or partition reaction arising at the bottom of the column system. Sensitivity of 0.1 micromole is readily obtainable. ■ The JEOL Universal Automatic Recording Liquid Column Chromatograph provides several unique advantages. Samples previously impossible to detect can now be analyzed. Color reagents are not required permitting non-destructive, economical detection of the sample and fractionation of the eluted sample. Efficient, reliable design and compact construction enable easy, convenient and dependable operation. And, JEOL has established a complete domestic servicing network to assure continuous trouble-free service. ■ Complete technical data on the Universal Automatic Recording Liquid Column Chromatograph as well as an informative paper on the theory of this principle of chromatography is available. Please write JEOLCO. (U.S.A.), Inc., 461 Riverside Avenue, Medford 55, Massachusetts, phone 396-6241, area code 617.





THE NEW ADAMS AUPETTE®*

—an automatic pipetting device
for delivering predetermined
quantities of liquid repeatedly—
without resetting or remeasuring!

The Adams Aupette saves time by eliminating the tedious task of measuring the individual quantity for each delivery. It is ideally suited for research, clinical and classroom laboratories. The Adams Aupette provides:

CONVENIENCE

Easy, *one hand* operation.

SAFETY

No danger of contamination,—eliminates mouth suction.

ACCURACY

Accurate to $\pm 1.5\%$;—micrometer adjustment allows for accurate, precise setting.

VERSATILITY

Use with any standard 10, 5, or 1 cc. tuberculin type syringe with adapters,— may be operated with one hand or mounted on any laboratory stand with standard clamps.

DURABILITY

All moving parts are enclosed in a stainless steel tube,— all parts may be *autoclaved*.

NEW ADAMS AUPETTE VALVE[†]

Primes fast and easy every time!

Operates on an exclusive *flap valve* principle. The pressure of the liquid being pipetted causes the flaps to open and close as required. Prevents back flow. No moving parts to stick.

The Adams Aupette Valve is made of durable, inert, temperature-resistant plastic. It is available separately and may be used wherever a reliable two-way valve is required. The Adams Aupette and Valve are available from your dealer

*Pat. †Pat. Pend

Clay-Adams

CLAY-ADAMS, INC. Dept. 13,
141 East 25th St., New York 10, N. Y.

Gentlemen:

☐ Send me the new brochure describing the Adams AUPETTE and the AUPETTE VALVE.

NAME _____ TITLE _____

INSTITUTION _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

New from J. T. Baker...

LINDE highest purity gases in

Ar H₂ Kr Ne C₂H₂ N₂ O₂

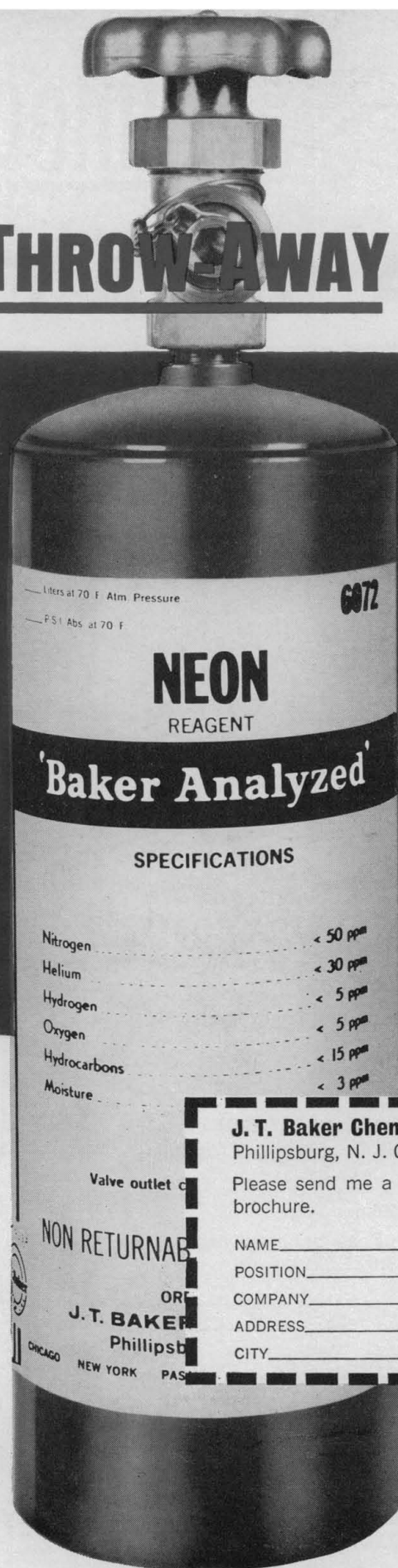
Now you can order LINDE highest purity reagent gases direct from J. T. Baker. And for the first time, these specially purified gases are available in convenient and economical Throw-Away cylinders. Benefit too from the standards of service that have made Baker the leading supplier of high purity chemicals for laboratory use. ■ J. T. Baker's line of highest purity gases includes argon, carbon dioxide, helium, hydrogen, krypton, neon, nitrogen, oxygen, and xenon. In addition, you can obtain mixtures of these gases in the proportions you specify, as well as custom-blended mixtures with carbon monoxide, methane, krypton⁸⁵, chlorine, and bromine. Both the individual gases and mixtures are supplied in glass bulbs up to one-liter size and in Throw-Away cylinders delivering up to 100 liters. ■ **New Throw-Away cylinder**—This new cylinder offers you many conveniences and savings. You no longer have to keep

track of cylinder deposits and returns or pay demurrage on cylinders not returned promptly; now you can economically stock cylinders for immediate availability. Transportation costs are also eliminated. Thus, the slightly higher initial cost can be more than recovered. ■ The new Throw-Away cylinder weighs about 1/3 as much as comparable returnable cylinders. It's only 16 inches in length, 4 inches in diameter—fits right in the laboratory bench drawer. It's easier and safer to handle and store. A solid-rim base gives the cylinder anti-tip stability—another important safety consideration. Valve outlets are standard. ■ Baker ensures fast delivery nationwide, with supply points in Chicago, Ill., Pittsburgh, Pa., Washington, D.C., Pasadena, Cal., and Phillipsburg, N.J. For prices, specifications and further information on gases available from J. T. Baker, send the coupon.

J. T. Baker Chemical Co.  **Phillipsburg, N. J.**

The term LINDE is a registered trade mark of Union Carbide Corporation.

the first THROW-AWAY cylinders



J. T. Baker Chemical Co.

SC

Phillipsburg, N. J. 08865

Please send me a copy of the J. T. Baker laboratory gases brochure.

NAME _____

POSITION _____

COMPANY _____

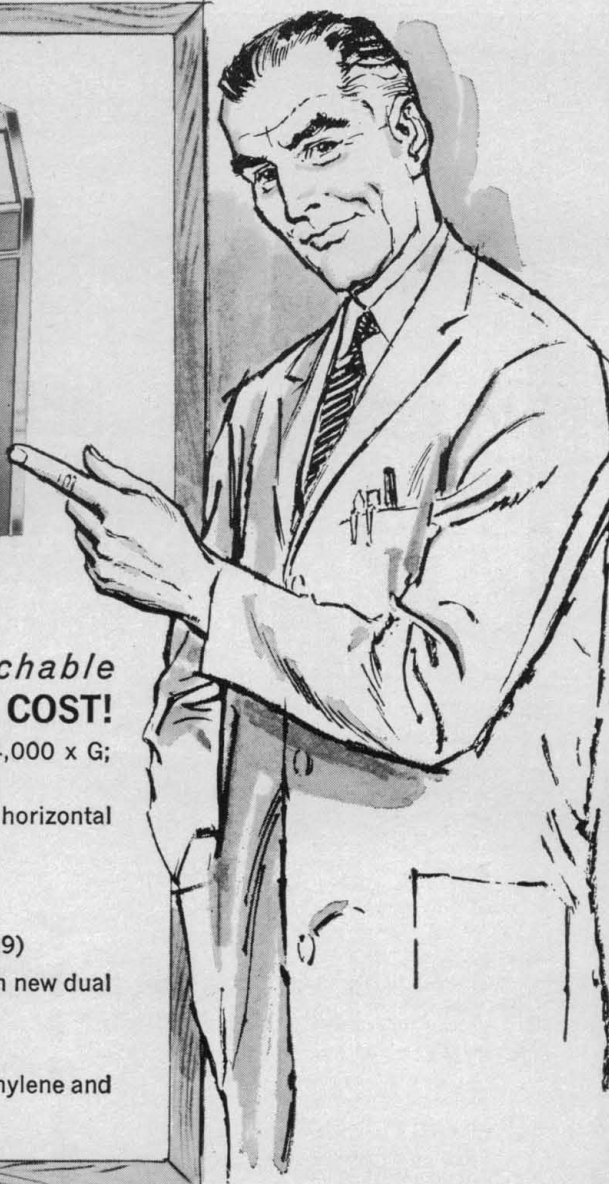
ADDRESS _____

CITY _____ STATE _____ ZIP _____

Lourdes

unequalled!

MODEL A "BETA-FUGE"



Patented Features Give Unmatchable Performance . . . AT NO EXTRA COST!

- Spins 3,300 ml (6x550 ml) capacity rotor at 14,000 x G; 400 ml (8x50 ml) rotor at 40,000 x G.
- Eleven interchangeable rotors including angle, horizontal and the simplest continuous flow system (Patent #3,104,225)
- Motor brush life indicator.
- Roto-Air refrigeration system (Patent #2,917,229)
- Temperature control range — 20°C to +40°C with new dual adjustment.
- Solid state electronic control system.
- Permits use of support and sealing cap for polyethylene and polycarbonate bottles (Patent #3,071,316)

BE SURE—
... CHOOSE
LOURDES
SUPER-SPEED
CENTRIFUGES

Lourdes

CATALOG UPON REQUEST FROM A FRANCHISED
LOURDES DISTRIBUTOR — OR WRITE US DIRECTLY

LOURDES INSTRUMENT CORP.

656-78 Montauk Avenue • Brooklyn, New York 11208

AUTOMATED ANALYTICAL CHEMISTRY

is it for me

where is it heading

how far has it come

Find answers to questions like these at the Technicon International Symposium in mid-September. Partial program below suggests the scope and depth of content and authority of speakers.

Pre-registration necessary. Write to Technicon, Chauncey, New York; or to be sure... telephone 914-OW 3-1000 or TWX 914-693-2028.

TECHNICON INTERNATIONAL SYMPOSIUM AUTOMATION IN ANALYTICAL CHEMISTRY

September 16th, 17th, 18th - 1964



Statler-Hilton Hotel, New York, N. Y.

HEMAGGLUTINATION PROCEDURES

Paper describes operating experience with a system for automated blood typing. Other papers cover new automated techniques, including antibody detection and identification; complement fixation testing; cell life experiments; viral hemagglutination.

CHROMATOGRAPHY

6 papers on latest developments in automated amino acid chromatography. Other individual presentations on automated chromatography for peptides, nucleotides, sugar, hexuronic acid and hexosamines, protein, etc.

LIPID ANALYSES

6 papers devoted to new automated techniques for both individual and simultaneous analyses of lipids, including cholesterol, triglycerides, etc.

ENZYME ANALYSES

5 papers on automated techniques in enzyme analysis; many encompass simultaneous multiparameter testing.

ELECTROPHORESIS

New automated techniques described for routine serum electrophoresis and nucleotide sequencing studies.

MULTIPLE ANALYSIS AND SCREENING PROCEDURES

8 papers on new automated techniques by which a series of analyses are performed from one sample. They cover design, chemistries, data handling and processing, and operating. Others describe automated advances in blood chemistry screening of large groups.

GYNECOLOGICAL CANCER

A paper on a new automated enzyme test as a screening procedure for vaginal and uterine cancer.

HEMATOLOGY

A paper on new, fully automated system for simultaneous red and white cell counting/hemoglobin analysis.

IN VIVO TECHNIQUES

Paper describes new technique for automatic control of blood sugar level via continuous monitoring and feedback control. Another, on regulation of blood creatinine concentration by automatic analysis and feedback control.

DIGESTION TECHNIQUES

5 papers on new automated digestion techniques include simultaneously measured nitrogen/chromium in feeds; determining phosphates in pesticide residues, etc.

NEW METHODS

8 papers on hitherto unpublished automated methodology for clinical and industrial applications, including new fluorometric methods, completely automatic PBI, amylase, etc.

CELL PHYSIOLOGY

Study of cell growth by continuous monitoring of several parameters such as DNA, RNA, total protein, total cell population, CO₂, glucose, etc.

POLLUTION ANALYSES

9 papers cover automated systems and methods to monitor and control water and air pollution. Specific subjects: oceanic studies; cyanide and phenol analyses of plant wastes; large body of water profiles; methods for chemical oxygen demand, sulfur dioxide-trioxide, fluorides, nitric oxide-nitrogen dioxide, etc.

POWER STATION CHEMISTRY

Papers describe monitoring of copper in steam-water cycle at super critical power plant; closed loop system for automatic phosphate feed to high pressure boilers.

CHEMICAL PROCESS CONTROL

Series of papers describe role of automated chemical analysis in controlling closed loop chemical processing systems.

SOILS AND FERTILIZERS

5 papers on automation of soils and fertilizer component analysis (phosphates, sulfates, potassium, nitrogen, etc.); individual methods and simultaneous analyses from a single sample described.

PHARMACEUTICAL ASSAYS

3 papers present descriptions of automated techniques for single tablet assays; microbiological assays; and insulin assays.

TEXTILE PROCESSING

Papers on control of dye processing by automated acidity and chrome analyses; continuous control of bleaching by automated analysis.



SLANTS IN BOTTLES?

Yes. And they introduce a whole new concept in bacteriological culture media. Fisher's new Vu/Slants are easier and more convenient to use. No racks or supports needed; no rolling off bench tops. 5% more slant area. Windows in the handy carton let you check growth while the bottles are in the carton. And the carton takes up 1/3 less incubator volume. **More facts** on Vu/Slants? Just write Fisher Scientific Company, 139 Fisher Building, Pittsburgh, Pa. 15219.

X-385



FISHER SCIENTIFIC

World's Largest Manufacturer-Distributor of Laboratory Appliances & Reagent Chemicals

Complete stocks in these locations: Atlanta • Boston • Chicago • Fort Worth • Houston • New York
Philadelphia • Pittsburgh • St. Louis • Union, N. J. • Washington • Edmonton • Montreal • Toronto

A flame is capable of exciting certain elements to emit characteristic light radiations. Isolating these emissions and measuring their intensity is the basis of flame photometry. Baird-Atomic's Model KY-2 Flame Photometer is specifically designed for analysis of trace quantities of sodium and potassium in solutions. Model KY-2 consists of an atomizer, a gas burner, special optical filters, photomultiplier detectors, and a meter for direct readout.

flame

MODEL KY/2



Photometer



BAIRD-ATOMIC LABORATORY INSTRUMENTS DEPT.

The Model KY-2 Flame Photometer is the only instrument now available which permits the combined versatility of either clinical or research analysis of Na and K!

The Model KY-2 Flame Photometer is the only instrument that combines direct readout in the clinical range and null-balance mode for research studies!

The Model KY-2 Flame Photometer incorporates new, improved electronic circuitry for more stable operation—a new D.C. power supply increases efficiency and prolongs the useful life of photomultiplier detectors!

The Model KY-2 Flame Photometer is easy to operate. It determines Na and K from a single sample and saves time, cuts glassware costs, and eliminates tedious handling!

VERSATILITY

For research use, Model KY-2 incorporates Baird-Atomic's DB Series null-indicating method for wide concentration ranges. For clinical use, Model KY-2 features the speed and simplicity of direct meter readout in mEq/l of Na and K within the concentration ranges found in blood serum and other body fluids!

DEPENDABILITY

Flame photometric analysis of sodium and potassium provides a high degree of reproducibility which **cannot** be matched by other analytical techniques. High accuracy and stability are obtained in Model KY-2 by the use of the double-beam principle with a lithium internal standard that minimizes variations due to fluctuations encountered in changes of burner and atomizer operation!

EFFICIENCY

Simple standardization methods using known concentrations of Na and K in Baird-Atomic standard solutions permit determinations of unknowns to be obtained in **less than 20 seconds!**

CONVENIENCE

The Model KY-2 enclosure is designed for easy accessibility. While the instrument is in operation, the hinged front panel, containing all controls, may be opened to reveal all the electronic components for easy servicing. The internal fine-grain Na and K controls are located at the front of the tube chassis should recalibration be necessary!

COMBINATION ATOMIZER

A combination gravity feed-aspirator atomizer is now standard on the Model KY-2. The aspirator feature allows the use of samples as small as 0.05cc of serum and reduces sample contamination. The atomizer is combined with a patented closed atomizer-burner system, sealed from outside air!

ECONOMY

Model KY-2's improved electronics means less maintenance, less service, and more effective use of operator time!

SALES AND SERVICE

The Model KY-2 Flame Photometer may be purchased directly from Baird-Atomic sales offices located in Atlanta, Cambridge, Chicago, Detroit, Houston, Los Angeles, and Philadelphia.

