

SCIENCE

A black and white micrograph showing a dense network of neurons. A central cell body is surrounded by numerous branching processes that extend across the field of view, forming a complex web-like structure. The branching processes appear as thin, dark lines against a lighter background.

19 October 1973

Vol. 182, No. 4109

Instrument Issue

I did 500 radioimmunoassays while I slept

The big, 500-sample capacity of the LKB-Wallac Automatic Gamma Sample Counter means that you, too, could set up for long uninterrupted runs overnight or on weekends. Come back in the morning and find a complete printout of results in digital form, with every sample positively identified. And with sample transfer taking as little as 10 seconds, you get fast results.

The LKB-Wallac Gamma Counter is simple to operate. You will be able to handle a high volume of samples for radioimmunoassays with a minimum of effort and at low cost. Samples can be added or removed from the counter at any time, without interrupting the run. They will always be positively identified. And you can add a binary-coded cap when you need to identify the samples of multi-users, or to give a

command to your computer to select a certain program for processing the data from a group of samples.

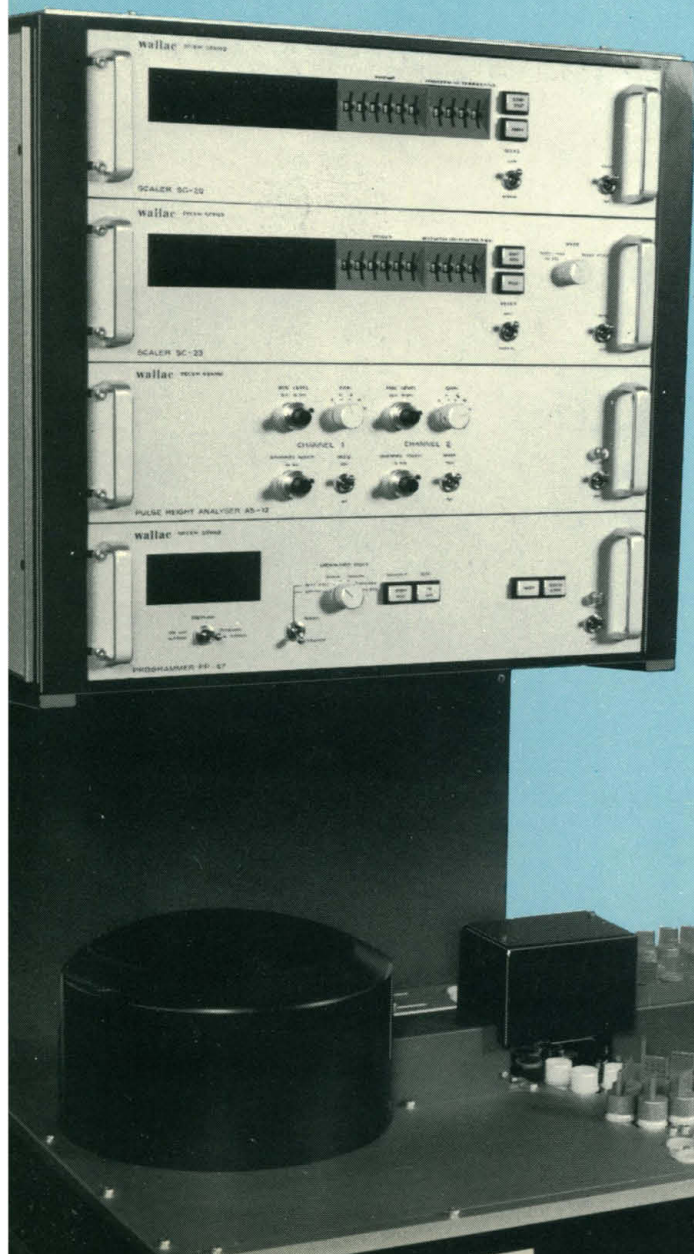
Write now for information about LKB-Wallac Gamma Counters for either 300 or 500 samples, with one or two channels, for single or dual labelled samples.

LKB

LKB Instruments Inc.

12221 Parklawn Drive, Rockville MD. 20852
11744 Wilshire Blvd. Los Angeles Calif. 90025
6600 West Irving Park Road, Chicago Ill. 60634
260 North Broadway, Hicksville N.Y. 11801

Circle No. 1 on Readers' Service Card





Measure dirt (or temperature, or anything) cheap

Gather weather data, pollution data, agricultural data, 5 to 200 channels

Measure it, print it out, tape record it, feed it to the computer (sound the alarm!)

Build your experiment or monitoring system around the D-2020, and your data reduction worries are over! It's a low cost, versatile, and standardized data acquisition system that handles up to 200 sensors, performs signal conditioning, A to D conversion, DVM, display, and output to tape or computer as well as printed out-

put. Sets up with simple switches. Backed by sales and service nationwide. Hundreds in use. Request Bulletin B-101 from Esterline Angus, P.O. Box 24000, Indianapolis, Indiana 46224. Phone 317 244-7611.



ESTERLINE ANGUS

A UNIT OF ESTERLINE CORPORATION

Circle No. 19 on Readers' Service Card

19 October 1973

Volume 182, No. 4109

SCIENCE

LETTERS	Appointments to Working Government Councils: <i>J. H. Comroe, Jr.</i> ; The Albatross Award: <i>R. Walker</i> ; <i>J. J. Marcus</i> ; Knowledge Factory: <i>D. Troyer</i> ; Marital Status and Mobility: <i>E. Kahan</i> and <i>B. M. Allison</i> ; Parapsychology: <i>C. T. Tart</i> ; <i>T. Healey</i> ; Pesticide Regulation: <i>R. D. O'Brien</i> ; A Visit to Bulgaria: <i>F. T. Manheim</i>	220
EDITORIAL	A Sino-American Soybean Research Institute	227
ARTICLES	The Lunar Laser Ranging Experiment: <i>P. L. Bender et al.</i>	229
	Picosecond Kinetics of Reaction Centers Containing Bacteriochlorophyll: <i>T. L. Netzel, P. M. Rentzepis, J. Leigh</i>	238
	Millikelvin Temperatures Measured with a Noise Thermometer: <i>J. C. Wheatley and R. A. Webb</i>	241
	Air Pollution Monitoring by Advanced Spectroscopic Techniques: <i>J. A. Hodgeson, W. A. McClenny, P. L. Hanst</i>	248
	Meteorological Doppler Radar: <i>R. Lhermitte</i>	258
NEWS AND COMMENT	Electric Power Research Institute: A New Formula for Industry R & D	263
	Training Grants: Tied Up in Congress with Ethics Bills	265
	Water Projects: How to Erase the "Pork Barrel" Image?	266
	Telecommunications: U.S. Applications Fall Short	267
RESEARCH NEWS	Medium-Sized Computers: Bringing Computers into the Lab	270
BOOK REVIEWS	The Arthropod-Borne Viruses of Vertebrates, reviewed by <i>T. H. Work</i> ; The Cell Cycle in Development and Differentiation, <i>P. J. Stambrook</i> ; Air Pollution and Lichens, <i>I. M. Brodo</i> ; Biology of Hydra, <i>H. M. Lenhoff</i> ; Books Received	273

BOARD OF DIRECTORS		GLENN T. SEABORG Retiring President, Chairman	LEONARD M. RIESER President	ROGER REVELLE President-Elect	RICHARD H. BOLT LEWIS M. BRANSCOMB	BARRY COMMONER EMILIO Q. DADDARIO
CHAIRMEN AND SECRETARIES OF AAAS SECTIONS		MATHEMATICS (A) Lipman Bers F. A. Ficken	PHYSICS (B) Edwin M. McMillan Rolf M. Sinclair	CHEMISTRY (C) Thomas E. Taylor Leo Schubert	ASTRONOMY (D) Frank D. Drake Arlo U. Landolt	
		PSYCHOLOGY (J) Carl P. Duncan William D. Garvey	SOCIAL AND ECONOMIC SCIENCES (K) Robert K. Merton Harvey Sapolsky		HISTORY AND PHILOSOPHY OF SCIENCE (L) Ernest Nagel Dudley Shapere	
		INDUSTRIAL SCIENCE (P) Jacob E. Goldman Jordan D. Lewis	EDUCATION (Q) Gordon Swanson Phillip R. Fordyce	DENTISTRY (R) Martin Cattoni Sholom Pearlman	PHARMACEUTICAL SCIENCES (S) William Heller John Autian	
DIVISIONS		ALASKA DIVISION		PACIFIC DIVISION		SOUTHWESTERN AND ROCKY MOUNTAIN DIVISION
		Gunter E. Weller President	Irma Duncan Executive Secretary	Robert C. Miller President	Robert T. Orr Secretary-Treasurer	Gordon L. Bender President Max P. Dunford Executive Secretary-Treasurer

SCIENCE is published weekly, except the last week in December, but with an extra issue on the fourth Tuesday in November, by the American Association for the Advancement of Science, 1515 Massachusetts Ave., NW, Washington, D.C. 20005. Now combined with *The Scientific Monthly*. Second-class postage paid at Washington, D.C. Copyright © 1973 by the American Association for the Advancement of Science. Member rates on request. Annual subscription \$30; foreign postage: Americas \$4, overseas \$6, air lift to Europe \$18. Single copies \$1 (back issues, \$2) except Guide to Scientific Instruments which is \$4. School year subscriptions: 9 months \$22.50; 10 months \$25. Provide 4 weeks notice for change of address, giving new and old address and zip codes. Send a recent address label. Science is indexed in the Reader's Guide to Periodical Literature.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

REPORTS	Volcanic Gases: Hydrogen Burning at Kilauea Volcano, Hawaii: <i>D. P. Cruikshank, D. Morrison, K. Lennon</i>	277
	Ground-Based Thermal Infrared Surveys as an Aid in Predicting Volcanic Eruptions in the Cascade Range: <i>I. M. Lange and J. C. Avent</i>	279
	Chondrites: Initial Strontium-87/Strontium-86 Ratios and the Early History of the Solar System: <i>G. W. Wetherill, R. Mark, C. Lee-Hu</i>	281
	Copulation in Castrated Male Rats following Combined Treatment with Estradiol and Dihydrotestosterone: <i>M. J. Baum and J. T. M. Vreeburg</i>	283
	Periodicity of Susceptibility to Pneumococcal Infection: Influence of Light and Adrenocortical Secretions: <i>P. G. Shackelford and R. D. Feigin</i>	285
	Complete Amino Acid Sequence of the Mu Heavy Chain of a Human IgM Immunoglobulin: <i>F. W. Putnam et al.</i>	287
	Neuronal Properties of Nymphal and Adult Insect Neurosecretory Cells in vitro: <i>K. R. Seshan and R. Levi-Montalcini</i>	291
	Neuromuscular Junction in Myasthenia Gravis: Decreased Acetylcholine Receptors: <i>D. M. Fambrough, D. B. Drachman, S. Satyamurti</i>	293
	Proteins from Human Cerebrospinal Fluid: Binding with Nucleic Acids: <i>H. Kubinski and M. Javid</i>	296
	Defect in Conversion of Procollagen to Collagen in a Form of Ehlers-Danlos Syndrome: <i>J. R. Lichtenstein et al.</i>	298
	Oxygen Affinity and Electrolyte Distribution of Human Blood: Changes Induced by Propranolol: <i>A. Agostoni et al.</i>	300
	Crowding among Hunter-Gatherers: The !Kung Bushmen: <i>P. Draper</i>	301
	Delayed Recovery of Function following Orbital Prefrontal Lesions in Infant Monkeys: <i>E. A. Miller, P. S. Goldman, H. E. Rosvold</i>	304
	<i>Technical Comments: Carbon Dioxide and pH: Effect on Species Succession of Algae: J. C. Goldman; J. Shapiro</i>	306

EDWARD E. DAVID, JR.
WARD H. GOODENOUGH

CARYL P. HASKINS
PHYLLIS V. PARKINS

WILLIAM T. GOLDEN
Treasurer

WILLIAM BEVAN
Executive Officer

GEOLOGY AND GEOGRAPHY (E)
Helmut Landsberg
Ramon E. Bisque

ENGINEERING (M)
Raynor L. Duncombe
C. Towner French

INFORMATION AND
COMMUNICATION (T)
Jordan Baruch
Scott Adams

BIOLOGICAL SCIENCES (G)
Dorothy Bliss
Richard J. Goss

MEDICAL SCIENCES (N)
Robert A. Good
F. Douglas Lawrason

STATISTICS (U)
Frederick Mosteller
Ezra Glaser

ATMOSPHERIC AND HYDROSPHERIC
SCIENCES (W)
Max A. Kohler
Louis J. Battan

ANTHROPOLOGY (H)
Richard N. Adams
Anthony Leeds

AGRICULTURE (O)
Roy L. Lovvorn
Michael A. Farrell

COVER

Photomicrograph (Nomarski interference microscope) of 18 neurosecretory cells from the pars intercerebralis of the brain of an adult cockroach (*Periplaneta americana*) after 3 weeks of culture in a chemically defined medium. Nerve fibers of a considerably large size branch out profusely from the neurosecretory cells and make multiple interconnections (about $\times 640$). See page 291. [K. R. Seshan and R. Levi-Montalcini, Washington University, St. Louis, Missouri]

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

How to use Gaertner optical/ instrument benches for

*lab set-ups,
alignment,
and
vibration
isolation.*

—in the lab
or shop

—in
■ physics,
■ metrology,
■ biomedical
engineering,
■ spectroscopy,
■ vision,
■ psychology,
■ anatomy . . .
you name it.

SEE OUR EXHIBITS AT:
TEL AVIV, 10/23-31
MILAN, 11/5-10
BANGKOK, 11/26-30

Manufacturers
of **metric**
instrumentation
since 1896



**GAERTNER SCIENTIFIC
CORPORATION**
1218 Wrightwood Avenue,
Chicago, Ill. 60614
Phone: (312) 281-5335

Checking lenses . . . straight line set-ups . . . aligning electronic parts . . . or ?

**Lathe bed optical/
instrument benches.**



If your work involves checking the parameters of lenses and lens systems, or the manipulation and alignment of experimental systems using lasers, optical, and electronic parts and similar devices, consider a Gaertner optical bench. It will provide the stability and precision you need—with a choice of options to meet your specific requirements.

Rugged. These benches are made of a special, massive casting with ribbed design for stability—treated and precision ground to assure permanent straightness of the guide ways.

Two basic lengths, 160cm and 120cm are offered. We can furnish any combination of these lengths, joined to provide extra long benches as needed.

Optical testing. For accurate testing of lenses, mirrors, and optical systems our Model L36ON precision optical bench assembly is ideally suited for measuring focal length, resolving power, distortion, astigmatism, curvature of field, coma, spherical aberration and lateral and axial chromatic aberrations.

Alignment. If your laboratory experiments involve precise, dependable and stable alignment of components, as for instance, laser or photometric systems, electron guns, breadboarding or prototype setups, you'll find a lathe bed bench indispensable. Or you can use the bench as a base for a scale comparator, a flame photometer, spectro-photometer, or similar instrumentation. **Ask for Bulletin 156-73.** ■

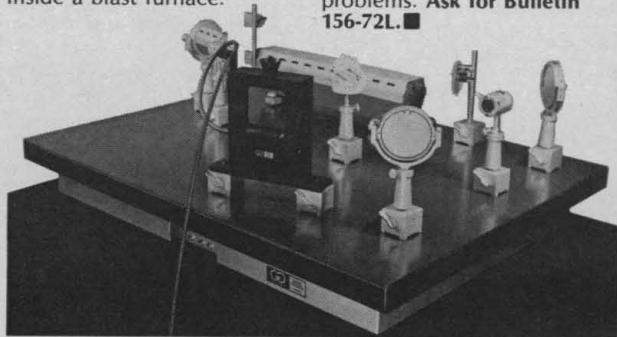
Rectangular flat bed optical/instrument benches.

You can select these Gaertner benches in three basic sizes, all with or without vibration isolation air-suspension systems: 2 meters x 57cm; 3'x4' or 4'x6'. They provide a large stable magnetic surface, yet are reasonably portable. With a variety of magnetic carriages and other accessories, these benches give you great flexibility for positioning, breadboarding and prototype set-ups—for holographic work, instrument experiment and design arrangements using folded optical paths, and more . . .

Vibration isolation. With the vibration isolation system you can support sensitive instruments such as spectroscopic systems, interferometers, a micro balance, etc. Also useful in photography and photogrammetry. The benches are used for many industrial applications as well as research. Example: in a steel mill to isolate delicate equipment for monitoring the chemical composition of the melt inside a blast furnace.

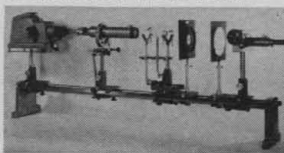
Unlimited holographic applications. Gaertner rectangular optical/instrument benches can be furnished with holographic components for use in information storage and retrieval, material studies, and other work in a broad range of fields where holography is being applied. Examples: (1) the study of internal stress in medicinal tablets to eliminate a problem with crumbling; (2) micro-holographic study of tissues from rats; (3) refractometer experimentation, (4) the investigation of the second harmonic generation of a laser, and many many more . . .

Accessories . . . plus an inexpensive liquid plate-holder. Gaertner offers a complete selection of optical bench accessories and component assemblies, including magnetic holders. The low-cost liquid plate-holder for real-time holography permits processing a plate without removing from the holder, eliminating repositioning problems. **Ask for Bulletin 156-72L.** ■



Double rod benches: inexpensive and versatile.

For less critical applications, you'll find a double rod optical instrument bench excellent. It is a relatively inexpensive yet sturdy and straight base for a variety of carriages and component assemblies. Available in 1, 2, and 3 meter lengths, with or without a linear scale.



These benches may be used for lens testing, determination of conjugate foci of lenses, or with microscopes for the measurement of dimensional changes of materials such as floor tile, paper, etc., in various environments. Medical researchers have used a double rod bench in developing special transducers for use in open heart surgery. With the bench supported over an

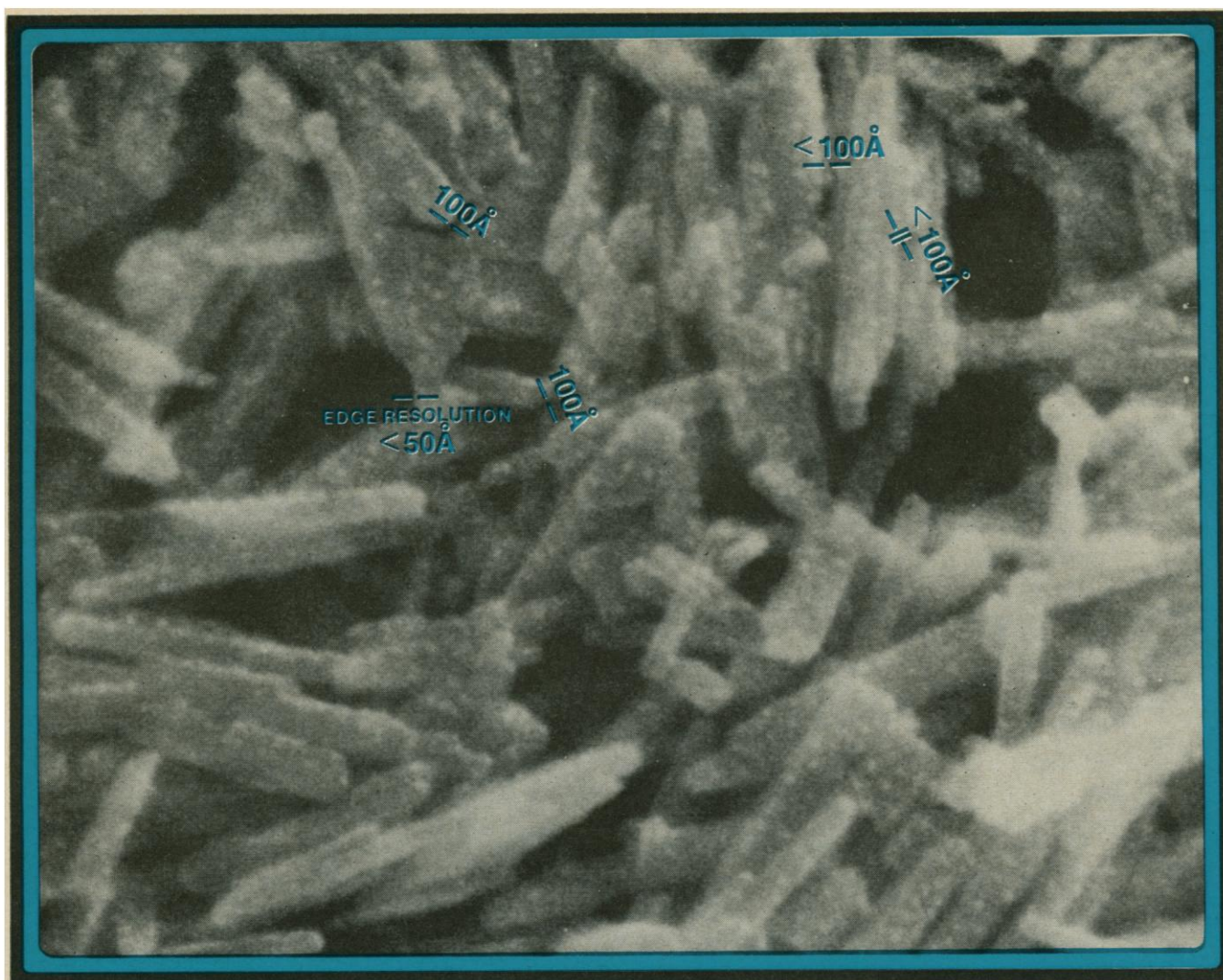
aquarium, they were able to precisely position samples and transducers within the tank.

Accessories. There's a complete selection of Gaertner optical/instrument bench accessories for all kinds of set-ups requiring alignment, positioning, linear and rotational movement of test pieces or components. Included are calibrated fine x-y and x-y-z motion stages, lift-off carriages, microscopes, light sources, holders, slits, collimators, and others.

For information on Gaertner lathe bed and double rod optical/instrument benches, **ask for Bulletin 156-73.** ■

Information.

Please request literature on any Gaertner instruments of interest to you. Or ask our recommendation for an instrument designed to meet your particular requirement.



Chromium dioxide taken at 55,000X, enlarged 2 times, cropped and photoengraved into dot pattern for mass production.

THE BIG PICTURE yours every time with Autoscan[®]

The reasons why scientists don't have to develop electronics expertise to get optimum performance from an Autoscan SEM are simple: high resolution, operational simplification through automation, and an ultra-high resolution recording cathode ray tube.

