

SCIENCE

19 May 1972

Vol. 176, No. 4036

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



How to choose the right preparative ultracentrifuge

If you need maximum centrifugal forces, select the Beckman L2-75B: 75,000 rpm, 500,000 g's, superb temperature control over the range of 0 to 40 C. The finest preparative ultracentrifuge in the world.

If you don't need the extra force and wider temperature range, choose the L2-65B: 65,000 rpm, forces to 400,000 g. The largest selling model in the world. You can also update it later to the capabilities of the L2-75B.

For intermediate speeds and forces, the choice is L3-50: 50,000 rpm, forces to 300,000 g. It gets to speed rapidly, has precise temperature control for density gradient separations—an outstanding combination of performance and price.

For routine preparative work at speeds to 40,000 rpm and forces in the 200,000 g range, select the economically priced L3-40. It can be updated at any time to the status of a Model L3-50.

What else does Beckman offer? The longest line of rotors and accessories; the most experience; direct sales and service throughout the United States, Canada, and around the world; applications and technical support.

Write for Data File UCF-4 to Spinco Division, Beckman Instruments, Inc., 1117 California Avenue, Palo Alto, California 94304

Circle No. 10 on Readers' Service Card

Beckman
INSTRUMENTS, INC.

INTERNATIONAL SUBSIDIARIES: AMSTERDAM;
CAPE TOWN; GENEVA; GLENROTHES, SCOTLAND; LONDON;
MEXICO CITY; MUNICH; PARIS; STOCKHOLM; TOKYO; VIENNA

Helping science and industry improve the quality of life.



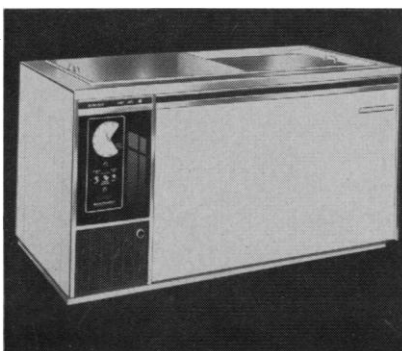
K-K-K-KEL-VI-VINATOR. -96°C !

We sell ultra-cold. Hair-cracking cold. Upright drops to -76°C . Chest model sinks to -96°C . And in over-all performance, we're the hottest cold buy around.

We know what you need in the way of cold so we've designed our units to make you happy. Take the upright. Beyond the cold you need, you'll find convenience features like six French doors. Open one without losing the cold everywhere else. You can label each door. Know what's behind it.

What's good about the chest model? It gets colder. And the top can give you some more work surface. And here too we've come up with a great way for you to identify the location of everything that's in it.

More. Both have automatic alarm systems and 2" portholes to accommodate recorders. More importantly, both carry the name Kelvinator Commercial. The company that knows how to give you the best cold you ever had.



Send for detailed literature.

Upright UC-105 ($-76^{\circ}\text{C}/-105^{\circ}\text{F}$)
— 12 Cubic Feet.

Chest UC-520 ($-85^{\circ}\text{C}/-120^{\circ}\text{F}$),
UC-540 ($-96^{\circ}\text{C}/-140^{\circ}\text{F}$)
— 12 Cubic Feet.

Write: J. E. Hirssig, Sales Mgr.,
Scientific and Industrial Division,
Kelvinator Commercial Products, Inc.,
621 Quay Street, Manitowoc, Wisconsin 54220. Phone (414) 682-0156.

Kelvinator

One of the White Consolidated Industries
WCI

Circle No. 13 on Readers' Service Card

19 May 1972

Vol. 176, No. 4036

SCIENCE

LETTERS	Science and Technology: <i>A. M. Russell; T. W. Jeffries</i> ; Sex Discrimination: <i>J. G. Gutwillig; P. R. Gross</i> ; Admission Policies: <i>R. I. Walter; A. W. Astin</i> ; Controlling the Earth's Temperatures: <i>D. D. Elliott</i> ; Herzberg in Canada: <i>G. F. Wright</i>	741
EDITORIAL	Can Stockholm Succeed?: <i>H. H. Landsberg</i>	749
ARTICLES	The Pressure Variable in Materials Research: <i>D. B. McWhan</i>	751
	Transmissible Multiple Drug Resistance in Enterobacteriaceae: <i>J. E. Davies and R. Rownd</i>	758
	Plant Pests and Diseases: Assessment of Crop Losses: <i>L. Chiarappa, H. C. Chiang, R. F. Smith</i>	769
	Population Trends of the 1960's: <i>C. Taeuber</i>	773
NEWS AND COMMENT	Professional Societies: Identify Crisis Threatens on Bread and Butter Issues	777
	Turks Gather on Boardwalk: Debate Role in Political Arena	779
	Israel: Pollution Problems Rife but Other Issues Take Priority	781
	FAS Group En Route to China	783
BOOK REVIEWS	Lives Through Time, reviewed by <i>L. J. Cronbach</i> ; Affinity and Matter, <i>D. P. Jones</i> ; Introduction to Middle Missouri Archeology, <i>R. A. Krause</i> ; Introduction à la Phytogéographie des Pays Tropicaux, <i>H. G. Baker</i> ; Books Received	785
REPORTS	Deuterium Content of Snow as an Index to Winter Climate in the Sierra Nevada Area: <i>I. Friedman and G. I. Smith</i>	790
	Terrestrial Atmospheric Composition from Stellar Occulations: <i>P. B. Hays, R. G. Roble, A. N. Shah</i>	793

BOARD OF DIRECTORS

MINA REES
Retiring President, Chairman

GLENN T. SEABORG
President

LEONARD M. RIESER
President-Elect

DAVID BLACKWELL
RICHARD H. BOLT

LEWIS M. BRANSCOME
BARRY COMMONER

VICE PRESIDENTS AND SECTION SECRETARIES

MATHEMATICS (A)
John W. Tukey
F. A. Ficken

PHYSICS (B)
Herbert Friedman
Rolf M. Sinclair

CHEMISTRY (C)
Martin Paul
Leo Schubert

ASTRONOMY (D)
George B. Field
Arlo U. Landolt

PSYCHOLOGY (I)
Dale B. Harris
William D. Garvey

SOCIAL AND ECONOMIC SCIENCES (K)
James S. Coleman
Harvey Sapolsky

HISTORY AND PHILOSOPHY OF SCIENCE (L)
Everett Mendelsohn
Raymond J. Seeger

PHARMACEUTICAL SCIENCES (Np)
Linwood F. Tice
John Autian

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

INDUSTRIAL SCIENCE (P)
Jacob E. Goldman
Jordan D. Lewis

EDUCATION (Q)
Lloyd K. Johnson
Phillip R. Fordyce

DIVISIONS

ALASKA DIVISION

Gordon Harrison
President
Irma Duncan
Executive Secretary

PACIFIC DIVISION

Roy A. Young
President
Robert C. Miller
Secretary

SOUTHWESTERN AND ROCKY MOUNTAIN DIVISION

John R. Lacher
President
Marlowe G. Anderson
Executive Secretary

SCIENCE is published weekly, except the last week in December, but with an extra issue on the third 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 © 1972 by the American Association for the Advancement of Science. Annual subscription \$20; foreign postage: Americas \$3; overseas \$5; air freight to Europe, North Africa, Near East \$16 single copies \$1 (back issues, \$2) except *Guide to Scientific Instruments* which is \$4. School year subscription: 9 months, \$15; 10 months, \$16.75. 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

Hepatic Collagen Metabolism: Effect of Alcohol Consumption in Rats and Baboons: <i>L. Feinman and C. S. Lieber</i>	795
Chromosomal Proteins in the Dinoflagellate Alga <i>Gyrodinium cohnii</i> : <i>P. J. Rizzo</i> and <i>L. D. Noodén</i>	796
Viral and Cellular DNA Polymerase: Comparison of Activities with Synthetic and Natural RNA Templates: <i>M. S. Robert et al.</i>	798
Cribriform Degeneration (<i>cri</i>): A New Recessive Neurological Mutation in the Mouse: <i>M. C. Green, R. L. Sidman, O. H. Pivetta</i>	800
Primate Phylogeny and Immunological Distance: <i>C. O. Lovejoy, A. H. Burstein,</i> <i>K. G. Heiple</i>	803
Insulin Receptor of Fat Cells in Insulin-Resistant Metabolic States: <i>G. V. Bennett and P. Cuatrecasas</i>	805
Crystal Structure of Ethylene Di-11-bromoundecanoate: <i>D. L. Dorset and A. Hybl</i>	806
Reversible Inhibition of Chloroplast Movement by Cytochalasin B in the Green Alga <i>Mougeotia</i> : <i>G. Wagner, W. Haupt, A. Laux</i>	808
Hyperprolinemia and Prolinuria in a New Inbred Strain of Mice, PRO/Re: <i>R. L. Blake and E. S. Russell</i>	809
Unit Responses to Moving Visual Stimuli in the Motor Corex of the Cat: <i>T. J. Teyler, C. Shaw, R. F. Thompson</i>	811
<i>Technical Comments</i> : Human Virus Vaccines: Why Monkey Cells?: <i>L. Hayflick;</i> <i>J. C. Petricciani, H. E. Hopps, D. E. Lorenz</i> ; Turbidity of the Atmosphere: Source of Its Background Variation with the Season: <i>H. W. Ellsaesser;</i> <i>R. F. Pueschel and H. T. Ellis</i> ; Galactose Toxicity in the Chick: Hyperosmolality or Depressed Brain Energy Reserves?: <i>H. R. Knull, W. W. Wells, L. P. Kozak;</i> <i>J. I. Malone, H. J. Wells, S. Segal</i>	813