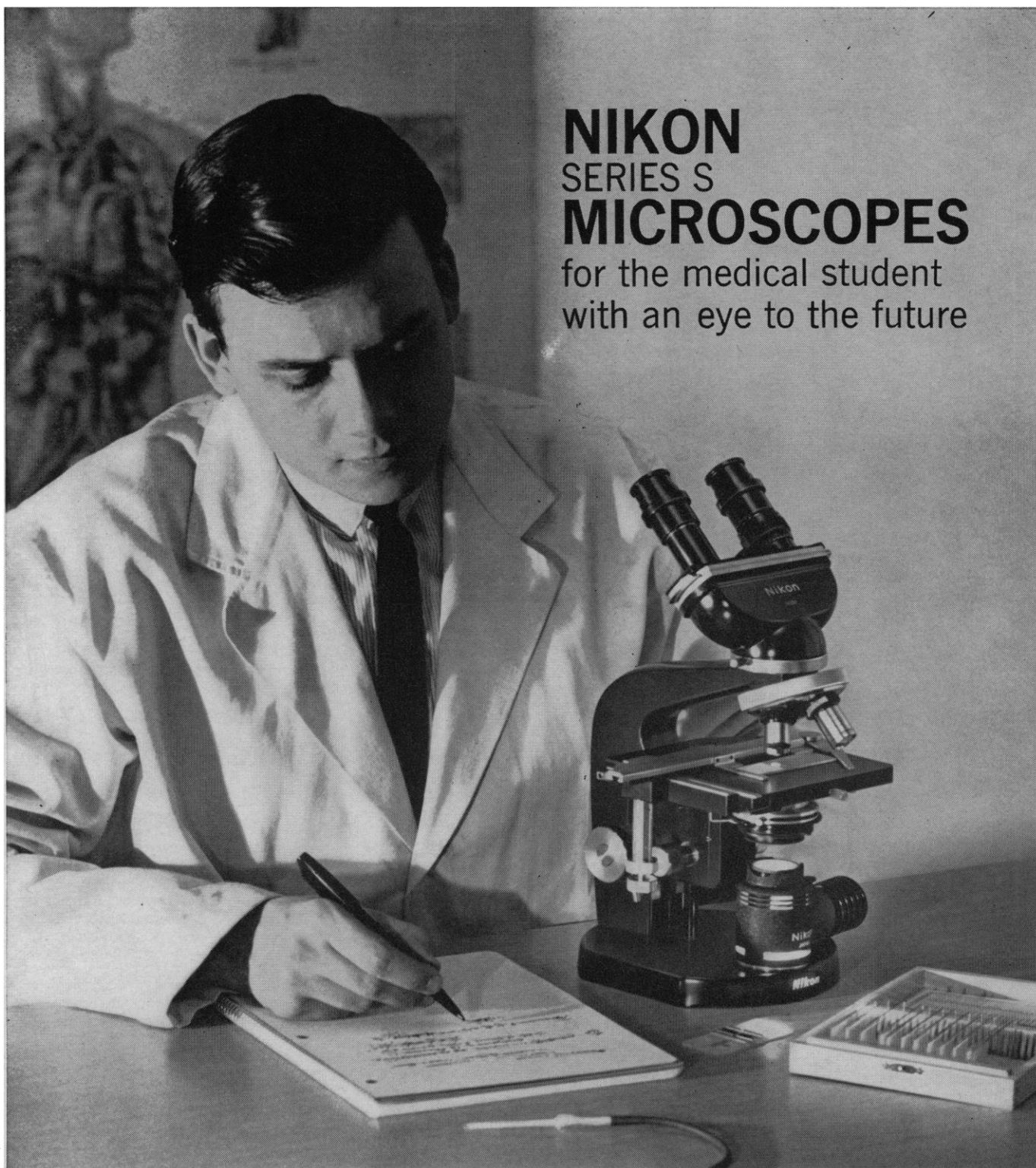
For a free copy of the NEW Model KY-2 8-page brochure, please call or write to the address below.

Scientists: Investigate challenging opportunities with Baird-Atomic. An Equal Opportunity Employer.



BAIRD-ATOMIC, INC.

33 University Road, Cambridge, Massachusetts 02138, Tel: 617 UNIVERSITY 4-7420

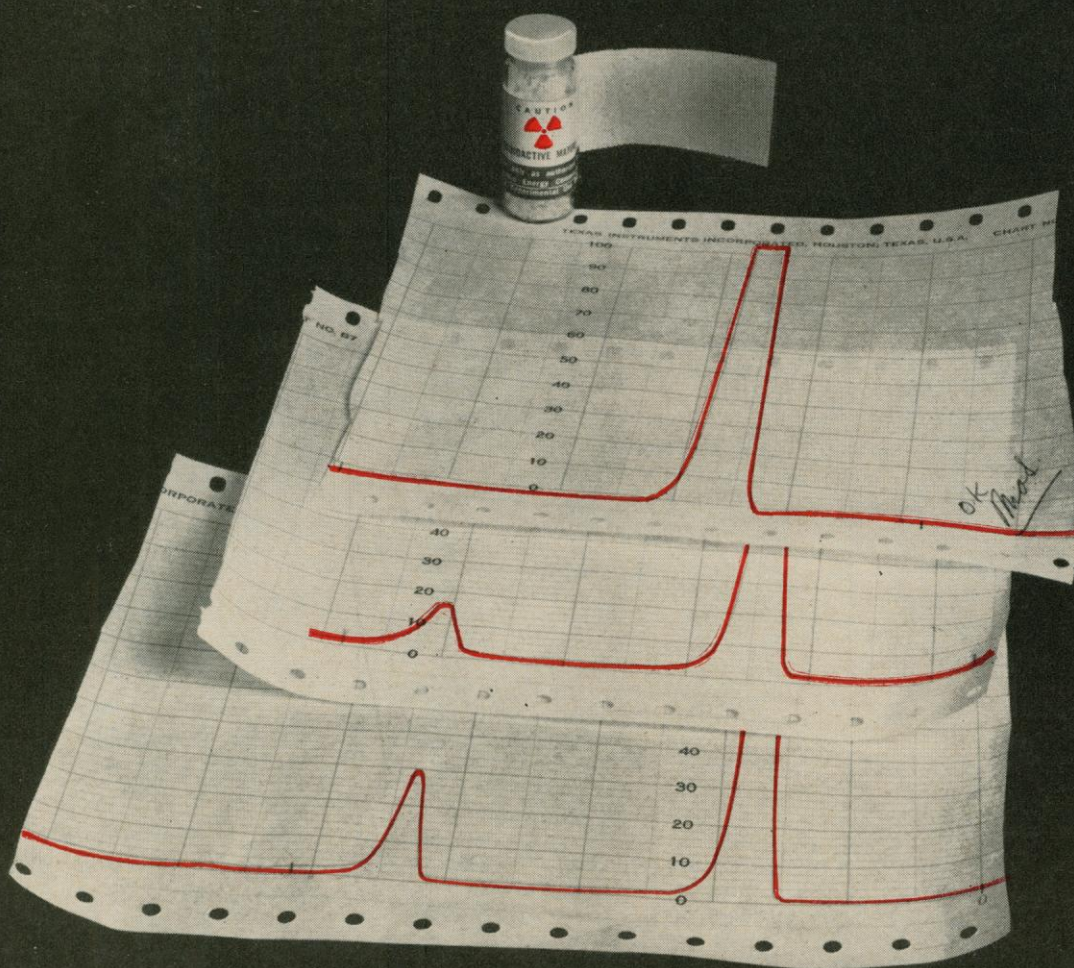


NIKON
SERIES S
MICROSCOPES
for the medical student
with an eye to the future

There are no Nikon *student* microscopes, as such. The same Nikon microscope which will serve the medical student through school, has the flexibility to meet his future professional needs, however specialized. Model SBR, the example shown above, is a versatile, sophisticated professional instrument, used widely in school, hospital and commercial laboratories. It is also a favorite with medical students.

For medical student microscope catalog, write to Dept. S-7

NIKON INC. • Instrument Division • 111 Fifth Ave., New York 3, N. Y. • Subsidiary of Ehrenreich Photo-Optical Industries, Inc.



Three chromatograms ago,
there was a stubborn radioactive impurity showing.
Now there is none. You expect to get
pure radioactive chemicals from New England Nuclear Corp.
575 Albany St., Boston 18, Mass. Phone (617) 426-7311



Coleman Photofluorometer®

**. . . the working tool for
fluorescence analysis**

The Coleman Photofluorometer is the practical tool for routine fluorescence analysis in the laboratory.

Simple and easy to use, it has proved its value over years of use in clinical and control laboratories having a large number of routine analyses.

Its sensitivity range covers all practical applications — quinines, quinoline, vitamins, porphyrins, steroids, metal complexes, etc. The instrument permits quantitative determination of fluorophors (quinine, for example) down to 3 parts in 10 billion.



The Photofluorometer achieves its sensitivity without photomultipliers or other elaborate, trouble-prone circuits. This forthright simplicity encompasses all aspects of the instrument's operation:

- samples insert directly into the instrument's optical system,
- readings are taken directly from the meter scale,
- a simple lens-and-aperture system prevents decay of sensitive substances by allowing exposure to irradiation only during the actual reading.

Priced at \$480, the Coleman Photofluorometer provides an economical approach to routine fluorescence in the working laboratory.

Write for Bulletin SB-245A



Lowest cost- per-analysis with the Coleman Universal Spectrophotometer

In laboratories where cost and high-volume analytical output are important, the Coleman Universal Spectrophotometer is still unequalled.

The instrument draws its speed from two design features:

. . . straightforward circuitry provides direct-deflection readings in terms of sample concentration.

. . . a two-position sample carrier permits almost instantaneous comparison of unknown samples with the reference standard.

Added to its high-volume output are these features:

VERSATILITY—from high-speed routine spectrophotometry, the Universal readily adapts to the most painstaking measurements of fluorescence and light scattering . . . from macro to micro volumes. A calibrated slidewire potentiometer permits ultra-precise null readings.

EXTENDED RANGE—Universal uses a diffraction grating to produce a straight and linear spectrum from 325 to 825 mμ. Its constant band pass throughout the spectral range eliminates the need for mechanical slit adjustments.

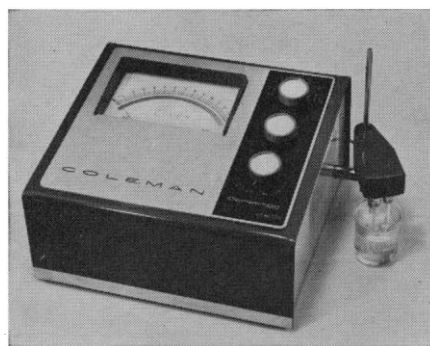
ACCURACY—results are reproducible to $\pm 0.2\%$ full scale; scale is linear to 0.5%. Wavelength calibration easily kept within 0.5%.

In planning your laboratory instrumentation, consider cost-per-analysis . . . ask your dealer to demonstrate the Coleman Universal. Bulletin SB-241A on request.

Companion pH Meter ...simplified controls, unequalled versatility

The Companion's three simple controls cover all its multiple functions—in pH determinations, in millivolt measurement, in manual or automatic titrations.

This permits the instrument to cover an exceptionally broad field of laboratory analysis without losing its basic simplicity of operation.



Companion features:

Accuracy—within 0.05 pH, reproducible to 0.02 pH.

Range—0-14 pH; any 1400 millivolt span from -1400 to +1400 mv.

Electrodes—uses any Coleman glass, reference, metallic or special-purpose electrodes; adapts to electrodes of other manufacture.

Related equipment—operates with Coleman Titration Automatic Titrator, and current and potentiometer type recorders.

Temperature compensation—manual TEMP control or Automatic Temperature Compensator accessory compensates for thermal effects over 0-100° C. range.

Economy—priced at \$325.

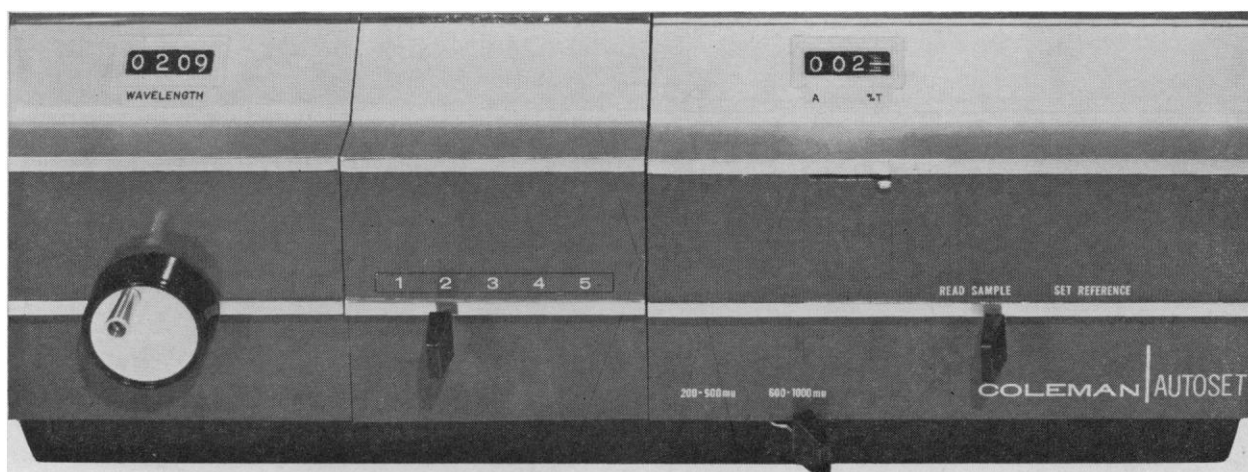
Write for Bulletin SB-267A and ask for a demonstration.

COLEMAN INSTRUMENTS, INC., MAYWOOD, ILLINOIS



AUTOSETTM

SPECTROPHOTOMETER



SIMPLE CONTROLS... NUMERICAL READOUT

This is the control panel of the AUTOSET Spectrophotometer, a new UV-Visible instrument featuring automatic reference setting, digital readout and simplified controls.

These are all the controls you need to perform fast, accurate spectrochemical analyses throughout the 200-1000 $m\mu$ spectrum.

SPEED and CONVENIENCE

Automated reference setting, the AUTOSET feature, ends the need for the multiple manipulations ordinarily required for making a spectrophotometer reference setting.

With AUTOSET, you can achieve the reference value in seconds by positioning a single control. Select the sample, place the control in "Read" position, and the sample value appears quickly in the readout window.

ERROR ELIMINATION

Reading analytical data from the AUTOSET's digital readout is twice as fast and three times as accurate as reading from a conventional dial.

In the AUTOSET Spectrophotometer, all data—wavelength, analytical results and sample identification—are presented in unmistakable numerical form.

SAMPLE VERSATILITY

The instrument's cuvette compartment is designed to accept a full range of cuvettes—ultramicro, long light path, test tube type and the highly-accurate 1-cm square cells.

The sample compartment has adequate room for such special equipment as mixers, thermostated components and 100-mm light path cells.

For additional information write for Bulletin SB-286.

CONDENSED SPECIFICATIONS

Monochromator

Bipartite reflection diffraction grating.
2 millimicron standard bandwidth; 1 and 5 millimicron bandwidths also available for special work.

Wavelength range 200-1000 millimicrons.

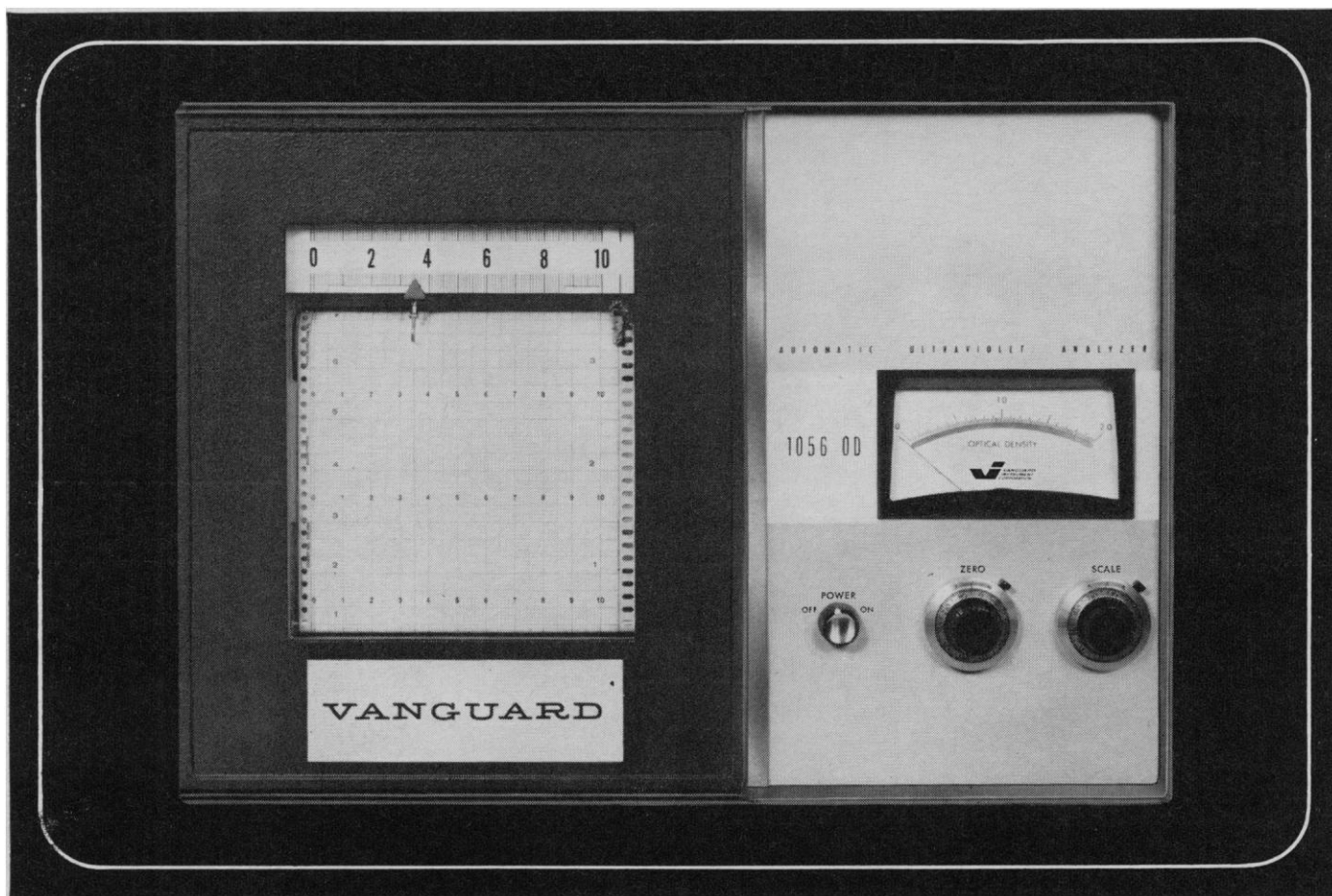
Photometer

Self-balancing null system.
Photometric accuracy: $\pm 0.5\% T$,
 $\pm 0.005 A$ at 0.4 A.

Sample Range

120 microliters to 25 milliliters.
1 to 100 millimeter light path.

COLEMAN INSTRUMENTS, INC., 42 MADISON ST., MAYWOOD, ILL.