Ultra-high resolution. 100 Å guaranteed, 150 Å routinely attainable. Optimum capability among scanning electron microscopes for biological research.

Simplification through automation. Automatic focus compensation, gun bias adjustment and magnification compensation when accelerating voltage is changed.

Automatic contrast and dark-level adjustment. Fully automatic electronically controlled camera. These mean optimum quality for photography in minimum time...and with virtually no effort. Delicate specimens can be recorded more quickly to eliminate or minimize damage or contamination, particularly at high magnification levels. Equally important, automation simplifies operator training.

2,500-line recording CRT with Dynamic Focusing. Two-and-one-half times the resolution of competitive SEMs. This means 2½X photographic enlargements of the same quality and resolution as con-

tact prints from other instruments.

The big picture of Autoscan is enhanced by the many accessories offered by Etec. No other SEM offers more. We'll show them to you when we demonstrate Autoscan.



3392 Investment Blvd., Hayward, CA 94545
Telephone: (415) 783-9210

Distribution:
U.S. and territories,
Canada and Mexico—Etec Corp.
Other International Sales—Siemens, AG.
© ETEC Corporation 1973

Circle No. 2 on Readers' Service Card

NCS is designed for solubilizing complex biological materials in toluene cocktails. Tests with NCS on whole tissue, blood, and plasma show higher figures of merit (counting efficiency times sample weight) than those with other digestion reagents or procedures. NCS is the strongest (0.6 N) solubilizer available for liquid scintillation counting.

NCS's versatility with tissues also applies to many different aqueous inorganic solutions (e.g. salts, acids, and water). Directions for mixing NCS with both tissues and aqueous solutions are as easy as "A-B-C":

- A. Add sample and NCS to the counting vial (usually 4-6 parts NCS to 1 part sample).
- B. When necessary, bring temperature to 50° C until the sample is digested.
- C. Cool and add scintillator solution.

NCS not only dissolves almost all tissues and many inorganic aqueous solutions, but helps water down high prices. It costs less since you use and need less. Therefore you purchase less.

Contact our technical service department for detailed information. Our staff will not only solve problems

concerning cocktails and sample-to-sample preparation, but help with any of your particular counting problems.



Amersham/Searle

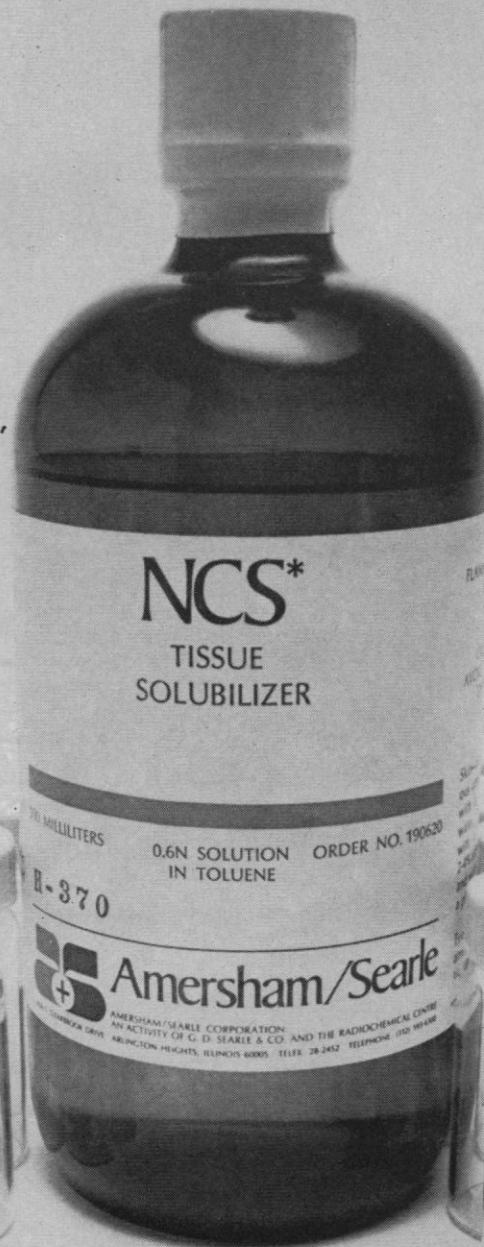
AMERSHAM / SEARLE CORPORATION

An Activity of G. D. Searle & Co. and the Radiochemical Centre

2636 S. Clearbrook Drive/Arlington Heights, Illinois 60005
Telephone: (312) 593-6300—Telex: 28-2452

In Canada:
400 Iroquois Shore Road/Oakville, Ontario
Telephone: (416) 364-2183—Telex: 069-82216

Our specific activity is service

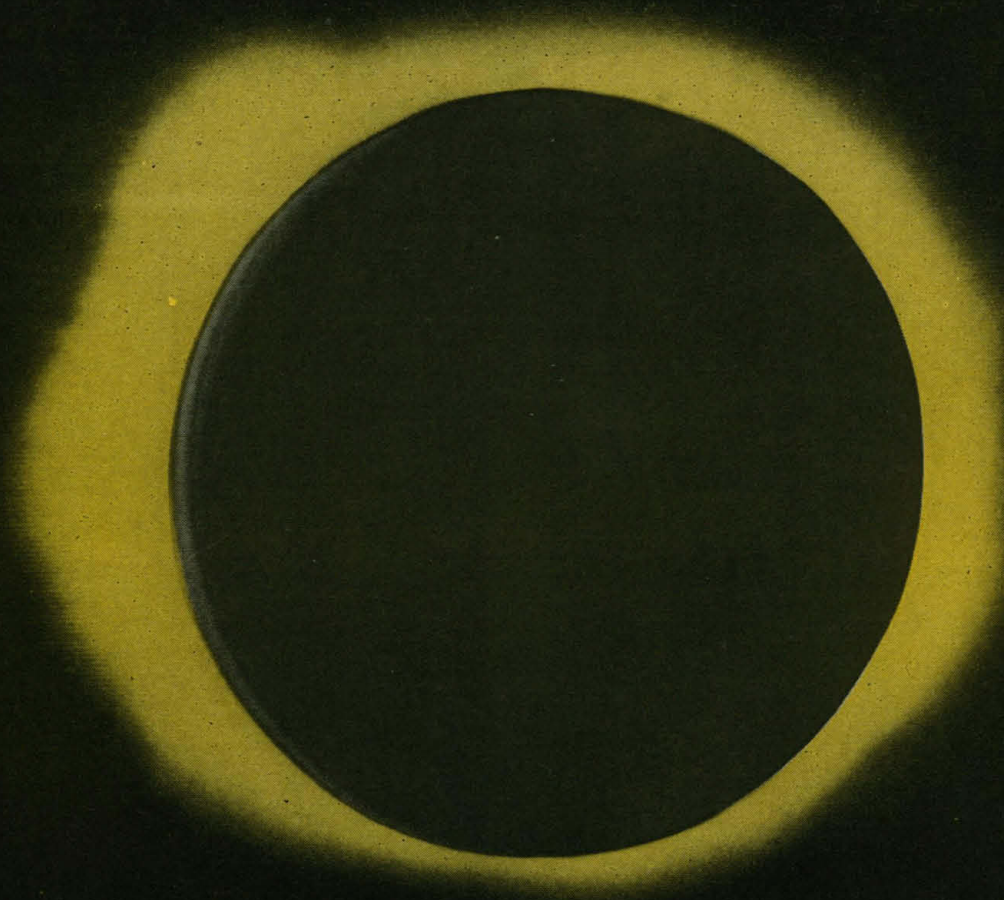


**The complete
tissue cocktail**

NCS™ with Spectrafluor for liquid scintillation counting

NCS U.S. Patent 3,506,828

Circle No. 11 on Readers' Service Card

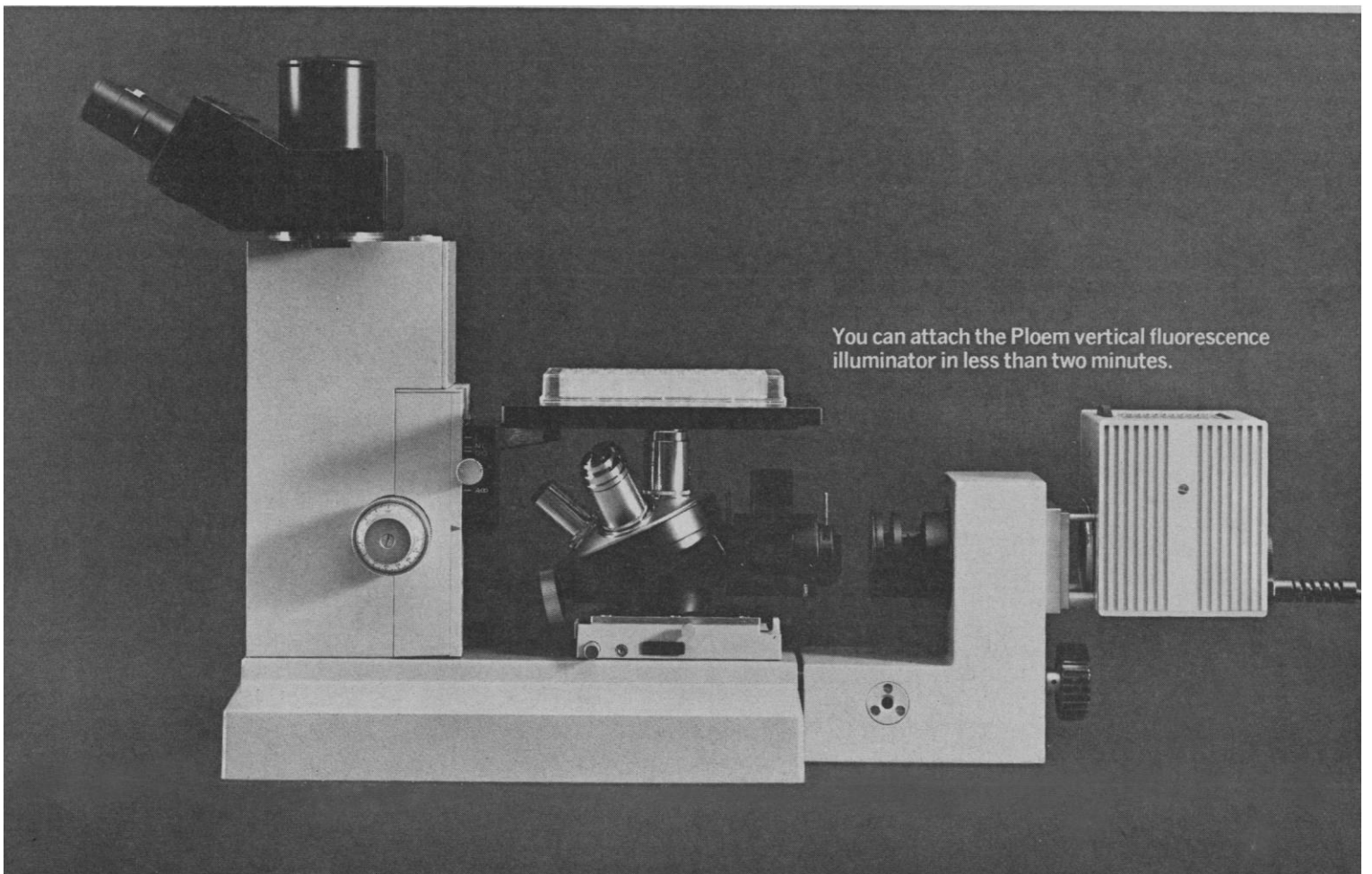
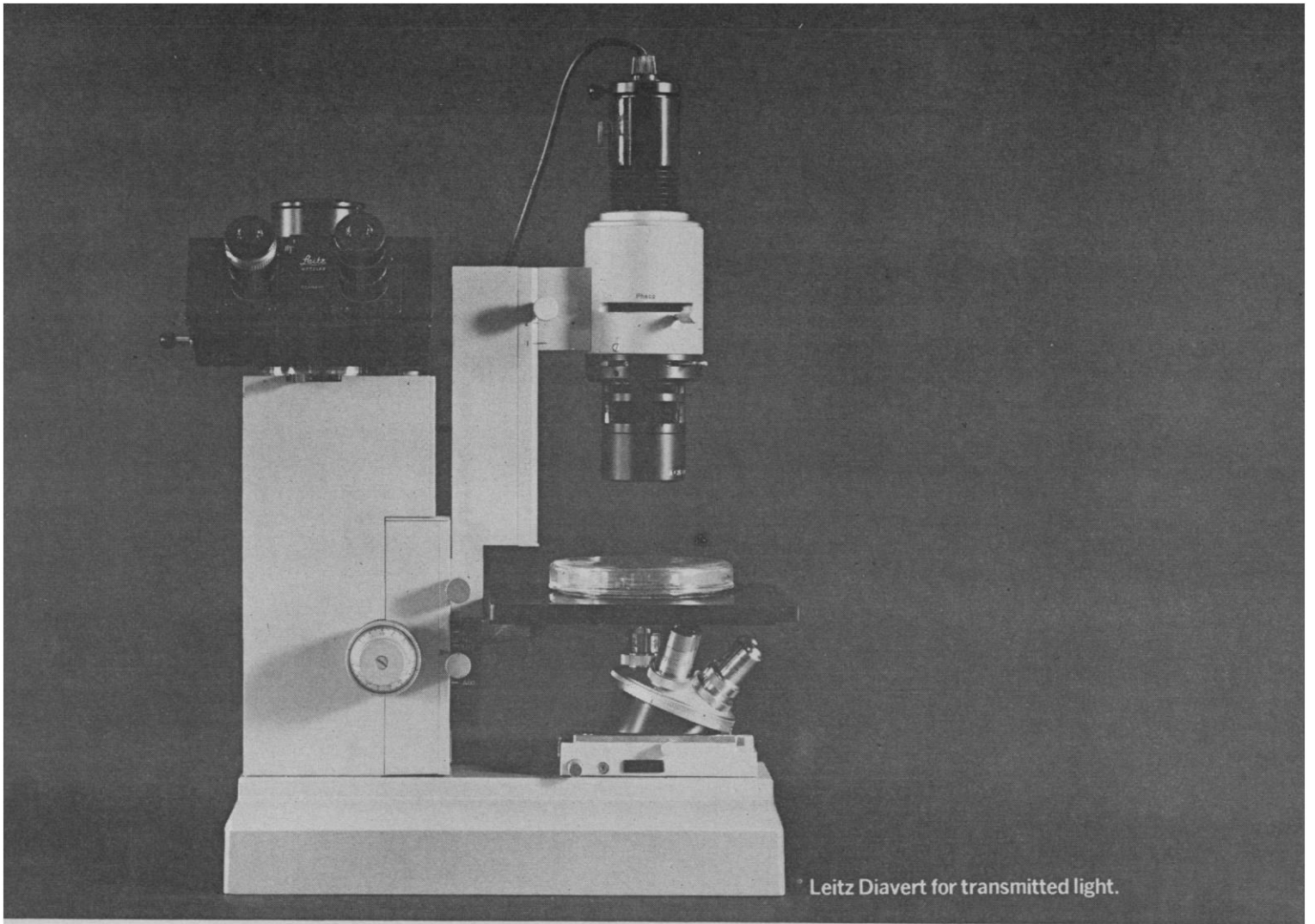


*Any gas you can find in nature,
Linde can deliver by flask or trailer.
Plus an almost infinite number
of mixtures. They're all
in our 108 page catalog.*

For free copy write:
Union Carbide Corporation
Linde Division, 10th Floor,
270 Park Avenue, New York, New York 10017



Circle No. 25 on Readers' Service Card



Introducing the first inverted microscope designed as an inverted microscope.

The new Diavert was engineered from the base up as a system designed to meet the special requirements of inverted microscope applications.

Leitz, in nearly a decade of development, made no compromises with the objectives of stability, convenience and versatility.

To begin with, the Diavert is exceptionally stable. That square shape is as solid as it looks. The base area is 627 cm.² The basic mechanical structure consists of rigid aluminum castings.

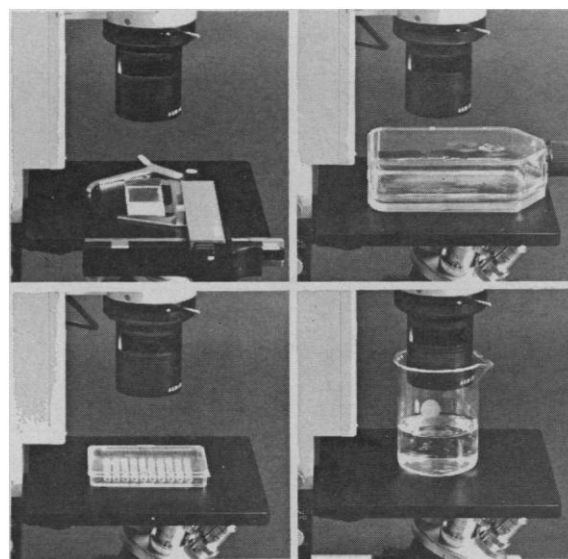
And the Diavert is indeed convenient. For instance, the 164x160 mm stage is positioned low. You can see what you're doing when you manipulate specimens. Focusing knobs are also low. So your arms don't get tired.

The image moves in the same direction as the specimen. Reason: image-erecting optics. The transmitted light lamp moves with the stage so it doesn't have to be refocused when you change the specimen plane.

And long working-distance condensers, up to 64mm, give you plenty of room above the stage.

As for versatility, the Diavert is a building block system so you can add or remove or exchange any accessory in a matter of seconds.

As the result you can readily employ all the techniques of light microscopy: brightfield, darkfield, phase contrast, polarized light,



You can conveniently use any type of culture vessel with the Leitz inverted microscope.

differential interference contrast. It can also be used with the Ploem vertical fluorescence illuminator. The Diavert accepts a full range of photomicrographic equipment.

If you own a Leitz Ortholux II research microscope, you can interchange all Ortholux accessories. And you save the cost of buying them for the Diavert.

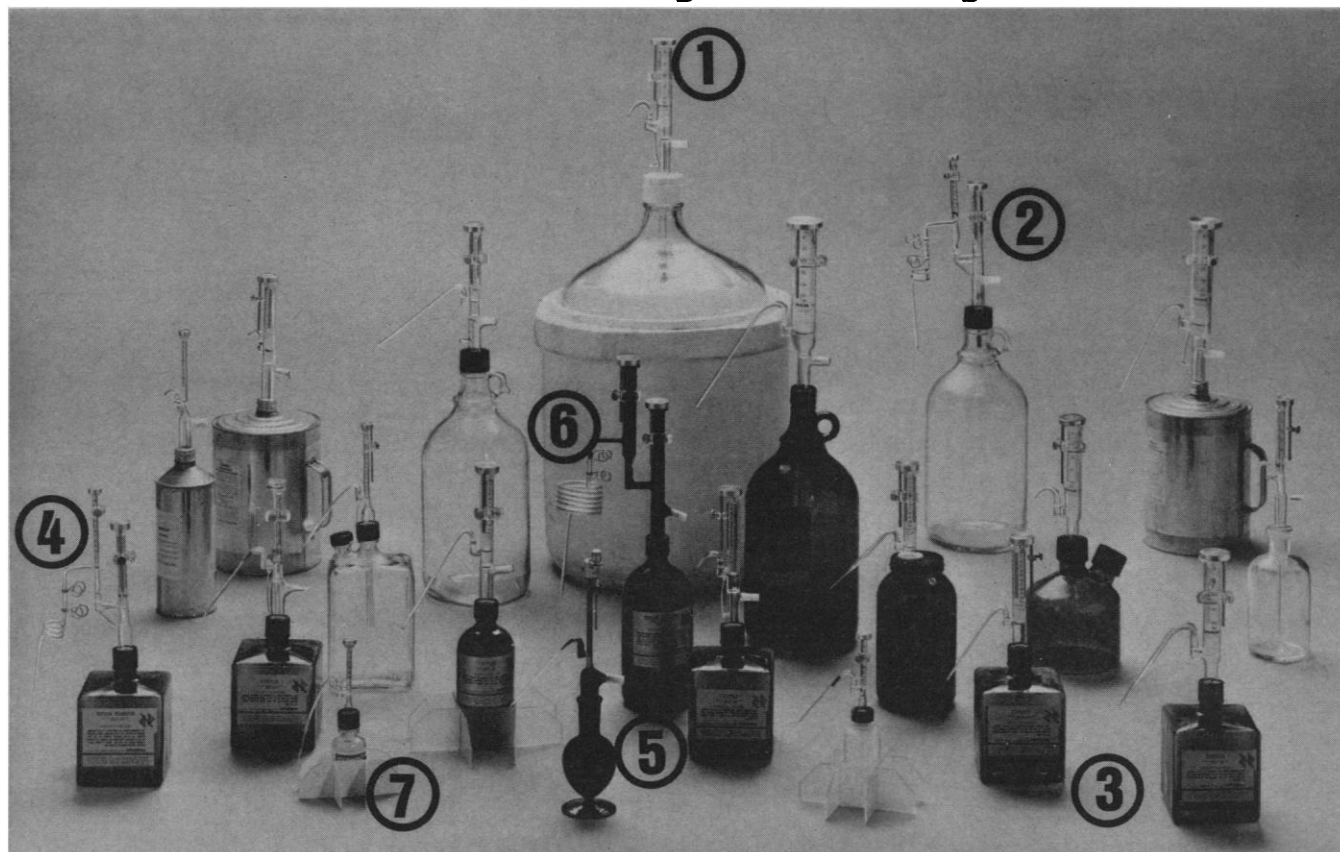
If an inverted microscope would be useful in your investigations, you should investigate the Diavert.

For a brochure, please write to E. Leitz, Inc., Rockleigh, N.J. 07647.

Leitz.

Where most new developments start.

L/I dispenses and dilutes any reagent from any container normally found in your lab.



Only REPIPETS® and Dilutors offer these features: ■ dispense and dilute **any** reagent except HF, including chlorinated hydrocarbons, concentrated acids and alkalis. ■ direct fit to almost any container in your lab. ■ Guaranteed accuracy 1%, reproducibility 0.1%. ■ air filters to protect reagent purity.

1&2 Universal REPIPETS and Dilutors

Universal REPIPETS and Dilutors fit almost any container you have on hand (with an opening greater than 19 mm I.D.) Just trim the Teflon® tubing to fit into the bottom extremity of the bottle. Each instrument includes tubing, Magnifying Indicator, and an assortment of screw caps so you can transfer the same instrument from one type of bottle to another. REPIPET prices start at \$75, Dilutors at \$129.50.