MEETINGS	Engineering Foundation Conferences: <i>S. S. Cole</i> ; The Bar Harbor Course in Medical Genetics: <i>V. A. McKusick</i> ; Order in an Anarchic Field: <i>D. Francis</i> ; Bryozoology II: <i>T. J. M. Schopf</i> ; Forthcoming Events	818
-----------------	--	-----

WARD H. GOODENOUGH CARYL P. HASKINS	DANIEL P. MOYNIHAN PHYLLIS V. PARKINS	WILLIAM T. GOLDEN Treasurer	WILLIAM BEVAN Executive Officer
--	--	--------------------------------	------------------------------------

GEOLOGY AND GEOGRAPHY (E) Frank C. Whitmore William E. Benson	BIOLOGICAL SCIENCES (FG) Ian Sussex Richard J. Goss	ANTHROPOLOGY (H) Richard N. Adams Anthony Leeds
ENGINEERING (M) Newman A. Hall Raynor L. Duncombe	MEDICAL SCIENCES (N) Robert W. Berliner F. Douglas Lawrason	DENTISTRY (Nd) Joseph L. Henry Sholom Pearlman
INFORMATION AND COMMUNICATION (T) Andrew A. Aines Scott Adams	STATISTICS (U) W. Duane Evans Ezra Glaser	ATMOSPHERIC AND HYDROSPHERIC SCIENCES (W) John A. Knauss Louis J. Battan

COVER

View southeast along the Sierra Nevada, California (from about 70,000 feet). Foreground area is Emigrant Basin, north of the prominent Grand Canyon of the Tuolumne River in Yosemite National Park; Mono Lake is in left middle distance. Owens Valley is elongate depression beyond Sierras near top of view. See page 790. [U.S. Geological Survey photograph (No. HA041L-004) taken 2 April 1970 by the U.S. Air Force]

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.



WIN A PYREX® BRAND CLASS A VOLUMETRIC FLASK 250ml, ± 0.12 ml, WITH A PENNY-HEAD § STOPPER.

Announcing Sweepstakes No. 2 from Corning!

And what a prize! The criterion of excellence in measurement—a Class A PYREX brand No. 5640 volumetric flask. Certified accuracy. Built to last. With an easy to handle § glass stopper.

Win this sweepstakes and you'll also win the criterion of excellence

in skywatching—a 7-inch Questar telescope.

Enter today. The entry form is on the next page.

Then keep watching for still another great Corning sweepstakes coming later this year.

Meanwhile, insist on PYREX labware everywhere in your lab, and you can't lose.

PYREX® brand Volumetric Flask Sweepstakes OFFICIAL RULES—NO PURCHASE REQUIRED

1. To enter, complete this official entry blank, or, on a plain 3" x 5" piece of paper, hand print your name and address.
2. You may enter as often as you wish but each entry must be mailed separately to PYREX brand Volumetric Flask Sweepstakes, P.O. Box 694, Blair, Nebraska 68009. Entries must be postmarked by August 31, 1972 and received by September 15, 1972.
3. The winner will be determined by a random drawing from among all entries received by D. L. Blair Corporation, an independent judging organization whose decisions are final. Winner will be notified by mail. No substitution for prizes is permitted. Entrants must be residents of the U.S.A. Prize delivery limited to continental U.S.A.



AND A 7-INCH QUESTAR 'SCOPE TO KEEP AN EYE ON THE MENISCUS.

Circle No. 12 on Readers' Service Card

4. This sweepstakes is void where prohibited, taxed or restricted by Federal, state or local laws and regulations. Employees of Corning, its advertising and sweepstakes agencies, dealers, and their families are not eligible. Federal, state and other taxes, if any, are the responsibility of the prize winner.

5. This prize is guaranteed to be awarded. Name of the prize winner will be furnished to anyone sending a stamped self-addressed envelope to Corning Laboratory Sweepstakes, Corning Glass Works, Corning, New York 14830.

CORNING
Makers of PYREX® labware

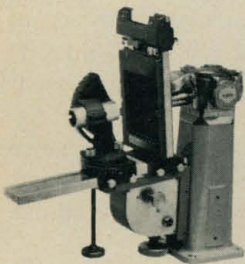
PYREX brand Volumetric Flask Sweepstakes, P.O. Box 694, Blair, Nebraska 68009
I want to win that PYREX brand Volumetric Flask! And the 7-inch Questar 'Scope!

Name Title Organization

Address City State Zip

Not required, but if you wish to list the name of the representative who sells you Corning products, please do: _____
If you win, he wins \$1,000.

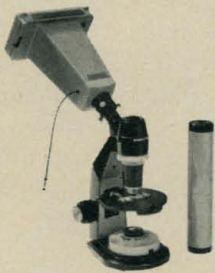
Recording wonders in seconds is one of the wonders.