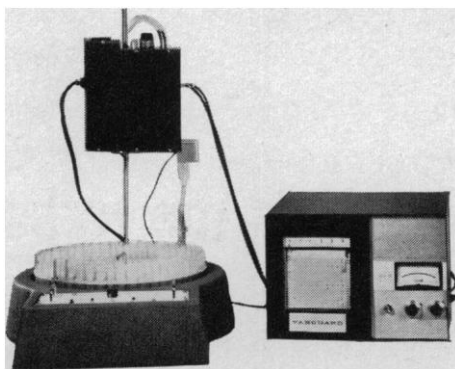
new automatic optical density ultra-violet analyzer

Vanguard Model 1056-OD Automatic Ultra-Violet Analyzer provides the investigator with unequalled reliability and versatility. Through the use of two independent logarithmic converters, this instrument provides a chart recording of the optical density of the effluent from a chromatographic column—the ordinate of which is linear with optical density. In addition, a plain diffraction grating monochromator enables the operator to select any wave length from 200 millimicrons into the visible spectrum.

■ Dual beam operation utilizing sample and reference cuvettes provides continuous base line

compensation for gradient elutions or other applications where the optical density of the eluent may change ■ Automatic chart recorder marking system speeds location and identification of test tubes containing ultra-violet absorbing fractions ■ Completely transistorized for dependable, maintenance-free operation ■ Detection system completely self-contained and light-shielded.

For complete specifications on the Model 1056-OD Automatic Ultra-Violet Analyzer, send for new informative literature. For immediate information and/or a quotation, call your nearest Vanguard office.



Model 1056-OD Automatic Ultra-Violet Analyzer shown with Model 1000 Fraction Collector. Model 1056-OD is compatible with all Fraction Collectors.

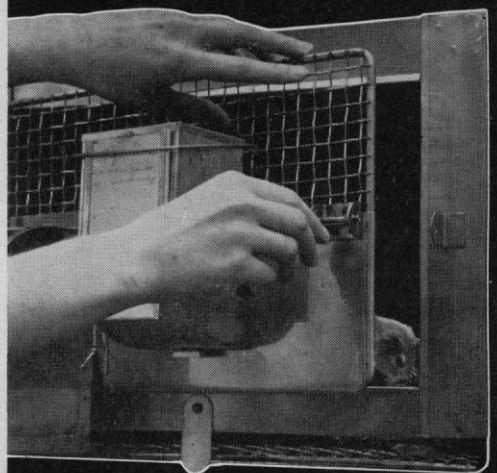
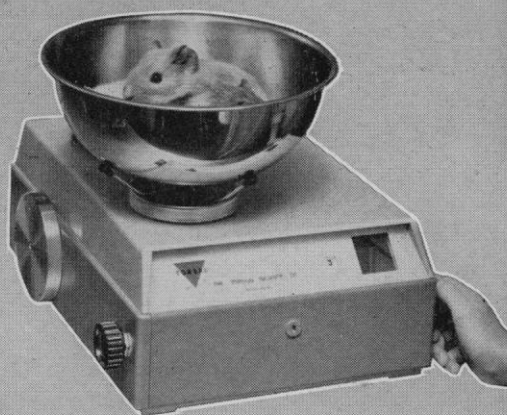
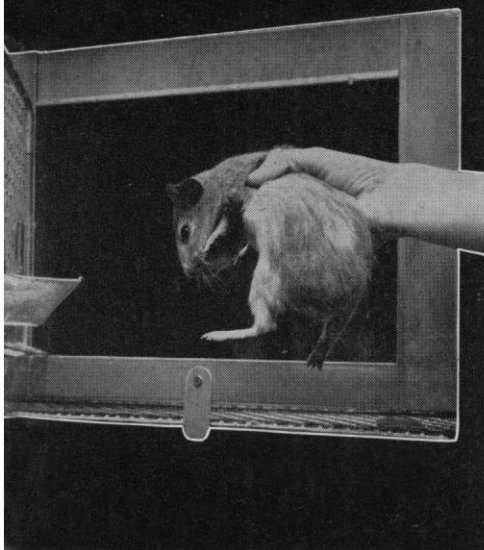


Designers and Manufacturers of Precision Instrumentation for Research • P. O. Box 244, LaGrange, Illinois 60526, FL 2-1600
 New York, 103 Park Ave., Suite 1204, TN 7-1998 • Boston, 1156 Broadway, Somerville, 491-4589
 San Francisco, 115 New Montgomery St., EX 2-0511 • Baltimore, 217 North Calvert St., 727-3666
 Houston, 1213 Capitol Ave., CA 5-5757 • Los Angeles, 9460 Wilshire Blvd., Suite 414, Beverly Hills, 275-3567

OUT...

ON...

IN...



Weigh them in seconds on the Torbal® PL-2

Make quick, accurate weighings of rats, chickens, guinea pigs and mice **on the same balance**. Specify the fast Torbal PL-2 optical projection balance. Here's why.

(1) **No knife edge construction**—assures accuracy for years despite dust, dirt and severe environmental conditions; (2) **speed** — balance can be damped so

that it comes to rest immediately; (3) **out of level conditions** — you don't have to rezero the PL-2 **even when it is moved**.

In addition, the Torbal PL-2 2000 gram balance is easy to operate and requires minimum maintenance. Various commodity holders are available.

CONVINCE YOURSELF — ASK FOR A DEMONSTRATION OR WRITE FOR TORSION CATALOG

THE TORSION BALANCE COMPANY

Main Office and Factory: Clifton, New Jersey • Sales Offices: Chicago, Ill., San Mateo, Cal.



announcing
A NEW THERMOSTATIC
RECORDING pH-STAT
FROM SARGENT



For both research and routine studies of reaction kinetics and stoichiometry by high-precision recording of reaction curves under closely controlled conditions of temperature, mixing, and pH.

A compact, easily operated instrument which combines the functions of pH control, temperature control, reagent delivery and mixing, and volume recording—thus replacing the complex of separate instruments, apparatus, and accessory devices formerly required.

it controls

pH • by addition of acid or base reagent from an all-glass precision displacement burette. • by precise measurement and comparison through a chopper input, stabilized amplifier sensitive to 0.005 pH and accommodating all types of electrodes. • at a value dial-selected to 0.01 pH over the range 0 to 14 pH. • reliably with a long-term stability of ± 0.01 pH, no drift. **temperature** by automatic addition or withdrawal of heat through a solid state thermoelectric element in a stirring plate. • at a temperature set by a single dial selector and detected by an immersed thermistor element. • with a precision of $\pm 0.05^\circ\text{C}$ over the range 20 to 50°C . • without water jackets, baths, liquid circulating devices, refrigerants, or compressors; without any visual or mechanical impedimenta.

it records

volume • on a chart whose 250 mm axis may be made to represent from 0.05 ml to 10 ml, accommodating 0.25, 2.5 or 10 ml burette systems. Five-to-one drive reduction selector permits recording of $\frac{1}{5}$ burette capacity over full scale. • with an accuracy $\pm 0.1\%$ of capacity. **time** • on the other axis of a chart graduated in 1-inch and 0.1-inch divisions. • at chart speeds of 1 inch per hour, $\frac{1}{60}$ inch per minute, or 1 inch per minute, instantly interchangeable by 3-speed electrical switching mechanism. Motors of other speeds are available and easily installed. **S-30240 pH STAT, Sargent.....\$2475.00**

It provides additional convenience in such features as variable speed magnetic stirring, swing-away sample platform, and rapid-drive burette systems for flushing and filling. It accommodates 5 ml, 10 ml, or larger sample beakers.



SARGENT®

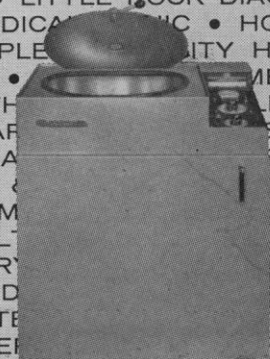
Scientific Laboratory Instruments • Apparatus • Supplies • Chemicals

Complete Information
write for Bulletin EC

E. H. SARGENT & CO., 4647 WEST FOSTER AVE., CHICAGO, ILLINOIS 60630

DETROIT • BIRMINGHAM • DALLAS • HOUSTON • ANAHEIM, CALIF. • KENSINGTON, MD. • SPRINGFIELD, N.J. • INDEPENDENCE, OHIO

UNIVERSITY OF SOUTHERN CALIFORNIA SCHOOL OF MEDICINE • UNIVERSITY OF CHICAGO • DADE REAGENTS INC. • UNIVERSITY OF ILLINOIS • UNITED NUCLEAR CORP. • UNIVERSITY OF PITTSBURGH • WESLEY MEDICAL CENTER • UNIVERSITY OF ARKANSAS • HOFFMAN-LA ROCHE INC. • JOHN HOPKINS SCHOOL OF MEDICINE • SINAI HOSPITAL, DETROIT • UNIVERSITY OF KENTUCKY MEDICAL CENTER • UNIVERSITY OF NEW MEXICO • UNIVERSITY OF WASHINGTON SCHOOL OF MEDICINE • NEW YORK HOSPITAL-CORNELL MEDICAL CENTER • VANDERBILT UNIVERSITY SCHOOL OF MEDICINE • ALBERT EINSTEIN MEDICAL CENTER • SAN JOSE MEDICAL CL. LABORATORY • UNIVERSITY OF WISCONSIN • TULANE UNIVERSITY MEDICAL SCHOOL • MASSACHUSETTS MEMORIAL HOSPITAL • UNIVERSITY OF NORTH DAKOTA • RICE UNIVERSITY • UNIVERSITY OF MONTREAL • UNIVERSITY OF TENNESSEE • CARNEGIE INSTITUTE OF TECHNOLOGY • FLORIDA STATE UNIVERSITY • MEDICAL COLLEGE OF VIRGINIA • UNIVERSITY OF MARYLAND SCHOOL OF MEDICINE • MASSACHUSETTS GENERAL HOSPITAL • UNIVERSITY OF CALIFORNIA MEDICAL CENTER • SACRAMENTO COUNTY HEALTH DEPT. • WAYNE COUNTY GENERAL HOSPITAL • MILES LABORATORIES, INC. • IOWA STATE UNIVERSITY • SMITH KLINE & FRENCH • CANADA DEPARTMENT OF AGRICULTURE • UNITED STATES DEPARTMENT OF AGRICULTURE • PRESBYTERIAN MEDICAL CENTER, SAN FRANCISCO • HARVARD MEDICAL SCHOOL • WOMAN'S MEDICAL COLLEGE OF PENNSYLVANIA • BIRDS EYE DIV., GENERAL FOODS • AMERICAN POLYMER & CHEMICAL CORPORATION • OHIO STATE UNIVERSITY • WYETH LABORATORIES, INC. • ABBOTT LABORATORIES • STANDARD OIL COMPANY OF TEXAS • UNIVERSITY OF BUFFALO SCHOOL OF MEDICINE • JEFFERSON MEDICAL COLLEGE, PHILADELPHIA • OKLAHOMA UNIVERSITY MEDICAL CENTER • UNIVERSITY OF TEXAS SOUTHWESTERN MEDICAL SCHOOL • ST. LUKE'S HOSPITAL, NEW YORK • UNIVERSITY OF GEORGIA • VIRUS LABORATORY OF WASHINGTON STATE • POST CEREALS DIVISION GENERAL FOODS CORP. • UNIVERSITY OF MANITOBA • UNITED STATES FOOD & DRUG ADMINISTRATION • AMES COMPANY • CAMPBELL SOUP COMPANY • IBM COMPONENTS DIVISION • YALE UNIVERSITY SCHOOL OF MEDICINE • MAINE MEDICAL CENTER • ALLISON DIVISION GENERAL MOTORS CORPORATION • UNIVERSITY OF NEBRASKA • COLLEGE OF MEDICINE • EVANGELICAL DEACONESS HOSPITAL, CLEVELAND • UNIVERSITY HEALTH SERVICE, HARVARD UNIVERSITY • BOSTON UNIVERSITY MEDICAL SCHOOL • REXALL CHEMICAL COMPANY • RUTGERS UNIVERSITY • ROCKFORD MEMORIAL HOSPITAL, ROCKFORD • STANFORD UNIVERSITY • WAYNE STATE UNIVERSITY • MERCY HOSPITAL, COLUMBUS • MAYO CLINIC, ROCHESTER • SETON HALL COLLEGE OF MEDICINE • DUKE UNIVERSITY MEDICAL CENTER • DEFENSE RESEARCH MEDICAL LABORATORIES • DISTRICT OF COLUMBIA GENERAL HOSPITAL • DENVER GENERAL HOSPITAL • LITTLE ROCK DIAGNOSTIC CLINIC • UNIVERSITY OF KANSAS MEDICAL CENTER • SANTA BARBARA MEDICAL CENTER • HOUSE OF SEAGRAM LIMITED • BALTIMORE CITY HOSPITAL • HUNT FOODS INC. • TEMPLE UNIVERSITY HOSPITAL • EATON LABORATORIES • ORANGE COUNTY GENERAL HOSPITAL, ORANGE, CALIF. • MEMORIAL HOSPITAL, WILLOUGHBY, OHIO • COLORADO DEPARTMENT OF PUBLIC HEALTH • COLLEGE OF GEORGIA • JEWISH HOSPITAL OF BROOKLYN • ST. LOUIS COUNTY HEALTH DEPARTMENT • S CANDY COMPANY • HOUSTON DIAGNOSTIC LABORATORY INC. • MEADE JOHNSON RESEARCH • VETERANS ADMINISTRATION HOSPITALS • THE NESTLE COMPANY, INC. • SCRIPPS CLINIC • FOUNDATION • CARLING BREWING COMPANY • GROVE LABORATORIES INC. • MILITARY MEDICAL AGENCY • TUCSON MEDICAL CENTER • FEDERAL AVIATION AGENCY, CARLISLE, MT. ALTA • HOSPITAL • WASHINGTON, D.C. • NORTHEASTERN RADIOLOGICAL HEALTH LABORATORY • RESERVE • UNIVERSITY • COLUMBIA UNIVERSITY • LOUISVILLE GENERAL HOSPITAL • MADISON • HOSPITAL • OKLAHOMA STATE DEPARTMENT OF AGRICULTURE • INTERNATIONAL LATEX • SAN FRANCISCO CITY & COUNTY DEPARTMENT OF PUBLIC HEALTH • BUFFALO GENERAL • ROSWELL PARK MEMORIAL INSTITUTE • BRISTOL LABORATORIES • MEDICAL COLLEGE OF GEORGIA • ROYAL VICTORIA



EVER WONDER WHY SO MANY IMPORTANT LABORATORIES HAVE INSTALLED **IEC** UV CENTRIFUGES?

Look at the above random sample of UV purchasers. Never before has any centrifuge combined such speed, capacity, performance, and sheer versatility as to result in its installation by so many leading medical, scientific and industrial laboratories.

Hundreds of different accessory combinations make the UV capable of research work as well as a host of routine separations for the daily lab schedule. It will swing horizontal, angle and basket heads. Speeds to 5600 rpm. and forces to 5100 x G are obtained with many large capacity heads. Speeds of 21,600 rpm and gravities to 33,000 are obtainable with a multi speed attachment for smaller volumes. Although not refrigerated, very little material temperature rise is experienced, making the UV especially useful for centrifuging such heat-sensitive

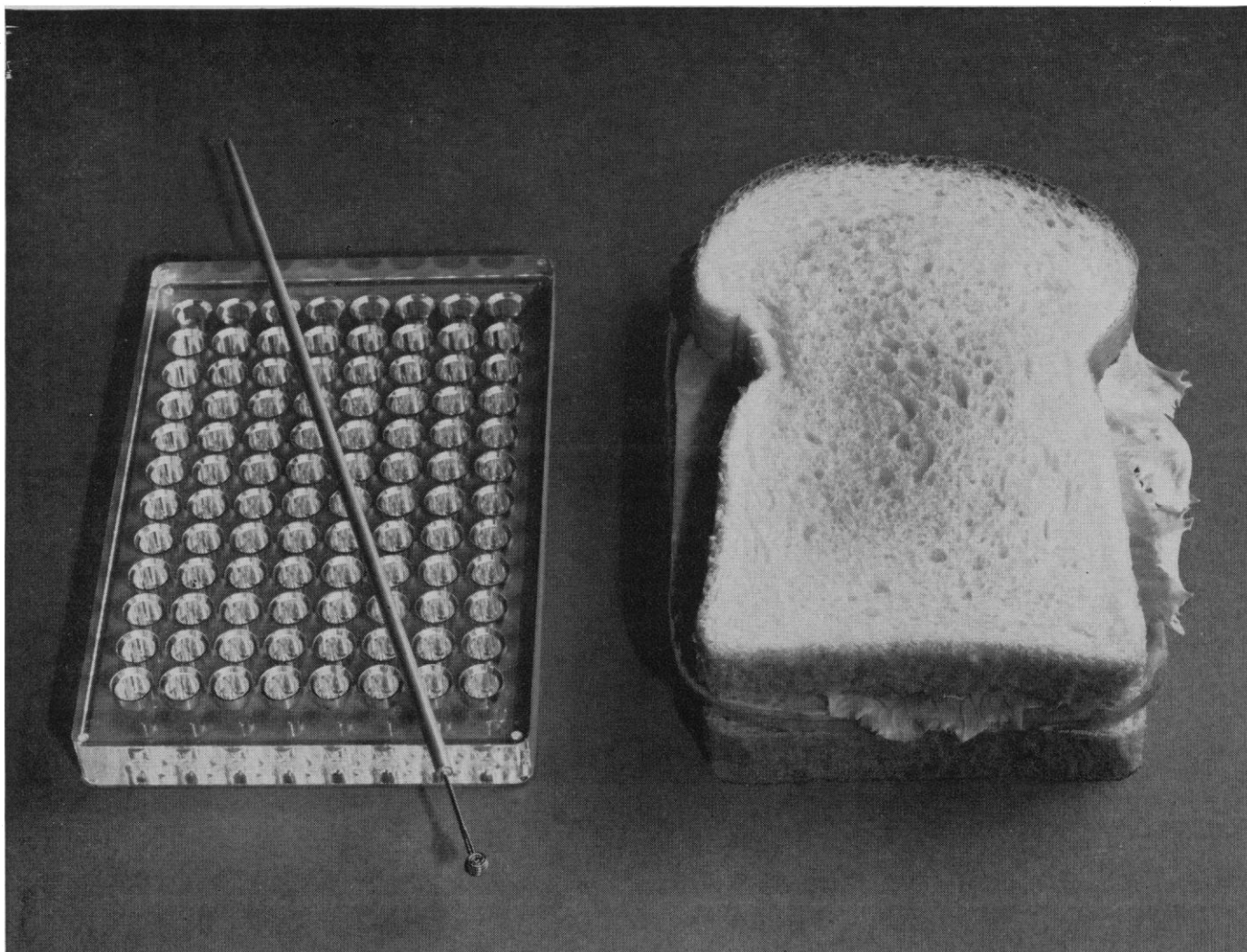
materials as proteins and enzymes. A new Helixtractor unit permits you to separate micro deposits from large volumes by the helical continuous flow process — up to 400% more efficient than ordinary centrifugation.