Circle No. 15 on Readers' Service Card

3&4 Low Silhouette REPIPETS and Dilutors

They're still the same REPIPETS and Dilutors so far as performance goes. The difference is the stable square bottle, which provides a firm base and a much lower profile. Low silhouette REPIPETS (12" high) and Dilutors (14" high) fit easily on or under shelves, and in the refrigerator. Bottle holds 1,000 ml. REPIPETS start at \$59.50, Dilutors \$109.50.

Circle No. 16 on Readers' Service Card

5&6 Standard REPIPETS and Dilutors

Our old standbys. More than 150,000 in use, including the first one we made over 10 years ago! Standard REPIPETS and Dilutors are supplied with a 950 ml round amber bottle, a 1,000 ml square amber bottle, or a ground glass joint. Use with any reagent except HF. Instruments include air intake tube with filter. Dilutors are self-cleaning, include a variety of tips supplied at no extra charge. REPIPETS start at \$59.50, Dilutors \$109.50.

Circle No. 17 on Readers' Service Card

L/I's policy is to satisfy as many customer needs as possible. If we don't have a REPIPET or Dilutor already on hand that suits you, we'll make one that's tailored to your needs.

L/I stocks REPIPETS and Dilutors in 1, 5, 10, 20 and 50 ml sizes. Order from Labindustries or your distributor.

LABINDUSTRIES

1802M Second Street/Berkeley, CA94710

7 MINI-REPIPETS

For dispensing directly from any reagent bottle ½ ounce or larger. Miniature Dilutors also available. MINI-REPIPETS \$59.50, MINI-Dilutors \$109.50.

Circle No. 18 on Readers' Service Card

Eastman Organic Chemicals News

For your consideration . . . select products from a family grouping of specialties. One may just spark an application you're researching or developing. We'd like to help. Detailed product information is as close as the coupon below.

pH indicators

If you use pH indicators in your work, our wall chart, *pH Ranges and Color Changes of EASTMAN Indicators*, should be a useful addition to your laboratory. In addition to directions for preparing 67 indicator solutions, its four-color format illustrates the color changes over the active pH range of the indicators. Use the coupon below to request your copy of Kodak Publication No. JJ-13. Circle No. 5 on Readers' Service Card

New additions

N-Methyl-(7-dimethylcarbamoyl) quinolinium Iodide (EASTMAN 11864). Fluorescent probe for acetylcholinesterase, sensitive to concentrations in the nanomolar range. Active sites of the enzyme can be titrated, since the first-order carbamoylation reaction rate is much higher than the concentration-independent decarbamoylation reaction. The number of active sites per molecule can be calculated from the turnover number and the enzyme normality. [*Biochemistry*, 10, 4114 (1971).]

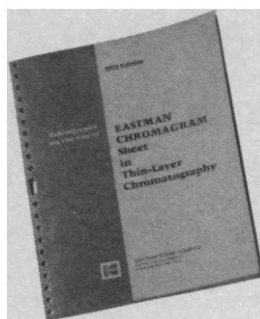
Phenazine Methosulfate (EASTMAN 11509).

The combination of phenazine methosulfate and nitro BT (EASTMAN 11350) forms an activity stain for enzymes. Has been used for the *in situ* identification after acrylamide gel electrophoresis of threonine deaminase [*Science*, 170, 1414 (1970)] and of bovine LDH [*Biochemistry*, 9, 4372 (1970)].

Circle No. 6 on Readers' Service Card

For TLC

Kodak Publication No. JJ-7, *Bibliography on the Use of EASTMAN CHROMAGRAM Sheet in Thin-Layer Chromatography*, has been revised and updated. With the addition of many new abstracts, the current edition contains 213 references to the use of EASTMAN CHROMAGRAM Sheet in TLC. References are divided into 34 categories, from "alcohols" to "vitamins," and from "apparatus" to "techniques and methods." If you have an earlier version of JJ-7, let us bring you up to date. If you are involved in TLC and don't yet have a copy, use the coupon to request Kodak Publication No. JJ-7.

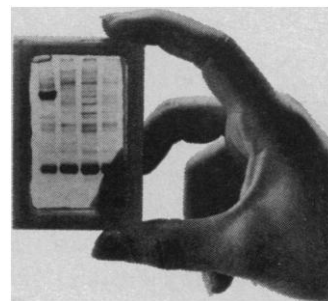


Circle No. 7 on Readers' Service Card

For electrophoresis

Among the initiators, stains, buffer components, and specially purified monomers are some with very unique properties. 1-Ethyl-2-[3-(1-ethylnaphtho[1,2d]-thiazolin-2-ylidene)-2-methylpropenyl]-naphtho[1,2d]-thiazolium Bromide (EASTMAN 2718) is a dye reported to stain RNA bluish-purple, DNA blue, protein red, and is also useful for staining acid polysaccharides. Because of the versatility of this dye by virtue of its differential staining ability, the reagent has been called "Stains-All." [*J. Mol. Biol.*, 41, 139 (1969).] The dye has also been used for estimating lipopolysaccharides. [*FEBS Letters*, 16, 343 (1971).]

For a complete list of these products including prices and package sizes, request Kodak Publication No. JJ-11, *Reagents for Acrylamide Gel Electrophoresis*.



Circle No. 8 on Readers' Service Card



Eastman Kodak Company
Organic Chemicals Markets
Dept. 412-L
Rochester, N.Y. 14650

10-65

Please send the following:

☐ Publication No. JJ-11, Reagents for Acrylamide Gel Electrophoresis ☐ Publication No. JJ-7, Bibliography on the Use of EASTMAN CHROMAGRAM Sheet in Thin-Layer Chromatography ☐ Publication No. JJ-13, pH Ranges and Color Changes of EASTMAN Indicators.

Name _____

Company _____

Address _____

City _____

State _____

Zip _____

This is a new P.A.G.E.



Pharmacia Gel Electrophoresis System for polyacrylamide gradient electrophoresis and other P.A.G.E. techniques

The complete system

Full capabilities for the new pore gradient electrophoresis technique, two dimensional studies, gel rod electrophoresis.

Polyacrylamide gradient gels PAA 4/30

Convenient ready-to-use gradient gel slabs give extreme resolution over the whole range 50,000–2 million MW. Self-limiting migration concentrates the zones after separation by molecular size.

Gel electrophoresis apparatus GE-4

4 gel slabs, 12 samples on each, or 16 gel rod capacity. Robust moulded construction with built-in cooling system. Full range of accessories for all applications.

Electrophoresis power supply EPS 500/400

Compact, all solid state. 0–400 mA constant current, 0–500 V constant voltage with automatic cross-over. Maximum effect 60 W. Full personnel and instrument protection. Available 1974.

Gel destainer GD-4

Electrophoretic or diffusion destaining of slabs or rods in a single operation. Twin cells. Active dye removal and solvent circulation. Results can be inspected at any time.

Destainer power supply DPS

Compact, reliable, all solid state. Push-button selected constant voltages 12, 24, or 36 V. Timer controls electrophoretic destaining up to 90 minutes.

Find out more about the Pharmacia Gel Electrophoresis System from your usual supplier of Sephadex® and Sepharose®.

Pharmacia Fine Chemicals Inc.
800 Centennial Avenue
PISCATAWAY
New Jersey 08854
Phone (201) 469-1222

Pharmacia (Canada) Ltd.
2044 St. Regis Boulevard
Dorval, Quebec, Canada
(514) 684-8881

 **Pharmacia
Fine Chemicals**

RIA? BEFORE YOU BUY... COMPARE

RIA - Radioimmunoassay - is today's fastest growing clinical diagnostic technique. The equipment is costly. Too costly to buy without careful comparison. Before you buy your gamma spectrometer, be sure it will meet tomorrow's increased demands.



INTERTECHNIQUE CG30

INTERTECHNIQUE'S CG30 does everything you need today . . . and then a little bit more.

- 200 and 300 SAMPLES
- 3 CHANNELS
- PREADJUSTED WINDOWS - simplifies operation, assures reproducible settings
- ADVANCED COMPUTATION OPTIONS - programs available for all commercial RIA kits.

We back up these extra features with a convenient, easy-to-use design! With outstanding reliability! With next day service!

These are some of the reasons why you owe it to yourself to check with us before you decide on a gamma spectrometer for RIA.

**TELEDYNE
INTERTECHNIQUE**

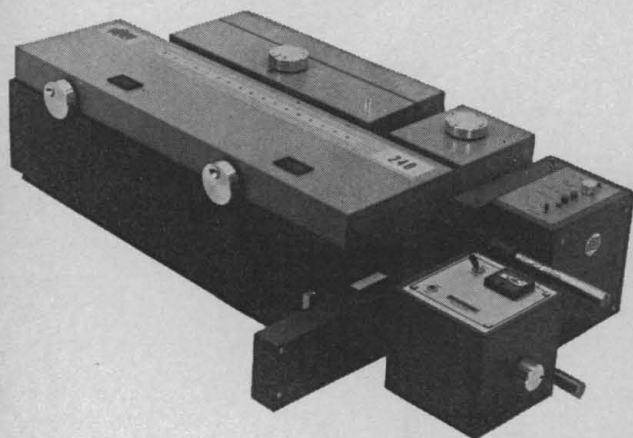
50 VAN BUREN AVE., WESTWOOD, N.J. 07675
PHONE: 201-664-7070 TELEX: 134-474

IN EUROPE CONTACT INTERTECHNIQUE S.A. 78370 PLAISIR, FRANCE

Circle No. 42 on Readers' Service Card

Do you need a 20 cm gel scanner?

If so, we have an accessory for such work, plus the only spectrophotometer than can accommodate such a sample. And even if you don't, that same instrument design versatility can help you meet your particular application requirements.



The unique optical bench of our Model 240 permits the attachment of a wide variety of accessories to fulfill application needs in research, industrial, and clinical laboratories including:

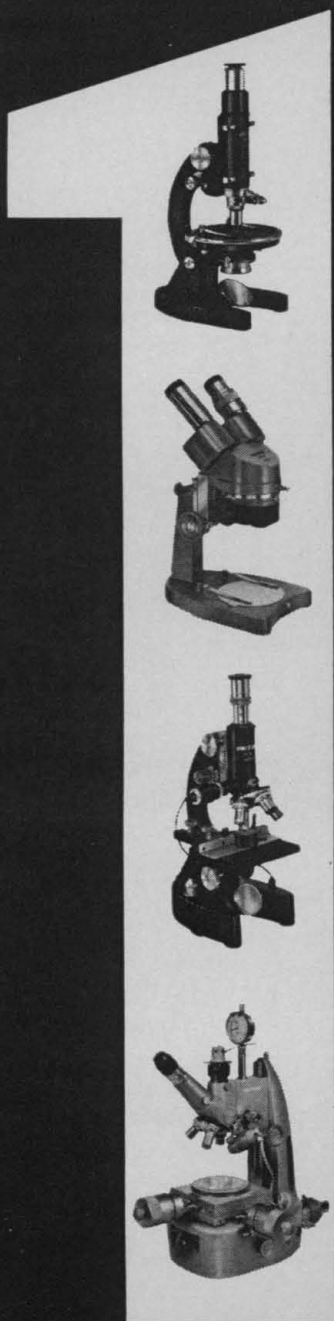
- Density gradient scanning
- Rapid sampling
- Thermal programming for absorption vs $T^{\circ}\text{C}$ plots
- Aspirating thermo-cuvette for precise temperature control
- Programmed, reference compensated wavelength scanning for accurate qualitative assay as part of the basic system
- Automatic sampling system for batch analysis

The flexibility of the Model 240 for a wide variety of applications means cost savings for you. For a laboratory demonstration and additional information write or call Al Marchesi, Research Products Manager.

gilford
INSTRUMENT

Oberlin, Ohio 44074
Paris (Malakoff), France
Dusseldorf, W. Germany
Morden, Surrey, England
216/774-1041 • Cable: GILLABS

ACCEPT A FREE 10 DAY TRIAL OF ANY *UNITRON* MICROSCOPE



TRY BEFORE YOU BUY

A salesman's demonstration only gives you about 30 minutes to examine a microscope, hardly the best conditions for a critical appraisal.

But UNITRON's unique Free 10 Day Trial gives you the opportunity to evaluate any model in your own laboratory at your convenience.

Prove its value in your own application before you decide to purchase . . . all without cost or obligation.

ASK FOR YOUR FREE MICROSCOPE CATALOG

Choose from a complete line of budget-priced microscopes for Research, Industry and Education including metallurgical, biological, stereoscopic, polarizing, measuring, and student models. See for yourself, as have thousands of other buyers, why . . . UNITRON means MORE MICROSCOPE FOR THE MONEY.



MICROSCOPES

A COMPLETE RANGE OF MODELS AND ACCESSORIES FOR
RESEARCH • INDUSTRY • EDUCATION

Please send UNITRON's Microscope Catalog No. 1-4

Name

Company Dept.

Address

City State Zip

UNITRON
INSTRUMENT COMPANY

MICROSCOPE SALES DIV.
66 NEEDHAM STREET
NEWTON HIGHLANDS
MASSACHUSETTS 02161

Maryland makes more plastic cages than anybody.

Twelve different types in three different materials. Plus a complete line of accessories including molded spun polyester filters, stainless steel and zinc plated lids, bottles and sippers, and even cage racks.

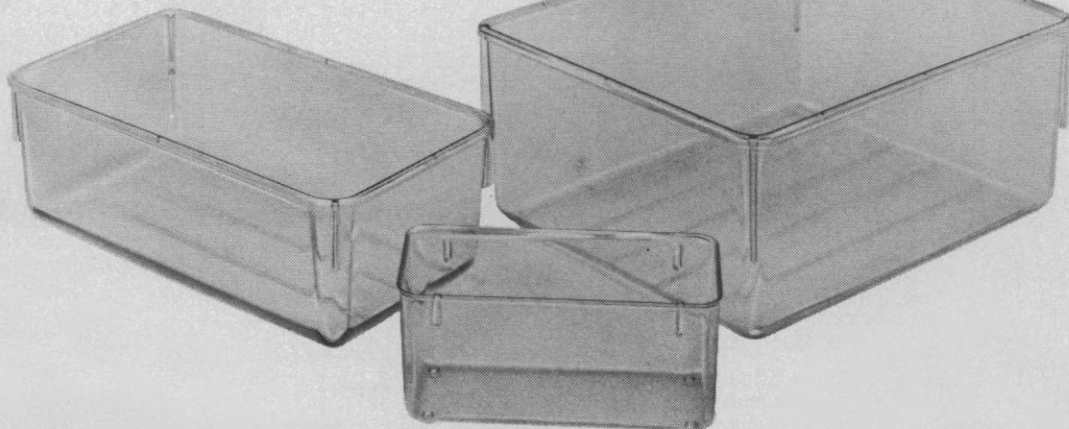
From permanent Econo-Cages that can be autoclaved to Disposable Pre-bedded cage systems the Econo-Cage line is the largest in the industry.

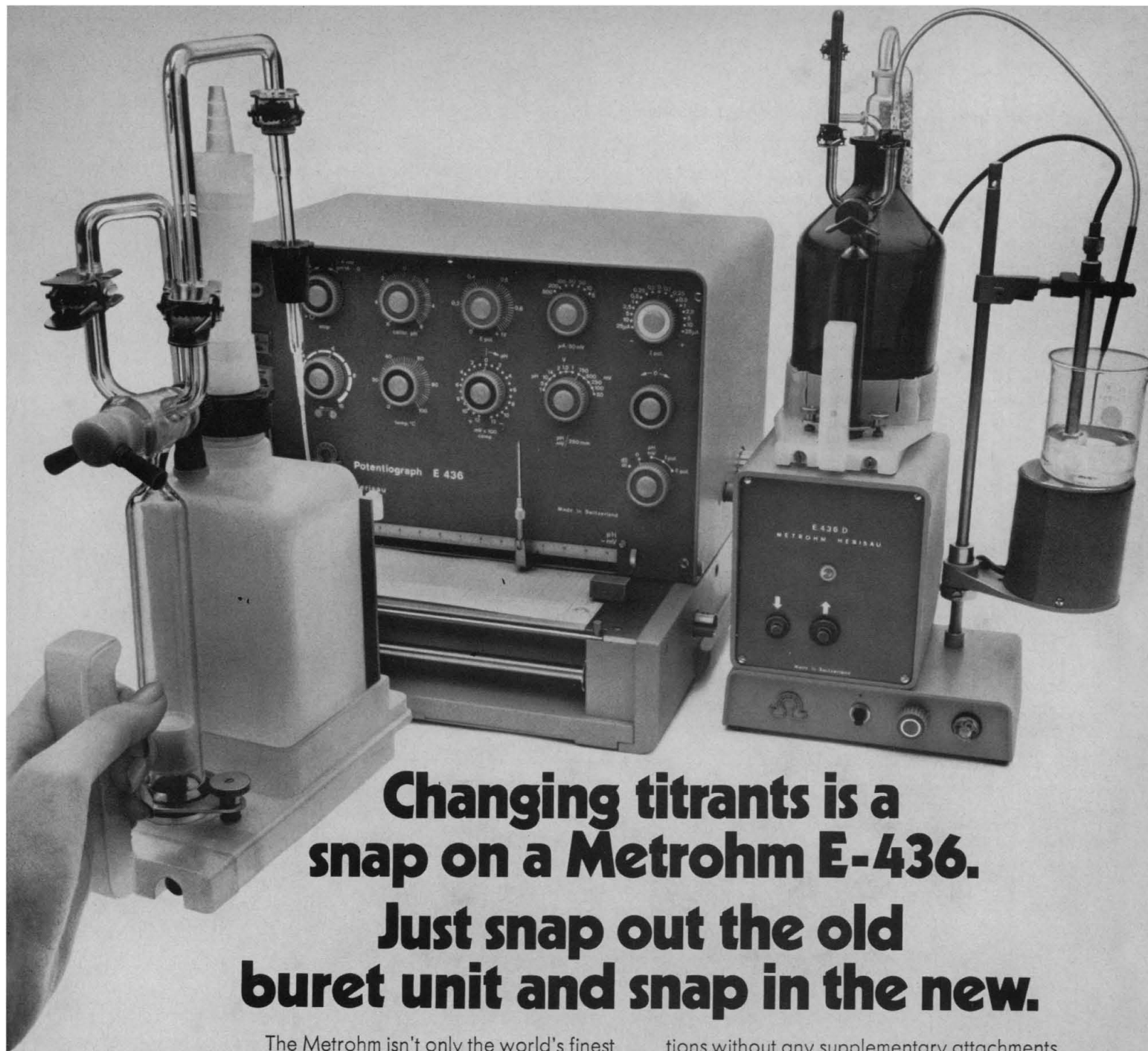
If you are housing or breeding mice, rats, hamsters, guinea pigs, gerbils or dwarf hamsters you need a copy of our new catalog of Laboratory Animal Care Products. Ask your Econo-Cage Distributor for a copy; or, write directly to Maryland Plastics, Inc., Scientific Division, 461 Eighth Avenue, New York, N. Y. 10001



ECONO-CAGE QUICK SELECTOR GUIDE

ANIMALS						CAGES		
Mice	Rats	Hamstrs.	G. Pigs	Gerbils	D. Hamst.	Cage Series	Nominal Dimensions (inches)	No. Cages Per Standard Rack
•	•					Series 10	11x8½x6	60
•	•	•	•	•	•	Series 20	11½x7¼x5	84
•					•	Series 30	19x10½x5½	36
•	•	•	•	•		Series 40	19x10½x6½	30
•	•	•	•	•		Series 50	14¾x12¾x6¾	20
•				•	•	Series 60	13¾x8¾x5½	72
•	•	•	•			Series 70	20x16x8½	15
•				•	•	Series 80	19x8¾x5¾	36
•				•	•	Series 120	11½x5¼x5½	132
•	•	•	•			Series 140	19x10x8	30
•				•	•	Disposable Cage	11½x7¼x5	84
•				•	•	Pre-Bedded Disposable Cage	11½x7¼x5	84





Changing titrants is a snap on a Metrohm E-436. Just snap out the old buret unit and snap in the new.

The Metrohm isn't only the world's finest recording titrator. It is also the only automatic titrator with interchangeable, snap-in buret units, and nine buret sizes; from 0.2 ml. to 50 ml. On the E-436 you can do non-stop titrations and change titrant as often as you like. There's no need to constantly stop, disassemble and clean burets, as on instruments with dual systems. Simply replace one buret unit with another and keep right on going.

But convenience isn't the only unique feature of the E-436. It provides eight mV ranges (50 mV to 200 mV), four pH ranges (1, 5, 10 and 14 pH), and 50 mV (1 pH) sensitivity per full scale deflection, the highest of any automatic titrator. Besides potentiometric and Redox titrations, the E-436 is also equipped to do amperometric and voltametric titra-

tions without any supplementary attachments. Finally, the E-436 eliminates zeroing problems by using a single motor for both buret and paper drives.

Of course, the E-436 also has numerous conventional features, including automatic stop, automatic adaption of titrating speed to curve slope, a continuously variable buret delivery rate, and a very attractive price. But to learn more about the unconventional features, you really should have our catalog. For your free copy, just write: Metrohm Division, Brinkmann Instruments, Cantiague Road, Westbury, N.Y. 11590.



Metrohm Titrators

Circle No. 26 on Readers' Service Card

LETTERS

Appointments to Working Government Councils

In December 1972, Frank Sinatra was appointed a member of the National Advisory Heart and Lung Council, to fill a 1-year unexpired term. This council, by law, consists of 5 ex officio members and 18 members appointed by the secretary of the Department of Health, Education, and Welfare (HEW). The National Heart, Blood Vessel, Lung and Blood Act of 1972 states that 5 of the 18 "shall be selected from members of the general public who are leaders in the fields of fundamental or medical sciences or in public affairs." Neither I nor any other council member questions the principle of appointing nonscientists to the council, or the wisdom shown by the secretary of HEW in the appointment of any individual. However, the scientists on the council do have a right to expect full participation of all members in the heavy work load of the council, and to expect that the nonscientists will bring new concepts and fresh points of view to the council's discussions—and express these effectively. The council must meet from

four to six times a year, and members must spend much time between meetings on the council's business.