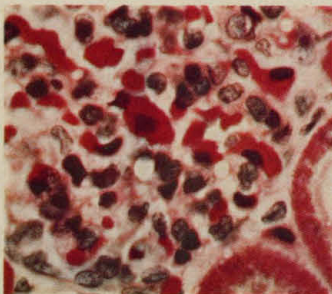
XR-7 FOR X-RAY CRYSTALLOGRAPHY



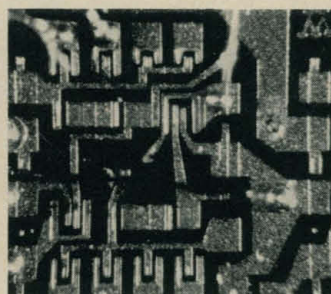
Diffraction pattern, sapphire



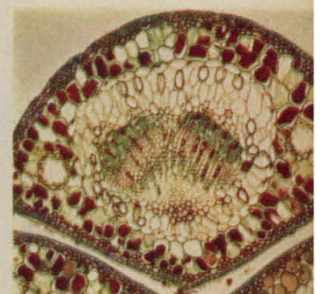
ED-10 FOR PHOTOMICROSCOPY



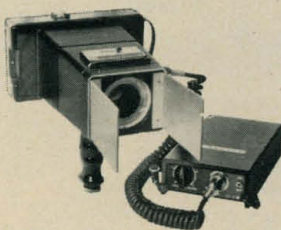
Section, mouse kidney, 1000x



Integrated circuit, 80x



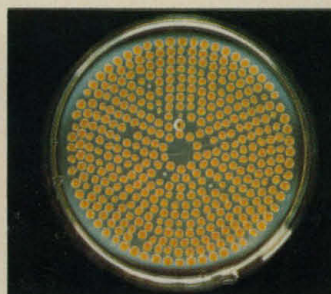
Pinus leaf section, 100x



CU-5 FOR CLOSE-UPS



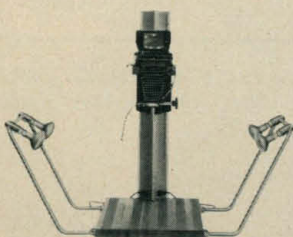
Clinical dental record



Macro photograph, bacteria colonies



Immunoelectrophoresis



MP-3 MULTIPURPOSE



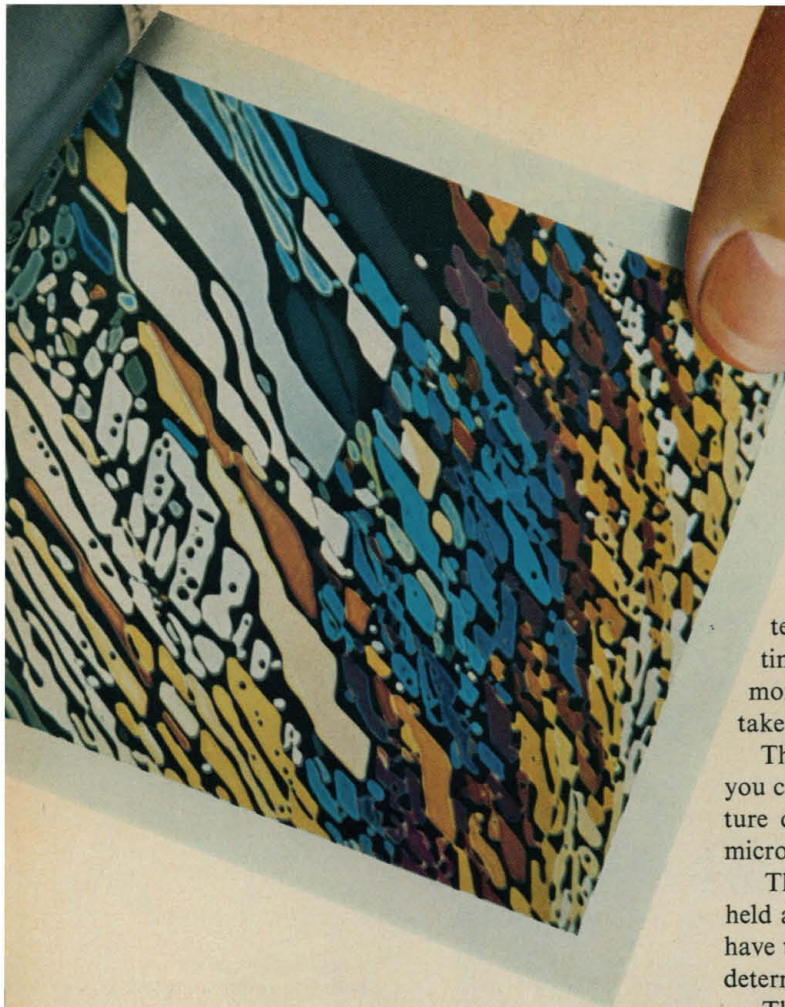
High contrast copy, continuous-tone art



Macro photograph, diode fractures



Fingerprint record, negative



What's wonderful is that you get a finished black-and-white print in seconds, or color in a minute. Of almost any subject. So you spend less of what you can spare least. Time.

Even if a picture gets spoiled, you see it right away. You don't have to wait hours or days to find out. You simply shoot again. Right on the spot. Without having to set things up all over again.

And there's a Polaroid laboratory camera for almost any application: scientific, medical or industrial.

They're all so simple and easy to operate, you don't have to be experienced in photography to use them.

The XR-7 System is for recording X-ray diffraction patterns. It produces high quality prints in a fraction of the time required for wet-process photography. And with far more convenience. Exposures on Polaroid 3000-speed film take minutes, not hours.

The ED-10 is one of the lowest-priced microscope cameras you can buy anywhere. But it gives you the resolution and picture quality of the expensive ones. Because they all use the microscope's own optics.

The CU-5 Close-up Camera can go anywhere. It's handheld and has a power pack to supply its own light. You don't have to focus. Or compute exposure settings. They are all predetermined. Just place the camera over the subject and shoot.

The MP-3 Multipurpose Camera is really a self-contained photo lab. It's on its own stand, with its own lighting. It uses 13 Polaroid Land films, including color; black-and-white; high speed; high contrast; line and continuous tone transparency films; even one that gives you both a positive and matching negative in seconds. It has 5 lens and shutter combinations. And 3 changeable backs for a variety of film formats. It's so versatile, even Polaroid hasn't found out all it can do.

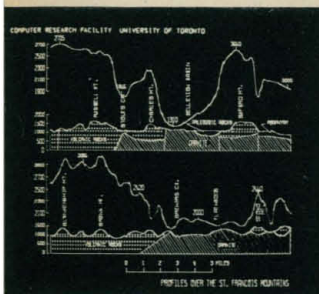
But we know that the Polaroid system of instant photography does what nothing else in the world can. It gives you a permanent record of nearly any subject in seconds. And gives it to you simply and easily.

If you'd like full information, or a demonstration of any Polaroid lab camera, write to Polaroid Corporation, Dept. 57-209, 549 Technology Square, Cambridge, Mass. 02139. In Canada, 350 Carlingview Drive, Rexdale, Ontario.

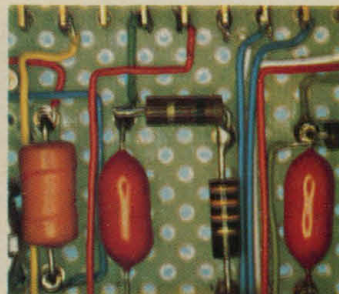
Convincing you of the benefits of the system should be easy. All you need is a little exposure.

Polaroid®

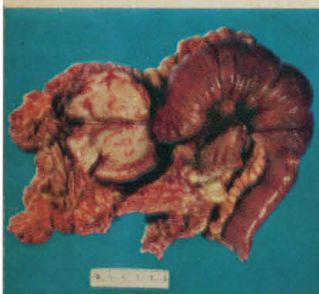
Polaroid Instant Lab Cameras.