The UV is a paragon of convenience with an electric brake, two hour timer, rugged stainless steel guard bowl, speed controller, continuous reading tachometer, unitized control panel and modern cabinetized design. An exclusive custom-built IEC motor supplies "work horse" capability that means trouble free performance over a long service lifetime under the heaviest laboratory schedules.

Perhaps you should consider a UV, too.
Write for Bulletin I.

INTERNATIONAL **IEC EQUIPMENT CO.**

300 SECOND AVENUE • NEEDHAM HEIGHTS 94, MASS.



Save reagents . . . do thirty-two 12-step serial dilutions

in less time and space than your lunch!

The calibrated loop, micro technic has proven itself to be economical, fast and accurate. *Using the Microtiter*, 500 viral titrations can be done in one day by only four people. Ordinarily, this would take fifteen people five days.* In this system, a transparent plate just $3\frac{1}{2}'' \times 5''$ takes the place of 96 test tubes. With very little practice, you can perform eight serial dilutions simultaneously. And the Microtiter system saves eight times the amount of reagents and sera required in the test tube method, yet results are equal in reliability and reproductivity.

This is an exciting new technic that can best be appreciated by reviewing the following papers: "A Simplified Method for Virus-Tissue Culture Procedures in Microtitration Plates," Proceedings of the Society for Experimental Biology and Medicine, Vol.

113, 1963; "Application of a Microtechnique to Viral Serological Investigations," The Journal of Immunology, March, 1962; "Protocol for Micro Anti-streptolysin O Determinations," Journal of Bacteriology, May, 1964.

The Microtiter system has been proved in tests such as: complement fixation, hemagglutination inhibition, as well as ox cell hemolysin, anti-streptolysin titration, heterophile antibody agglutination, and metabolic inhibition. Order an introductory set today . . . it's the most convincing way to prove the value of this system in your own laboratory.

No. B1195—Microtiter® System Introductory Set: 2 plates, 2 pipettes and 4 loops complete with directions for comparing with test tube technic . . . \$59.50.

*Developed and manufactured by Cooke Engineering Co.



scientific products

DIVISION OF AMERICAN HOSPITAL SUPPLY CORPORATION

GENERAL OFFICES: 1210 LEON PLACE, EVANSTON, ILLINOIS—Regional Stocking Locations: Atlanta • Boston • Charlotte • Chicago • Columbus • Dallas • Detroit • Kansas City • Los Angeles • Miami • Minneapolis • New Orleans • New York • San Francisco • Seattle • Washington, D.C.
In Canada: Canadian Laboratory Supplies Limited—In Mexico: Hoffmann-Pinther & Bosworth, S.A.

new PICKER **2/1** SPECTRO/DIFFRACTOMETER

x-ray emission / x-ray diffraction

always ready for either technique

two permanently mounted x-ray tubes preclude changeover downtime

use this tube for fluorescence analysis

it offers these advantages

- end window type with W, Mo, Cr, or Pt target
- 60 KV CP high intensity radiation
- water-cooled specimen chamber
- rapid, easy crystal changing
- remote crystal tuning (with Omega motor)
- integrating specimen spinner
- air/helium operation (10 second flush)

this for x-ray diffraction

it offers these advantages

- constant potential operation
- variety of focal spots (.4, .75 and 1.5 mm available)
- both Omega and 2-Theta scanning
- electrically operated shutters
- take-off angle easily adjustable (without disturbing beam alignment)
- track-mounted specimen and detector supports
- complete set of slits or pinhole collimators

slew motor for single-angle programmer

encoder for single-angle programmer

The Picker Two-in-One SPECTRODIFFRACTOMETER provides uniquely versatile technical resources for a minimal outlay. It will find particular welcome in the laboratory where both diffraction and emission analyses may be required on the same specimen: one can follow the other by simple switchover (no need to interchange and/or align components). The instrument's instant readiness to tackle either job commends it to the small laboratory where scant space or stringent budget permits investment in only one goniometer.

To get the detailed story of these remarkable instrumental advances, call any local Picker representative or write PICKER X-RAY CORPORATION, WHITE PLAINS, N.Y.

another advance ...

automatic single-angle programming

The attachments seen jutting from the diffractometer base in the picture above are the slew motor and encoder for the Picker Single-Angle Programmer.

The programmer will automatically analyze

- up to 10 elements by x-ray emission techniques
- or up to 5 pairs of Bragg angles by diffraction

Operating unattended, it can save countless manhours in situations where much sequential work is to be done.

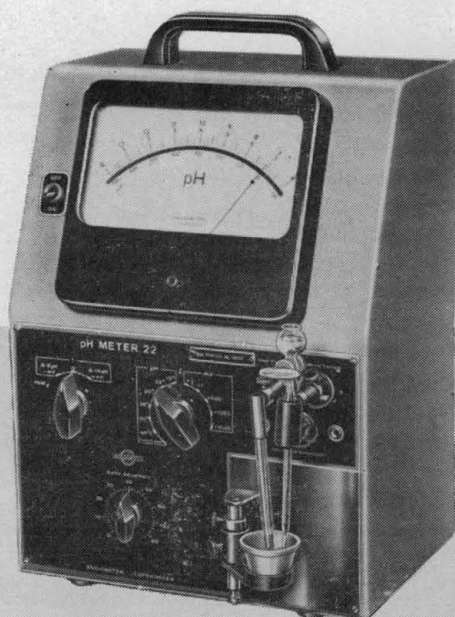


*For accurate
measurement of*

pH

...the

RADIOMETER pH Meter 22



Included in the complete line of famous Danish RADIOMETER Electro-chemical instruments is the pHM 22. This model is a-c line operated and designed for general laboratory use inclusive of electrometric titrations.

Features

- Exceptional stability — no zero drift
- Large mirror scale spreads 14 pH over 11 inches
- Accessory biological meter 6-8 pH on a 6.4" scale
- Accuracy .01 to .05 pH with reproducibility down .002 pH
- 10 Millivolt ranges
- Accurate temperature compensation
- Will perform measurements on grounded media
- Will perform Dead Stop End Point titrations
- Full range of standard and special type electrodes

Applications

- pH determinations and millivolt measurements in the laboratory
- Continuous pH determinations or millivolt measurements
- Acid/base, redox or other potentiometric titrations
- Dead-stop end-point titrations

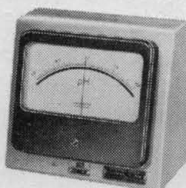
Descriptive literature on request.

ALSO AVAILABLE



PHA 630 P Scale Expander: Expands any selected 1.4 pH zone up to full scale proportions — nearly 6 times scale expansion.

PHA 621 External Meter: Presents on a full 7" mirrored scale, only the biological range of 6 to 8 pH.



SOLD AND SERVICED IN U.S.A. BY
THE LONDON COMPANY

811 Sharon Drive

WESTLAKE, OHIO



RADIOMETER

72 Emdrupvej

COPENHAGEN, DENMARK

In Canada: Factory representatives Bach-Simpson Limited; sold and serviced by Canadian Laboratory Supplies Limited



Take time to find out

There are three distinctly new Beckman Infrared Spectrophotometers.

IR-10 — a precision instrument with a range of 2.5 to 33.3 microns for only \$6,800.

IR-11 — that runs survey scans in about 10 minutes over the 12.5 to 300 micron range.

IR-12 — the widest continuous range, automatic spectrophotometer ever... 2.5 to 50 microns.

Take a few minutes to learn more about these unusual IR instruments.

Call your local Beckman Sales Engineer or write us direct for Data File LIR-38-364.

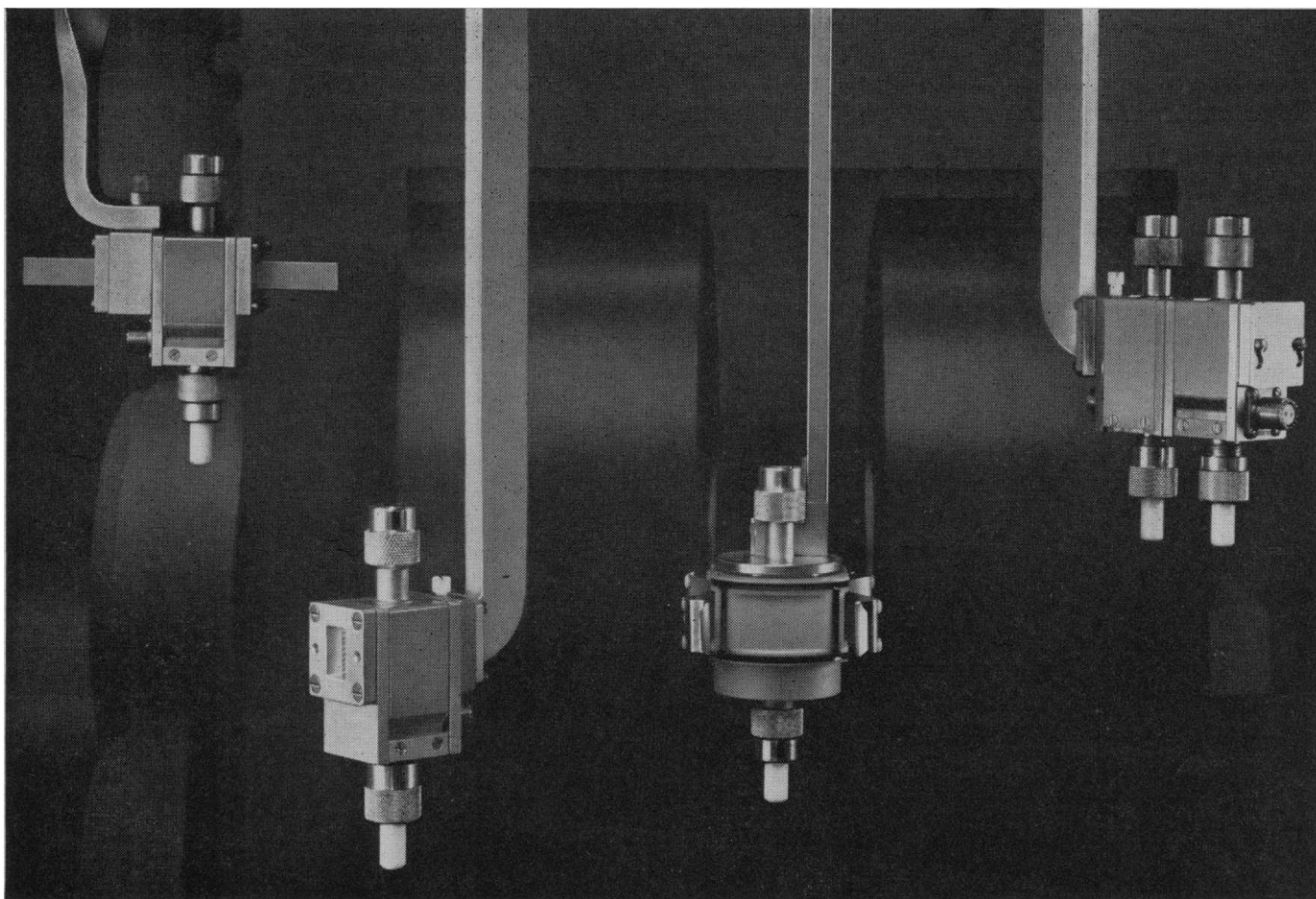
Beckman

INSTRUMENTS, INC.

SCIENTIFIC AND PROCESS INSTRUMENTS DIVISION

FULLERTON, CALIFORNIA • 92634

INTERNATIONAL SUBSIDIARIES: GENEVA, SWITZERLAND; MUNICH, GERMANY; GLENROTHES, SCOTLAND; PARIS, FRANCE; TOKYO, JAPAN; CAPETOWN, SOUTH AFRICA



GREATER EPR VERSATILITY

WITH INTERCHANGEABLE CAVITIES

The ultimate usefulness of an EPR spectrometer depends largely on the variety of experiments you can perform with the instrument. That's why Varian designed an EPR system with four interchangeable sample cavities and a large number of cavity accessories. Each of the cavities and accessories extends the total capabilities of the system and provides optimum performance over a wide range of applications.

As new uses for EPR are discovered, Varian will continue to develop compatible cavities and accessories designed to give you the very best in system performance. We call this our "Living Instrument" policy. It's your assurance that the Varian Spectrometer bought today will still be the most versatile spectrometer available tomorrow.

Please write or call the Analytical Instrument office nearest you for complete information.

V-4531 MULTI-PURPOSE CAVITY. Will accept sample tubes with diameters up to 11 mm. Permits experiments with accessories such as aqueous sample cell, liquid mixing chamber, liquid nitrogen Dewar, electrolytic cell, and variable temperature accessory. Samples can be irradiated continuously with either u-v or visible light.

V-4532 DUAL SAMPLE CAVITY. Allows simultaneous observation of two samples. Provides a method for determining precise g value and line widths as well as hyperfine splittings and the relative and absolute number of electron spins in an unknown.

V-4534 OPTICAL-TRANSMISSION CAVITY. Allows simultaneous observation of changes in sample optical density, and observation of paramagnetic resonance, as well as simultaneous irradiation of the sample from two light sources of different wave lengths.

V-4533 ROTATING CAVITY. Particularly useful in single crystal studies with a rotating electromagnet. Compatible with Varian liquid nitrogen and variable temperature accessories. Irradiation is possible from above or below this cavity. Provides improved sensitivity for many types of samples.

VARIAN ASSOCIATES
ANALYTICAL INSTRUMENT DIVISION
611 HANSEN WAY, PALO ALTO, CALIF.
In Europe: Varian A. G., Zug, Switzerland

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

BINOCULAR BRIGHTFIELD RESEARCH BR-BMIC \$775

LABORATORY MICROSCOPE MLK \$191

WIDEFIELD FILAR MICROMETER EYEPIECE
\$105

TISSUE CULTURE INCUBATOR
\$399

BINOCULAR AUTO-ILLUMINATION BMLU \$414

UNITRON MICROSCOPE FOR THE MONEY

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. 44
☐ 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.

performance-proved instruments for
DIFFERENTIAL THERMAL ANALYSIS



NOW— MEASURE ENERGY TRANSITIONS DIRECTLY IN CALORIES!

The Model DSC-1 Differential Scanning Calorimeter measures energy transitions

directly in calories, and produces results similar to classical determinations in a fraction of the time. Heats of fusion, specific heat, glass transitions, heats of reaction, and combustion energy—characterizing catalyst activity, curing rate, thermal stability and degree of crystallinity—are measurable by this new instrument.

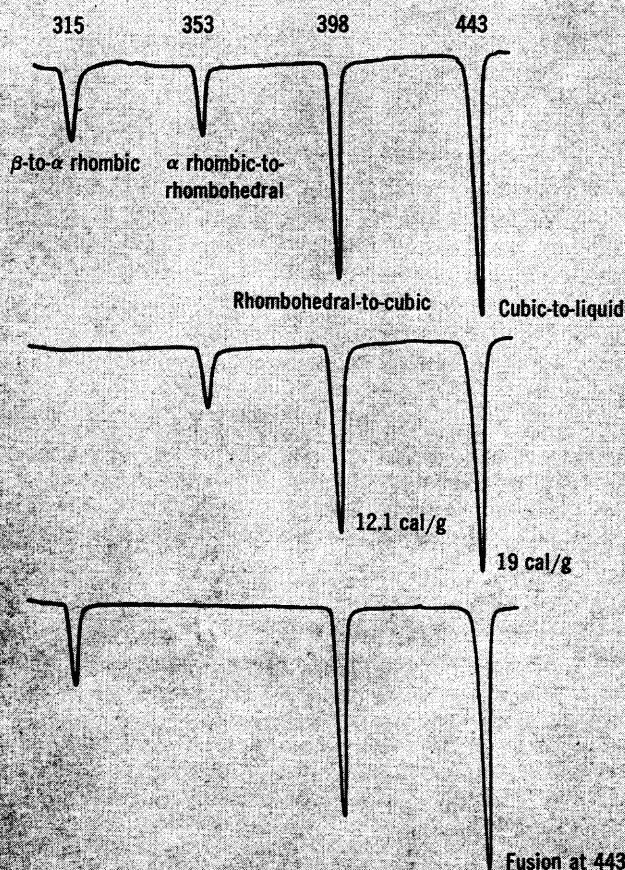
In addition to providing direct calorie measurement, the DSC-1 will scan up or down in the range of -173°K to 773°K , with linear scan rates from 0.625°K to $80^{\circ}\text{K}/\text{min}$. It

takes samples as small as 0.1 mg, and operates in vacuum or inert atmosphere. The DSC-1 resolves transitions less than 0.5°K apart, and analyzes effluent samples with a thermal conductivity cell. No reference compound is required. Samples may be open or sealed liquid, powder or film. Temperature is directly recorded.

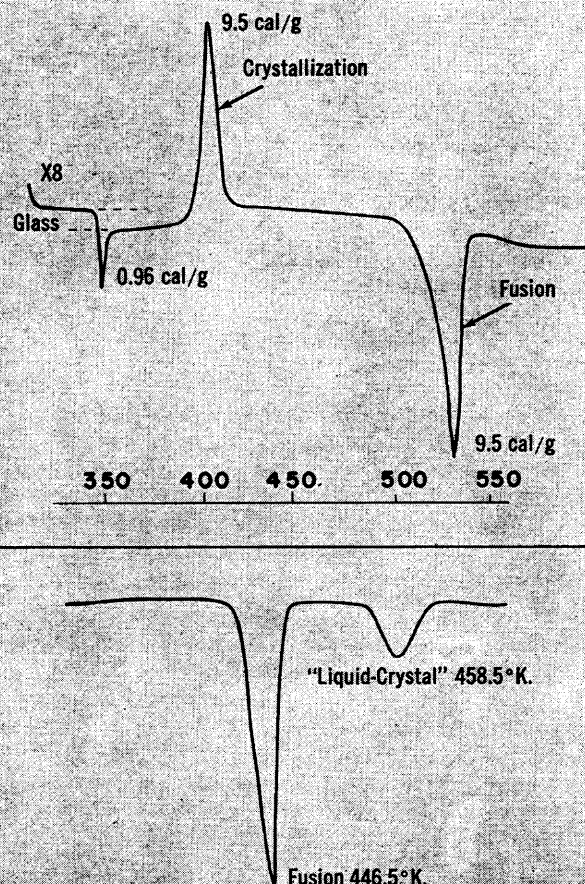
Free—Differential Scanning Calorimetry booklet. Write to the Instrument Division, Perkin-Elmer Corporation, 910 Main Avenue, Norwalk, Connecticut.