Mr. Sinatra accepted appointment to the council but did not attend even part of the four council meetings held since then (15 to 17 March, 29 and 30 March, 13 to 15 June, and 17 and 18 September), nor did he contribute to the council's work between meetings. Since his term has now expired, why bring the matter to public attention? Simply in the hope that the public may ask the secretary of HEW that there be no more honorary or courtesy appointments to working councils whose responsibilities require the dedicated efforts of all its members. Surely the government can find ways to honor those whose special talents or contributions deserve recognition without lessening the effectiveness and prestige of its working councils.

JULIUS H. COMROE, JR.
*Cardiovascular Research Institute,
School of Medicine, University of
California, San Francisco 94122*

The Albatross Award

In the cover story (News and Comment, 7 Sept., p. 926) on giving the bird to Roger Revelle, Robert Gillette approaches, but doesn't quite manage, Coleridge's

Instead of the cross, the Albatross
About my neck was hung.

An ancient Oceanographer, wishing to be rid of "that damned dusty creature" and its attendant drought, might shift from "slimy things did crawl with legs upon a slimy sea" to blessing the water snakes:

O happy living things! no tongue
Their beauty might declare.

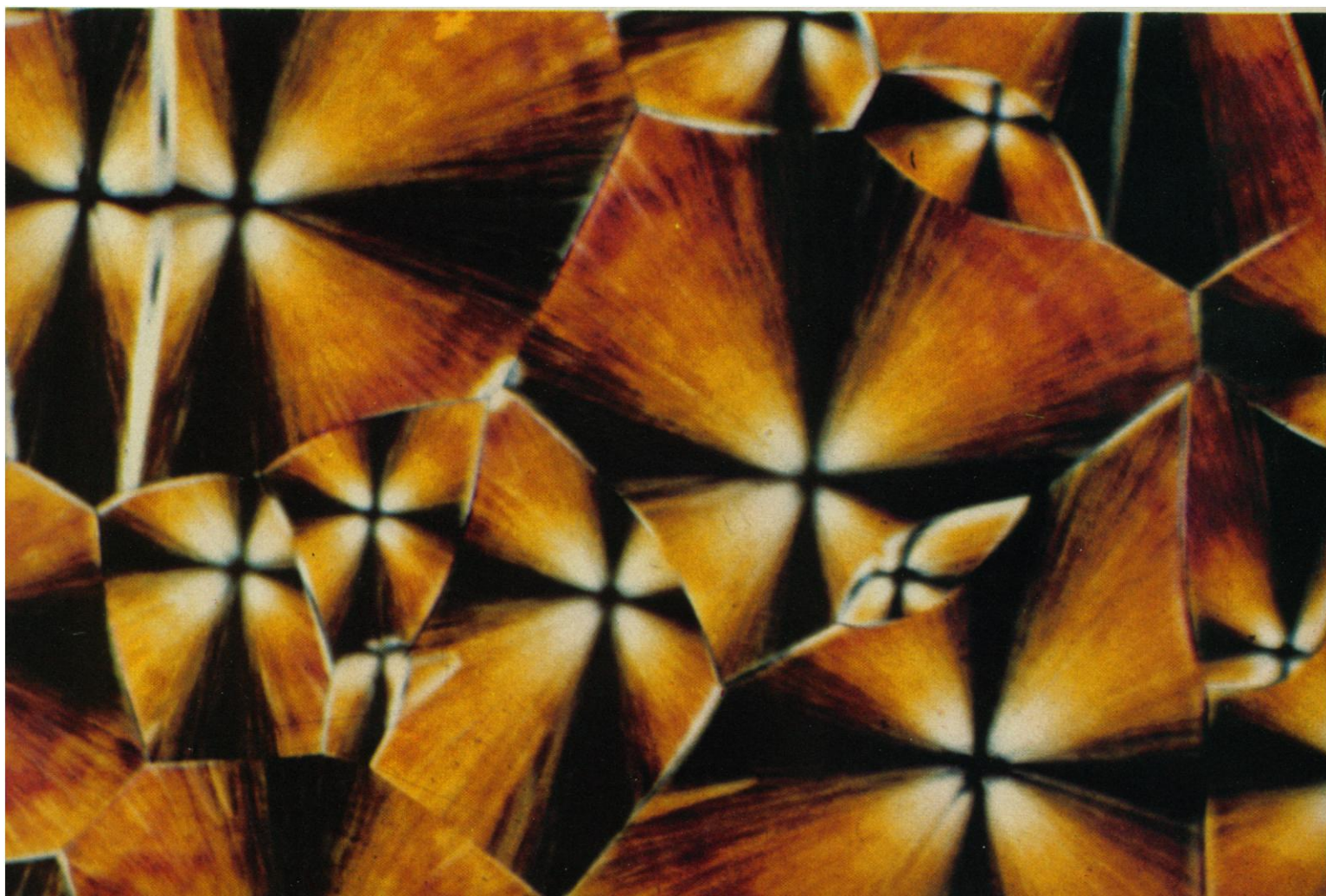
For that inward grace no award is
needed.

Who killed *this* albatross?

ROLAND WALKER

*Department of Biology,
Rensselaer Polytechnic Institute,
Troy, New York 12181*

The story on the Albatross award, would-be Nobelists, and AMSOC (American Miscellaneous Society) reminds me of our own system of



awards. When we moved into our three-story laboratory, we inherited a modern communications system—a pull cord attached to a bell which could be heard at all three levels. We now use it for ingenious approaches to the solution of problems, and, as yet, no one has achieved the ultimate—the five-bell award. However, when an original stupidity is perpetrated, we issue the no-bell award.

J. J. MARCUS

Missouri Analytical Laboratories, Inc.,
1820 Delmar Boulevard, St. Louis

Knowledge Factory

The following excerpt from Sinclair Lewis's novel *Arrowsmith* (1) is an interesting addition to Harold L. Enarson's editorial "University or knowledge factory?" (7 Sept., p. 897).

The University of Winnemac is at Mohalis, fifteen miles from Zenith. There are twelve thousand students; beside this prodigy Oxford is a tiny theological school and Harvard a select college for young gentlemen. The University has a baseball field under glass; its buildings are measured by the mile; it hires hundreds

of young Doctors of Philosophy to give rapid instruction in Sanskrit, navigation, accountancy, spectacle-fitting, sanitary engineering, Provençal poetry, tariff schedules, rutabaga-growing, motor-car designing, the history of Voronezh, the style of Matthew Arnold, the diagnosis of myohypertrophica kymoparalytica, and department-store advertising. Its president is the best moneyraiser and the best after-dinner speaker in the United States; and Winnemac was the first school in the world to conduct its extension courses by radio.

It is not a snobbish rich-man's college, devoted to leisurely nonsense. It is the property of the people of the state, and what they want—or what they are told they want—is a mill to turn out men and women who will lead moral lives, play bridge, mention books, though they are not expected to have time to read them. It is a Ford Motor Factory, and if its products rattle, they are beautifully standardized, with perfectly interchangeable parts. Hourly the University of Winnemac grows in numbers and influence, and by 1950 one may expect it to have created an entirely new world-civilization, a civilization larger and brisker and purer.

DEAN TROYER

440 North Winona Street,
Indianapolis, Indiana 46202

References

1. S. Lewis, *Arrowsmith* (Harcourt Brace, New York, 1949), chap. 2, sect. 1.

Marital Status and Mobility

Beverley R. Green (Letters, 10 Aug. p. 496) reports that only 5 percent of the applicants for a biochemistry position and 3 percent of the applicants for a botany position at the University of British Columbia were women. She implies that, since between 10 and 20 percent of those receiving Ph.D.'s in these fields are women, women are giving up without trying; that women make up a small proportion of faculty because they do not apply for jobs; and that men cannot be blamed for this.

We analyzed the applications received for five positions in the department of biology at Michigan Technological University as a result of an advertisement in the 2 March issue of *Science*. We found that the percentages of women applicants compared well with the percentages reported by Green. However, our interpretation of these results is quite different from Green's.

In addition to classifying applicants according to sex, we also noted marital status. We found that more than 90 percent of the male applicants were married, while all but one (93 percent) of the female applicants were single.

NIKON

EXTENDING MAN'S VISION IN THE BIOMEDICAL SCIENCES

Your health is the most precious commodity you possess. It cannot be bought—or can it?

Funds are allocated each year enabling dedicated men and women to conduct crucial medical research. Your health and the health of succeeding generations depends on their efforts.

Nikon supplies these men and women with the most sophisticated research equipment that modern technology can produce. These are the weapons that provide them

with the extra vision to discover and combat the scourges of man.

Producing the finest instruments available for science and industry is a constant challenge.

Wherever biomedical research is being conducted; on land, beneath the seas, or in space—we are meeting that challenge.

Extending your vision is our main concern.

The finest optics in the world.

Nikon Instrument Division, Ehrenreich Photo-Optical Industries,
623 Stewart Ave., Garden City, N.Y.
Tel. (516) 248-5200.
In Canada, Anglaphoto Ltd., Ontario.



Cholesteryl acetate spherulites
photographed under polarized light.



Nikon Model M Inverted Microscope

World's most sophisticated optical instrument for tissue culture studies. Recommended for automatic time lapse cinematography. Utilizes long working distance phase-contrast optics. Accepts wide variety of special and standard Nikon attachments.

Circle No. 60 on Readers' Service Card



Nikon Model MS Inverted Microscope

Simplified version of the Model M. Utilizes almost all Model M accessories including photomicrographic. Available with both transmitted and reflected light and quartz iodine illumination. Built-in photo tube.

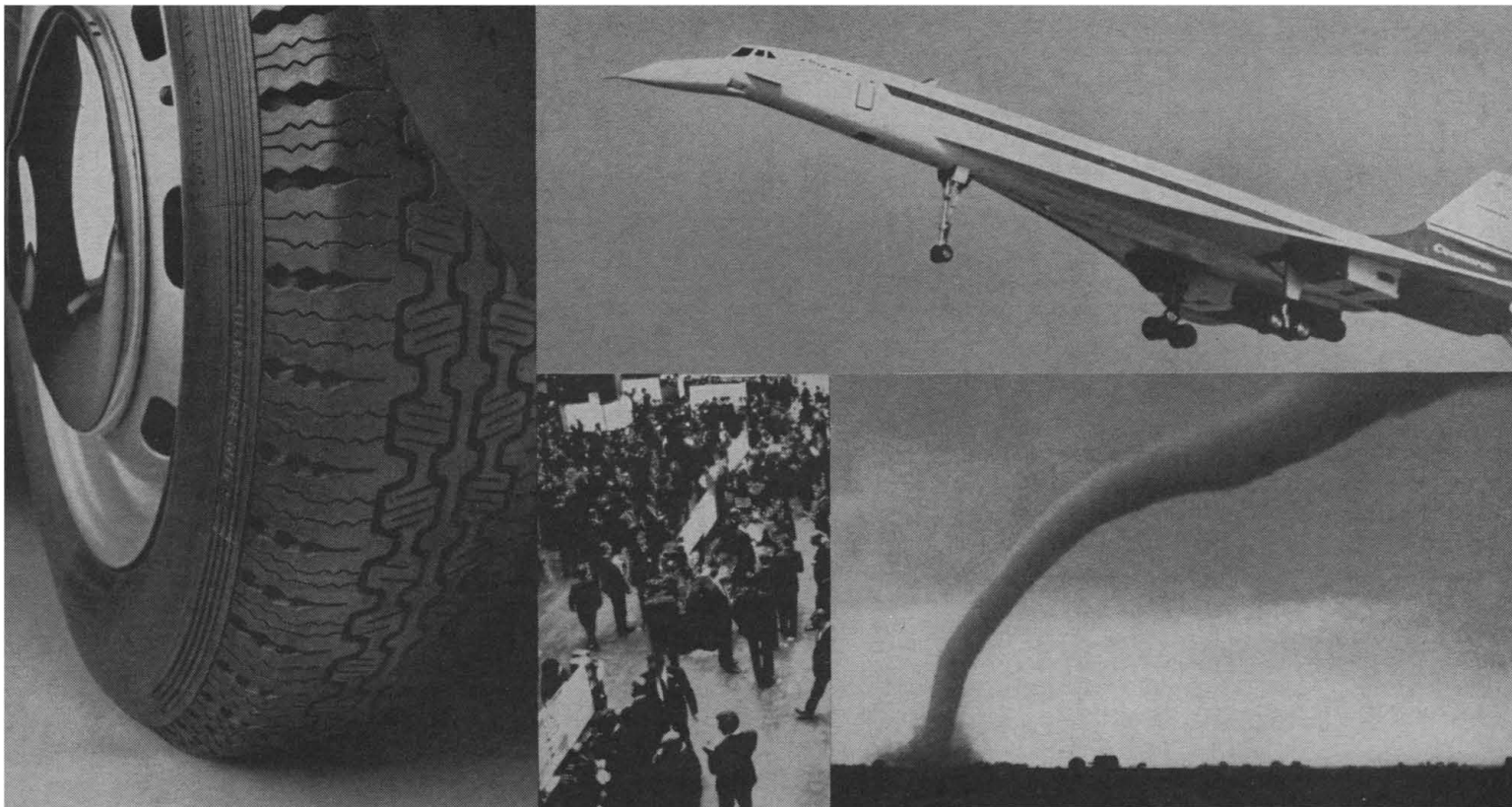
Circle No. 61 on Readers' Service Card



Nikon Polarizing Research Microscope POH-2

For observation, measurement and analysis of birefringent specimens. Interchangeable, centerable, rotating nosepieces, built in substage illumination or epi-illumination, graduated Babinet compensator and universal 4-axis stage. Trinocular eyepiece for photomicrography. Special depolarizer.

Circle No. 62 on Readers' Service Card



The plot changes. The story stays the same.

On Monday morning, weather maps will be drawn on a CalComp system—those for the German weather service on a flatbed plotter—and those for the United Kingdom on a microfilm graphic system.

At the same time, a leading firm of London stockbrokers and many of their clients will begin their week with trend analysis graphs plotted on CalComp drum plotters.

During the week, Pirelli of Italy will use a CalComp plotter to design tire treads.

The Concorde supersonic jet will fly, thanks in part to engineering drawings produced by a CalComp plotter. And map makers all over the world can draw maps with a speed and precision man cannot approach.

The plots change.

Wherever in the world a new need for computer graphics arises, CalComp will assuredly have the hardware and the software to meet the need.

We set the standards for our industry. We service what we sell around the world.

The plot changes. But our reputation for innovation and our concern for excellence—those stay the same.

For information on plotters, call your local CalComp office, or contact California Computer Products, Inc., SM-10-73, 2411 West La Palma Avenue, Anaheim, California 92801. (714) 821-2011.



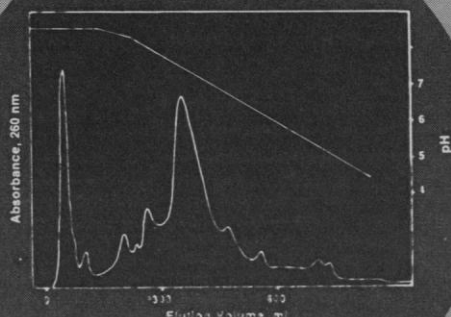
CALCOMP

Circle No. 24 on Readers' Service Card

High porosity DEAE!

DEAE Bio-Gel® A has high capacity for macromolecules and no bed volume variation

This new, advanced anion exchanger, based on Bio-Rad's strong, highly porous, beaded agarose gel, separates and purifies large proteins, nucleic acids and other macromolecules better than other exchangers. Why? DEAE Bio-Gel A has high porosity, high capacity — and it doesn't shrink or swell with changes in ionic conditions. It has other advantages, too, includ-



Separation of fresh pooled human serum on DEAE Bio-Gel A using an increasing salt concentration

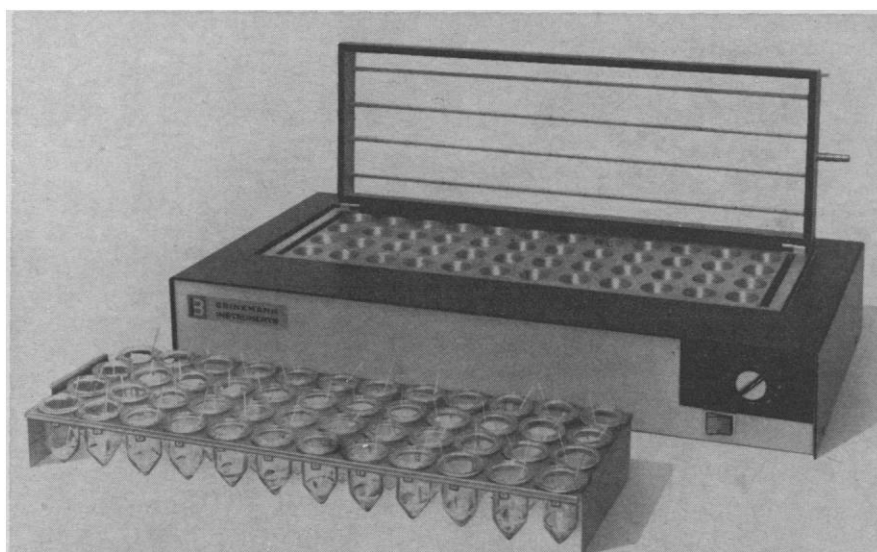
ing: Rapid sorption and desorption of proteins; Easy column preparation (supplied fully hydrated — pours like a gel); Excellent chemical stability; Autoclavable. Use DEAE Bio-Gel A wherever you would use DEAE cellulose. You'll

save time and get better reproducibility. For more complete technical information, including pricing, contact:

BIO-RAD Laboratories

32nd & Griffin Avenue, Richmond, CA 94804, Phone (415) 234-4130
Also in: Rockville Centre, N.Y.; London, England; Milan, Italy; Munich, Germany

Circle No. 84 on Readers' Service Card



Now concentrate 48 samples at once...

Brinkmann's new Sample Concentrator SC/48 accommodates up to 48 evaporation tubes in a stainless steel rack, eliminating handling of individual samples.

Concentration is by means of heat and vacuum, combined with an air current directed into each sample. A glass cover prevents fumes from escaping and permits use of nitrogen atmosphere. Solid-state circuitry, with a temperature range adjustable from 30 to 100°C. Ideal for drug

screening extractions, column chromatography, liquid scintillation and many other procedures.

For literature, write: Brinkmann Instruments, Cantiague Rd., Westbury, N.Y. 11590. In Canada, write: Brinkmann Instruments (Canada) Ltd., 50 Galaxy Blvd., Rexdale (Toronto), Ont.



Brinkmann SC/48
SAMPLE CONCENTRATOR

Circle No. 86 on Readers' Service Card

veloped in one strain of mice after administration of dieldrin. They did not develop in other strains of mice, nor in dogs, rats, or primates. The susceptible mouse strain was one in which an unusually high incidence of tumors had already been found. The committee did not feel that the balance of data indicated a carcinogenicity hazard.

R. D. O'BRIEN

Division of Biological Sciences, Cornell University, Ithaca, New York 14850

A Visit to Bulgaria

In 1971, D. E. Hathaway (Letters, 17 Dec., p. 1182) reported bureaucratic foul-ups and other unfavorable experiences that led to a forced cancellation of an exchange trip to eastern Europe. I should like to report the opposite experience in Bulgaria in late 1972, which may be of interest to those planning to apply for NAS (National Academy of Sciences) exchange visits to the Soviet Union and eastern European countries.

As an earth scientist, I visited Bulgaria for 1 month in October and November 1972. Officials at NAS were efficient and helpful. I was not impressed with American Embassy staffers in Sofia, but Bulgarians were the salt of the earth. Few kinder or more generous people can be found anywhere. They have bureaucratic difficulties but make a vigorous effort to minimize them for their guests. I was even allowed to return alone at night to an office in the Geological Institute of the Bulgarian Academy of Sciences (Sofia), something which I am given to understand would not be likely in the Soviet Union.

Bulgarian earth science is poorly known in the United States, but R. M. Foose (a coparticipant in the U.S.-Bulgarian exchange program) and I were impressed by its quality and scope. Unexpectedly, we found that Bulgarian articles and books tend to be succinct, unlike many Soviet and Western counterparts. If this is due in part to a serious paper shortage, as Bulgarian academy officials indicated (publications must be "defended" before appointed publication committees), then some benefit has come from adversity.

Those interested in exchange visits and wishing more detail may write to me for a copy of my report to NAS.

FRANK T. MANHEIM

Post Office Box 509,
Teaticket, Massachusetts 02536

For the money, you'll never buy a better electron microscope than the Corinth 275.

At around \$31,500, the Corinth 275 doesn't come cheap. But when you consider that it has more innovative features than many electron microscopes costing thousands more, we think you'll give it a careful appraisal.

Corinth 275 is an entirely new electron microscope designed to meet the requirement for a simple, high-performance instrument of compact design.

Developed primarily for the investigation of biological problems, the Corinth 275 is the only \$31,500 electron microscope available with full specimen handling facilities.

It allows specimen tilts of up to $\pm 30^\circ$ —with a guaranteed resolution of 7\AA at all angles.

And no other electron microscope in this price range offers both a serial section and a multi-specimen holder. Both specimen holders fit into the same stage without the need for modification.

Specimen loading is the simplest yet devised for an electron microscope. The specimen holder fits loosely over a guide peg in the specimen airlock, and when the airlock is closed it is evacuated automatically.

The dominant feature of the instrument is an extremely large viewing screen measuring $6\frac{1}{2}$ in. square (275 cm^2) and positioned at the correct height and angle for optimum viewing by the operator. This viewing screen is ideal for teaching and demonstration purposes.

Furthermore, there is a full double condensor lens so specimens susceptible to damage by a high intensity beam can be investigated and still provide a bright image on the screen.

The Corinth 275 takes up a minimum of floor space, and offers modular solid-state circuitry to ensure trouble-free operation—an essential requirement of an instrument designed for heavy work loads.

With its high performance, unique viewing screen and compact design, the Corinth 275 is the only instrument in its class that offers many of the same facilities found in the large ultimate-performance electron microscopes.

To learn more about the Corinth 275, just complete the coupon below and mail it today.