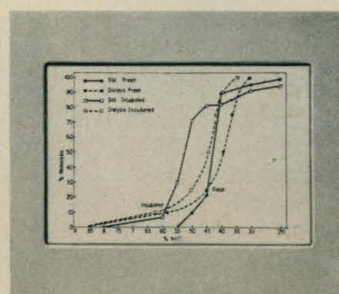
Hard copy, computer terminal display



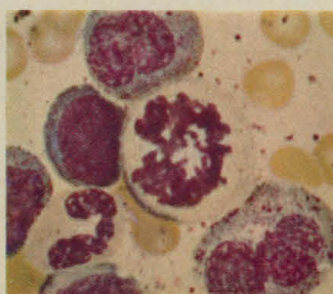
Electronic components



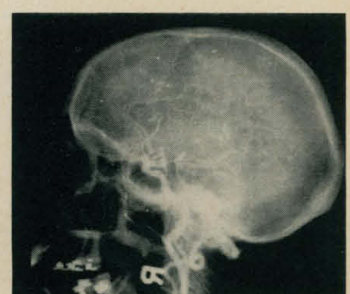
Cross specimen, intestinal fibroma



Graph for presentation, 35mm



Human leukemia, 1600x

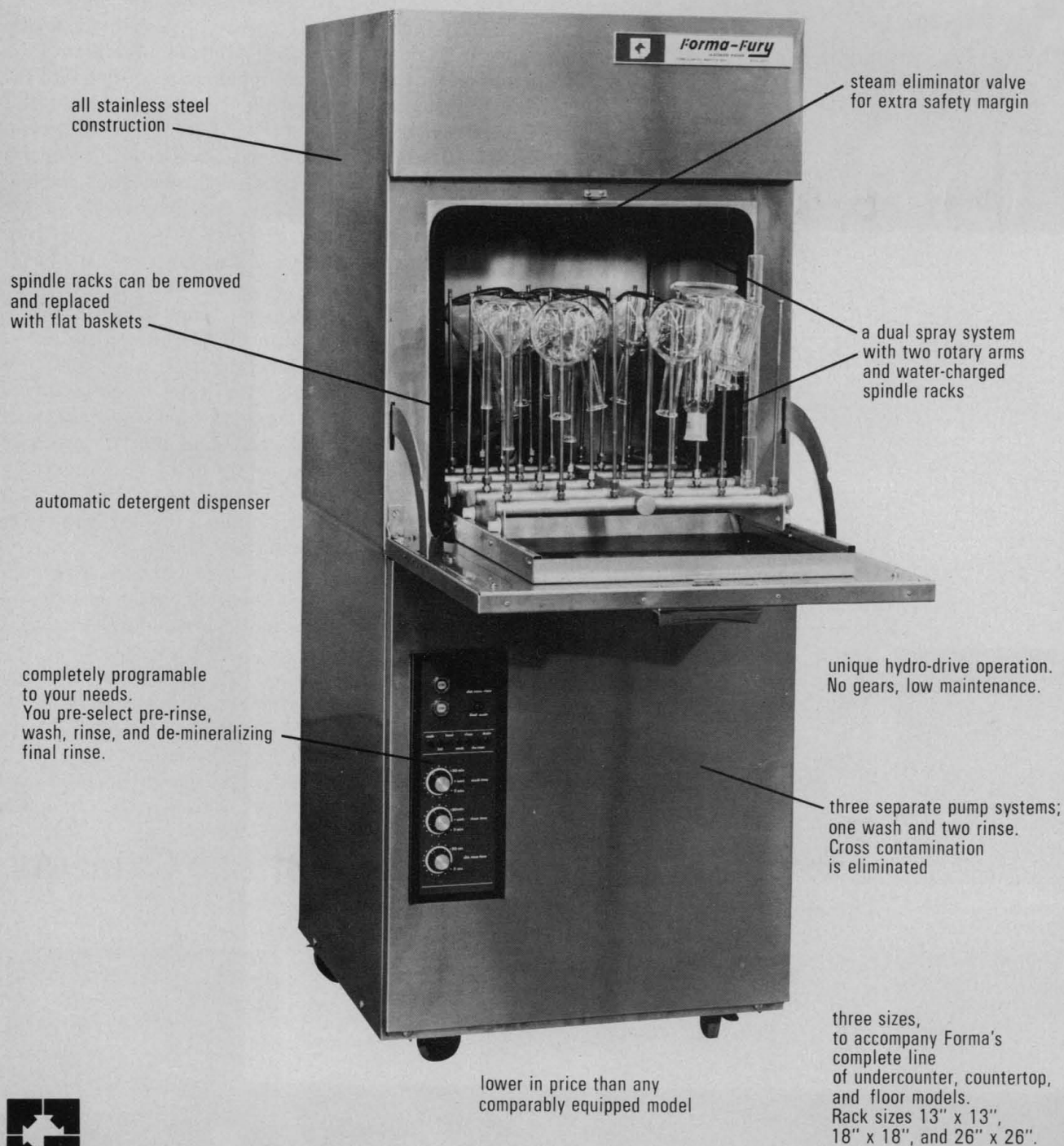


X-ray copy

The Forma Fury Glassware Washer. We loaded it.

With extras. See for yourself. Our brand new floor model is way out in front in terms of what you get for what you pay. Just like our other washers.

Washer step: Check the Forma Fury before you buy.



Forma Scientific

BOX 649 • MARIETTA, OHIO 45750 • AREA CODE 614/373-4763

Circle No. 4 on Readers' Service Card

Most dispensers are gadgets. This one is an instrument.

It's accuracy (± 0.005 ml) makes the difference.

There are numerous liquid dispensers on the market today, but unfortunately, most of them are gadgets. The new Brinkmann Dispenser, on the other hand, is an instrument, and it sets entirely new standards for performance and convenience in liquid handling systems.

Consider the accuracy: from ± 0.005 ml (for the 2 ml model) to ± 0.02 ml (for the 15 ml model). This accuracy is nearly 100 times greater than that of conventional systems. Standard deviation is equally phenomenal: ± 0.0025 ml at 2 ml and ± 0.0035 ml at 15 ml. Next, consider its unique design. It converts from a hand-held pipettor to a flask-mounted dispenser simply by interchanging two valves to reverse liquid flow. All parts touched by liquid are either glass, Teflon*, or platinum-iridium. Lastly, consider ease of operation and repair. Its push-button action is simple and foolproof, and volume is easy to adjust.

To minimize breakage, there is no exposed glass; also any working part can be replaced by the user without special tools.

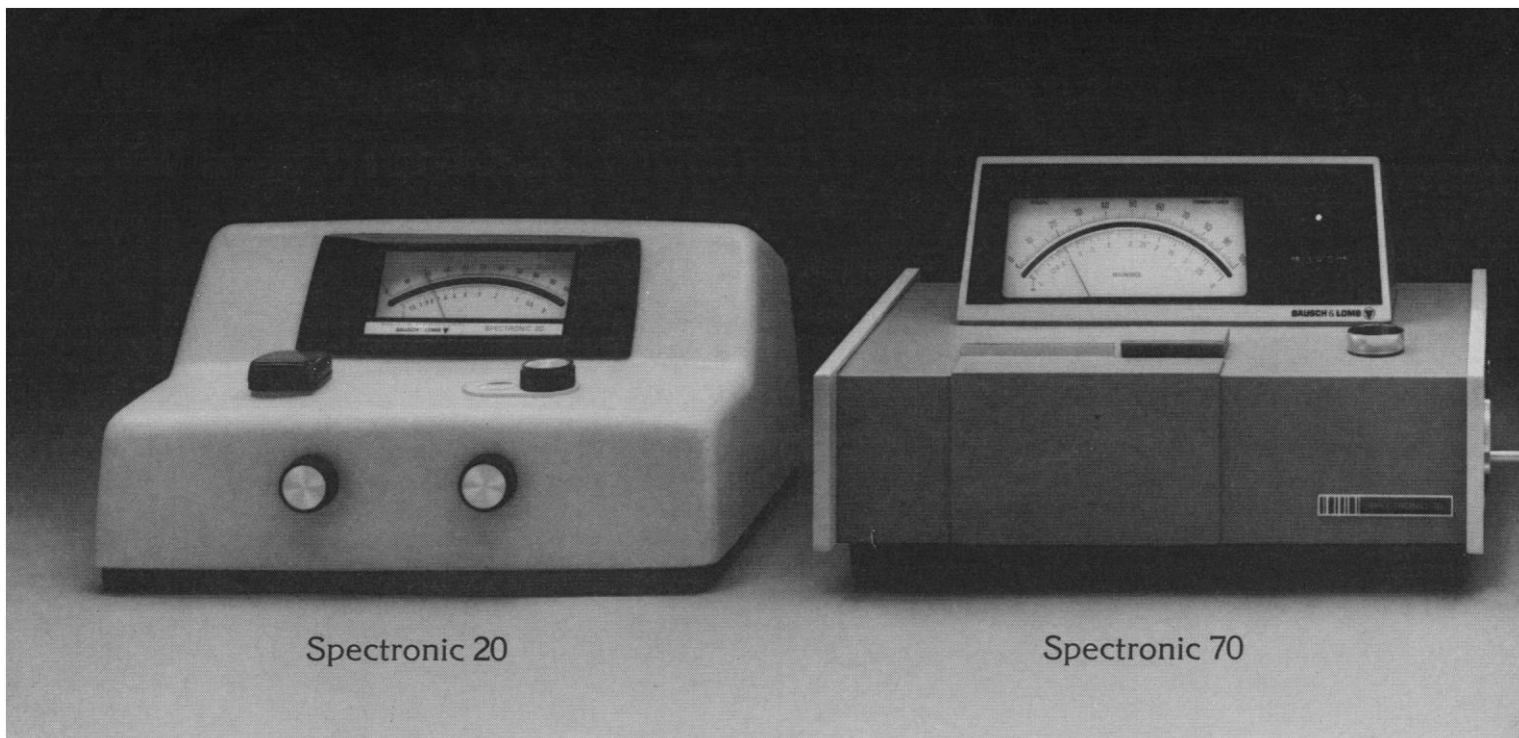
A complete line of accessories, including dispenser bottles, Teflon stoppers and Teflon hose connectors, is available. Our literature describes it all. For your free copy, just write: Brinkmann Instruments, Cantiague Rd., Westbury, N.Y. 11590. In Canada write: Brinkmann Instruments (Canada) Ltd., 50 Galaxy Boulevard, Rexdale (Toronto), Ont.

Circle No. 24 on Readers' Service Card

 **Brinkmann
Dispensers**

*Teflon is a registered trademark of the E. I. DuPont Co.





Spectronic 20

Spectronic 70

Whatever you need in a visible spectrophotometer, we've got it made.

It all adds up.

Let us demonstrate in your lab

Call collect 716 385-1000 or use the coupon.

Bausch & Lomb
Analytical Systems Division
820 Linden Ave., Rochester, N.Y. 14625

- ☐ Please have representative call to arrange a demonstration.
- ☐ Please send literature: (circle)
- | | |
|---------------|----------------|
| Spectronic 20 | Spectronic 70 |
| Spectronic 88 | Spectronic 100 |