PERKIN-ELMER

Thermograms illustrate crystal transitions of ammonium nitrate. Peak areas yield the transition energies shown.



Top chart is thermogram of polyethylene terephthalate. Peak areas correspond to transition energies as shown. Bottom run is anisaldazine.



The Faraday Press announces 21 major Soviet Scientific Journals now available for the first time

- **AUTHORITATIVE COVER-TO-COVER ENGLISH TRANSLATION**
- **REGULAR YEARLY SUBSCRIPTION - BEGINNING WITH JAN. 1965 ISSUES**

Nuclear Physics / Yadernaya Fizika

Soviet progress at the Kurchatov Institute, at Dubna and other key centers, previously reported in various journals, will now be covered by this indispensable Academy of Sciences publication.
Monthly, \$150 / year

Differential Equations / Differentsial'nyye Uravneniya

Offers for the first time in a single journal the original work of outstanding Soviet mathematicians in this increasingly important field.
Monthly, \$150 / year

Theoretical and Experimental Chemistry /

Teoreticheskaya i Eksperimental'naya Khimiya

Reports on the most important current research of the leading centers throughout the Soviet Union; the equivalent in importance in chemistry to the Soviet J. Theoretical & Exp. Phys. in physics.
Bimonthly, \$120 / year

Soviet Radiophysics / Izvestiya VUZ: Radiofizika

Presents original contributions by Troitskiy and other world-famous Soviet radiophysicists dealing with lunar and solar radio emission, the propagation of electromagnetic waves, and other radiophysical phenomena.
Bimonthly, \$125 / year

Soviet Radio Engineering / Izvestiya VUZ.

Radiotekhnika

Publishes articles on the latest Soviet advances in information theory, high-frequency radio electronics and electrodynamics, and new radio engineering materials and components.
Bimonthly, \$115 / year

Journal of Applied Mechanics and Technical Physics /

Zhurnal Prikladnoy Mekhaniki i Tekhnicheskoy Fiziki

A wide-ranging journal of importance to applied physicists, and mechanical, aeronautical, chemical, and structural engineers.
Bimonthly, \$150 / year

Soviet Physics / Izvestiya VUZ. Fizika

Covers advanced Soviet theoretical and experimental investigations in plasma physics, optics, molecular physics, electronic processes and the entire range of physics research.
Bimonthly, \$125 / year

Astrophysics / Astrofizika

Describes Soviet research in lunar, interplanetary, solar and stellar physics, as performed under the direction of V. A. Ambartsumyan and other leading astrophysicists. *Quarterly, \$90 / year*

Polymer Mechanics / Mekhanika Polimerov

Keeps the reader informed on the latest and most valuable developments in Soviet polymer research and applications.
Bimonthly, \$120 / year

Heat and Power / Teploenergetika

Reports the latest advances in heavy power equipment and automation, fuels and combustion, turbomachinery design, and thermophysical properties.
Monthly, \$220 / year

Applied Solar Energy / Geliotekhnika

A significant new journal, devoted entirely to a subject in which Soviet scientists are making outstanding contributions.
Bimonthly, \$110 / year

Journal of Organic Chemistry /

Zhurnal Organicheskoy Khimii

Of interest to every Western organic chemist, this new journal will be the principal source of information on Soviet research in this field, previously available only as scattered articles in many journals.
Monthly, \$160 / year

Journal of Applied Spectroscopy /

Zhurnal Prikladnoy Spektroskopii

Describes the many expanded and new applications of spectroscopy in the various engineering and scientific disciplines.
Monthly, \$150 / year

Journal of Engineering Physics /

Inzhenerno-Fizicheskiy Zhurnal

Devoted to Soviet basic and applied research in heat and mass transfer and exotic heat sources; highly valuable, presenting many original contributions.
Monthly, \$150 / year

Magnetic Properties of Liquid Metals /

Magnitnaya Mekhanika Zhidkikh Metallov

Increasing research and success in technological applications of magnetism in the Soviet Union have led to the publication of this important new journal.
Quarterly, \$90 / year

Chemistry of Heterocyclic Compounds /

Khimiya Geterotsiklicheskikh Soyedineniy

Expanding Soviet research in this increasingly important area has contributed this vital new journal. *Bimonthly, \$120 / year*

Chemistry of Natural Compounds /

Khimiya Prirodnykh Soyedineniy

The Soviet journal devoted to original research in the structure, modification and synthesis of natural compounds.
Bimonthly, \$110 / year

Electrical Engineering / Elektrotekhnika

Reports the latest, most important advances in Soviet electrical equipment and instrumentation.
Monthly, \$160 / year

Applied Biochemistry and Microbiology /

Prikladnaya Biokhimiya i Mikrobiologiya

Research in this field is producing extensive and valuable new applications in many areas of industry and medicine; reviewed fully in this critically important new journal.
Bimonthly, \$120 / year

Physicochemical Properties of Materials /

Fiziko-Khimicheskaya Mekhanika Materialov

Of great importance to industry, this journal reports on new materials being developed in the Soviet Union, their properties and specific applications.
Bimonthly, \$115 / year

Cybernetics / Kibernetika

Offers a complete review of current achievements and long-range goals in this field being rapidly developed in the Soviet Union, in which top Soviet talent is being concentrated.
Bimonthly, \$115 / year

Note: Yearly subscriptions and back copies (1962-current) to "Soviet Engineering Physics Abstracts" and "Soviet Heat and Power Abstracts" are still available—write for further information.

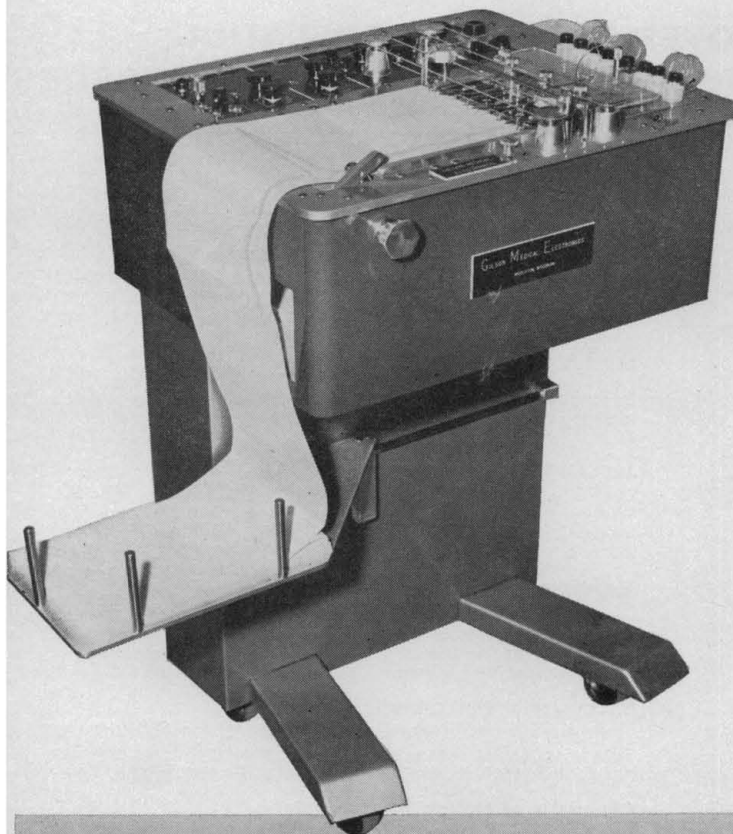
**Order your 1965 subscriptions to the essential
Soviet journals described above from:**



The Faraday Press PUBLISHERS
15 Park Row, New York, N.Y. 10038

GME

MODEL M5P MINI-POLYGRAPH



- *Fully modular*
- *2 to 5 channels*
- *Rectilinear recording*
- *Simultaneous 8" servo and other records on one graph*
- *Compact versatility—up to 4 chopper, ECG, or EEG channels in any assortment —up to 2 servos...for a total of 5 channels*

- Each channel a complete, self-contained interchangeable unit
- One or two servos may be used, writing the full width of 8" chart. Sensitivity up to 6 millivolts full scale, traverse time approximately 1 second
- Chopper amplifiers, for pressure or force with a Statham transducer, or for temperature with a thermistor bridge. Include Zener diode regulated power supply for bridge. May also be used as stable high gain DC amplifiers
- Time and event markers included
- Rectilinear recording — simple and reliable linkage with only two moving parts
- Transducers plug in directly — no extra power supply or pre-amplifiers needed
- Ease of record analysis — the servo record is on the same chart as other records (EEG, ECG, pressure, etc.) — all on 8"-wide fan-folded paper with millimeter square marking
- Anti-clogging inking system
- Instantaneous speed change without gear shifting — 6 speeds
- Rugged and sturdy construction

MODEL M8PM FULLY MODULAR 8-CHANNEL MACRO-POLYGRAPH AVAILABLE

GILSON MEDICAL ELECTRONICS

MIDDLETON, WISCONSIN

On Madison's West Beltline Highway

**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

MELVIN CALVIN	NEAL E. MILLER
ERNEST COURANT	PHILIP M. MORSE
FARRINGTON DANIELS	COLIN S. PITTENDRIGH
JOHN T. EDSALL	KENNETH S. PITZER
DAVID R. GODDARD	DEWITT STETTIN, JR.
ALEXANDER HOLLAENDER	WILLIAM L. STRAUS, JR.
ROBERT JASTROW	EDWARD L. TATUM
EDWIN M. LERNER II	JOHN R. WINCKLER
WILLARD F. LIBBY	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, MARION ZEIGER, ROSEMARY GALLI*Europe:* VICTOR K. McELHENY, Flat 3, 18 Kensington Court Place, London, W.8, England (Western 5360)*Book Reviews:* SARAH S. DEES*Editorial Assistants:* ISABELLA BOULDIN, ELEANORE BUTZ, SYLVIA EBERHART, GRAYCE FINGER, NANCY HAMILTON, OLIVER HEATWOLE, ANNE HOLDSWORTH, MARCIA ISAAK, RUTH KINGERLEE, HOWARD NATHENSON, EDGAR RICH**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 CALLISChicago, Ill., 6 W. Ontario St. (312-DE-7-4973);
HERBERT BURKLANDLos Angeles 45, Calif., 8255 Beverly Blvd.
(213-653-9817); WINN NANCEEDITORIAL 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.**Only One Side of the Question**

In the past year Congress has wrestled with problems of controlling and legislating for research and development funds, but achievements so far appear to be minuscule. One problem which has been scarcely considered is that of obtaining a multiplicity of well-founded opinions on scientific and technical programs. The authorization hearings for the \$5 billion space program illustrate the point. The House and Senate committees heard extensive testimony from government witnesses representing, for example, the National Aeronautics and Space Administration. Although a majority of the nation's scientists question facets of the program, no opposing witnesses appeared. In part, this was because they were not invited; in part, because they did not seek a hearing.

In contrast, committees considering legislation in areas other than science and technology often find that many citizens ask to testify. In matters in which conflicts of self-interest exist, issues usually are well examined. For instance, committees considering legislation concerned with labor and management are presented with expert testimony from both sides. Many organizations support staffs that compile reports, prepare presentations and rebuttals, and look for special opportunities to advance their cause. In an effort to triumph, the opponents may propose fruitful new ideas. The public and Congress emerge with a sounder view of the factors involved.

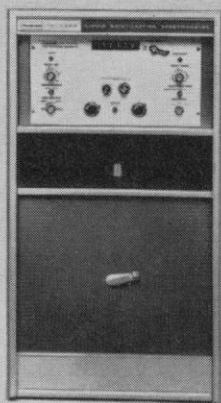
There are several reasons why scientists do not seek to testify at hearings on research and development legislation. Most scientists are unaware of the schedule of impending hearings and unfamiliar with mechanisms for obtaining an audience. Only a limited number feel competent to make judgments in the diverse, highly technical areas. With few exceptions there are no staffs to aid in preparation of material. Only when highly emotional issues, such as fallout, are involved is there a semblance of broad response. A major reason why research and development legislation is not more adequately discussed is a lack of evident immediate clash of self-interest among scientists. The self-interest of those who advocate expenditures is obvious, but who makes the probing counterargument? At present, it comes not from informed witnesses but from congressmen, whose principal well-worn line is that we are spending too much money on science in general.

Failure of scientists publicly to criticize to any appreciable degree programs many deem ill-judged often stems from analysis of the balance sheet of their own self-interest. On the positive side is the consideration that the long-term interest of their profession and the nation dictates that unwise expenditures not be made. If the public loses confidence in the integrity of scientists, the sequel could be calamitous for all. But this is a nebulous possibility which does not outweigh the realities of the present. The witness in questioning the wisdom of the establishment pays a price and incurs hazards. He is diverted from his professional activities. He stirs the enmity of powerful foes. He fears that reprisals may extend beyond him to his institution. Perhaps he fears shadows, but in a day when almost all research institutions are highly dependent on federal funds, prudence seems to dictate silence.—PHILIP H. ABELSON

TEN YEARS AGO IT COST \$7,500
to buy a manual Tri-Carb® Liquid
Scintillation Spectrometer



Original Model 314 Tri-Carb Spectrometer. Floor space required: Approximately 20 square feet. Price: \$7,500.



TODAY
THE PRICE
IS ONLY
\$4,750

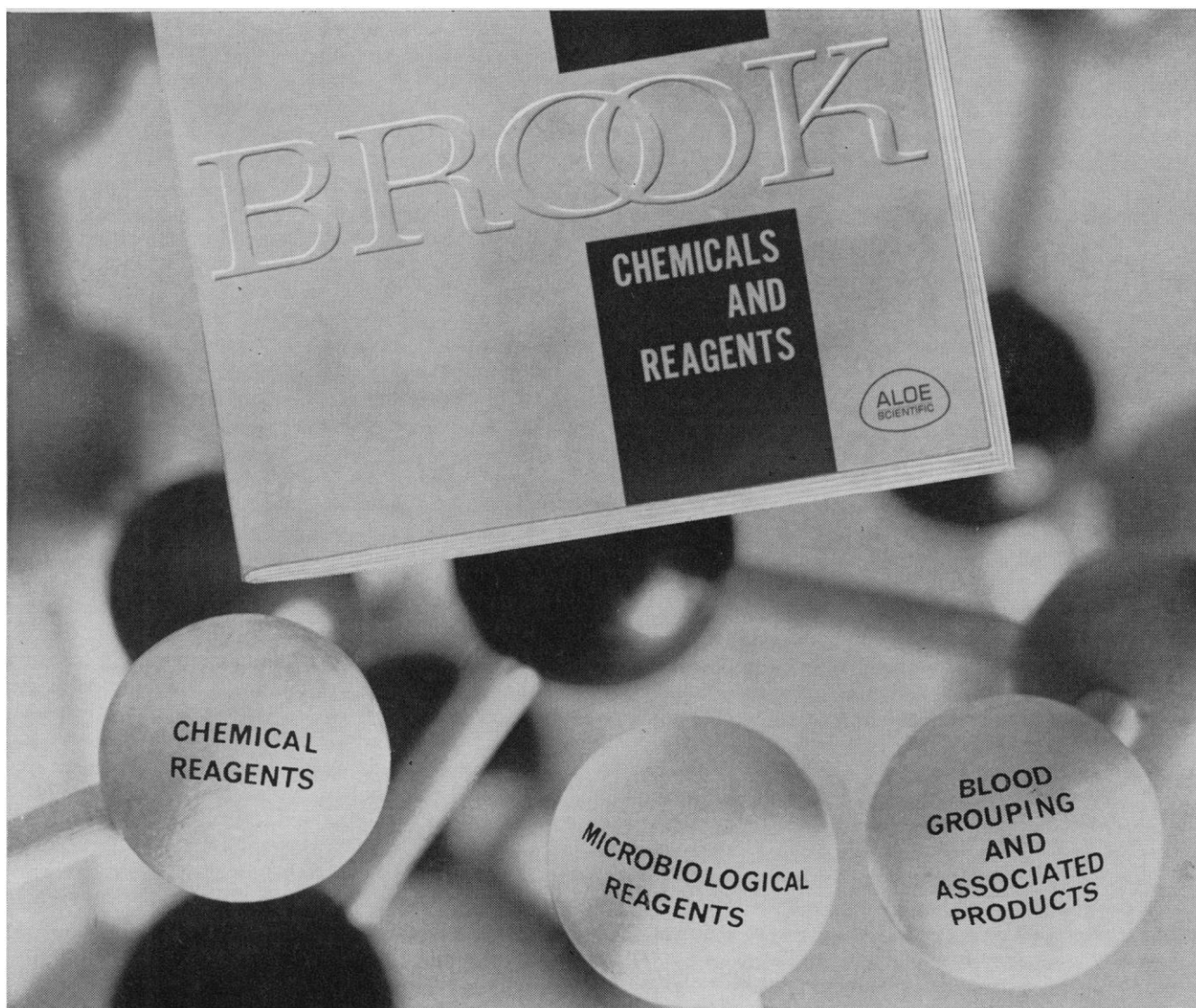
1964 Model 3101 Tri-Carb Spectrometer. Floor space required: 2.5 square feet. Price: \$4,750.

Packard

PACKARD INSTRUMENT COMPANY, INC.

2200 WARRENVILLE ROAD • DOWNERS GROVE, ILLINOIS 60515
AREA CODE 312 • 969-8000

In 1954, the first regular production model Tri-Carb Liquid Scintillation Spectrometer was delivered. It counted one sample at a time. Manual loading of the sample into the counting chamber in the freezer was complicated and slow. Typically, the Model 314 would count a good unquenched organic tritium sample with a minimum efficiency of 15% and a background of approximately 60 cpm. ■ Today, you can buy a new Model 3101 Tri-Carb Spectrometer that far surpasses the original instrument in every respect for just \$4,750—an instrument in which the sample can be loaded in one second and which, typically, will count unquenched organic tritium samples with a minimum efficiency of 35% and a background of approximately 30 cpm. This represents more than a tenfold improvement in the figure of merit, E^2/B , for tritium. The Model 3101 is a manual room-temperature instrument designed for modest research programs, teaching, and demonstration. Other 3000 and 4000 Series Tri-Carb Spectrometers, of course, incorporate improved automation and other convenience features, while providing a figure of merit which greatly exceeds even that of the Model 3101. ■ In addition to vastly improved performance, all Tri-Carb Spectrometers offer a degree of reliability impossible to achieve ten years ago. Today, due to its continuous program of design improvement based on a decade of experience in designing, manufacturing, and servicing thousands of Tri-Carb Spectrometers, Packard Instrument Company is supplying the most reliable liquid scintillation spectrometers ever produced. ■ Your Packard Sales Engineer can provide complete details on new 3000 and 4000 Series Tri-Carb Spectrometers, or, write for Bulletin 1030.