**AEI Scientific Apparatus Inc.
500 Executive Boulevard
Elmsford, New York 10523**

AEI

Corinth 275

Dear AEI

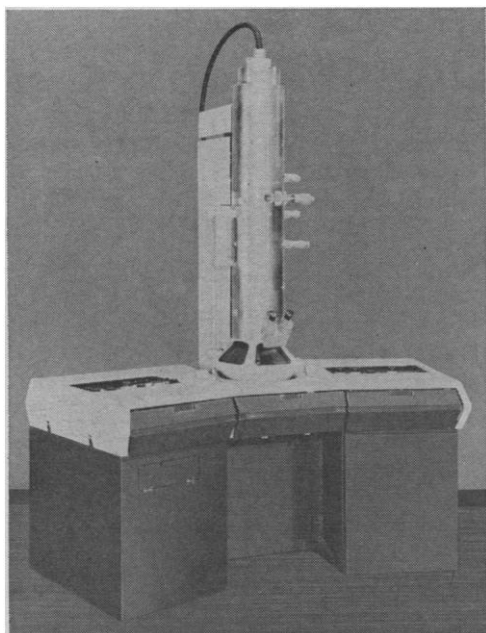
Tell me more about the best
electron microscope that sells for less.

Name _____
Title _____
Company _____
Street _____
City _____
State _____ Zip _____
Phone _____

Circle No. 3 on Readers' Service Card

Any electron microscope that can match our specifications, cannot match our prices

Two surprises for your electron microscope budget



2Å, under \$75,000

The Hitachi/Perkin-Elmer HU-12A is the ultimate transmission electron microscope. Resolutions of 1.4 Å are possible, and 2 Å (lattice) are guaranteed—in your lab.

And you get maximum applications versatility, with magnifications from 100X to 500,000X, and accelerating voltages from 10 KV to 125 KV.

What's more, you get unequalled operating convenience.

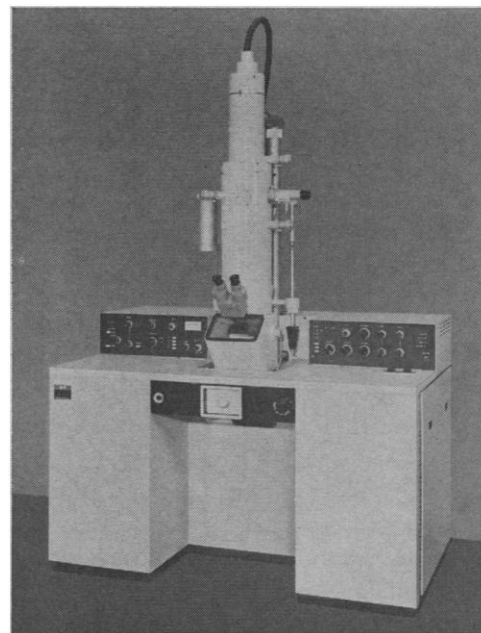
For example, a single control lets you electronically zoom over the whole magnification range: focus is automatically held constant.

There's also an easy-to-operate camera system that automatically records operating conditions.

Plus a six-position specimen holder and a unique pre-survey chamber.

A second specimen chamber even makes stereo microscopy possible.

All this, and much more, is what makes the HU-12A the most versatile, easiest to operate high resolution instrument available today—and for some time to come.



4.5Å, under \$40,000

The Hitachi/Perkin-Elmer HS-9 is the equal of many "high performance" instruments costing over \$50,000.

Besides its excellent guaranteed resolution, the HS-9 gives you magnifications from 200X to 100,000X, and an accelerating voltage of 75 KV.

Plus an automatic zoom focusing system and four electromagnetic lenses.

You also get other features you wouldn't expect in this price range.

Like an automatic camera. An automatic evacuation system. An image wobbler. And a convenient scan mode for specimen survey.

These are just some of the reasons why the HS-9 is becoming the industry's price/performance leader.

For a recommendation about the instrument that's right for your application, and/or a demonstration, call or write: Perkin-Elmer Scientific Instruments, 411 Clyde Avenue, Mountain View, CA 94040. Phone: (415) 961-0461. We'll give you everything you need, without taking everything you have.

PERKIN-ELMER

Circle No. 43 on Readers' Service Card

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

1973

H. S. GUTOWSKY	GARDNER LINDZEY
ARTHUR D. HASLER	RAYMOND H. THOMPSON
RUDOLF KOMPFFNER	EDWARD O. WILSON
DANIEL E. KOSHLAND, JR.	

1974

ALFRED BROWN	FRANK W. PUTNAM
JAMES F. CROW	MAXINE SINGER
SEYMOUR S. KETY	GORDON WOLMAN
FRANK PRESS	

Editorial Staff

Editor

PHILIP H. ABELSON

<i>Publisher</i>	<i>Business Manager</i>
WILLIAM BEVAN	HANS NUSSBAUM

Managing Editor: ROBERT V. ORMES*Assistant Editors:* ELLEN E. MURPHY, JOHN E. RINGLE*Assistant to the Editor:* NANCY TEIMOURIAN*News and Comment:* JOHN WALSH, LUTHER J. CARTER, DEBORAH SHAPLEY, ROBERT GILLETTE, NICHOLAS WADE, CONSTANCE HOLDEN, BARBARA J. CULLITON, SCHERRAINE MACK*Research News:* ALLEN L. HAMMOND, WILLIAM D. METZ, THOMAS H. MAUGH II, JEAN L. MARX, ARTHUR L. ROBINSON*Book Reviews:* SYLVIA EBERHART, KATHERINE LIVINGSTON, ANN SELTZ-PETRASH*Cover Editor:* GRAYCE FINGER*Editorial Assistants:* MARGARET ALLEN, ISABELLA BOULDIN, BLAIR BURNS, ELEANORE BUTZ, MARY DORFMAN, JUDITH GIVELBER, CORRINE HARRIS, NANCY HARTNAGEL, OLIVER HEATWOLE, CHRISTINE KARLIK, GINA BARI KOLATA, MARGARET LLOYD, JEAN ROCKWOOD, PATRICIA ROWE, LEAH RYAN, JOHN SCHAUER, LOIS SCHMITT, MICHAEL SCHWARTZ, RICHARD SEMIKLOSE, KENNETH SMITH, YA LI SWIGART*Guide to Scientific Instruments:* RICHARD SOMMER*Membership Recruitment:* GWENDOLYN HUDDLE;
Subscription Records and Member Records: ANN RAGLAND

Advertising Staff

<i>Director</i>	<i>Production Manager</i>
EARL J. SCHERAGO	PATTY WELLS

Advertising Sales Manager: RICHARD L. CHARLES

Sales: NEW YORK, N.Y. 10036: Herbert L. Burkland, 11 W. 42 St. (212-PE-6-1858); SCOTCH PLAINS, N.J. 07076: C. Richard Callis, 12 Unami Lane (201-889-4873); CHICAGO, ILL. 60611: John P. Cahill, Room 2107, 919 N. Michigan Ave. (312-DE-7-4973); BEVERLY HILLS, CALIF. 90211: Winn Nance, 111 N. La Cienega Blvd. (213-657-2772)

EDITORIAL CORRESPONDENCE: 1515 Massachusetts Ave., NW, Washington, D.C. 20005. Phones: (Area code 202) Central Office: 467-4350; Book Reviews: 467-4367; Business Office: 467-4411; Circulation: 467-4417; Guide to Scientific Instruments: 467-4480; News and Comment: 467-4430; Reprints and Permissions: 467-4483; Research News: 467-4321; Reviewing: 467-4440. Cable: Advancesci, Washington. Copies of "Instructions for Contributors" can be obtained from the editorial office. See also page xv, *Science*, 28 September 1973. ADVERTISING CORRESPONDENCE: Room 1740, 11 W. 42 St., New York, N.Y. 10036. Phone: 212-PE-6-1858.

A Sino-American Soybean Research Institute

Over the past quarter-century, soybeans have emerged as one of the world's leading sources of protein. In recent years, world demand for soybeans has been expanding by nearly 7 percent annually. If sustained, this rate of growth doubles consumption every 11 years. For a billion people in East Asia, soybeans are consumed directly, constituting an important dietary staple. For the affluent industrial countries of North America and Europe, they have become the dominant source of high-quality protein for livestock and poultry feed. As growth in the world fish catch slows, the pressure on soybean supplies intensifies further.

Perhaps the best single barometer of the increasing world demand for protein is U.S. soybean exports. The growth in exports has been phenomenal, climbing from a few hundred million dollars in the early 1960's to more than \$2 billion in 1972. The value of U.S. soybean exports now exceeds that of any other product, including high-technology items such as computers and jet aircraft.

Future demand prospects for soybeans are very bright. Both growing populations and rising affluence are generating additional demand. The supply problem is somewhat less promising. The world protein market is being converted from a buyer's to a seller's market. Soybean prices in 1973 have been more than double the average price during the 1960's.

Agricultural scientists have not been able to achieve a breakthrough in soybean yield per acre of the sort achieved for most other important crops. Since 1950, yields of soybeans in the United States, where two-thirds of the world's soybean crop is produced, have increased just over 1 percent per year. This contrasts with nearly 4 percent per year for corn. As a result, most of the fourfold increase in U.S. soybean production since 1950 has come from expanding the acreage of soybeans. We get more soybeans by planting more soybeans. As of 1973, nearly 1 in every 6 acres of cropland in the United States is planted to soybeans.

Together the United States and mainland China produce 90 percent of the world soybean crop. With the cropland idled under government programs in the United States rapidly disappearing, and with the world dependent on the United States for 85 percent of exportable soybean supplies, this inability to achieve a yield breakthrough suddenly begins to loom as a rather formidable cloud hanging over the world food economy. The Department of Agriculture now projects a decline in the U.S. soybean crop in 1974 as other crops, especially cotton, compete for available cropland. Such a decline combined with continuing growth in the world demand for soybeans can bring only higher prices for soybeans and for livestock products produced with soybeans.

Within China, the remarkable achievements on the nutritional front are based in large measure on the extensive direct consumption of soybeans. If the production of soybeans in China continues to decline, as soybeans are displaced by the higher-yielding cereals, the nutritional gains of the past decade may be reversed.

These difficulties in raising soybean yields in a land-scarce world suggest the need for a much greater research effort and in particular for the creation of a Sino-American Soybean Research Institute. Since the soybean originated in China, it probably has the most diverse available collection of germ plasm, a vital asset in an expanded soybean research effort. On the other hand, scientists in the United States have expended a great deal of effort to devise better cultural practices and to make the soybean plant more productive. The critical importance of the soybean to both economies, not to mention mankind as a whole, and the pressing need to achieve a breakthrough in yields of soybeans, argues for a pooling of germ plasm, the coordination of research efforts, and the sharing of research results.—LESTER R. BROWN, *Overseas Development Council*, 1717 Massachusetts Avenue, NW, Washington, D.C. 20036



Tempstir®
Mount on any container and it's a constant temperature bath. High performance heater-controller-stirrer maintains temperature uniformity $\pm 0.15^\circ\text{C}$. Weighs only 5 1/4 lb. High capacity 1000-watt heater won't burn out—even out of liquid. Controls to 100°C .

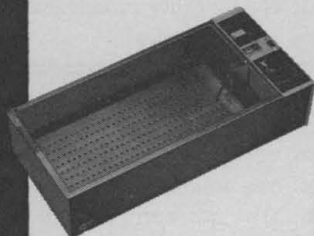
Circle No. 28
on Reader Service Card



AquaRator® Measures COD

Two-minute COD determinations! Repeatable to $\pm 3\%$ or better. Check water quality fast for earlier corrective action. Uses inexpensive CO_2 and saves hours of lab time. Results easily correlated with standard COD methods prescribed by APHA.

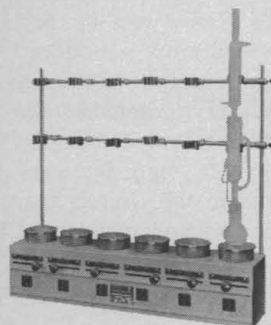
Circle No. 29
on Reader Service Card



Shaker Baths

Temperature control to $\pm 0.03^\circ\text{C}$ and variable oscillation for all types of chemical/biochemical reactions. Latest solid-state technology—automatic 37°C set button. Accommodates any combination of glassware. Gassing hoods, cooling coils available. Guaranteed 5 years or 50 million oscillations.

Circle No. 30
on Reader Service Card



Extraction Racks

Six-unit and two-unit models, 300-watt individually controlled heaters, temperature range— 390° to 775°F . Complete with support rods and clamps. In applications requiring the dichromate oxygen demand (COD) test, their 300-watt heaters are ideal.

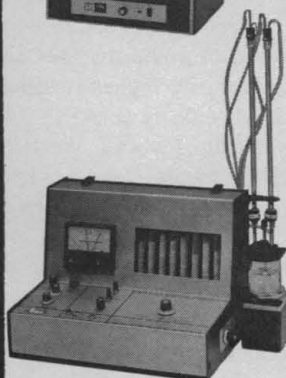
Circle No. 31
on Reader Service Card



Thelco® Ovens and Incubators

Reliability and uniformity have kept Thelco the leading name in constant temperature equipment for 50 years. Mechanical or gravity convection and vacuum models for every need. Our published thermocouple performance tests of uniformity are guaranteed.

Circle No. 32
on Reader Service Card



Auto-Aquatrator®

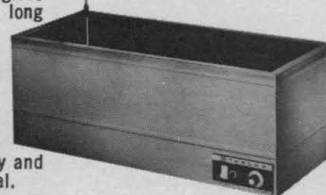
Performs KF titrations automatically. Auto-Aquatrator handles any organic or inorganic giving quick, accurate and consistent results reproducible to ± 0.025 ml. of titrant. Non-automatic Aquatrator® offers same accuracy—plus economy.

Circle No. 33
on Reader Service Card

Thelco® Baths

Gravity convection gives gentle mixing and long service—no moving parts to wear out. Temperatures from ambient to 100°C with uniformity an excellent ± 0.3 or better at 56°C . Six models—Sero-Utility and Low Profile Serological.

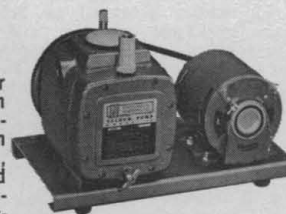
Circle No. 34
on Reader Service Card



VacTorr® Vacuum Pumps and Equipment

The VacTorr line is your source for all your vacuum equipment—quiet mechanical pumps, diffusion pumps, fittings, gauges, traps, pumping station and associated system elements, supplies and accessories.

Circle No. 35
on Reader Service Card



Problem Solvers

Freas® Low Temp Incubators/BOD Cabinets

Great capacity—full 17 cu. ft. Solid-state controls—utmost dependability. Wide temperature range—from -10°C to 50°C . Uniformity—a precise $\pm 0.3^\circ$ at 20°C . Models available for photosynthesis and diurnal simulation.

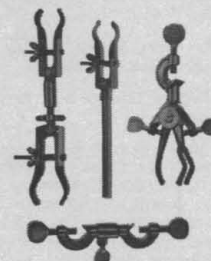
Circle No. 36
on Reader Service Card



Laboratory Clamps

You name it... Precision's got it! A complete line with the right clamp for every laboratory need. Also unique Lab-Frames® for sturdy, versatile set-ups. All constructed of PS Alloy® for strength, durability and corrosion resistance.

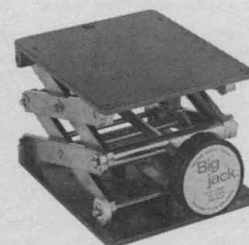
Circle No. 37
on Reader Service Card



Big Jack®/ Little Jack®

Sturdy, adjustable platform for heavy flasks, hot plates, heating mantles, baths or complicated glassware set-ups... precisely controlled lifting up to 100 lbs. Little Jack is designed for micro and semi-micro work.

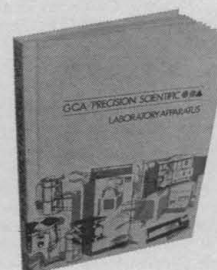
Circle No. 38
on Reader Service Card



Lab Apparatus Catalog

Get your copy of the complete GCA/Precision Scientific Laboratory Apparatus Catalog. It's a hard cover book with 260 pages of detailed information, illustrations and prices of over 1200 items. To get a free copy, use Reader Service Card or write.

Circle No. 39
on Reader Service Card



GCA/Precision Scientific
3737 W. Cortland St., Chicago, IL 60647.

in the region covered by the radar. Dual Doppler radar systems are also being used and developed by the National Oceanic and Atmospheric Administration, the National Severe Storms Laboratory, and also by the National Center for Atmospheric Research in conjunction with the National Hail Research Experiment sponsored by the National Science Foundation.

The method offers a unique opportunity to observe the wind field in precipitating convective storms at all stages of their development. The probing of convergence/updraft structures inside the precipitation regions in a manner discussed above will allow better description and study of a storm's inflow and outflow. The presence of vorticity and its vertical transport can also be assessed. Suspected interactions between the circulation of adjacent convective storms can be monitored and studied. Mixing processes can be identified from Doppler spectrum width and related to the structure of the organized wind field.

In addition, it should be possible to extend the dual Doppler method to the storm environment by release of man-made targets. This will bring a wealth of new information about convective

storms and, therefore, should provide a significant contribution to the study of intense small-scale convective processes.

Note

Contribution No. 1669 from the Rosenstiel School of Marine and Atmospheric Science, University of Miami, Coral Gables, Florida 33124.

Bibliography

- D. Atlas, *Adv. Geophys.* **10**, 317 (1964).
 —, R. S. Sekhon, R. J. Serafin, *Preprints 15th Radar Meteorology Conference* (American Meteorological Society, Boston, 1972).
 L. J. Battan, *Proceedings 10th Weather Radar Conference* (American Meteorological Society, Boston, 1963), p. 303.
 — and J. B. Theiss, *Preprints 13th Radar Meteorology Conference* (American Meteorological Society, Boston, 1968), p. 26.
 J. A. Borresen, *Preprints 14th Radar Meteorology Conference* (American Meteorological Society, Boston, 1970).
 R. A. Brown and K. C. Crawford, *Preprints 15th Radar Meteorology Conference* (American Meteorological Society, Boston, 1972), p. 16.
 K. A. Browning and R. Wexler, *Proceedings 12th Weather Radar Conference* (American Meteorological Society, Boston, 1966), p. 125.
 P. G. G. Caton, *Proceedings 10th Weather Radar Conference* (American Meteorological Society, Boston, 1963), p. 290.
 K. C. Crawford and R. A. Brown, *Preprints 15th Radar Meteorology Conference* (American Meteorological Society, Boston, 1972), p. 27.
 R. J. Donaldson, Jr., *Proceedings 4th Conference on Severe Local Storms* (American Meteorological Society, Boston, 1967), p. 89.
 —, G. M. Armstrong, A. C. Chmela, M. J. Kraus, *Proceedings 6th Conference on Severe Local Storms* (American Meteorological Society, Boston, 1969), p. 146.
 —, G. A. Armstrong, K. J. Banis, R. M. Dyer, *Preprints 15th Radar Meteorology Conference* (American Meteorological Society, Boston, 1972), p. 22.
 A. G. Gorelik, V. V. Kostarev, A. A. Chernikov, *Meteorol. Gidrol.* (1962), No. 7, p. 34.
 H. L. Groginsky, *Preprints 15th Radar Meteorology Conference* (American Meteorological Society, Boston, 1972), p. 233.
 T. W. Harrold, *Quart. J. Roy. Meteorol. Soc.* **92**, 31 (1966).
 M. J. Kraus, *Preprints 14th Radar Meteorology Conference* (American Meteorological Society, Boston, 1970), p. 127.
 R. M. Lhermitte, *Bull. Amer. Meteorol. Soc.* **45**, 587 (1964).
 —, *ibid.* **47**, 703 (1966).
 —, *Proceedings 12th Weather Radar Conference* (American Meteorological Society, Boston, 1966), p. 117.
 —, *Preprints 13th Radar Meteorology Conference* (American Meteorological Society, Boston, 1968), p. 14; *ibid.* p. 498.
 —, *Proceedings 6th Conference on Severe Local Storms* (American Meteorological Society, Boston, 1969), p. 146.
 — and L. J. Miller, *Preprints 14th Radar Meteorology Conference* (American Meteorological Society, Boston, 1970), p. 133.
 —, *ibid.*, p. 139.
 —, *J. Appl. Meteorol.* **10**, 234 (1971).
 —, *Preprints 15th Radar Meteorology Conference* (American Meteorological Society, Boston, 1972), p. 364.
 L. J. Miller, *ibid.*, p. 309.
 R. R. Rogers, *Proceedings 12th Weather Radar Conference* (American Meteorological Society, Boston, 1966), p. 128.
 — and A. J. Chimera, *Proceedings 8th Weather Radar Conference* (American Meteorological Society, Boston, 1960), p. 377.
 R. S. Sekhon and R. C. Srivastava, *Preprints 14th Radar Meteorology Conference* (American Meteorological Society, Boston, 1970), p. 171.
 — and D. Atlas, *Preprints 15th Radar Meteorology Conference* (American Meteorological Society, Boston, 1972), p. 222.
 D. A. Wilson, *Preprints 14th Radar Meteorology Conference* (American Meteorological Society, Boston, 1970), p. 191.

Aquasol for:

Preparation of
blood samples
for LSC

The problems in preparing whole blood and blood plasma for liquid scintillation counting are solved when the sample is incubated in 70% perchloric acid plus hydrogen peroxide followed by counting directly in Aquasol®

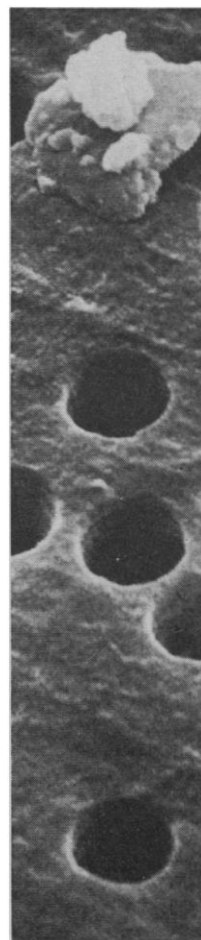
Aquasol NEF-934: \$46/4 liters \$166/4x4 liters

Reference for the use of Aquasol in counting blood and other materials available on request.

NEN New England Nuclear
575 Albany Street, Boston, Mass. 02118
Customer service 617-482-9595

NEN Canada Ltd., Dorval, Quebec; NEN Chemicals GmbH, Dreieichenhain, Germany.