Name _____

Title _____

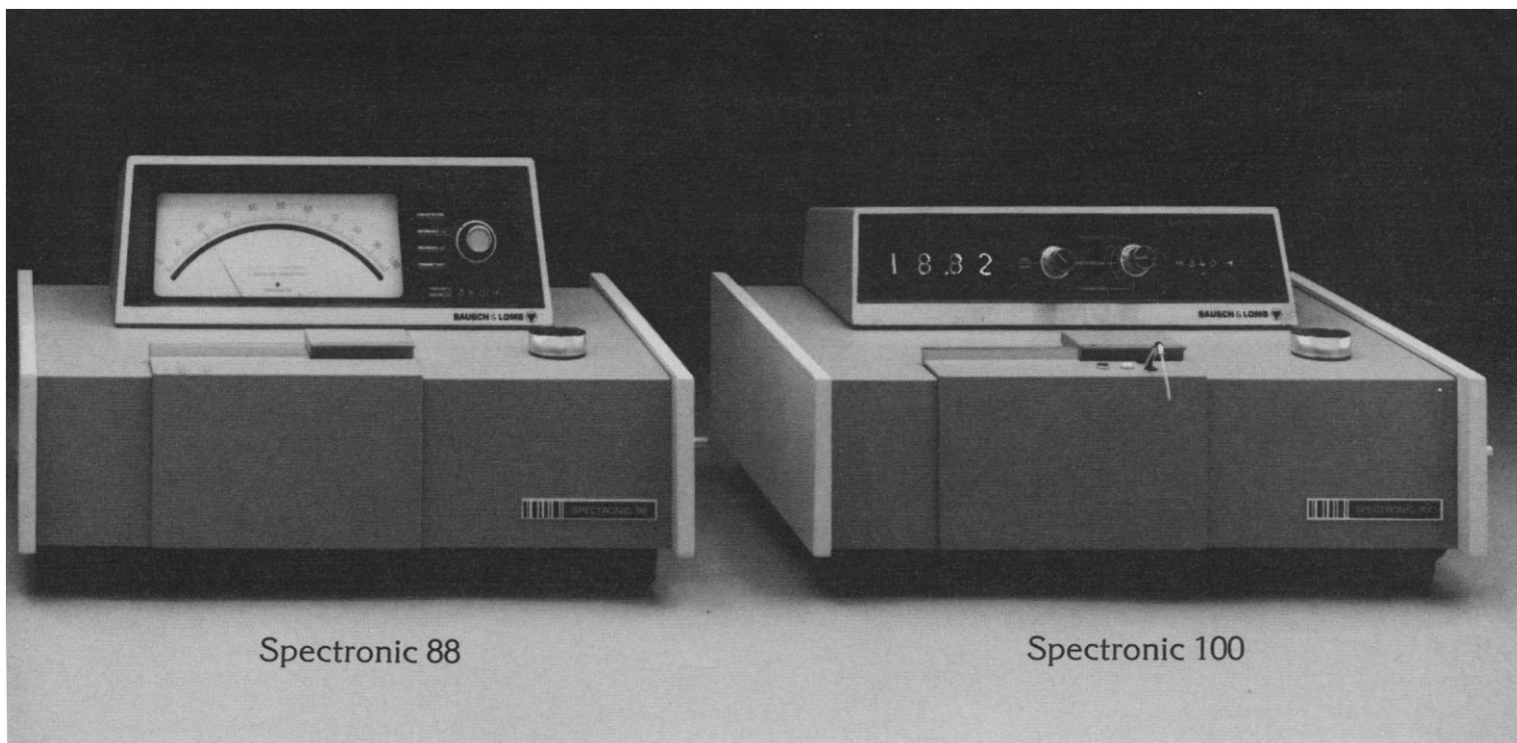
Firm/Institution _____

Address _____

City _____

State _____ Zip _____

Telephone _____



Spectronic 88

Spectronic 100

For your work and your budget, Bausch & Lomb has an instrument with the features you require. Narrow bandpass. Wide spectral range. High performance. Minimum dollars. The right amount of instrument for the right amount of money. Off the shelf. Take a look.

Spectronic 20

The world's most widely used spectrophotometer, with over 90,000 sold. It has no equal in dependability, accuracy and ruggedness in the low-price field. Wavelength range is 340-600 nm, extendable to 950 nm with an inexpensive phototube and filter accessory. Narrow 20-nm bandpass provides excellent resolution. Readout is on a wide 5½" meter in % transmittance and absorbance. Extremely simple operation.

Circle No. 17 on Readers' Service Card

Spectronic 70

For exceptional sampling versatility and excellent performance, at a low cost, choose the Spectronic 70. It accepts virtually any test tube or cell made—test tubes up to 20-mm pathlength, rectangular cuvettes with pathlengths from 1.0 mm to 10.0 mm, and cylindrical cells up to 100-mm pathlength. Three quickly

interchangeable sample compartments permit you to choose the one exactly suited to your needs. Wide 325-950-nm wavelength range and 8.0-nm bandpass provide for an extended range of applications. Readout is on an 8" meter in % transmittance and absorbance.

Circle No. 18 on Readers' Service Card

Spectronic 88

The Spectronic 88 permits direct meter readings in concentration, linear absorbance and transmittance. A single knob selects the operating mode.

You can read linear absorbance values between 0.0 to 2A effectively over 16 inches of meter. 0.1X to 3X scale expansion in the concentration mode assures accurate readings of samples with low absorbance differences.

Specifications are excellent—an 8-nm bandpass, photometric linearity better than .010A near .500A, less than 0.2% drift/day, continuous wavelength range from 325 nm to 950 nm.

Circle No. 19 on Readers' Service Card

Spectronic 100

The Spectronic 100 provides everything you've ever hoped for in a medium-priced visible spectropho-

meter. It has all the sampling versatility and excellent performance of the Spectronic 70 and Spectronic 88—and a great deal more! It gives you a four-place digital readout in linear absorbance, transmittance and concentration, with selectable positioning of the decimal point. An automatic error light flashes a warning of out-of-range readouts.

A unique function-control system provides a quick and easy performance checkout. You'll always know that you're getting electronic performance right to specification.

If you choose the Spectronic 100 with flow-thru sample compartment, you get a self-purging sampling system with zero-error logic that eliminates all possibility of cross contamination.

Two status lights provide positive, immediate sampling-mode identification, informing you at a glance whether your sample is in, out, or ready to be purged.

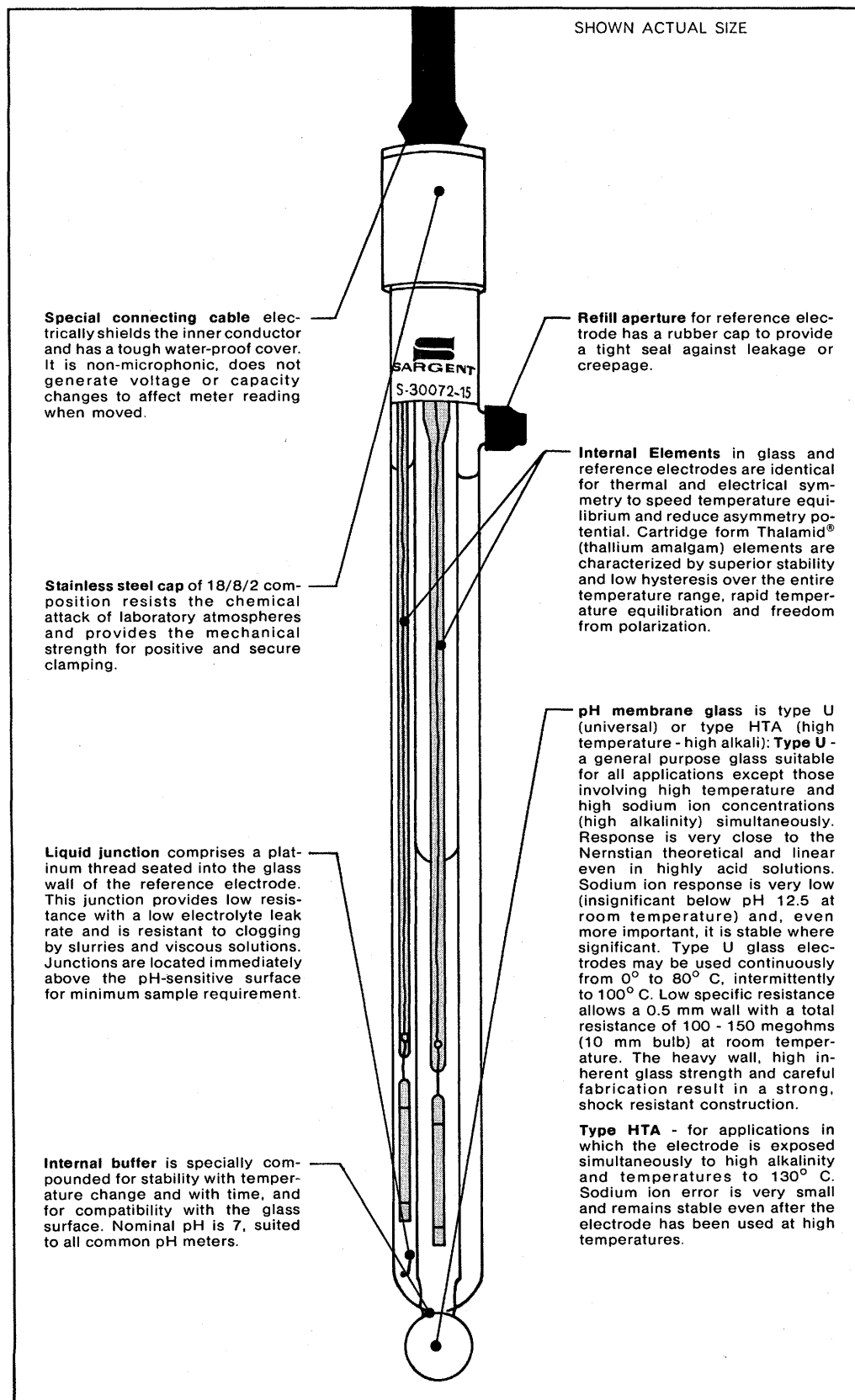
We do have it made—ready and waiting—whatever your needs. At the right price. Our servicing is everywhere, expert and fast, to keep you in business at all times. And the experts in our Applications Lab thrive on helping our customers find solutions to their problems.