MORE THAN DEPENDABILITY

Next to dependability, time is the most important element in modern laboratory practice. To help make your time most productive, Brook diagnostic aids and chemical reagents are easier for you to order and easier for you to identify in use. Complete information is included in this simplified Brook catalog along with useful conversion and reference tables — and a cross reference of clinical instrument procedure manuals. It's yours on request from your Aloe Scientific Representative or send coupon.



Serving the Sciences that Serve Mankind

For your **FREE** copy . . .

Clip and mail to

Aloe Scientific ☐ Division of Brunswick
1831 Olive Street, St. Louis 3, Mo.

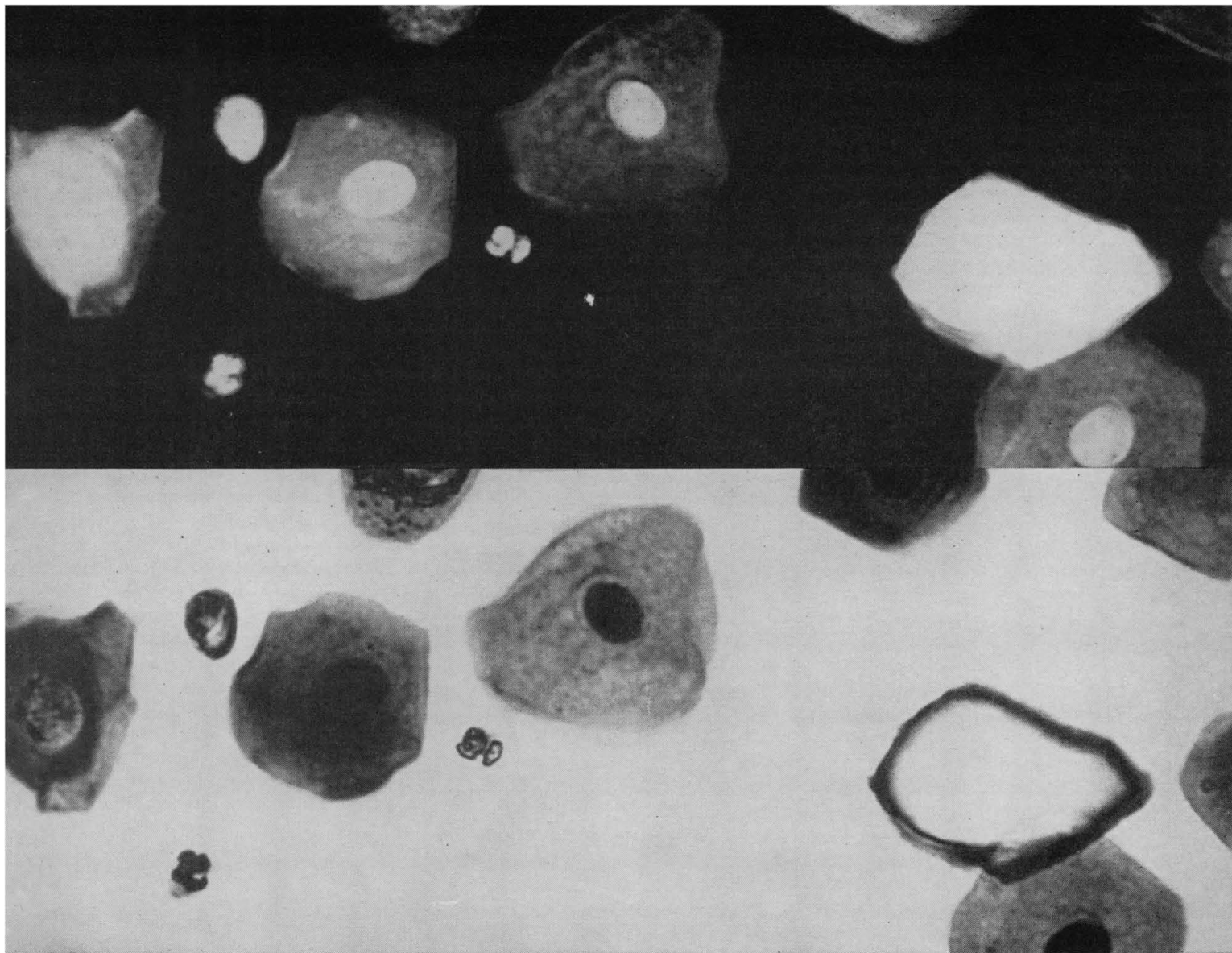
Name _____

Title _____

City _____

State _____

SC-7

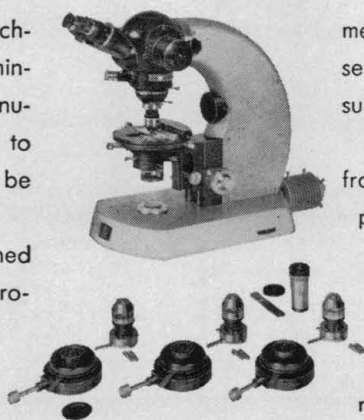


Squamous epithelial cells: negative and positive image contrast.

Maximum contrast in interference microscopy

The design of Carl Zeiss Interference Attachments for transmitted light is based on Jamin-Lebedeff concepts. Present scientific and manufacturing methods have made it possible to greatly improve the equipment so that it can be used at highest magnifications.

The Interference Attachments were designed for the various Carl Zeiss Polarizing Microscopes, except the KFT. They are quickly installed and very simple to manipulate. The use of matched birefringent plates permits critical alignment of the beam-splitting and beam-combining systems. No other interference equip-



Interference Attachments.

ment provides as much separation between observation and comparison ray paths. This assures maximum image contrast.

All sensitive optical parts are mounted free from strain; thus, images of highest quality are produced and phase differences can be most accurately measured. A variety of compensators is available for measuring small and large phase differences, which must be determined to calculate concentrations, thicknesses, refractive indices, etc. of objects examined.

Write Dept. SC for further details. **Complete service facilities available.**

CARL ZEISS, INC.

444 Fifth Avenue, New York, N. Y. 10018

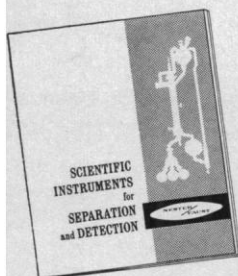
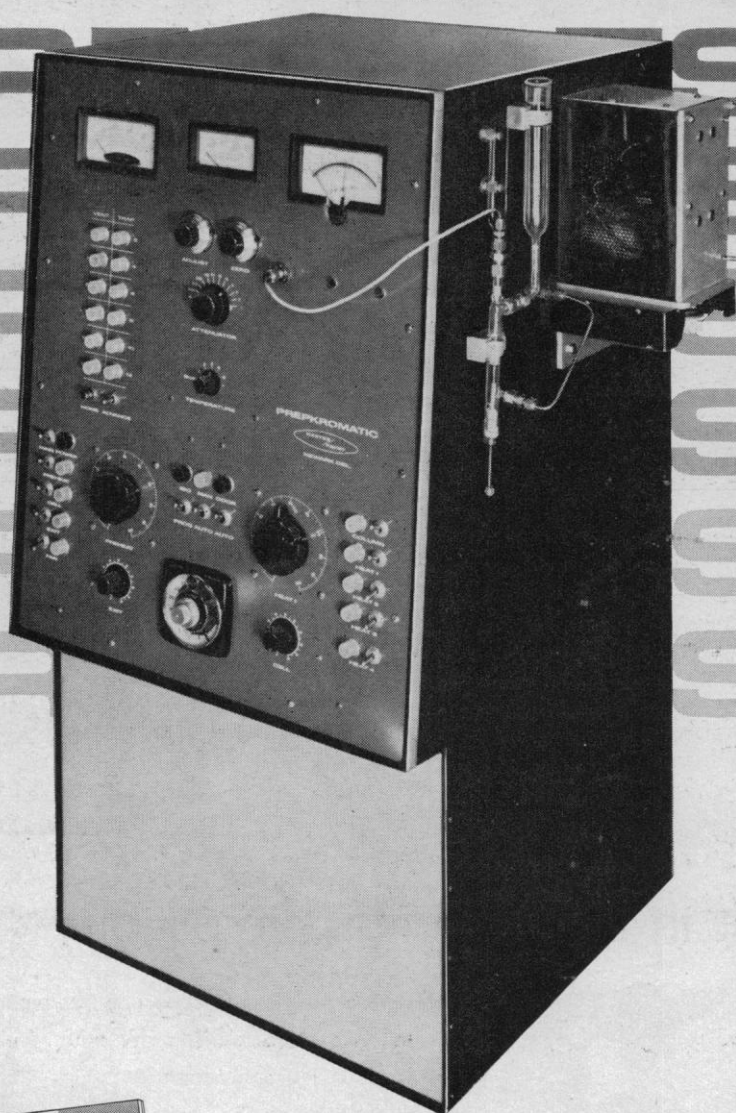
BRANCH OFFICES IN ATLANTA, CHICAGO, LOS ANGELES, SAN FRANCISCO, SEATTLE



The Great Name in Optics

IN CANADA: TORONTO, MONTREAL, WINNIPEG, VANCOUVER

REPEATS REPEATS



Prepkromatic is a preparative gas chromatograph which automatically injects and collects samples either isothermally or in a linear programmed mode. This process continually repeats itself.

It operates using Bi-wall or smaller diameter columns and offers many exclusive features. Write or call for a complete brochure.

**1964
CATALOG
NOW
AVAILABLE!**



NESTER/FAUST manufacturing corporation • 2401 OGLETOWN RD., NEWARK, DELAWARE
PHONE 302-368-9146

that is, the one away from invention of gadgetry for its own sake, and toward the standardization of the most useful techniques and equipments so that usable information can be obtained in some depth and quantitative relatedness with other data.

The selection of some outstanding papers always runs the risk of accusation of bias and judgment, and this is no doubt true. What is new and interesting depends upon how much the observer knows and upon his predilections. The paper by Wally Sinaiko on international teleconferencing opened up a whole new field of research having the possibility of immediate results in our present highly insecure society. He described some of the studies being done on communications by telephone, teletype, language translation, and the TV-phone. Ward Edwards described some of his work on decision-making by use of Bayesian mathematics. We are leaving ourselves open to an accusation of bias by stating that this is only an arbitrary sample of what was an almost universally worthwhile symposium. We recommend that interested readers obtain a copy of the proceedings from IEEE headquarters (Box A, Lenox Hill Station, New York, N.Y. 10021).

W. E. WOODSON
M. FREITAG

*General Dynamics/Astronautics,
San Diego, California*

Forthcoming Events

August

2-3. **Ophthalmic Biochemistry**, first intern. conf., Woods Hole, Mass. (S. Lerman, Univ. of Rochester, Rochester, N.Y.)

2-4. American Assoc. of **Colleges of Pharmacy**, New York, N.Y. (C. W. Bliven, 1507 M St., NW, Washington, D.C. 20005)

2-6. National **Medical Assoc.**, 69th annual, Washington, D.C. (Administrative Secretary, 520 W St., NW, Washington, D.C. 20001)

2-7. American **Pharmaceutical Assoc.**, 111th annual, New York, N.Y. (G. B. Griffenhagen, Div. of Communications, 2215 Constitution Ave., NW, Washington, D.C.)

2-8. **Applied Psychology**, 15th intern. conf., Ljubljana, Yugoslavia. (B. Petz, Inst. of Psychology of Zagreb, Djure Salaja b.b., Zagreb, Yugoslavia)

2-8. **Reactivity of Solids**, 5th intern. symp., Munich, Germany. (B. Stuke, Physikalische-Chemisches Institut, Sophienstr. 11, Munich)

3-5. Compounds of Interest in **Nuclear Reactor Technology**, intern. symp.,

Separation media for the modern laboratory

Scientifica

AMBERLITE® ION EXCHANGE RESIN LOADED PAPERS

SA-2 strong acid
WA-2 weak acid
SB-2 strong base
WB-2 weak base

...combining the advantages and the best properties of ion exchange resin columns with the techniques of paper chromatography. Unlike chemically "treated" papers, AMBERLITE Ion Exchange Resin Loaded Papers have the micro-pulverized resins loaded directly into a slurry of high quality alpha-cellulose pulp.

Result: a series of chromatographic papers with exceptional separation versatility.

Advantages: Use shorter lengths of paper. Get higher capacities and concentration effects. Work with simple aqueous-buffer solutions.

For more detailed information and a complete listing of possible separations, ask for TECHNICAL BULLETIN #3032

Write to Dept. RL

Scientifica

P.O. BOX 1084, CLIFTON, NEW JERSEY

24 JULY 1964

Boulder, Colo. (J. T. Waber, Los Alamos Scientific Laboratories, P.O. Box 1663, Los Alamos, N.M. 87544)

3-7. Instrument Soc. of America, instrumentation conf., Geneva, N.Y. (H. S. Kindler, 530 William Penn Place, Pittsburgh, Pa.)

3-7. World Federation for Mental Health, 17th annual, Bern, Switzerland. (F. Cloutier, 1, rue Gevray, Geneva, Switzerland)

3-8. International Years of the Quiet Sun, regional symp., Buenos Aires, Argentina. (J. G. Roederer, Facultad de Ciencias, Perú 272, Buenos Aires)

3-10. Anthropologists and Ethnologists, 7th world conf., Moscow, U.S.S.R. (American Anthropological Assoc., 1530 P St., NW, Washington, D.C. 20005)

3-12. Botanical Congr., 10th intern., Edinburgh, Scotland. (Miss S. C. Penny, 5 Hope Park Sq., Edinburgh 8)

4-7. Poultry Science Assoc., annual, Minneapolis, Minn. (E. L. Johnson, Dept. of Poultry Science, Univ. of Minnesota, St. Paul 55101)

4-17. Methods of Hydrological Forecasting, 3rd inter-regional seminar, World Meteorological Organization/UN Economic Commission for Asia and the Far East, Bangkok, Thailand. (WMO, Secretariat, Geneva, Switzerland)

5-7. Sonic Investigations on Internal Damping in Solids, symp., London, England (Administration Assistant, Institute of Physics and the Physical Society, 47 Belgrave Square, London, S.W.1)

5-12. Atmospheric Radiation, symp., World Meteorological Organization/Intern. Union of Geodesy and Geophysics, Leningrad, U.S.S.R. (Secretariat, WMO, Geneva, Switzerland)

5-15. High Energy Physics, 12th intern. conf., Dubna, U.S.S.R. (M. L. Goldberger, Commission on High Energy Nuclear Physics, IUPAC, Princeton Univ., Princeton, N.J. 08540)

6-11. American Podiatry Assoc., New York, N.Y. (F. A. Kalbacher, American Podiatry Assoc., 3301 16th St., NW, Washington, D.C. 20010)

7-14. Scientific Study on Mental Retardation, intern. congr., Copenhagen, Denmark. (A. Dupont, Statens Andssvageforsorg, Nyropsgade 28.2, Copenhagen 5)

9-12. Heat Transfer, 7th natl. conf., Cleveland, Ohio. (W. Chenoweth, American Inst. of Chemical Engineers, 345 E. 47 St., New York 17)

9-13. American Soc. of Animal Science, Knoxville, Tenn. (J. E. Oldfield, Dept. of Animal Science, Oregon State Univ., Corvallis)

9-14. South American Union of Engineers' Federations, 10th conv., Rio de Janeiro, Brazil. (Federação Brasileira de Associações de Engenheiros, Caixa Postal 1229, Rio de Janeiro)

10-14. Structural Developments in Inorganic Chemistry, New Hampton, N.H. (W. G. Parks, Dept. of Chemistry, Univ. of Rhode Island, Kingston)

10-15. Pan American Federation of Engineering Socs., 8th biennial conv., Caracas, Venezuela. (L. K. Wheelock, Engineers Joint Council, 345 E. 47 St., New York 10017)

WANT A GC SUPPORT YOU CAN LEAN ON?

it's ANAKROM by choice!

A Product of Analabs

The modern gas chromatographer demands the high resolution and performance reliability available only with uniform packing of the purest diatomaceous earth support. And that's Anakrom*. Quality controlled Anakrom in accurate 10 mesh cuts—40/50 through 160/170 mesh—minimizes "tailing," increases efficiency. Five types: Untreated, Acid Washed, Acid and Alcohol-Base Washed, Vacuum Siliconized varieties of both washed types. Also, a complete line of Adsorbents, Phases, Packed Columns, Hardware. Send today for our illustrated Catalog and Price List.

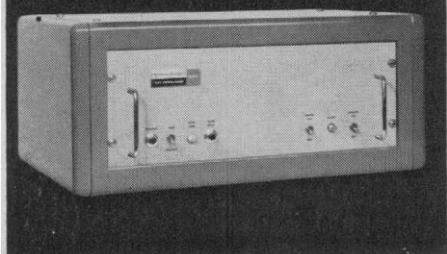
Gas and Thin Layer Chromatography Courses by leading authorities
Mayflower Hotel, Washington, D. C., Sept. 28, 1964
Analabs pioneered these invaluable seminars. Write immediately for information and registration card.

*Registered trademark

ANALABS

P.O. BOX 5215
HAMDEN, CONNECTICUT — 06518

Digitize Amino Acid Liquid-Column Chromatography



with Perkin-Elmer integrated data reduction and programming systems

Perkin-Elmer digital translation equipment puts the speed and accuracy of computers to work with liquid-column chromatography, by providing a complete and automatic data link. Designed for compatibility with the Honeywell and Bristol multi-channel and single-channel recorders, typically used in Phoenix-Precision and Technicon colorimeters, Perkin-Elmer systems provide exceptional accuracy and reliability.