Circle No. 91 on Readers' Service Card



NUCLEPORE® MEMBRANE

the unique microfiltration tool

- Precise pore sizes: 20 Å to 8 μm
- 10 μm "thin"; flat, smooth surface
- Millions of straight-through pores for fast reliable filtration
- Unusually low absorption losses for higher yields
- Transparent polycarbonate: non-staining & chemical resistant

the ideal membrane for

Virology
Chemotaxis
Cytology
Tissue Culture
Microbiology
Cellular Separations
Plasmapheresis
Microscopy
Sterilization
Aerosol Sampling

for more information, contact



7035 Commerce Cir., Pleasanton, Ca. 94566
(415) 462-2230

Or ask your local laboratory supply dealer
(list available)

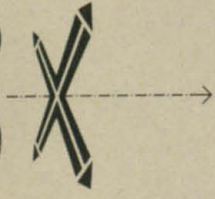
Circle No. 95 on Readers' Service Card

The only true advance in light microscopy since this Culpeper Microscope (circa 1725) took place in 1873 when Dr. Ernst Abbe of Carl Zeiss abandoned the traditional ideas about the design of microscope optics and formulated his revolutionary theories on the formation of the microscopic image. To this day this breakthrough has remained the basis for the design of optics, not only at Zeiss, but throughout the optical industry of the world.

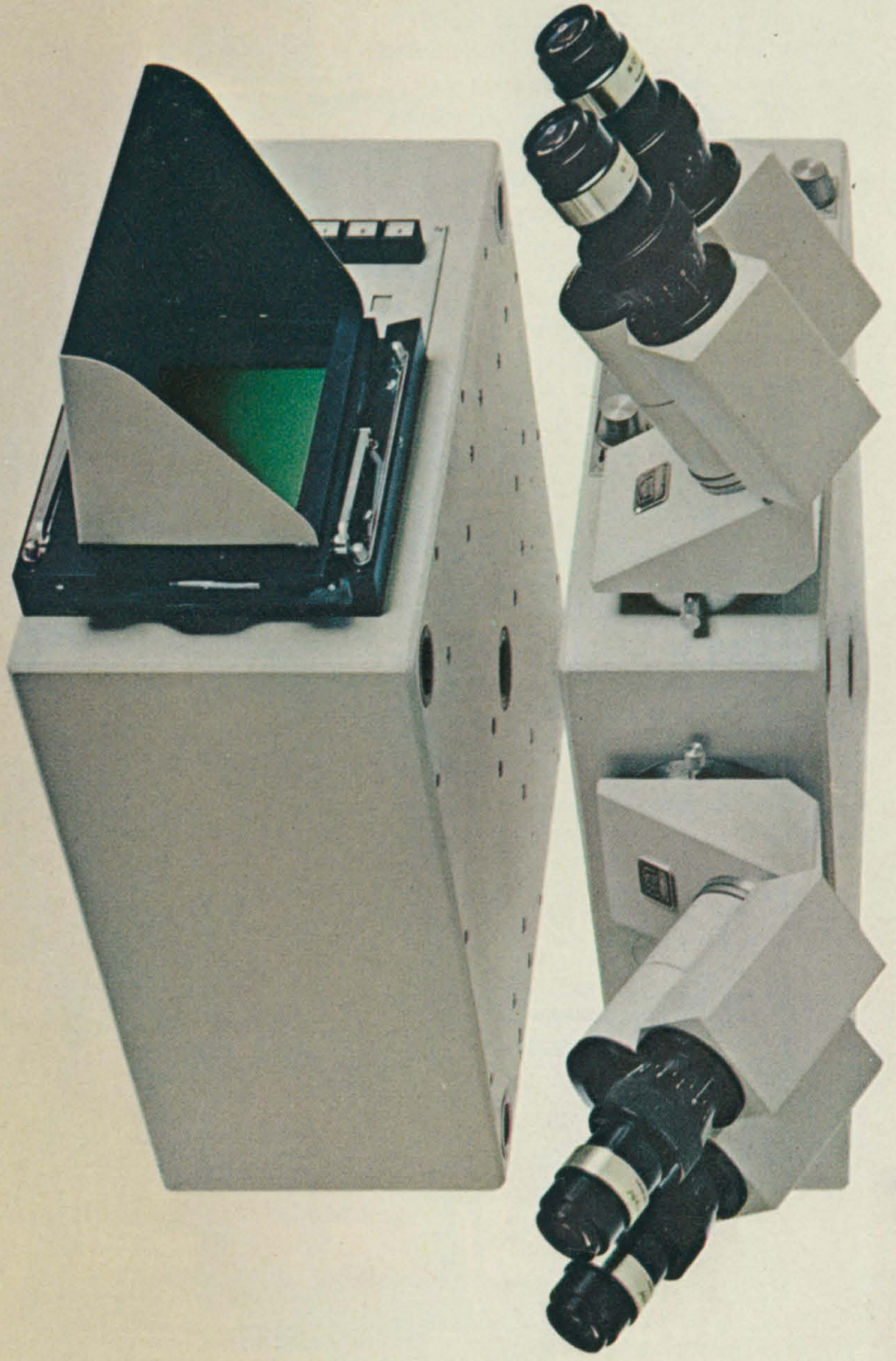
Now, one hundred years later, Dr. Kurt Michel of Carl Zeiss, West Germany, has abandoned all traditional ideas about the design of the microscope itself and has returned to the basic principle of the Culpeper Microscope, where the optical axis and the axis of symmetry are coincident, to create another breakthrough that may well lay the foundation for microscope design for the 21st century.

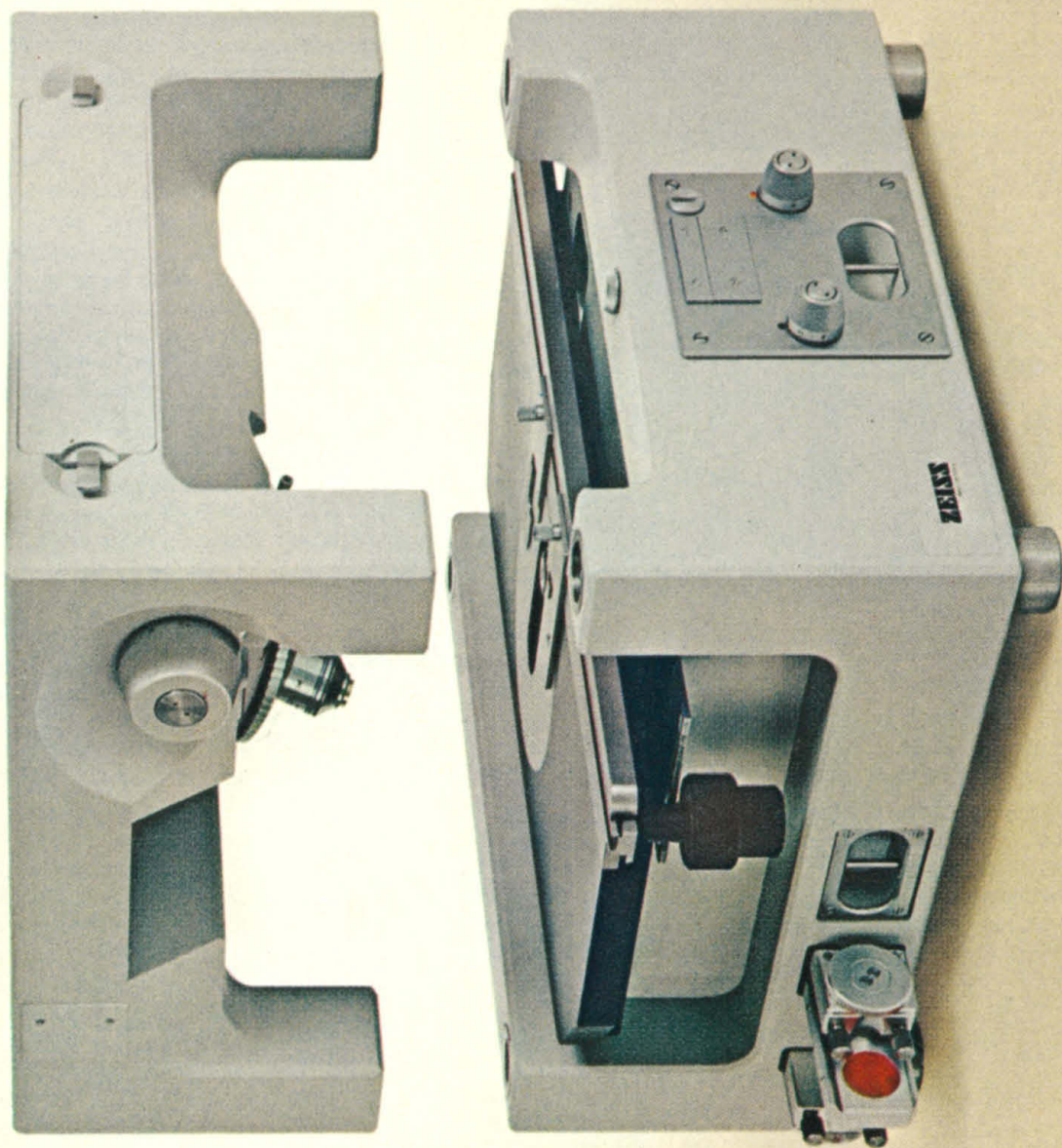


Zeiss introduces the Axiomat



(And puts the optical axis where it belongs—along the axis of symmetry)





A revolution in microscope design—the Modular concept—a combination of modules for any application without any compromise.

Ultimate stability—extending the present limits of photomicrography and quantitative microscopy.

Widest field and unparalleled resolution, even by Zeiss standards, through completely new optics.

Two fully automatic camera systems, 4x5" and 35mm, in *one* unit, both always ready and never in the way.

Axiomats are completely new upright or inverted microscopes . . . not adaptations of anything . . . for all applications in biology and medicine, metallurgy, chemistry, technology, industry.

You've got to see them to believe them.

Zeiss Axiomats.

Microscopes without compromise.

For over 200 years, microscope design has seen one compromise after another . . . necessary compromises, everyone thought, to achieve the benefits of advancing techniques and science. But now microscope design has been rethought. Axiomats are constructed of square modules, broken down by major microscope functions and with the optical axis of each module coincident with the axis of symmetry. The result is a series of microscopes with unequalled stability, optical performance, convenience and ease of operation—in fact, until you see an Axiomat for yourself, you probably won't believe it.

Axiomats for every purpose.

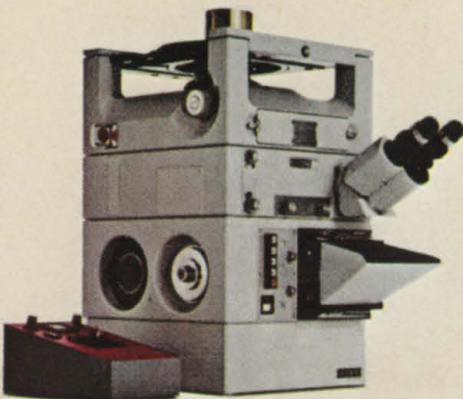
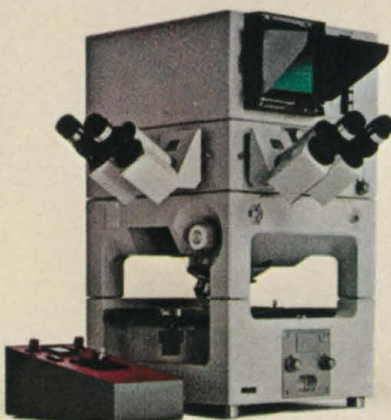
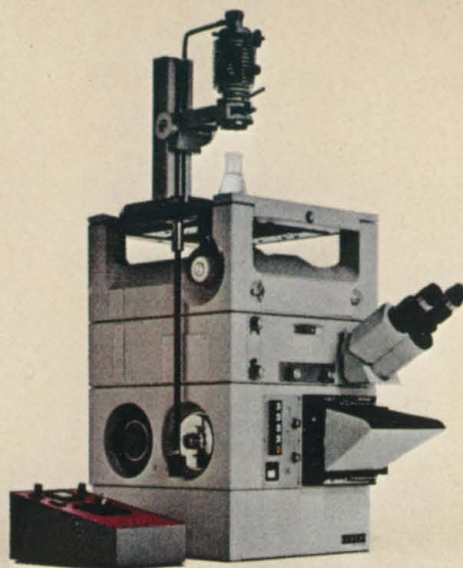
No matter what your field, you can use an Axiomat for the most specialized and highly advanced techniques. Pictured here are just four of the many configurations that can be assembled from the 12 basic modules:

1. Axiomat . . . for inverted transmitted-light microscopy. The only such instrument that permits *all* types of quantitative microscopy and, *simultaneously*, fully automatic photography.
2. Axiomat . . . for upright transmitted- (and reflected-) light microscopy. Ideal for biology and medicine.
3. Axiomat . . . for inverted reflected-light microscopy. *The finest, most stable metallograph ever made.*
4. Axiomat . . . for upright reflected-light microscopy for objects up to 90mm thick.

Every microscope technique easily, conveniently, optimally performed.

Brightfield, darkfield, phase contrast, polarization, differential interference contrast, double-beam interference, fluorescence, UV, IR, TV image analysis, scanning microspectrophotometry, microspectrofluorometry. Let us tailor your microscope to your present needs. If later your requirements call for another configuration, one module can simply be substituted for another. Zeiss can easily do that for you.

New optics—the best the world has ever seen—even when compared with those that made Zeiss "The Great Name in Optics." Zeiss has developed completely new optics for the Axiomats . . . infinity-corrected Planachromats, Planapochromats, and Ultrafluars for transmitted light; Epi-plans and even new Epiplanapos for reflected light. And you've literally never seen an image like the images they produce. The field of view is considerably wider than that of the best of other instruments. Numerical apertures go as high as 1.6 for the highest obtainable resolution in light microscopy. Objective magnifications range



from 1x to 125x, with total magnifications up to the limits of light microscopy. And there is a built-in 4:1 zoom system that works not only for observation, but for the cameras and photometers, too. Its image quality is exactly the same as that of the stationary Zeiss optics, completely parfocal to all image planes.

All known light sources for microscopy, including UV and IR, can be used with the various Axiomats, either singly or two simultaneously.

Everything is designed for convenience, stability, accuracy.

For example condensers, diaphragms, filters, micrometers . . . everything is mounted on convenient sliders that are inserted into the light path at the optically ideal location.

Axiomats extend the limits of light microscopy, they are truly the microscopes of the future based on a principle that is almost 300 years old. If you'd like to find out how these revolutionary instruments can extend the limits of your work, write Carl Zeiss, Inc., 444 Fifth Avenue, New York, N.Y. 10018. Or call (212) 736-6070.

In Canada: 45 Valleybrook Drive, Don Mills 405, Ont., M3B 2S6. Or call (416) 449-4660.

NATIONWIDE SERVICE

ZEISS

THE GREAT NAME IN OPTICS



Only Zeiss, of all the microscope manufacturers in the world, has dared to go back to basics.

Circle No. 101
on Readers' Service Card



⇒ BOWENS MACRO-LITE

is a new lower cost
high intensity
electronic flash
lighting system
for close-up and
photomacrography

Write for illustrated literature or
see your dealer

BOGEN PHOTO CORP.

100 So. Van Brunt St. P.O. Box 448
Englewood, New Jersey, 07631

Circle No. 81 on Readers' Service Card

BOOKS RECEIVED

(Continued from page 276)

Environmental Design Research. Vol. 1, Selected Papers. Proceedings of a conference, Blacksburg, Va., Apr. 1973. Wolfgang F. E. Preiser, Ed. Dowden, Hutchinson and Ross, Stroudsburg, Pa., 1973, xii, 558 pp., illus. \$20. Community Development Series.

The Evolution of Radio Astronomy. J. S. Hey. Science History (Watson), New York, 1973. x, 214 pp., illus. \$8.95.

Fast Ion Transport in Solids. Solid State Batteries and Devices. Proceedings of a NATO institute, Belgirate, Italy, Sept. 1972. W. van Gool, Ed. North-Holland, Amsterdam, and Elsevier, New York, 1973. xvi, 728 pp., illus. \$38.50.

Fifth Symposium on the Structure of Low-Medium Mass Nuclei. Lexington, Ky., Oct. 1972. J. P. Davidson and Bernard D. Kern, Eds. University Press of Kentucky, Lexington, 1973. x, 302 pp., illus. \$12.50.

Flame Retardancy of Polymeric Materials. Vol. 2. William C. Kuryla and A. J. Papa, Eds. Dekker, New York, 1973. xiv, 242 pp., illus. \$22.50.

Forced Movements, Tropisms, and Animal Conduct. Jacques Loeb. Dover, New York, 1973. xxvi, 210 pp., illus. Paper, \$3. Reprint of the 1918 edition.

The Fungi. An Advanced Treatise. Vol. 4-A, A Taxonomic Review with Keys: Ascomycetes and Fungi Imperfecti. G. C. Ainsworth, Frederick K. Sparrow, and Alfred S. Sussman, Eds. Academic Press, New York, 1973. xviii, 622 pp., illus. \$29.

The Generation of Subcellular Structures. Proceedings of a symposium, Norwich, England, July 1972. Roy Markham, J. B. Bancroft, D. R. Davies, D. A. Hopwood, and R. W. Horne, Eds. North-Holland, Amsterdam, and Elsevier, New York, 1973. x, 372 pp., illus. \$15.75.

Genetics of Sex Differentiation. Ursula Mittwoch. Academic Press, New York, 1973. xiv, 254 pp., illus. \$16.50.

Geochronology. Radiometric Dating of Rocks and Minerals. C. T. Harper, Ed. Dowden, Hutchinson and Ross, Stroudsburg, Pa., 1973. xvi, 470 pp., illus. \$24.

A Guide to Teaching about Computers in Secondary School. Donald D. Spencer. Abacus Computer Corp., Ormond Beach, Fla., 1973. xiv, 138 pp., illus. \$12.95.

A Guide to the National Parks. Their Landscape and Geology. William H. Matthews III. Natural History Press (Doubleday), Garden City, New York, ed. 2, 1973. xxii, 530 pp., illus. Paper, \$5.95.

A Handbook to the Common Intertidal Invertebrates of the Gulf of California. Richard C. Brusca. University of Arizona Press, Tucson, 1973. xviii, 428 pp., illus. Paper, \$10.95.

Health Practice Research. And Formalized Managerial Methods. F. Grundy and W. A. Reinke. World Health Organization, Geneva, 1973 (U.S. distributor, American Public Health Association, Washington, D.C.). 194 pp., illus. Paper, \$3. Public Health Papers No. 51.

Human Environments and Natural Systems. A Conflict of Dominion. Ned H. Greenwood and J. M. B. Edwards. Duxbury (Wadsworth), North Scituate, Mass., 1973. xiv, 430 pp., illus. Paper, \$6.95.

I'll Quit Tomorrow. Vernon E. Johnson.

Harper and Row, New York, 1973. viii, 168 pp., illus. \$5.95.

Laboratory Procedures in Clinical Veterinary Bacteriology. G. W. Osbaldiston. University Park Press, Baltimore, 1973. x, 126 pp. Spiral bound, \$9.50.

MTP International Review of Science. Organic Chemistry Series One. Butterworths, London, and University Park Press, Baltimore, 1973. Vol. 3, Aromatic Compounds. H. Zollinger, Ed. xii, 336 pp., illus. Vol. 4, Heterocyclic Compounds. K. Schofield, Ed. xii, 350 pp., illus. Vol. 7, Carbohydrates. G. O. Aspinall, Ed. xii, 344 pp., illus. Vol. 8, Steroids. W. F. Johns, Ed. xii, 286 pp., illus. Vol. 10, Free Radical Reactions. W. A. Waters, Ed. xii, 320 pp., illus. Each volume, \$24.50.

Macromolecular Physics. Vol. 1, Crystal Structure, Morphology, Defects. Bernhard Wunderlich. Academic Press, New York, 1973. xiv, 550 pp., illus. \$35.

Man in Isolation and Confinement. Proceedings of a symposium, Rome, Oct. 1969. John E. Rasmussen, Ed. Aldine, Chicago, 1973. xii, 330 pp. \$9.50. Modern Applications of Psychology.

Management of ADP Systems. Marvin M. Wofsey. Auerbach, Philadelphia, 1973. xviii, 264 pp. \$9.95. Auerbach Computer Science Series.

Manual of Methods for Fisheries Resource Survey and Appraisal. Part 2, The Use of Acoustic Instruments for Fish Detection and Abundance Estimation. S. T. Forbes and O. Nakken, Eds. Food and Agriculture Organization of the United Nations, Rome, 1972 (U.S. distributor, Unipub, New York). x, 138 pp., illus. Paper, \$4. FAO Manuals in Fisheries Science, No. 5.

Mathematics in Civilization. H. L. Resnikoff and R. O. Wells, Jr. Holt, Rinehart and Winston, New York, 1973. xii, 372 pp., illus. \$12.50.

Mechanics. Charles Kittel, Walter D. Knight, and Malvin A. Rudermann. Revised by A. Carl Helmholz and Burton J. Moyer. McGraw-Hill, New York, ed. 2, 1973. xviii, 426 pp., illus. \$8.95. Berkeley Physics Course, vol. 1.

Medicine and Public Health in the People's Republic of China. Joseph R. Quinn, Ed. Fogarty International Center for Advanced Study in the Health Sciences, Bethesda, Md., 1973. xii, 334 pp. Geographic Health Studies. DHEW Publication No. (NIH) 73-67.

Membranes. A Series of Advances. Vol. 2, Lipid Bilayers and Antibiotics. George Eisenman, Ed. Dekker, New York, 1973. xvi, 542 pp., illus. \$34.50.

Memory and Transfer of Information. Proceedings of a symposium, Göttingen, Germany, May 1972. H. P. Zippel, Ed. Plenum, New York, 1973. xxiv, 582 pp., illus. \$29.

Methods of Neurochemistry. Vol. 5. Rainer Fried, Ed. Dekker, New York, 1973. viii, 280 pp., illus. \$19.50.

Modern Elementary Statistics. John E. Freund. Prentice-Hall, Englewood Cliffs, N.J., ed. 4, 1973. xii, 532 pp., illus. \$11.95.

Modernizing Urban Land Policy. Proceedings of a forum, Washington, D.C., Apr. 1972. Marion Clawson, Ed. Published for Resources for the Future by Johns Hopkins University Press, Baltimore, 1973. viii, 248 pp., illus. \$11.

AAAS Audiotapes

Inventory Sale

The following audiotapes are offered at a reduced rate of \$10 for the first session and \$5 for each additional session.