Circle No. 20 on Readers' Service Card

BAUSCH & LOMB
ANALYTICAL SYSTEMS DIVISION



Why is this such a good pH Electrode?



SHOWN ACTUAL SIZE

There are a lot of reasons. Reasons like the scientific refinement of old-world glass-working skills. Like continual innovation wed to more than a quarter-century of experience. And a specially focused understanding of electrochemistry, glass-materials research, and quality control.

All of these skills have contributed—and continue to contribute—to the technological sophistication of this deceptively simple looking combination electrode, which we use so casually and take so much for granted.

The thought and care we've put into our combination electrode are detailed on this page. And we'll be happy to send you further information on this electrode and on our separate glass and reference electrodes of comparable quality.

EHS-2-211

S-30072-15
COMBINATION ELECTRODE—
General Purpose, Type U,
Sargent-Welch. \$45.00

S-30072-20
COMBINATION ELECTRODE—
High Temperature, High Alkali,
Type HTA,
Sargent-Welch. \$46.50

SARGENT-WELCH

Scientific instruments, apparatus, chemicals.
Sargent-Welch Scientific Company
7300 N. Linder Ave., Skokie, Illinois 60076

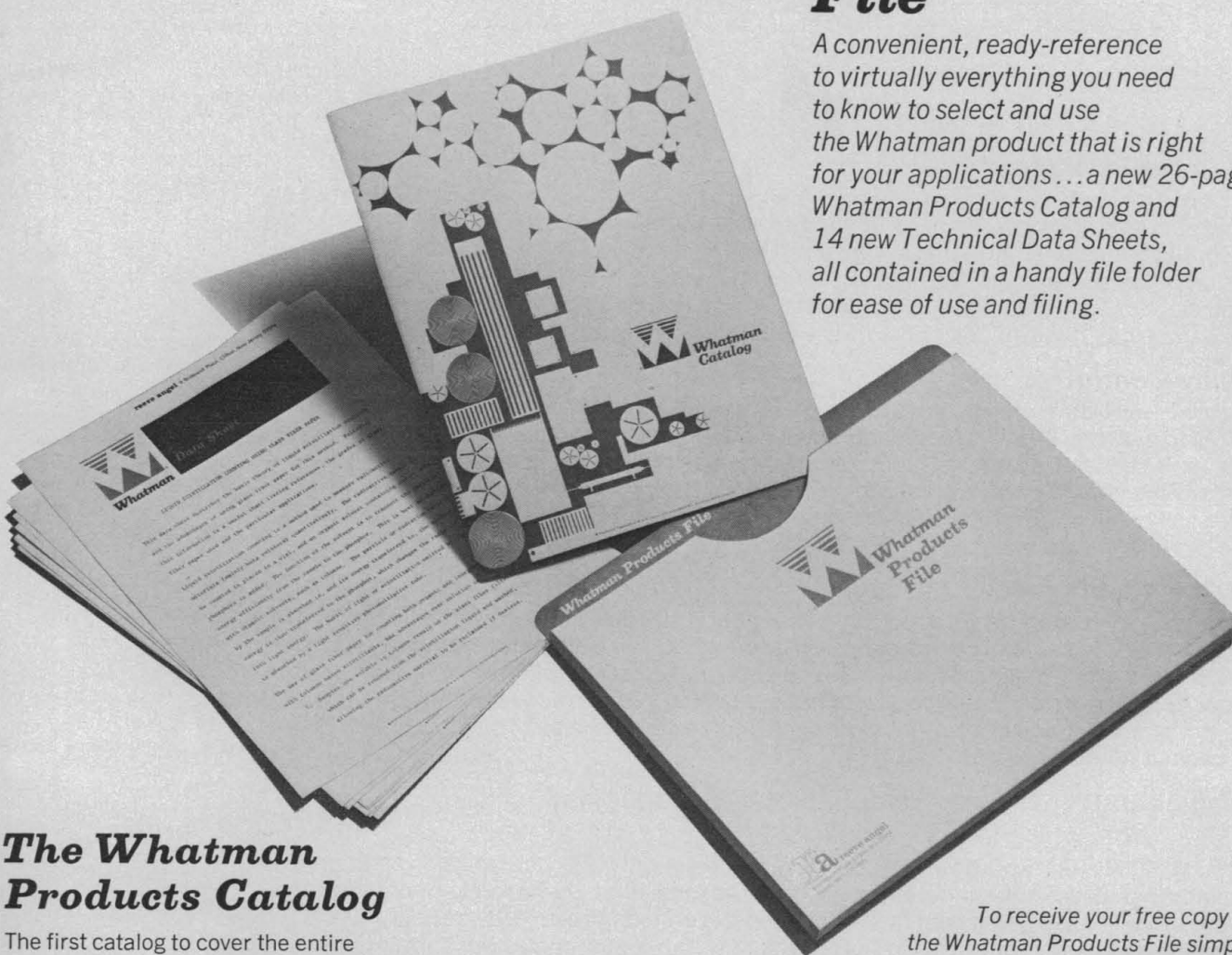
Chicago/Anaheim/Birmingham/Cincinnati
Cleveland/Dallas/Denver/Detroit
Springfield, N.J./Toronto/Montreal/Vancouver

New



Whatman® Products File

A convenient, ready-reference to virtually everything you need to know to select and use the Whatman product that is right for your applications... a new 26-page Whatman Products Catalog and 14 new Technical Data Sheets, all contained in a handy file folder for ease of use and filing.



The Whatman Products Catalog

The first catalog to cover the entire range of Whatman products for filtration, extraction, absorption, electrophoresis, and chromatography. Presents valuable information on Whatman filter papers, filtering aids, absorption and extraction accessories, specialty products, and media for paper, column, and thin layer chromatography.

The Whatman Data Sheets

14 Technical Data Sheets covering the physical properties, applications, and methods of use for various Whatman products. Each is designed to present specific information gathered in the field and in the Whatman research laboratories.

To receive your free copy of the Whatman Products File simply fill out and return the coupon below.

La reeve angel

9 Bridewell Place, Clifton, New Jersey 07014

Gentlemen: Please send me my free copy of the Whatman Products File.

NAME

TITLE

ORGANIZATION

ADDRESS

CITY

STATE

ZIP

© WHATMAN IS THE REGISTERED TRADEMARK OF W. & R. BALSTON LTD., MAIDSTONE, ENGLAND

Circle No. 7 on Readers' Service Card

What is Carworth now doing for users of laboratory animals ?

The Carworth Letter

The Carworth Letter, a venerable and useful institution, has undergone major content and format changes. It is now a vehicle for getting new information to you quickly. For example, we'll publish research news that might otherwise be unduly delayed. Or brief notes on the housing or care of animals. Or anything else that might be helpful to users of laboratory animals. (Contributions welcomed.) And if you're not now on our mailing list, let us know. We'll need your name, title, department, and address including zip code.

Quality Control

We are keenly aware of this fact: the user of laboratory animals simply can't tolerate animals that fail to meet his precise specifications—whatever these may be. Since an animal is, in a sense, a "raw material" that is subsequently "processed" by the user, shortcomings in the starting material can well jeopardize everything that follows. Accordingly, we are in the process of further upgrading all of our quality control efforts in order to assure you of the most dependable animals available anywhere.

Surgical Modifications Available

We routinely provide a broad spectrum of surgical procedures. For example, depending upon species: hypophysectomy, thyroidectomy, adrenalectomy, partial hepatectomy, vasectomy, splenectomy, and organ transplants. Beyond that, we offer the following unique service: we'll come to your laboratories and learn your procedures so that you can subsequently turn to us for this time-consuming ritual. In many instances, having us do it will also reduce your overall cost. Tell us your needs.

"The Laboratory Mouse: Selection and Management"

by M. L. Simmons and J. O. Brick

As you probably already know, this recent text is eminently practical in its orientation. Why interject a book review here? For several reasons. First: author M. L. Simmons—now at Carworth—is deeply involved in the changes described herein. And secondly: we're offering this book to readers for a limited time only and for as long as our supply lasts. Just write and give us the information requested in the first item above.

Consultative Services

Do you have problems related to laboratory animal selection, housing or care? Then turn to Carworth. We'll help you evaluate your various experimental requirements, or help with the design of your animal facility and the animals' total environment, or with any other aspect that can influence the ultimate success of your programs.