Perkin-Elmer undertakes complete equipment responsibility between transmittance and wavelength sources and a terminal tape punch. Standard systems are supplied with a FORTRAN program, providing automatic base line correction and concentration calculations.

Complete systems include transducers for the sensing sources, solid-state translation equipment and a paper tape punch. Optional versions provide for time-sharing in a common translator for multiple-recording stations, and common or multiple-tape punches.

For complete descriptive information and specifications, write to the Electronic Products Division, Perkin-Elmer Corporation, 784 Main Avenue, Norwalk, Connecticut.

PERKIN-ELMER

11-14. American Soc. for **Pharmacology and Experimental Therapeutics**, San Francisco, Calif. (H. G. Mandel, George Washington Univ. Medical School, Washington, D.C. 20005)

12-14. **Ballistic Missile and Space Technology**, 9th symp., U.S. Naval Training Center, San Diego, Calif. (C. Morrow, Aerospace Corp., P.O. Box 95085, Los Angeles, Calif. 90045)

12-14. **Galaxies**, preliminary conf., Uppsala, Sweden. (T. Page, Van Vleck Observatory, Wesleyan Univ., Middletown, Conn. 06457)

12-14. **X-Ray Analysis Applications**, 13th annual conf., Denver, Colo. (W. G. Mueller, Metallurgy Div., Univ. of Denver, Denver Research Inst., Denver 80210)

13-15. International Soc. for **Horticultural Science**, Edinburgh, Scotland. (G. de Bakker, Le v.d. Boschstraat 4, The Hague, Netherlands)

16-21. **Histochemistry and Cytochemistry**, intern. congr., Frankfurt am Main, Germany. (T. H. Schiebler, Anatomisches Institut der Universität, Koellikerstr. 6, 87 Würzburg, Germany)

16-23. **Latin American Schools of Medicine**, 4th conf., Pocos de Caldas, Brazil. (O. Versiani Caldeira, Univ. of Minas Gerais Medical School, Belo Horizonte, Minas Gerais, Brazil)

16-24. **Human Economy**, conf., Inst. of Paper Chemistry, Appleton, Wis. (A. N. McLeod, IPC, Appleton)

17-20. American Assoc. of **Clinical Chemists**, 16th natl., Boston, Mass. (F. F. Ronan, AACC, 19 Bay State Rd., Boston 15)

17-20. **Natural Ultra Low Frequency Electromagnetic Fields**, symp., Boulder, Colo. (W. H. Campbell, National Bureau of Standards, Boulder)

17-21. **Combustion**, 10th intern. symp., Cambridge, England. (Combustion Inst., 986 Union Trust Bldg., Pittsburgh 19, Pa.)

17-21. **Cryogenic Engineering**, conf., Philadelphia, Pa. (K. D. Timmerhaus, Engineering Research Center, Ketchum 129, Univ. of Colorado, Boulder)

17-21. **Simulation in Space Technology**, Blacksburg, Va. (F. J. Maher, Virginia Polytechnic Inst., Blacksburg)

17-22. International **Astronomical Union**, symp., Thessaloniki, Greece. (Maj. B. R. Agins, Air Force Office of Scientific Research, SRMA, Washington, D.C.)

17-22. **Cardiology**, 4th European congr., Prague, Czechoslovakia. (H. Kafka, Karlovo nám. 32, Prague 2)

17-22. **Endocrinology**, 2nd intern. congr., London, England. (A. S. Mason, London Hospital, Whitechapel, London, E.1)

17-22. **Social Psychiatry**, 1st intern. congr., London, England. (J. Bierer, 7 Hollycroft Ave., London, N.W.3)

17-28. **Molecular Biophysics**, intern. inst., Squaw Valley, Calif. (Prof. Weissbluth, Biophysics Laboratory, Stanford Univ., Stanford, Calif.)

18-20. International Assoc. of **Milk and Food Sanitarians**, Portland, Ore. (H. L. Thomasson, P.O. Box 437, Shelbyville, Ind.)

19-21. **Physiology of Digestion in the Ruminant**, 2nd intern. symp., Ames, Iowa. (R. W. Dougherty, Box 70, Ames)

20-21. National Council of Teachers of **Mathematics**, Minneapolis, Minn. (J. D. Gates, NCTM, 1201 16th St. NW, Washington, D.C. 20036)

22. American Inst. of **Ultrasonics in Medicine**, 9th annual, Boston, Mass. (W. J. Fry, Biophysical Research Laboratory, Univ. of Illinois, Urbana)

22-24. **History of Astronomy**, symp., Hamburg, Germany. (B. Sticker, Institut für Geschichte der Naturwissenschaften, Universität Hamburg, Hartungstr. 5, 2 Hamburg 13, Germany)

22-28. American Soc. of **Human Genetics**, Boulder, Colo. (S. H. Boyer, Johns Hopkins Hospital, Baltimore, Md.)

23. American Assoc. of **Electromyography**, annual, Boston, Mass. (M. K. Newman, 16861 Wyoming Ave., Detroit, Mich. 48221)

23-26. American **Phytopathological Soc.**, Lafayette, Ind. (J. R. Shay, Purdue Univ., Lafayette)

23-26. **Soil Conservation Soc. of America**, 19th annual, Jackson, Miss. (SCS, 7515 Northeast Ankeny Rd., Ankeny, Iowa)

23-28. American Inst. of **Biological Sciences**, annual, Boulder, Colo. (AIBS, 2000 P St., NW, Washington, D.C.)

The following societies will hold meetings in conjunction with the AIBS meeting:

- American Bryological Society
- American Fern Society
- American Fisheries Society
- American Microscopical Society
- American Society for Horticultural Science

- American Society of Human Genetics
- American Society of Parasitologists
- American Society of Plant Physiologists
- American Society of Plant Taxonomists
- American Society of Zoologists
- Biometric Society ENAR-WNAR
- Botanical Society of America
- Ecological Society of America
- Genetics Society of America
- Mycological Society of America
- National Association of Biology Teachers

- Nature Conservancy
- Phi Sigma Society
- Phycological Society of America
- Society for Industrial Microbiology
- Society for the Study of Development and Growth
- Society of Nematologists
- Society of Protozoologists
- Tomato Genetics Cooperative

23-28. American Congr. of **Physical Medicine and Rehabilitation**, Boston, Mass. (G. Gullickson, Jr., 30 N. Michigan, Chicago, Ill.)

23-28. **Conservation Education**, conf., Tacoma, Wash. (C. Boyce, Office of the Superintendent of Public Instruction, Olympia, Wash.)

24-26. American Inst. of **Aeronautics and Astronautics**, Los Angeles, Calif. (AIAA, 1290 Sixth Ave., New York, N.Y.)

24-26. Society for **Cryobiology**, annual, Washington, D.C. (V. P. Perry, Tissue Bank Dept., U.S. Naval Medical School, National Naval Medical Center, Bethesda, Md. 20014)

24-26. **Education in the Nuclear Power Era**, conf., Gatlinburg, Tenn. (M. L. Nel-

NEW PHOENIX CHROMATO- GRAPHIC COLUMNS* WITH REMOVABLE POROUS TEFLON DISC

Eliminates the difficulties most often encountered with permanently fused, sintered glass disc type columns. Write for Phoenix Fact File ICC-264 for complete information.

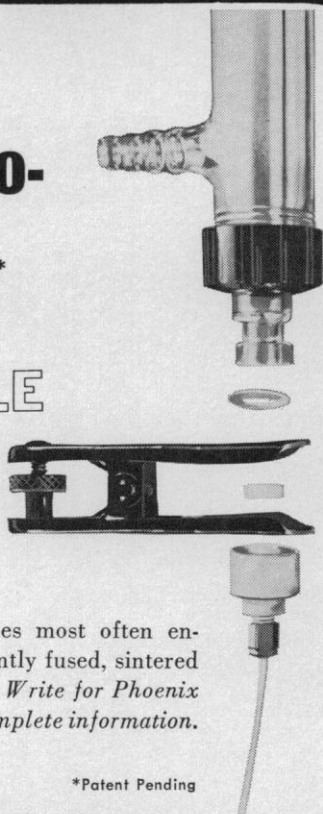


*Patent Pending

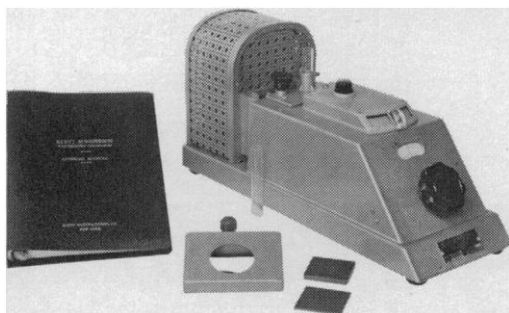
PHOENIX PRECISION INSTRUMENT CO.

A Subsidiary of **CENCO** Instruments Corp.

3803-05 N. Fifth St., Phila., Penna. 19140, U.S.A. • Cable PPICO



Klett Summerson Photoelectric Colorimeter

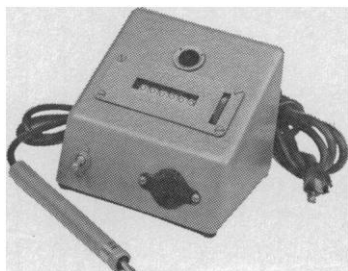


No. 800-3

Test Tube
Model

KLETT COLONY MARKER and TALLY

This instrument takes the drudgery and error out of the counting of bacterial colonies.



Klett MANUFACTURING CO., INC.,
179 East 87th Street, New York, 28, N.Y.



NEW! NATIONAL CO₂ INCUBATOR

*water jacketed stainless steel
interior and exterior for maximum control
of temperature, humidity and CO₂*

For predictable and dependable performance, National CO₂ incubators are the logical choice for your laboratory. Here is why:

- ✓ Water jacketed chamber of welded stainless steel maintains uniform temperature and eliminates leaks and resulting contamination.
- ✓ Stainless steel exterior resists corrosion.
- ✓ No ducts within the chamber; shelf standards are removable for sterilizing.
- ✓ Latchless door opens without vibration.
- ✓ Safety plate glass inner door with positive lock
- ✓ CO₂ is preheated before it enters the chamber.
- ✓ Capacity 6 to 12 cubic feet, including both single and double door models.
- ✓ Sliding shelves included at no extra charge (six for single door model, twelve for double door model)
- ✓ Full instrumentation, including safety thermostat and CO₂ controls are standard equipment at no extra charge.
- ✓ Double door model contains two separate chambers for individual control of CO₂ and RH.

For additional data on construction and performance of the National CO₂ incubator, mail the coupon.



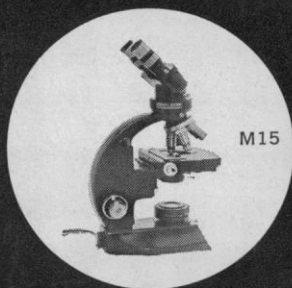
NATIONAL APPLIANCE COMPANY

P.O. Box 6408, Portland, Oregon 97223
P.O. Box 3102, Stamford, Conn. 06905

NATIONAL APPLIANCE COMPANY, P.O. Box 6408,
Portland, Oregon 97223

Please send literature and information on the
National CO₂ incubator to

Name _____
Company _____
Address _____ Zone _____
City _____ State _____



VICKERS
Phase Contrast
MICROSCOPES



Superb phase contrast performance
... with Vickers microscopes
(conventional or inverted) ...
built-in annuli centering system and
Magnification Changer available ...
choice of a variety of phase
systems ... normal or long (up to
18mm W.D. with high-dry lens)
working distance ...
TRILUX system for rapid interchange
between bright field, dark field and
phase contrast ... low power
phase of tissue cultures in test tubes.



**COOKE,
TROUGHTON
& SIMMS, Inc.**

91 WAITE STREET, MALDEN 48, MASSACHUSETTS

son, Education Div., Oak Ridge Natl. Laboratory, P.O. Box 117, Oak Ridge, Tenn.)

24-26. **Mathematical Assoc. of America**, summer meeting, Univ. of Massachusetts, Amherst. (H. M. Gehman, Univ. of Buffalo, Buffalo 14, N.Y.)

24-27. **American Soc. for Pharmacology and Experimental Therapeutics**, Univ. of Kansas, Lawrence, Kan. (E. B. Cook, The Society, 9650 Wisconsin Ave., NW, Washington, D.C.)

24-27. **Biological Photographic Assoc.**, annual, New York, N.Y. (C. H. Weiss, 81 Bedford St., New York 14)

24-27. **American Hospital Assoc.**, Chicago, Ill. (E. L. Crosby, 840 N. Lake Shore Dr., Chicago 11)

24-27. **Toxicology and Occupational Medicine**, 4th inter-American conf., Miami Beach, Fla. (W. Machle, Univ. of Miami School of Medicine, Coral Gables, Fla.)

24-28. **International Council of the Aeronautical Sciences**, 4th congr., Paris, France. (American Inst. of Aeronautics and Astronautics, 2 E. 64 St., New York, N.Y. 10021)

24-28. **Astrodynamic Guidance and Control**, conf., Los Angeles, Calif. (K. Watanabe, 4731 B Engineering Building III, University of California, Los Angeles 24)

24-28. **American Astronautical Soc.**, military space applications symp., Stanford, Calif. (AAS, 516 Fifth Ave., New York, N.Y.)

24-28. **Society for Industrial and Applied Mathematics**, Amherst, Mass. (W. S. Dorn, T. J. Watson Research Center, I.B.M., P.O. Box 218, Yorktown Heights, N.Y.)

24-28. **Scandinavian Mathematical Congr.**, Copenhagen, Denmark. (Secretariat, The Congress, c/o Mathematical Inst., H. C. Ørsted Inst., Universitetsparken 5, Copenhagen Ø)

24-28. **American Mathematical Soc.**, New York, N.Y. (G. L. Walker, AMS, 190 Hope St., Providence, R.I.)

24-28. **Preventive Cardiology**, first intern. conf., Burlington, Vt. (W. Raab, Preventive Heart Reconditioning Foundation, 206 Summit St., Burlington, Vt.)

24-28. **Water Pollution Research**, 2nd intern. conf., Tokyo, Japan. (Water Pollution Control Federation, 4435 Wisconsin Ave., Washington, D.C. 20016)

24-29. **Psychotherapy**, 6th intern. congr., London, England. (F. Pannell, The Congress, 11 Whitehall Ct., London, S.W.1)

24-29. **Preparation and Biomedical Application of Labeled Molecules**, Venice, Italy. (C. Colombini, Center of Nuclear Chemistry, Univ. of Padova, Via Loredan 6, Padova, Italy)

24-3. **International Assoc. of Agricultural Economists**, 12th triennial conf., Lyons, France. (French Organization Committee of the Conference, 4, rue de Lafayette, Paris 16°, France)

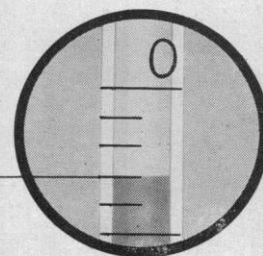
25-27. **Association for Computing Machinery**, 19th annual, Philadelphia, Pa. (H. S. Bright, Philco Computers, Willow Grove, Pa.)

25-28. **Western Electronics Show and Conv. (WESCON)**, Inst. of Electrical and Electronics Engineers, summer meeting,

new
**FALCON PLASTIC
PIPET**

RIGID • STERILE
DISPOSABLE

send
for
samples



- non-wettable... minimizes meniscus, reduces drainage "hold-back" errors
- chemically clean
- biologically clean
- crystal clear
- cotton plugged
- sharp graduations

3 graduation markings

- 1 ml x 0.1
- 1 ml x 0.01
- 1.1 ml (0.5, 1.0, 1.1 graduations)

convenient use packages

100 (individually wrapped) in dispensing box, or 25 in "poly" bag and other package forms. Available through your local distributor.



FALCON PLASTICS
DIVISION OF

B-D LABORATORIES, INC., RUTHERFORD, NEW JERSEY
B-D AND FALCON ARE TRADEMARKS 12164

Los Angeles, Calif. (R. R. Bennett, Suite 1920, 3600 Wilshire Blvd., Los Angeles)

25-29. **Audiology**, 7th intern. congr., Copenhagen, Denmark. (H. W. Ewertsen, c/o State Hearing Centre, 7 D. Tvaergade, Copenhagen K)

25-3. **International Astronomical Union**, 12th general assembly, Hamburg, Germany. (D. A. Bell, c/o Royal Greenwich Observatory, Hertsmonceaux Castle, Hailsham, Sussex, England)

26-2. **British Association for the Advancement of Science**, 126th annual, Southampton, England. (BAAS, 3 Sanctuary Bldgs., London, S.W.1, England)

26-2. **Logic, Methodology, and Philosophy of Science**, intern. conf., Jerusalem, Israel. (Y. Bar-Hillel, Hebrew Univ., Jerusalem)

26-3. **Electron Microscopy**, 3rd European regional conf., Prague, Czechoslovakia. (Organizing Committee, Albertov 4, Prague 2)

27. **American Soc. for Horticultural Science**, Amherst, Mass. (R. E. Marshall, AMHS, Dept. of Horticulture, Michigan State Univ., East Lansing)

27-28. **Activation Analysis**, Glasgow, Scotland. (J. M. A. Lenihan, Western Regional Hospital Board, 9 W. Greham St., Glasgow, C.4)

27-29. **Pacific Slope Biochemical Conf.**, San Francisco, Calif. (M. P. Gordon, Dept. of Biochemistry, Univ. of Washington, Seattle 98105)

27-29. **Reactive Intermediates in Organic Chemistry**, symp., Quebec City, P.Q., Canada. (C. R. Engel, Faculté des Sciences, Université Laval, Quebec City)

28-3. **Neurology**, 8th intern. congr., Vienna, Austria. (H. Hoff, Medizinische Fakultät, Neurologische und Psychiatrische Abteilung, Vienna 9)

29. **Gravity Research Foundation**, annual, New Boston, N.H. (The Foundation, Gravity Village, New Boston)

29-5. **International Epidemiological Assoc.**, 4th intern. meeting, Princeton, N.J. (L. Breslow, Div. of Preventive Medical Services, California Dept. of Public Health, 2151 Berkeley Way, Berkeley 95704)

30-2. **Electronic Properties and Applications of Solid-Solid Interfaces**, Boston, Mass. (F. S. Gardner, Office of Naval Research, 495 Summer St., Boston, Mass. 02110)

30-3. **Illuminating Engineering Soc.**, Miami Beach, Fla. (A. D. Hinckley, IES, 345 E. 47 St., New York 10017)

30-4. **American Chemical Soc.**, fall natl. meeting, Chicago, Ill. (A. H. Emery, 1155 16th St., NW, Washington, D.C.)