- 1-69 Hunger and Malnutrition (I-VII)
- 6-69 The City as a Social System: Perspectives on Urban Social Organization (I-II)
- 7-69 The Organization of Urban Places (I)
- 8-69 Statistics, Governments, and the Analysis of Social Problems (I-II)
- 9-69 Systems Models of Urban Systems (I-II)
- 11-69 The Identity and Dignity of Man: A Scientific and Theological Dialogue on Issues Emerging from Behavioral, Surgical, and Genetic Interventions (I-VIII)
- 14-69 Recent Developments in the Field of Pulsars (I)
- 18-69 Deep Sea Drilling Project (JOIDES) Science and Resources (I-II)
- 26-69 Approaches to Policy Sciences (I-II)
- 27-69 Science and Public Policy Workshop: Technology Assessment (I)
- 28-69 The Political Attitudes of Scientists (I)
- 29-69 Science and Society: A New Intergovernmental Approach to Domestic Problems (I-II)
- 30-69 Arms Control and Disarmament (I-II)
- 31-69 Academic Research and the Military (I-III)
- 37-69 Comparative History and Sociology of Science (I)
- 38-69 The Sorry State of Science: A Student Critique (I-II)
- 39-69 Photosynthetic Organisms: Origin and Evolution on Early Earth (I)
- 47-69 Expanding Horizons in Medical Education (I-II)
- 48-69 Ecology and the Undergraduate Curriculum (I)
- 63-70 The U.S. Contribution to the International Biological Program (I-II)
- 69-70 Industrial Approaches to Urban Problems (I-II)
- 71-70 Science Education in the Seventies (I)
- 72-70 Urbanization in the Arid Lands (I-III)
- 76-70 Mood, Behavior, and Drugs (I-IV)
- 78-70 Crime, Violence, and Social Control (I-II)
- 80-70 The Teaching of Science (I-II)
- 81-70 Scientific Organizations, War-Peace Issues, and the Public Policy Process (I-II)

Money order or check payable to AAAS—No cash. Allow 3 to 4 weeks for delivery.

Please Check: ☐ Reel ☐ Cassette

Name _____

Street _____

City _____

State _____

Zip _____

Tape No. _____ Session No. _____ Tape No. _____ Session No. _____ Tape No. _____ Session No. _____

Tape No. _____ Session No. _____ Tape No. _____ Session No. _____ Tape No. _____ Session No. _____

Tape No. _____ Session No. _____ Tape No. _____ Session No. _____ Tape No. _____ Session No. _____

|A|A|A|S|

AMERICAN ASSOCIATION for the ADVANCEMENT OF SCIENCE
Department GF
1515 Massachusetts Avenue, NW, Washington, D.C. 20005

GOLDEN RETRIEVER PUP



The small time fraction collector.

It's also a small drop counting fraction collector. In fact, it's one of the smallest fraction collectors available. And it has a price to match: \$545.00, complete.

95 test tubes 12 or 13 mm diameter are held in 19 removable racks, each with a rotating shoe to allow it to stand upright when removed from the instrument. The Pup will retrieve from 1 to 2 columns and can be programmed for timed interval, drop counting, or volumetric collection. For cleaning after spills, the entire shifting mechanism can be easily removed and submerged. An automatic shut-off and an optional column support mast help make the Golden Retriever Pup one of the best values for your lab.

ISCO has other circular and linear collectors, absorbance monitors, pumps, and more instruments for column chromatography and other kinds of biochemical research. For more information, write for our current catalog.



BOX 5347 LINCOLN, NEBRASKA 68505
PHONE (402) 434-0231 TELEX 48-6453

Circle No. 87 on Readers' Service Card

Monitoring in Anesthesia. William H. L. Dornette, Ed. Davis, Philadelphia, 1973. xvi, 428 pp., illus. \$20. Clinical Anesthesia, vol. 9, Nos. 2 and 3.

The National Aeronautics and Space Administration. Richard Rirsch and Joseph John Trento. Praeger, New York, 1973. x, 246 pp. + plates. \$9.50. Praeger Library of U.S. Government Departments and Agencies, No. 35.

National Health Services. Their Impact on Medical Education and Their Role in Prevention. Proceedings of a conference, The Hague, June 1972. John Z. Bowers and Elizabeth Purcell, Eds. Josiah Macy, Jr. Foundation, New York, 1973. xii, 168 pp.

Noise Pollution. Donald F. Anthrop. Lexington (Heath), Lexington, Mass., 1973. xvi, 160 pp., illus. \$12.50.

Nutrition, National Development, and Planning. Proceedings of a conference, Cambridge, Mass., Oct. 1971. Alan Berg, Nevin S. Scrimshaw, and David L. Call, Eds. MIT Press, Cambridge, Mass., 1973. xiv, 402 pp., illus. \$10.

Oculocutaneous Manifestations of Rheumatic Diseases. George E. Ehrlich, Ed. Karger, New York, 1973. viii, 148 pp., illus. \$20.60. Rheumatology, vol. 4.

Origin and Development of Living Systems. J. Brooks and G. Shaw. Academic Press, New York, 1973. xii, 412 pp., illus. \$13.50.

Pattern Recognition, Learning, and Thought. Computer-Programmed Models of Higher Mental Processes. Leonard Uhr. Prentice-Hall, Englewood Cliffs, N.J., 1973. xxii, 506 pp., illus. \$13.95. Prentice-Hall Series in Automatic Computation.

Perception of Displayed Information. Lucien M. Biberman, Ed. Plenum, New York, 1973. xvi, 346 pp., illus. \$25. Optical Physics and Engineering.

Perspectives in Mössbauer Spectroscopy. Proceedings of a conference, Ayeleth Hashahar, Israel, Aug. 1972. S. G. Cohen and M. Pasternak, Eds. Plenum, New York, 1973. viii, 260 pp., illus. \$15.

Physical Anthropology. Gabriel Ward Lasker. Holt, Rinehart and Winston, New York, 1973. viii, 424 pp., illus. \$9.95.

Physical Chemistry of Fast Reactions. Vol. 1, Gas Phase Reactions of Small Molecules. B. P. Levitt, Ed. Plenum, New York, 1973. x, 332 pp., illus. \$22.50.

The Physical Properties of Glass. D. G. Holloway. Wykeham, London, and Springer-Verlag, New York, 1973. xii, 220 pp., illus. Paper, \$6.80. Wykeham Science Series, vol. 24.

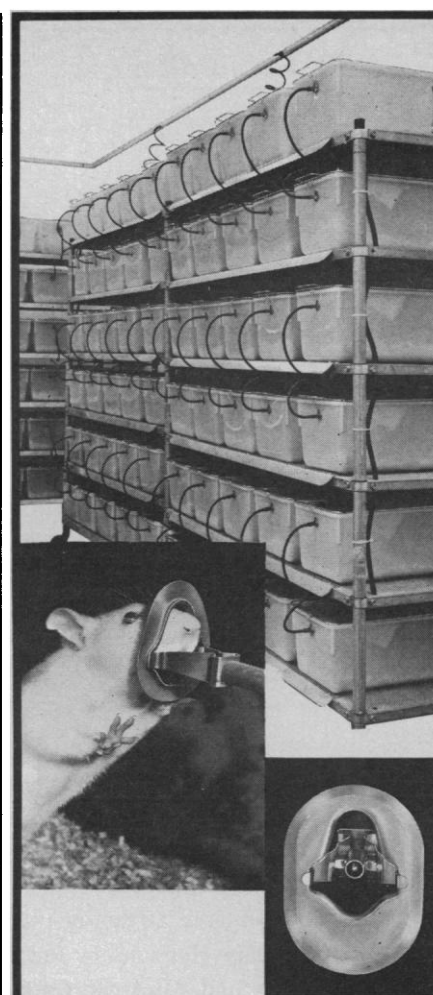
Phytochemistry. Vol. 2, Organic Metabolites. Lawrence P. Miller, Ed. Van Nostrand Reinhold, New York, 1973. xvi, 446 pp., illus. \$24.50.

The Pion-Nucleon System. B. H. Bransden and R. G. Moorhouse. Princeton University Press, Princeton, N.J., 1973. x, 538 pp., illus. Cloth, \$20; paper, \$8.95.

Plastic Foams. Vol. 1, part 2. Kurt C. Frisch and James H. Saunders, Eds. Dekker, New York, 1973. xviii pp. + pp. 451-1024, illus. \$47.50. Monographs on Plastics.

The Politics of Environmental Concern. Walter A. Rosenbaum. Praeger, New York, 1973. viii, 298 pp. Cloth, \$9; paper, \$3.95.

Polyamines in Normal and Neoplastic



LIFEGUARD® "Outside-of-Cage" Automatic Watering Systems...

For dependable, low-cost watering of mice, rats, hamsters, rabbits, guinea pigs and other small animals

LIFEGUARD "outside" watering with quick-change cage attachment gives immediate improvement in small animal care . . . Total dryness, positive safety, superior sanitation and reduced work load. Indeed, better animal care at lower cost. Guaranteed satisfactory performance. Write or call.

SE systems engineering

A Div. of Atco Mfg. Co., Inc.

461 Walnut St., Napa CA 94558

Telephone: (707) 252-1622

Circle No. 80 on Readers' Service Card

Growth. Proceedings of a symposium. Diane Russell, Ed. Raven, New York, 1973. xii, 430 pp., illus. \$21.50.

Polymers and Ecological Problems. Proceedings of a symposium, New York, Aug. 1972. James Guillet, Ed. Plenum, New York, 1973. xxiv, 206 pp., illus. \$18.50. Polymer Science and Technology, vol. 3.

Power and Research Reactors in Member States. International Atomic Energy Agency, Vienna, 1972 (U.S. distributor, Unipub, New York). 72 pp. Paper, \$3.

The Predatory Behavior of Wild Chimpanzees. Geza Teleki. Bucknell University Press, Lewisburg, Pa., 1973. 232 pp., illus. \$15. The Primates.

Prehistory and Human Ecology of the Valley of Oaxaca. Vol. 1, The Use of Land and Water Resources in the Past and Present Valley of Oaxaca, Mexico. Anne V. T. Kirkby. University of Michigan Museum of Anthropology, Ann Arbor, 1973. xvi, 174 pp., illus. + plates. Paper, \$6. Memoirs of the Museum of Anthropology, No. 5.

Present Problems in the Democratization of Secondary and Higher Education. A. le Gall, J. A. Lauwerys, B. Holmes, A. B. Dryland, and S. Mattsson. Unesco, Paris, 1973 (U.S. distributor, Unipub, New York). 238 pp., illus. Paper, \$6. The Development of Higher Education Series.

Principles and Techniques of Electron Microscopy. Vol. 3, Biological Applications. M. A. Hayat, Ed. Van Nostrand Reinhold, New York, 1973. xiv, 322 pp., illus. \$19.95.

The Principles of Engineering Materials. Craig R. Barrett, William D. Nix, and Alan S. Tetelman. Prentice-Hall, Englewood Cliffs, N.J., 1973. xvi, 554 pp., illus. \$14.95.

Principles of Survey Analysis. Travis Hirschi and Haran C. Selvin. Free Press (Macmillan), New York, and Collier-Macmillan, London, 1973. xx, 280 pp. Paper, \$2.95. Reprint of *Delinquency Research*, 1967.

Protective Groups in Organic Chemistry. J. F. W. McOmie, Ed. Plenum, New York, 1973. xii, 418 pp., illus. \$28.

Proteins in Human Nutrition. Proceedings of a NATO Advanced Study Institute, Reading, England, Mar. 1972. J. W. G. Porter and B. A. Rolfs, Eds. Academic Press, New York, 1973. xii, 560 pp., illus. \$26.50.

Public and Private Lives of Psychotherapists. William E. Henry, John H. Sims, and S. Lee Spray. Jossey-Bass, San Francisco, 1973. xiv, 272 pp. \$12.50. Jossey-Bass Behavioral Science Series.

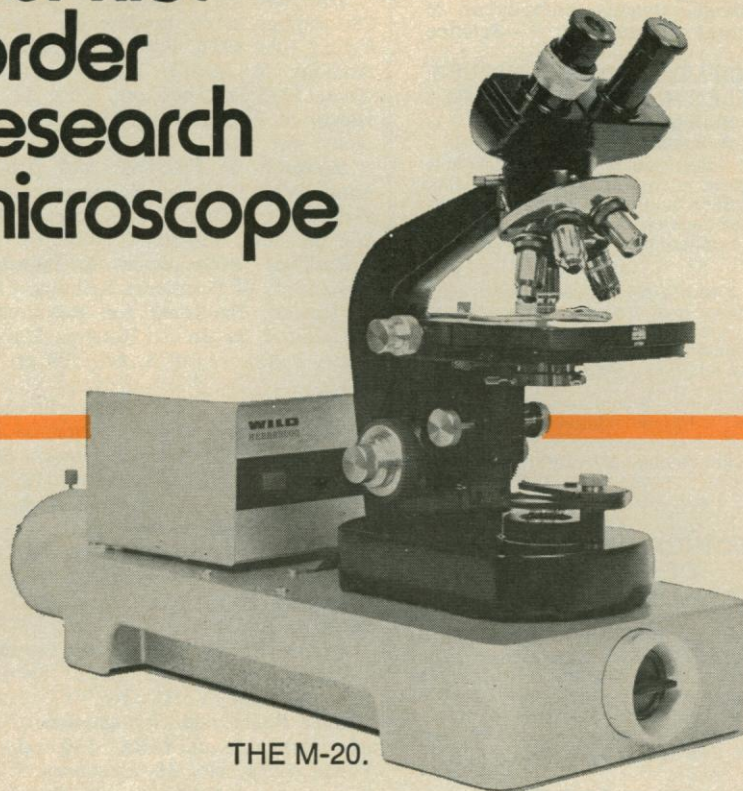
Public Policy toward Environment, 1973. A Review and Appraisal. New York Academy of Sciences, New York, 1973. 202 pp., illus. Paper, \$25. Annals of the New York Academy of Sciences, vol. 216.

Reaction Mechanisms and Control Properties of Phosphotransferases. Proceedings of a symposium, Thuringia, G.D.R., May 1971. Akademie, Berlin, 1973. xvi, 686 pp., illus. Paper, M 68.

Reactor Shielding for Nuclear Engineers. N. M. Schaeffer, Ed. U.S. Atomic Energy Commission, Oak Ridge, Tenn., 1973 (available from National Technical Information Service, Springfield, Va.). xii, 788 pp., illus. Paper, \$13.60.

Readings on Ethical and Social Issues in

our first order research microscope



THE M-20.

the **BUDGET SAVER.**

WILD

The Wild M-20 is for all observation methods, and for all types of illumination. With every useful accessory and attachment available, it does what you want it to do, when you want to do it.

Our new high-intensity 12v100w Quartz Iodine Single Illuminator Base* now provides ample light for combined phase-contrast polarization, high power color photomicrography, darkfield fluorescence, and up to oil immersion.

The Wild M-20 is one microscope you don't outgrow. It grows with you. A real budget saver, from the family of great Swiss optical instruments for geodesy, photogrammetry and microscopy. Backed by fast, full factory services.

***UPDATES ALL WILD M-20, M-11 AND M-12 MICROSCOPES. MOUNTS PERFECTLY WITHOUT ADAPTATION.**

WILD®
HEERBRUGG

WRITE OR CALL FOR
BROCHURE ON THE SINGLE
ILLUMINATOR AND M-20.

WILD HEERBRUGG INSTRUMENTS, INC.

FARMINGDALE, NEW YORK 11735 • 516-293-7400
WILD OF CANADA, 881 LADY ELLEN PLACE, OTTAWA 3, CAN.
WILD OF MEXICO, S. A. LONDRES 256, MEXICO 6, D. F.



**BOOKS FROM
VAN NOSTRAND
REINHOLD**

"The most extensive compilation of procedures available." —Science

PRINCIPLES AND TECHNIQUES OF ELECTRON MICROSCOPY

Biological Applications

By M. A. Hayat, Newark State College

Volume 1 helps you more accurately interpret electron micrographs of any specimen that has been subjected to fixation, dehydration, embedding, sectioning, staining or electron bombardment. 412 pp., illus., 6 x 9, \$19.50

Volume 2 explains freeze-substitution, freeze-drying and freeze-etching; negative staining; shadow casting and replication; high resolution shadowing; and autoradiography. 304 pp., illus., 6 x 9, \$19.50

Volume 3 brings techniques for observing molecules, macromolecules and organelles. It includes ultracentrifugation, morphometry, critical point drying, and dark-field and in-focus phase contrast. Just published. 272 pp., illus., 6 x 9, \$19.95

ELECTRON MICROSCOPY OF ENZYMES

Principles and Methods: Volume 1

Edited by M. A. Hayat. Provides a complete understanding of electron cytochemical methods. Describes techniques used to localize enzymatic activity at the subcellular level. Contents of this book have been selected and written by scientists who have pioneered in their respective fields. Just published. 240 pp., illus., 6 x 9, \$16.95

PHYTOCHEMISTRY

Edited by Lawrence P. Miller

Volume 1: The Process and Products of Photosynthesis, includes information on chlorophyll; carotenoids; mono- and oligosaccharides; starch and inulin; hemicelluloses and gums; cellulose and chitin; the pectic substances; and glycosides. 544 pp., illus., 6 x 9, \$22.50

Volume 2: Organic Metabolites, covers amino acids; flowering plant proteins; purines, pyrimidines and their derivatives; alkaloids; steroids; lipids; terpenes; rubber, gutta percha and chicle; and flavonoids. 544 pp., illus., 6 x 9, \$24.50

Volume 3: Inorganic Elements and Special Groups of Chemicals, includes sulphur compounds; nonvolatile organic acids; naturally occurring acetylenes; lignin; cutin and suberin; surface waxes; gibberins; and molecular taxonomy. 544 pp., illus., 6 x 9, \$24.50

FREE 10-DAY EXAMINATION

Van Nostrand Reinhold Co.
300 Pike Street, Cincinnati, Ohio 45202

Please send me a copy of the book(s) I have checked below for 10 days' free examination. At the end of that time I will remit for the book(s) I keep plus a few cents for delivery costs, or return the book(s) and pay nothing.

- ☐ Principles and Techniques of Electron Microscopy, Vol. 1 (F5669-9981) \$19.50
- ☐ Principles and Techniques of Electron Microscopy, Vol. 2 (F5670-0009) \$19.50
- ☐ Principles and Techniques of Electron Microscopy, Vol. 3 (F5674-0000) \$19.95
- ☐ Electron Microscopy of Enzymes, Vol. 1 (F5676-0001) \$16.95
- ☐ Phytochemistry, Vol. 1 (F5382-0003) \$22.50
- ☐ Phytochemistry, Vol. 2 (F5385-000X) \$24.50
- ☐ Phytochemistry, Vol. 3 (F5386-0005) \$24.50

Name _____

Address _____

City _____

State _____ Zip _____

Prices subject to change

S10/73

Circle No. 89 on Readers' Service Page

312

Biomedicine. Richard W. Wertz, Ed. Prentice-Hall, Englewood Cliffs, N.J., 1973. x, 306 pp. Cloth, \$10.95; paper, \$4.95. Prentice-Hall Biological Science Series.

Receptors for Reproductive Hormones. Proceedings of a conference, Nashville, Tenn., July 1972. Bert W. O'Malley and Anthony R. Means, Eds. Plenum, New York, 1973. xii, 460 pp., illus. \$25. Advances in Experimental Medicine and Biology, vol. 36.

Research in Filariasis and Schistosomiasis. Vol. 2. Muneo Yokogawa, Ed. University Park Press, Baltimore, 1973. x, 262 pp., illus. \$19.50.

Residuals Management in Industry. A Case Study of Petroleum Refining. Clifford S. Russell. Published for Resources for the Future by Johns Hopkins University Press, Baltimore, 1973. xvi, 194 pp., illus. \$11.

Scandinavian Aerobology. Proceedings of a symposium, Sweden, Apr. 1972. Siwert Nilsson, Ed. Swedish Natural Science Research Council, Stockholm, 1973. 222 pp., illus. 25 SKr. Ecological Research Committee Bulletin No. 18.

Science and the Evolution of Public Policy. James A. Shannon, Ed. Rockefeller University Press, New York, 1973. xviii, 260 pp., illus. \$11.

Science Policy Studies and Documents. Unesco, Paris, 1972 (U.S. distributor, Unipub, New York). No. 27, National Science Policy and Organization of Scientific Research in India. 130 pp., illus. Paper, \$2.50. No. 30, European Scientific Co-operation. Priorities and Perspectives. Proceedings of a meeting, Budapest, July 1972. 32 pp. Paper, \$1.

The Scientific Community. James Taylor. Oxford University Press, New York, 1973. viii, 80 pp. Paper, \$3.50. Science and Engineering Policy Series.

Scientists in Search of Their Conscience. Proceedings of a symposium, Brussels, June 1971. Anthony R. Michaelis and Hugh Harvey, Eds. Springer-Verlag, New York, 1973. xii, 230 pp., illus. Paper, \$17.10.

Selected Papers in Biochemistry. Vol. 10, Mitochondria. Sitiro Sato, Ed. University Park Press, Baltimore, 1972. xxii, 306 pp., illus. \$12.50.

Selected Papers in Biochemistry. Vol. 11, Enzyme Mechanism. Osamu Hayashi, Ed. University Park Press, Baltimore, 1973. xii, 224 pp., illus. \$12.50.

The Settlement of Polynesia. A Computer Simulation. Michael Levison, R. Gerard Ward, and John W. Webb with the assistance of Trevor I. Fenner and W. Alan Sentence. University of Minnesota Press, Minneapolis, 1973. viii, 138 pp., illus. \$10.75.

SI Units. A Source Book. G. S. Ramaswamy and V. V. L. Rao. McGraw-Hill, New York, 1973. viii, 110 pp., illus. \$8.95.

Sleep Research. Vol. 1. Michael H. Chase, Warren C. Stern, and Pat L. Walter, Eds. Brain Information Service and the Brain Research Institute, Los Angeles, 1972 (available from the BRI Publications Office, Center for the Health Sciences, University of California, Los Angeles). x, 438 pp. \$15.

Social Issues in Computing. C. C. Gotlieb and A. Borodin. Academic Press, New York, 1973. xvi, 284 pp. \$9.50. Com-

puter Science and Applied Mathematics.

Social Psychology Research. Laboratory-Field Relationships. Alvin M. Snadowsky, Ed. Free Press (Macmillan), New York, and Collier-Macmillan, London, 1972. xii, 338 pp., illus. Paper, \$4.50.

Stochastic Processes and the Wiener Integral. J. Yeh. Dekker, New York, 1973. xii, 552 pp. \$24.75. Pure and Applied Mathematics, vol. 13.