Shipping Containers

Carworth is switching shipping packages. The new configuration better withstands the rigors of shipping, is easier to handle in transit and upon receipt, and, most importantly, appears to provide a more congenial environment for the animals while traveling.

Catalog Offer

Carworth is animals, of course. But Carworth is also a wide range of animal housing and animal care equipment and supplies. For example, we've pioneered the laminar flow rack as a practical means of reducing the airborne contamination that can sabotage your research efforts. Now to see what Carworth offers users of laboratory animals, write and ask for our catalog. Please include all the information requested in the first item above.



Carworth

M. L. SIMMONS / J. O. BRICK

THE LABORATORY MOUSE

Selection and Management

Carworth

Carworth, Division of Becton, Dickinson and Company B.D., New City, New York 10956

Number 80, February 1972

Because of popular demand on a recent survey to our customers, we wish to continue the Carworth Edition. The format has been mice begin as early as 1909 when Clarence Cook Little started inbreeding the descendants of a pair of mice carrying recessive genes for

Carworth

Carworth

Division of Becton, Dickinson and Company B-D New City (Rockland County), New York 10956

Circle No. 3 on Readers' Service Card

When you buy a a lot of people to talk to. hook it up, you

With all the computer salesmen lined up in your lobby when you're talking about buying one, it's interesting how hard they can be to find when it comes time to help you hook it up.

In the business we call hooking up "interfacing".

And if you had bought your computer from us in the first place, we'd have one of the engineers from our Logic Products Group

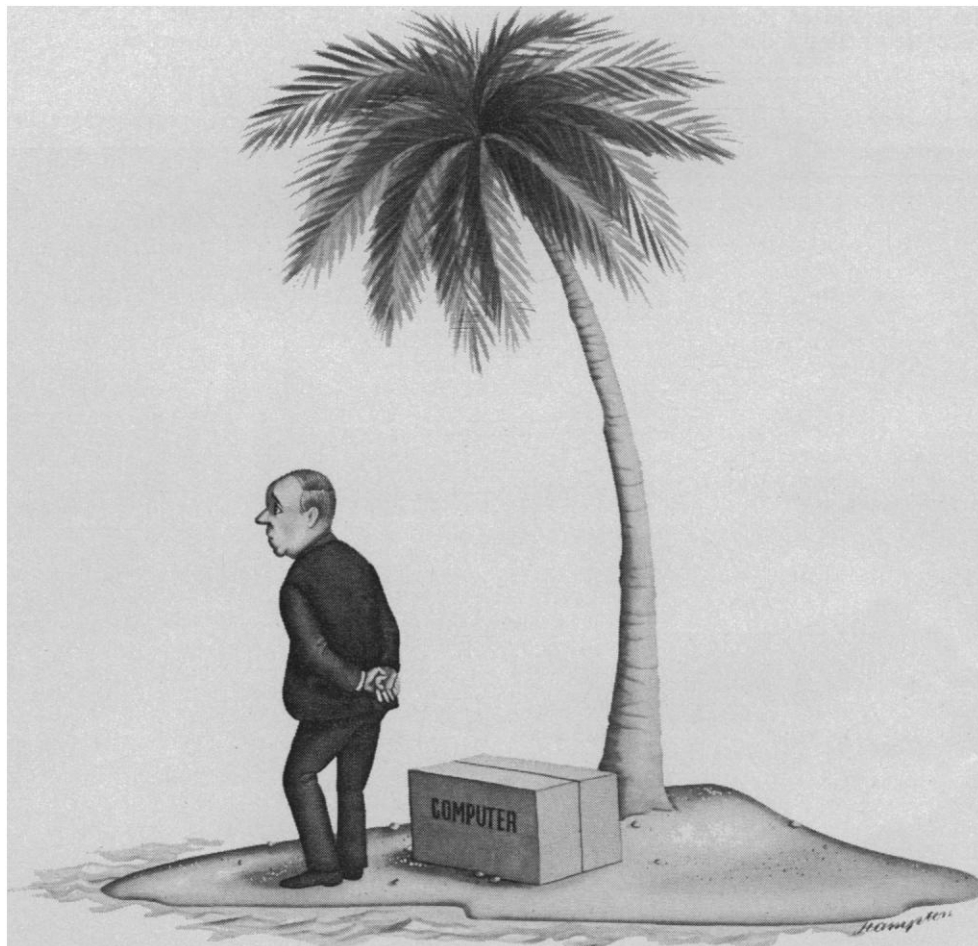
over there, face to face, ready to interface, when it arrives on time.

And he'd have all the smarts, parts and pieces that it takes to hook your computer up properly, to properly do what you want it to.

Like genuine Digital Equipment Corporation modules (including special modules) plus labs, wire wrap service, engineers, designers, logic people, seminars we set up for you in your area, cabinets, cables, hardware, assembled logic arrays, terminal, etc.

The reason most small computer companies can't give you big

computer you get When it comes time to got a problem.



We'd be happier if everybody in the world bought all their computers from us (we make and market more kinds, big, middle and small, than any other computer company in the world).

But, if you don't, and you don't know how to hook their's up when it does finally arrive, and they don't have anybody to run over and help you, we do.

And we will.

You see, we're big enough that it's no big deal to do it.

And we're bright enough to know that if we hook your computer up properly even if it isn't ours, you'll think we're nice guys and come to us first when it comes time to buy your second. (617) 897-5111 (Ext. 2785).

Digital Equipment Corporation,
Maynard, Massachusetts 01754

digital

Circle No. 8 on Readers' Service Card

computer support is because they're small computer companies.

Fluorescence microscopes from Zeiss come both large and small...with prices to match.

Consider the economical Zeiss RA Microscope with 100-watt Halogen Illuminator. That's the compact one shown up front. It's as easy to use as any regular laboratory microscope... at practically the same price. Our large fluorescence microscopes are so well-known in research laboratories that they have obscured our smaller, inexpensive instruments such as this one. Which is a shame—both for us and for those scientists who want great optical performance but do not need the ultimate in sophistication. But, consider, Zeiss has...

The widest line of fluorescence instruments available anywhere for transmitted and reflected light and for fluorometry.

Our superb optics provide unexcelled fluorescence contrast. No matter what the absorption and emission characteristics of your specimens or fluorescent dye, we can offer the best combination of exciter filters, barrier filters, or (for reflected light) dichroic mirrors. At a price to fit your budget.

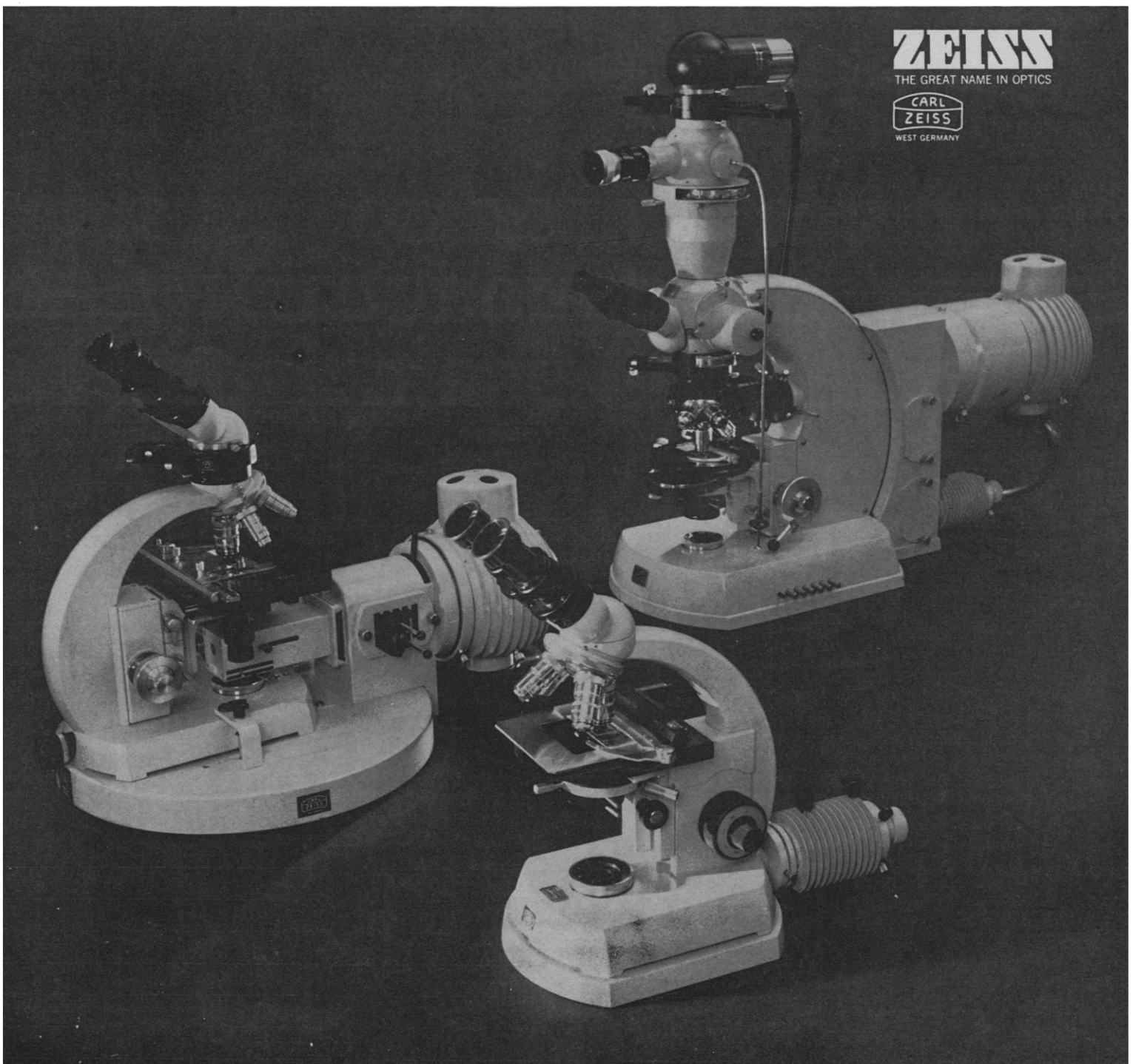
Send for full-color, 16-page brochure, "Fluorescence Microscopy," which is illustrated by some stunning examples of fluorescence photomicrography. It describes the full line.