30-4. **Institute of Mathematical Statistics**, annual, Amherst, Mass. (D. M. Gifford, Mathematical Sciences Division, Office of Naval Research, Washington, D.C.)

30-4. **American Ornithologists' Union**, Lawrence, Kan. (L. H. Walkinshaw, 1703 Wolverine Tower, Battle Creek, Mich.)

30-5. **Applied Mechanics**, 11th intern. congr., Munich, Germany. (Organisations-Sekretariat des Mechanik-Kongresses, Inst. für Mechanik, Arcisstr. 21, Munich 2)

30-5. **Cell Biology**, 11th intern. congr., Providence, R.I. (J. W. Wilson, Dept. of Biology, Brown Univ., Providence)

24 JULY 1964

Introducing-- the NEW VIRTIS "QUICKSEAL VALVE"* — The Vacuum Valve that you **don't** "twist, push, pull"; — or "guess" the open/close positions. Now — Freeze-drying Flasks, Ampules and Serum Bottles are easily connected to manifold Ports — eliminating tubing clamps or plugs to open/close vacuum. The QUICKSEAL VALVE, of pure gum rubber, contains a precision molded polypropylene "ON/OFF" Selector Knob.

☐ Dry Samples may be removed without breaking vacuum.

☐ Vessels may be connected or disconnected without breaking vacuum.

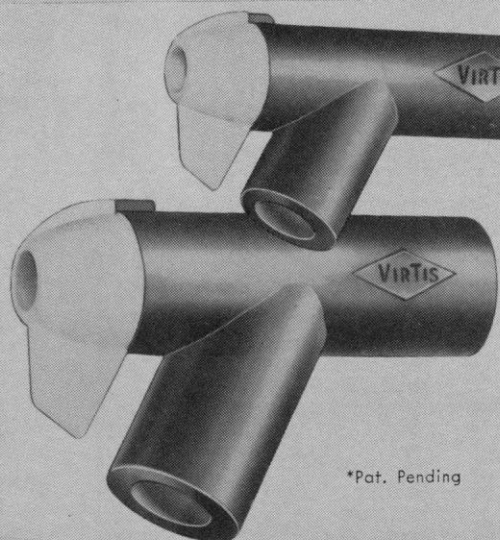
☐ Ampules may be heat-sealed while connected to Quickseal Valves.

Write today for FREE TECHNICAL DATA FILE, including low quantity prices.



THE VIRTIS COMPANY, INC.
GARDINER, NEW YORK

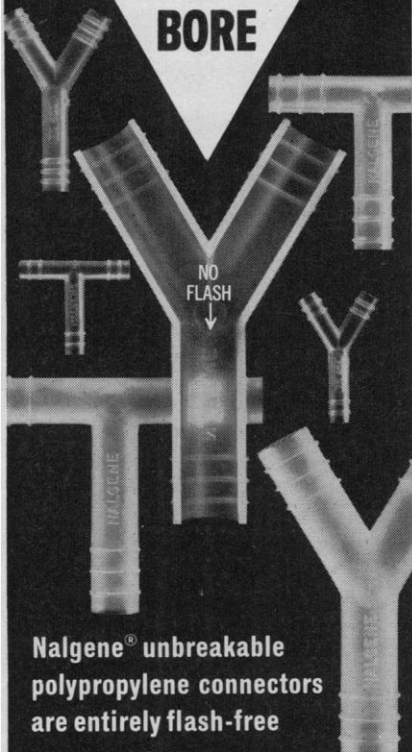
**QUICKSEAL
VALVES*
FOR
MANIFOLD
FREEZE-
DRYING
2 SIZES:
1/2" PORT
3/4" PORT**



*Pat. Pending

VACUUM TIGHT TO 1 MICRON

**NEVER
BEFORE
SO
SMOOTH
A
BORE**



**Nalgene® unbreakable
polypropylene connectors
are entirely flash-free**

You'll never find a baffle to cause clogging or plugging. There are no pockets to obstruct flow or harbor particles. Just a smooth, uniform bore—precision molded under exacting quality control.

Here are connectors designed for consistent, trouble-free performance. Molded of F.D.A. approved polypropylene, they are rugged and can be autoclaved repeatedly. Nothing sticks to them . . . they're easily cleaned. They can be kept pyrogen-free for work with injectables or blood. The non-adherent inner walls make them outstanding in handling blood—cells are not distorted or damaged. Nalgene connectors are non-corroding . . . never any chance of metallic contamination.

These versatile connectors are ideal for numerous lab applications using plastic or rubber tubing. Available in T-type or Y-type with O.D. of $\frac{1}{8}$ ", $\frac{3}{16}$ ", $\frac{1}{4}$ ", $\frac{5}{16}$ ", $\frac{3}{8}$ " and $\frac{1}{2}$ ". Low cost, too . . . prices start at 38¢, less quantity discounts. See your lab supply dealer or write for catalog to Dept. 21071, The Nalge Co., Inc., 75 Panorama Creek Drive, Rochester, New York 14602.

 **NALGENE
LABWARE**
Leader in quality plastic labware since 1949

Visit our Booth 26 at the 6th Intl. Congress of Biochemistry, July 27-31, New York Hilton.

NEWS AND COMMENT

(Continued from page 373)

wealthier institutions to the poorer ones: Brown University and Tougaloo College (outside of Jackson, Mississippi); the University of Michigan and Tuskegee Institute; and the University of Wisconsin and three southern colleges, Texas Southern, North Carolina College at Durham, and North Carolina A & T.

The University of Wisconsin exchange program, which is financed by a \$300,000 grant from the Carnegie Corporation, will involve exchanges of faculty members for periods ranging from 1 week to a full year. Faculty members from Wisconsin will serve on combined teams to work on curriculum revision, new teaching techniques, in-service training, and a host of other academic problems. Faculty members from the Negro colleges will do some teaching, complete work for advanced degrees, and generally study the academic life of Wisconsin. The Brown-Tougaloo exchange is basically similar but also involves exchange of administrative personnel, and the university has, in effect, committed itself to active fund-raising for Tougaloo to help the poorer college improve its facilities.

Courage, and Convenience

There should be no doubt that these exchanges will pose difficulties for both sides. Relations between the Negro colleges and southern state legislatures are extremely delicate. The colleges involved in the North Carolina-Wisconsin exchange are almost wholly dependent on the state for funds. Even a private institution such as Tougaloo is dependent on the good will of the state for the licensing of its graduates to serve as teachers in Mississippi schools—and in the case of Tougaloo this "good will" is already heavily damaged by the proclivity of the college's students and staff to engage in civil rights demonstrations. Local white politicians, embarrassed and angered by this latest manifestation of northern carpetbagging, have tried in some instances to dissuade Negro college administrators from the exchanges. Without question, the colleges' persistence is an act of courage and commitment.

For the northern universities, the problem is not so much one of courage as of convenience. For the exchanges to work, departments and administrations must actively encourage their best faculty members to leave the campus

for a semester or year, sometimes—especially at first—without sufficient notice to plan for replacements. In addition, the colleges have to devise ways of utilizing the southern professors who come to their campuses, again with as little disruption as possible to their regular programs. How these problems will be worked out is not yet clear. But other institutions who are considering exchanges, and the U.S. Congress will be watching the first ones closely. Congress now has before it a proposal by Representative Edith Green (D-Ore.) to provide \$5 million annually for a "Domestic Faculty Exchange Act" which would establish programs similar to those described on a broader scale. The House Education and Labor Committee is expected to begin hearings on the proposal shortly.

In addition to the institutes and the exchanges, a myriad of other projects have been begun, concentrating on improving the quality of Negro education at all levels, with a view toward raising the beginning level of college students and increasing scholarship opportunities for Negro students at established institutions throughout the country. Not all the programs are perfectly planned or represent the most sensible allocation of funds, and some will have little permanent impact. Several colleges and universities in the North, for example, hastily initiated summer sessions for neighboring Negro students, without preparing teaching plans (or teachers) very different from the daily grind the students reject, and without developing guidance programs to follow through on whatever summertime progress was made. At least one major northern university, to take an example of a different sort, put three full-time staff members (and considerable effort and money) on the job of recruiting talented Negro undergraduates last year—and managed to produce only 16 students, all of whom, it was thought, would have ended up in a fairly good college anyway.

Despite occasional mistakes and some confusion, however, there is no doubt that what is going on represents a massive and purposeful attack on problems until recently very poorly understood. A point not at all neglected by the educators and specialists who have been developing the new programs is that while they have much to teach, they also have much to learn.—ELINOR LANGER



Sigma is Unique

Look far and wide if you wish,—you won't find another firm even approximately like Sigma.

take Honesty for example.

Sigma is the **ONLY** major Biochemical Supplier willing to tell you exactly which items are produced By Sigma and which are not. Most other suppliers manufacture little or none of the items they list—yet subtly imply that they produced all of them.

Sigma is the **ONLY** major Biochemical Supplier that really assays almost every item sold—whether made by or for Sigma—not only at the time of production, but later too, if the item is still in stock—to see if decomposition has occurred. Other dealers often make bold claims for their "assayed purity," but they don't tell you that they *did not* do the assay themselves. They take the word of their supplier. Regrettably we find that too many "suppliers" can't be trusted! Where we have an item, such as Snake Venom, for which we have no real species assay, or antibiotics which require techniques not yet established in our lab, our Catalog is beginning to say so.

When you specify Sigma you get something that you can't include in "specifications."

The remarkable growth of "Little Sigma" continues to require dedicated individuals capable of assuming independence quickly in Production, Analysis, Clinical Biochemistry, Microbiology, and Office Administration. We can't use Job-Hoppers or Clock Watchers. Anyone interested?

WELCOME INTERNATIONAL BIOCHEMICAL CONGRESS

We are certainly sorry that we cannot be represented at the International Biochemical Congress in New York. It has been a difficult decision—to go to the Congress and lose many days Lab time, or to stay home and try to maintain production for the benefit of everyone who is waiting for some item or help. We finally decided that we could help you more by staying home. We are so badly overwhelmed, we simply can't do both.

We certainly hope your visit to the Congress will be pleasant and fruitful. If we can be of service, please phone us (Collect, of course.)

Sigma is growing about 50% per year. If any of our foreign friends would like to join our staff, they are invited to call us. We are really desperate for competent help.

ORDER DIRECT

TELEPHONE COLLECT

for IMMEDIATE SHIPMENT or to DISCUSS PROBLEMS

Day, Station to Station,

PRospect 1-5750

Night, Person to Person,

Dan Broida, WYdown 3-6418

TWX (Teletype) Day or Night: COLLECT-314-556-0594-U

TELEGRAM: SIGMACHEM, FAX, St. Louis, Mo.



SIGMA  **THE RESEARCH LABORATORIES OF**
SIGMA **CHEMICAL COMPANY**

3500 DE KALB ST. • ST. LOUIS 18, MO. • U.S.A.

MANUFACTURERS OF THE FINEST BIOCHEMICALS AVAILABLE

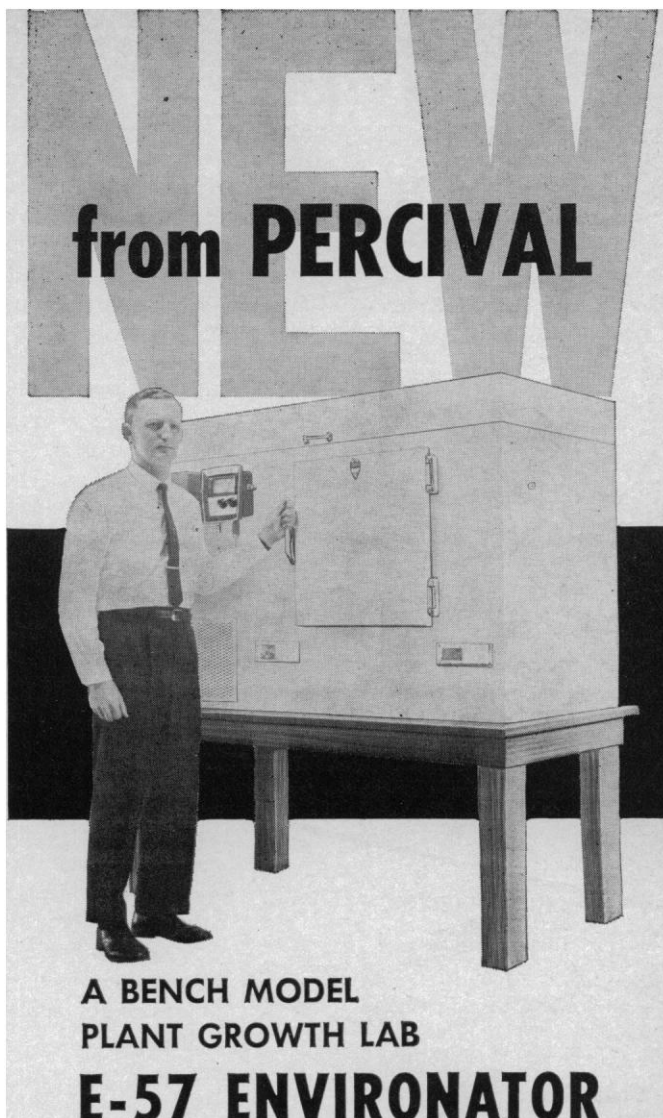
Distributed in the United Kingdom through

SIGMA LONDON Chem. Co. Ltd., 12, Lettice St., London, S.W.6, Eng.

Phone—RENow—5823

NEW

from PERCIVAL



A BENCH MODEL PLANT GROWTH LAB

E-57 ENVIRONATOR

The new PERCIVAL Environator is the perfect answer to demands for a small yet versatile environmental test lab. It is compact and portable—only 57 x 32" at the base—yet, it has a full 12 cu. ft. testing chamber. It's ideal for teaching as well as research.

Even though compact, the E-57 Environator has everything the larger PERCIVAL growth labs have. It features a removable thermal barrier, consistent air flow, controlled temperature from 45 to 90°F. and regulated light intensity from 200 to 2000 ft. candles. A complete programming mechanism provides 24-hour indicating thermostat control and a 24-hour clock for controlling day and night temperature and photo period.

Small, versatile and dependable. The E-57 Environator answers all these demands—and, at a low initial cost. For complete information mail this coupon today.

Please send bulletin on the PERCIVAL Environator to:

Name.....

Address.....

City.....Zone.....State.....





**PERCIVAL REFRIGERATION
AND MANUFACTURING CO.**


Box 589-S


Boone, Iowa


pH METERS
for every purpose

INDUSTRIAL

Model 85

ROUTINE

Model 115

HIGH PRECISION

Model 110

PORTABLE

Model 125

EXPANDED SCALE

Model 180

Stocked by
laboratory supply houses
PHOTOVOLT
CORPORATION
1115 Broadway • New York, N.Y. 10010
write for bulletin

Announcements

The Commission on Undergraduate Education in the Biological Sciences has moved from Washington University, St. Louis, Mo., to Washington, D.C. Correspondence may be sent to V. A. Greulach, Executive Director, George Washington University, 2023 G St., NW, Washington, D.C. 20006.

The U.S. Public Health Service has announced a change in deadline dates for the receipt of applications for **research grants**. The new dates, effective 1 January 1965, have been established to allow more time for staff review of applications before they are presented to the nonfederal advisory review panels.

The new deadlines for new and supplemental applications are: 1 October, 1 February, and 1 July. The respective council/committee meetings are: March, June-July, and November.

The new deadlines for renewal applications are: 1 September, 1 January, and 1 June. The respective council/committee meetings are: March, June-July, and November.

No deadline changes have been made for noncompeting continuation applications or for applications for other types of support.

Meeting Notes

Papers are invited for presentation at a symposium on the **inelastic scattering of neutrons**, scheduled 15-19 December in Bombay, India. It will be sponsored by the International Atomic Energy Agency. The topics for discussion will center around experimental and theoretical studies, including experimental techniques and facilities, dynamic properties of solids and liquids, molecular energy levels and molecular motion, neutron interaction with gases, and dynamics of magnetic systems. Abstracts of 250 to 350 words are required. Deadline for abstracts: *20 September*; for completed manuscripts: *9 October*. (J. H. Kane, International Conferences Branch, Division of Special Projects, U.S. Atomic Energy Commission, Washington, D.C. 20545)

About 55 papers will be presented 15-17 October during the second international conference on **beryllium** metallurgy and technology. The meeting will take place at the Franklin Institute, Philadelphia, and will include sessions

on purification and alloying studies, physical metallurgy, process metallurgy, and design and application of beryllium structures. (D. A. Parks, 345 E. 47 St., New York 10017)

Scientists in the News

B. Theodore Cole, biology professor at the University of South Carolina, has been appointed head of the department.

Robert H. Felix, director of the National Institute of Mental Health since 1949, has been appointed professor of psychiatry and dean of the medical school at St. Louis University. He will retire from NIMH 1 October.

Ryukichi Sawada, physics professor at Kyushu University, Japan, has joined the National Center for Atmospheric Research, Boulder, Colorado, as a visiting scientist in atmospheric studies, until next April.

John O. Corliss, professor of zoology at the University of Illinois, has been appointed head of the department of biological sciences at the university's new college of liberal arts and sciences, Chicago, as of 1 September.

Milton R. J. Salton has been named professor and chairman of the department of microbiology at New York University's medical school and postgraduate medical school. He has been a professor of microbiology at the University of New South Wales, Sydney, Australia.

Bodil Schmidt-Nielsen, associate research professor in zoology and physiology at Duke University, will become professor of biology at Western Reserve University in September.

Planned Parenthood-World Population recently appointed **Frederick S. Jaffe** vice president in charge of program planning. He had been director of special program development and associate director of information and education.

Erratum: The ranges of the Beckman IR-10 and IR-12 spectrophotometers ("What's new in research instruments," 15 May, p. 894) should have been described, respectively, as 4000 to 300 cm^{-1} and 4000 to 200 cm^{-1} .

Erratum: In the book review by G. E. Erikson (*Science*, 17 July, p. 256), the sentence in line 4, column 3, page 256, should read "Andrews reviews a whole universe of behavior in 'The displays of the primates' . . ." Line 8, column 1, page 257, should read "the task of relating karyotype to taxonomy."