Strategy for a Living Revolution. George Lakey. Freeman, San Francisco, 1973. xx, 234 pp. Paper, \$2.95.

Stresses in Shells. Wilhelm Flügge. Springer-Verlag, New York, ed. 2, 1973. xii, 526 pp., illus. \$19.10.

Structure and Bonding. Vol. 13. J. D. Dunitz and seven others, Eds. Springer-Verlag, New York, 1973. iv, 258 pp., illus. Paper, \$26.70. Rare Earths series.

Subunits in Biological Systems. Part B. Gerald D. Fasman and Serge N. Timasheff, Eds. Dekker, New York, 1973. xiv, 374 pp., illus. \$27.50. Biological Macromolecules, vol. 6.

Survive the Savage Sea. Dougal Robertson. Praeger, New York, 1973. 270 pp., illus. \$7.95. Books that Matter.

Symmetry and Energy Bands in Crystals. John C. Slater. Dover, New York, 1972. xii, 564 pp., illus. Paper, \$6. Reprint of *Quantum Theory of Molecules and Solids*, vol. 2, 1965.

Systematics and Evolution of the Gruiformes (Class Aves). 3. Phylogeny of the Suborder Grues. Joel Cracraft. American Museum of Natural History, New York, 1973. 128 pp., illus. Paper, \$4.75. Bulletin of the American Museum of Natural History, vol. 151, article 1.

Teaching Science in the Elementary School. David P. Butts. Free Press (Macmillan), New York, and Collier-Macmillan, London, 1973. xiv, 200 pp. Cloth, \$7.95; paper, \$3.95.

Techniques for Direct Access. Hardware Systems Programming. Keith R. London. Auerbach, Philadelphia, 1973. x, 326 pp., illus. \$14.95.

Tensile Structures. Design, Structure, and Calculation of Buildings of Cables, Nets, and Membranes. Frei Otto, Ed. Translated from the German edition (Frankfurt, vol. 1, 1962; vol. 2, 1967). MIT Press, Cambridge, Mass., ed. 2, 1973. Two volumes, illus. 320 pp., and 172 pp. Paper, \$7.95.

Theoretical Analysis of Information Systems. Börje Langefors. Studentlitteratur, Lund, Sweden, and Auerbach, Philadelphia, ed. 4, 1973. 490 pp., illus. \$17.50.

Theories and Observation in Science. Richard E. Grandy, Ed. Prentice-Hall, Englewood Cliffs, N.J., 1973. viii, 184 pp., illus. Cloth, \$7.95; paper, \$3.95. Central Issues in Philosophy Series.

Theories of Man and Culture. Elvin Hatch. Columbia University Press, New York, 1973. xii, 384 pp. \$12.50.

Theory of Nonlinear Operators. Proceedings of a summer school, Babylon, Czechoslovakia, Sept. 1971. Academia, Prague, and Academic Press, New York, 1973. 208 pp. \$14.

Theory of Spectroscopy. An Elementary Introduction. Oliver Howarth. Halsted (Wiley), New York, 1973. x, 214 pp., illus. Paper, \$6.75.

Thermobacteriology in Food Processing. C. R. Stumbo. Academic Press, New York,

We've made Cyclic AMP Assay so easy...

Just add water and stir.

Simplify your research procedure with our all-in-one Cyclic AMP Assay Kit; designed to accurately measure cyclic AMP levels in the range 0.2-16.0 pmol per incubation tube. The kit provides everything for the construction of one standard curve (five levels of cyclic AMP in duplicate) and the assay of 65 unknowns in duplicate. The reagents are freeze-dried for your convenience and may be stored under normal refrigeration. To reconstitute the reagents, just add water and stir.

- Short counting time (1-4 minutes)
- Very low cross-reaction with cyclic GMP and ATP
- Excellent reproducibility
- A linear calibration curve — easier to construct and use.

With the new Cyclic AMP Assay Kit from Amersham/Searle, you build your curves the easy way. Contact our Technical Service Department for detailed information.

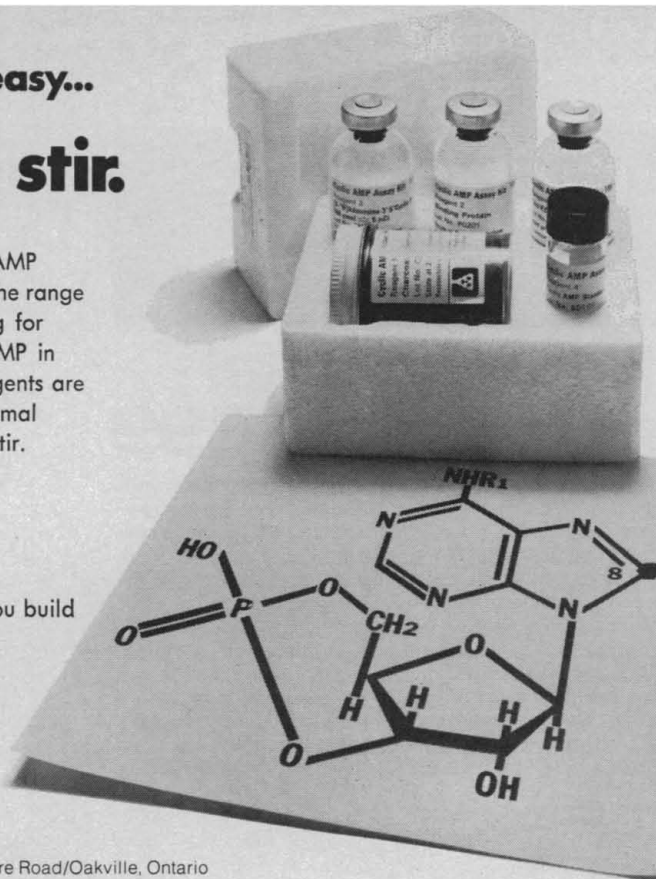
**Our specific
activity is service.**



2636 S. Clearbrook Drive/Arlington Heights, Illinois 60005
Telephone: 312-593-6300—Telex: 28-2452

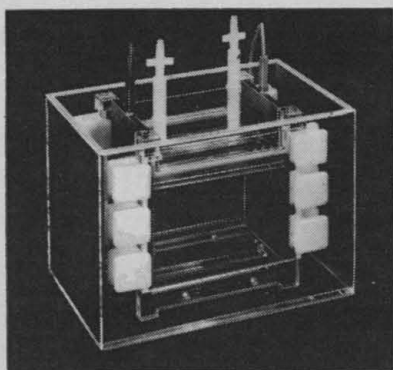
400 Iroquois Shore Road/Oakville, Ontario
Telephone: (416) 364-2183—Telex: 069-82216

Circle No. 67 on Readers' Service Card



HOEFER SCIENTIFIC VERTICAL SLAB GEL ELECTROPHORESIS SYSTEM

THE BASICS:



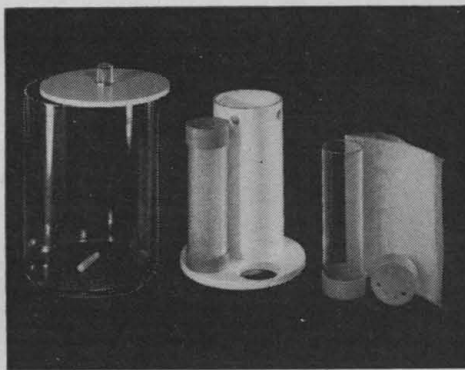
Vertical Slab accommodates two gels, up to 40 samples.

10x14 cm slabs; cast between removable glass plates; no need for grease or agar seals.

Slabs may be prepared in three thicknesses, 0.75, 1.5, 3.0 mm.

Uniform running conditions.

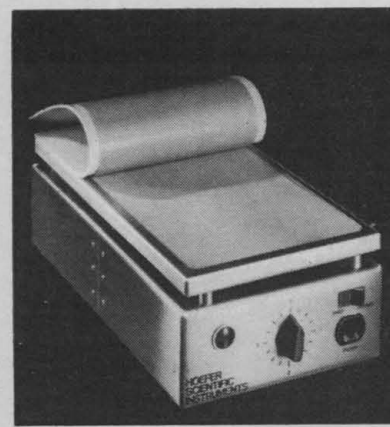
Accurate temperature control.



Diffusion Destaining more accurate, more economical than electrophoretic destaining.

No risk of band shifts. No loss of low molecular weight bands.

Background dye is rapidly removed by simple diffusion and is adsorbed by a charcoal cartridge. No risk of tearing; the slab is supported mechanically.



Slab Gel Dryer two 10x14x0.075 cm slabs can be dried in less than 30 minutes.

No distortion or cracking. Uses a dry heat, vacuum process.

For notebook storage, radioautography, densitometric analysis: slabs are bonded permanently to a porous support sheet.

Write for complete catalogue

HOEFER SCIENTIFIC INSTRUMENTS • 520 Bryant Street, San Francisco, California 94107 • (415) 398-1642



* New universal multimeter, \$299

- 26 ranges to measure ac/dc voltages from 100 microvolts to 1200 V, ac/dc currents from 100 nanoamperes to 2 amperes and resistance from 100 milliohms to 20 megohms.
- Basic dc accuracy, 0.1%.
- Guaranteed for one full year. Fluke gives you the best specs and strongest warranty on the market today for the lowest cost of ownership ever.
- Wide choice of options including rechargeable battery pack, digital printer output, deluxe test leads, high-voltage probe, RF probe, 200-amp ac current probe, carrying case, dust cover and rack mounts.
- Unique self-zero feature eliminates offset errors.
- Rugged high-impact case with securely mounted internal electronics.
- Service centers throughout U.S., Canada, Europe and Far East for 48-hour turnaround repairs.



P.O. Box 7428,
Seattle, Washington 98133.

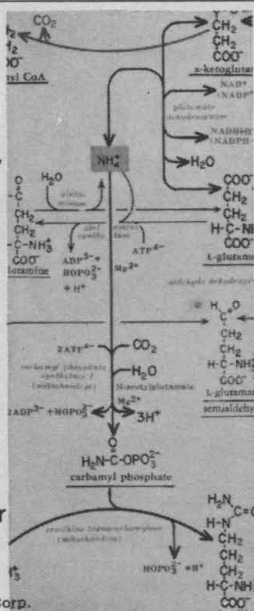
Get all the details from your nearest Fluke sales office. Dial toll-free 800-426-0361 for address of office nearest you.

Circle No. 93 on Readers' Service Card

P-L Biochemicals, Inc., proudly announces publication of the latest edition of the **INTERMEDIARY METABOLISM CHARTS***

- Thoroughly up-dated and revised
- New sections added
- Expanded new 4-chart format (each 23" x 34")
Chart section shown one-half size.
- New spiral binding and wall hanger
- High quality 5-color reproduction on heavy-duty paper

*Formerly published by Gilson Medical Electronics Corp.



- ☐ Please send _____ sets of charts @ \$3.75 each (less 25% for 25 sets or more). Enclosed find \$_____
(Check or money order only; Do not send cash)
- ☐ Please send additional information.

Name _____
Street _____
City _____ State _____ Zip _____



P-L biochemicals, inc.
P. O. Box 4606, Chicago, Illinois 60680, U.S.A.

314

Circle No. 90 on Readers' Service Card

How to Build and Use Electronic Devices Without Frustration, Panic, Mountains of Money, or an Engineering Degree

by Stuart A. Hoenig, Ph.D., Professor of Electrical Engineering, University of Arizona, Tucson; and F. Leland Payne, M.S., Design Engineer, Burr-Brown Research Corporation, Tucson

This is a new, refreshingly unorthodox "how to" book on op-amps. Clear and amusingly written, **HOW TO BUILD AND USE ELECTRONIC DEVICES** is geared to the person who wants to build both simple and complex circuits but who panics at the sight of standard electronics texts.

#368075, \$9.95

ORDER FROM: Little, Brown and Company, 34 Beacon St., Boston, Massachusetts 02106

Yes, I'm interested. Please send me _____ copies of **HOW TO BUILD AND USE ELECTRONIC DEVICES** by Hoenig and Payne (#368075). My check for \$9.95 is enclosed.

Name _____

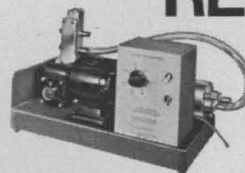
Street _____

City _____ State & Zip _____

Circle No. 94 on Readers' Service Card

FREE CATALOG Describes 17 models of ventilators for all laboratory animals. Includes **Ventilation Graph** - useful guide to ratios of tidal volumes/body weights required to maintain anaesthetized animals.

ANIMAL RESPIRATORS



Mail coupon to:
Harvard Apparatus Co., Inc.
Dept. C-29, P.O. Box 24,
Millis, Mass. 02054
Or call: 617-376-2987

Please send Animal Respirator Catalog 607.
Check ☐ for free 17"x19" Ventilation Wall Chart.

Name _____

Dept. _____

Institution _____

Address _____

City _____ State _____ Zip _____

HARVARD APPARATUS

Circle No. 92 on Readers' Service Card

ed. 2, 1973. xx, 330 pp., illus. \$18.50. Food Science and Technology.

Thymic Hormones. T. D. Luckey, Ed. University Park Press, Baltimore, 1973. xviii, 376 pp., illus. \$19.50.

Towards a Social Ecology. Contextual Appreciation of the Future in the Present. F. E. Emery and E. L. Trist. Plenum, New York, 1973. xvi, 240 pp. \$15.

Type Specimens of Birds in the American Museum of Natural History. Part 1. Tinamidae . . . Rallidae. James C. Greenway, Jr. American Museum of Natural History, New York, 1973. ii pp. + pp. 209-346. Paper, \$5.10. Bulletin of the American Museum of Natural History, vol. 150, article 3.

Uncertainty, Calibration and Probability. The Statistics of Scientific and Industrial Measurement. C. F. Dietrich. Halsted (Wiley), New York, 1973. xii, 412 pp., illus. \$49.

Understanding the Earth. A Reader in the Earth Sciences. I. G. Gass, Peter J. Smith, and R. C. L. Wilson, Eds. Published for the Open University Press by Artemis Press, Sussex, 1973 (U.S. distributor, MIT Press, Cambridge, Mass.). 356 pp., illus. Paper, \$8.95. Open University Set Book.

Underwater Medicine and Related Sciences. A Guide to the Literature. An Annotated Bibliography, Key Word Index, and Microthesaurus. Charles W. Shilling and Margaret F. Werts. IFI/Plenum, New York, 1973. x, 696 pp. \$37.50.

The University Teaching of Social Sciences. Law. Report prepared by Charles Eisenmann for the International Association of Legal Sciences. Unesco, Paris, ed. 2, 1973 (U.S. distributor, Unipub, New York). 182 pp. Paper, \$5. Teaching in the Social Sciences.

Vascular Disorders and Hearing Defects. Proceedings of a workshop, Baltimore, Apr. 1972. A. J. Darin de Lorenzo, Ed. University Park Press, Baltimore, 1973. xiv, 358 pp., illus. \$17.50.

Vers la Théorie de l'Homme. Pierre Vendryès. Presses Universitaires de France, Paris, 1973. 284 pp., illus. Paper, 24F. Collection SUP.

Water. A Comprehensive Treatise. Vol. 1, The Physics and Physical Chemistry of Water. Felix Franks, Ed. Plenum, New York, 1972. xx, 596 pp., illus. \$37.50.

Water. A Comprehensive Treatise. Vol. 3, Aqueous Solutions of Simple Electrolytes. Felix Franks, Ed. Plenum, New York, 1973. xviii, 472 pp., illus. \$37.50.

Water-Soluble Polymers. Proceedings of a symposium, New York, Aug. 1972. N. M. Bikales, Ed. Plenum, New York, 1973. xvi, 424 pp., illus. \$20. Polymer Science and Technology, vol. 2.

Wave Propagation. Ivan Tolstoy. McGraw-Hill, New York, 1973. xiv, 466 pp., illus. \$18.50. McGraw-Hill International Series in the Earth and Planetary Sciences.

Workshop on Micrometeorology. Proceedings of a workshop, Aug. 1972. Duane A. Haugen, Ed. American Meteorological Society, Boston, 1973. xii, 392 pp., illus. \$30.

The Writings of Anna Freud. Vol. 3, Infants without Families. Reports on the Hampstead Nurseries 1939-1945. Written in collaboration with Dorothy Burlingham. International Universities Press, New York, 1973. xxx, 682 pp. \$17.50.

Be on the safe side



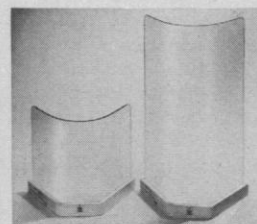
... with New Nalgene® Safety Shields

You'll get better protection against flying glass, dangerous liquids and other laboratory hazards with Nalgene Safety Shields. Made of $\frac{3}{8}$ " LEXAN® polycarbonate, the toughest of all thermoplastics, these shields are crystal-clear and distortion-free.

Polycarbonate, combining superior impact resistance and high tensile strength, is the best transparent shield material available today. The parabolic design gives side as well as front protection. Vertical sides provide maximum safety along the full height of the shield. The 12-pound, $\frac{3}{4}$ inch-thick epoxy-coated steel base projects beyond the front of the shield to provide a low center of gravity and resistance to tipping. The projecting base also serves as a convenient carrying handle. Enclosure is $8\frac{1}{4}$ inches deep and 16 inches wide at the rear.

Available in two sizes. The larger (Cat. No. 6350-3024) is 30-inches high with a total shield surface of 742 square inches. The smaller shield (Cat. No. 6350-1524) is 15-inches high providing 371 square inches of surface. Order from your Lab Supply Dealer. For complete details, write Dept. 4210C, Nalge Company, P.O. Box 365, Rochester, New York 14602.

*Registered trademark of General Electric Co.



Nalgene® Labware ... the safe unbreakables—preferred by professionals.







FOR
HIGH SPEED
COUNTING!

WITH
FAST RISE/FALL TIME
HIGH GAIN AND EXCELLENT
STABILITY **EMI TYPE 9813B**

The 9813B is a 14-stage linear focussed photomultiplier with a high performance bialkali cathode and extremely low dark current. Gains of the order of 10^8 are easily achieved at less than 2,500V and dark currents are typically 10 na. at 5,000 A/lm. The 9813B has been carefully designed to maximize collection efficiency, minimize the transit time and accurately reproduce the input signal. Typical time characteristics are: Rise time - 2.4 nsec; fwhm - 3.6 nsec; transit time - 45 nsec. Coupled to a Sodium Iodide Crystal, the 9813B gives a typical pulse height resolution of 7.5% to Cs 137.

For applications in the U.V. such as Cerenkov counting, the 9813QB with a quartz (fused silica) window is available. S-20 variants for laser detection and similar applications can be obtained with Pyrex or quartz window (9816B and 9816QB). In addition, there are 10 and 12 dynode versions in both the bialkali and S-20 cathodes. All types can be furnished capped with the standard B-20 base, or with the low loss B19A teflon socket.

Detailed Specifications are
available from:

GENCOM DIVISION

Emitronics Inc.
80 EXPRESS ST., PLAINVIEW, N.Y. 11803
TELEPHONE: (516) 433-5900

NEWS AND COMMENT

(Continued from page 269)

What could be more helpful would be to have projects planned according to all relevant values and goals, but with their final evaluation to be made by a high-level board of review free to render its judgments independently of the construction agencies and the OMB. Recommendations to that effect were made in 1949 and 1955 by the first and second Hoover commissions on executive reorganization and, again this year, by the NWC.

The reasons why such a review board is needed, the NWC has indicated, are (i) that the project evaluations of the construction agencies tend to be colored by bureaucratic self-interest; (ii) that neither the OMB nor the Congress has the staff necessary to review the agency evaluations with the thoroughness required; and (iii) that the OMB is not in any case unbiased in its reviews, because of its overriding commitment to carrying out the President's budgetary policies.

In the judgment of the NWC, the review board should be structured as an independent agency, "nominally within the executive branch but insulated from presidential politics by appointments which extend beyond the term of the President." The chairman of the board, the NWC has suggested, should also be chairman of the Water Resources Council, the latter no longer to be headed by the Secretary of the Interior, as at present. The WRC has, to date, been notably weak in its review of the policies and programs of the construction agencies.

If the Nixon Administration should succeed in the difficult task of persuading Congress to establish its proposed Department of Energy and Natural Resources (DENR), the WRC will be abolished and the project construction agencies will all be placed in the new department (in the case of the Corps of Engineers, only part of its planning staff would be transferred to DENR). Under these circumstances, however, the establishment of an independent review board could be more important than ever, for a counterweight to this big new bureaucratic conglomerate could be vitally needed.

As an adviser to the President and the Congress, the review board could function in two ways. One would be to point up broad policy issues, such as how water resource policy may affect the production of food and energy or

how it would relate to a strategy for redirecting patterns of national growth. The other would be to scrutinize water resource development in individual regions, watersheds, and projects, assaying the need for a particular project in the light of all available alternatives, the degree of citizen participation in plan formulation, the protection of environmental values, and the honesty of cost and benefit projections.

To keep its staff from ballooning to excessive size, the review board could (as the NWC suggests) rely on the construction agencies to provide most of the data needed for its review. Such information would not in every case be sufficient, but, as RFF's John Krutilla observes, "If you really made some internal checks for consistency, for plausibility, for reasonableness, project benefits would often be significantly deflated." In addition, the review board would be able to obtain much information from the comments made by entities such as the Environment Protection Agency (EPA), the U.S. Fish and Wildlife Service, and the private environmental groups on the environmental impact statements prepared by the project construction agencies, as required by the National Environmental Policy Act (NEPA).

NEPA itself has contributed remarkably to opening up the process of water project evaluation—this being most strikingly demonstrated in an opinion early this year by Judge Carl O. Bue, Jr., of the U.S. District Court in Houston. Judge Bue pronounced the benefit-cost analysis made by the Corps of Engineers for the Wallisville Dam-Trinity River navigation project to be grossly defective, particularly in that environmental benefits were claimed but environmental "costs" were not. A review board of the kind proposed by the NWC could, to the extent that the White House was willing to act on its advice, actually serve as an arbiter in water project controversies. The arbiter's role is not one that the courts have been able to assume because NEPA does not go much beyond demanding full disclosure.

In sum, a competent review board, assisted by NEPA and the natural adversary relationship that exists between agencies such as the Corp of Engineers and the EPA, may be able to do far more than even the best thought-out Principles and Standards in erasing water resource development's pork barrel image.—LUTHER J. CARTER