Write: Carl Zeiss, Inc., 444 5th Ave., New York, N.Y. 10018. Or call (212) 736-6070.

Nationwide service.

Circle No. 6 on Readers' Service Card

ATLANTA, BOSTON, CHICAGO, COLUMBUS, DALLAS, DENVER, FORT LAUDERDALE, HOUSTON, KANSAS CITY, LOS ANGELES, PHILADELPHIA, PHOENIX, SAN FRANCISCO, SEATTLE, WASHINGTON, D.C.



You work hard enough getting it all together.

Don't spoil every- thing when you separate it.

To keep your research projects from turning into remorse projects, insist on the Sorvall RC2-B Automatic Superspeed Refrigerated Centrifuge.

Year after year, the RC2-B has *proven* itself in performance. A fact to remember, if you want flaw-free separations. And, oddly enough, the RC2-B is newer in various ways than some latecomers. Because we set out to build the best—and then kept on making it even better, in feature after feature. Nearly all Sorvall improvements, particularly new rotors, are designed to fit all appropriate earlier models.

Sorvall's exclusive Gyro-Action Direct Drive gives you unmatched smoothness in acceleration, runs, and deceleration. Speeds? Up to 20,000 rpm and forces to 48,200 x g with a 400 ml rotor—and without a vacuum pump.

Depend on low-speed reliability as well. Our electronic speed control works at 750 rpm, provides rapid acceleration when you wish, and maintains pre-set speeds despite line voltage fluctuations.

The RC2-B's improved temperature control makes it almost impossible for unstable temperatures to wreck your samples. And you don't have to re-set the temperature control every time you change rotors.

Other advantages worth comparing: Automatic programming. A big, smooth-walled, stainless steel chamber. Compatibility with 8 angle and horizontal rotors, *plus* our SZ-14 Reorienting Density Gradient Zonal Rotor. No rotating or complex seal assemblies. GK continuous flow inserts in the SZ-14 can process up to 1400 ml per minute (84 liters per hour) and can collect up to 800 ml sediment.

The motor can be removed and reinstalled in 5 minutes. Repairs are remarkably infrequent—and remarkably easy. Maintenance is almost as simple as replacing a light bulb.

Around the world thousands of units are in continuous use in research projects—far more than any other high-speed centrifuge. So if you prefer unspooled separations, why not get together all the facts about the RC2-B—today? Simply write to Ivan Sorvall, Inc., Norwalk, Connecticut 06856.



SORVALL®

Circle No. 45 on Readers' Service Card

Ask for Bulletin SC-5 YH

maternity coverage. The two most popular plans, in which 80 percent of federal employees are enrolled, have no special limitations on maternity coverage, contrary to the practice in many private plans.

JACQUELINE G. GUTWILLIG
*Citizens' Advisory Council on
the Status of Women,
Washington, D.C. 20210*

Reference

1. *Women in 1970* (Citizens' Advisory Council on the Status of Women, Government Printing Office, Washington, D.C., 1971).

Perhaps the Department of Health, Education, and Welfare directives for appointment of fixed numbers of women to advisory jobs described by Judy Chase and Deborah Shapley (15 Oct. 1971, p. 271) will stir a reaction to the patent absurdity of attempts at curing social and cultural evils through discrimination. There may have been some sex discrimination in the assign-

ment of these posts, but, if so, it has not been evident. It certainly cannot be proven by appeals to numbers (women serving in advisory posts versus women in the population at large), nor by arguments ad hominem. However large or small the discrimination has been, it has never been written into practice. Most of the senior staff members I know at the National Institutes of Health (NIH) are blind to race, age, national origin, and sex when they make appointments to the various councils. Quality and competence outweigh all other considerations. Discrimination—compensatory to be sure—is now written into the rule books. To give in quota is to deny in quota.

Some activists may consider seats on advisory boards and study sections as sinecures. If that were the case, then quotas and ratios would be entirely appropriate, since the issue would be one of constituencies, not of competence. However, NIH programs have

been successful because of attention to quality alone. Any group of 2000 people will contain a few fools and some prejudice. But the jobs in question are not plums. They are ill-paying or non-paying, time-consuming, technically demanding activities performed by specialists, who have brought experience and distinction to their work of judgment. If women or members of one or another minority group are underrepresented in these jobs, it is evidence of a profoundly difficult social and cultural problem. Compensatory discrimination is a shabby importation of politics into what are, for some institutes of NIH, matters of life and death. It is about as appropriate as repairing a building foundation with mucilage. Some distinguished women scientists I know would, I daresay, agree.

PAUL R. GROSS

*Department of Biology,
Massachusetts Institute of Technology,
Cambridge 02139*

BAUSCH & LOMB


ALL NEW!



Academic StereoZoom Series Microscopes . . . Made in U.S.A. . . . priced unbelievably low!

Totally designed for science teaching: Every feature of the innovative design of this newest addition to the StereoZoom Microscope Series has been built with the user in mind. The superiority of Bausch & Lomb's quality Zoom Optical System and a completely new mechanical concept provide a level of performance never before approached in educational stereomicroscopes.

Every model will withstand the roughest, toughest treatment with full assurance of completely satisfactory service and low maintenance expense.

Write for the new full color catalog, 31-2395, and our free demonstration offer. Bausch & Lomb, Scientific Instrument Division, 20705 Bausch St., Rochester, New York 14602.

Circle No. 41 on Readers' Service Card

Admission Policies

In his editorial "Open admissions: The real issue" (24 Sept., p. 1197) A. W. Astin asserts that the central issue in education today is elimination of the de facto racial and socioeconomic segregation that results from the selective admission policies followed by many colleges and universities. He makes two recommendations: that we reexamine critically the factors which have led to the present hierarchical arrangement of educational institutions, and that selective institutions admit

mediocre or poorly prepared students; he implies that this will succeed because in the past "a few . . . major public universities have . . . been able to accommodate students who vary widely in ability."

The anecdotal evidence available to me about programs in the sciences for disadvantaged students does not encourage confidence that the elimination of admission standards will be educationally beneficial. We have had little experience with students who are outside a narrow range of backgrounds and developed abilities. Most of these

students are afraid even to try a science or mathematics course, and they are right in the sense that they are woefully unprepared to meet the competition from regularly admitted students in the usual introductory courses. A few thoughtfully planned special introductory courses give promise that they can supply motivation and fill background gaps for these students, but it has yet to be demonstrated that these courses can assist significant numbers of students to achieve competitive performance levels by the time they reach the baccalaureate level. To date, special admission programs have been expensive for the institutions involved, ineffective in broadening the social outlook of normally selected students, and shattering to the unprepared students who have been admitted to academic competition under special criteria. If any institution or faculty member can demonstrate otherwise, they should teach the rest of us the basis for their success, for we badly need to do better.

Liberal admission policies are not crucial to the broadening of the educational opportunities available to the minority-group student. Such policies may indeed be counterproductive if they encourage him to believe that his institution is committed to giving him a degree, rather than to understand that he is obliged—like any other student—to *earn* a degree. What is crucial is what is done to provide the necessary help for this student after he appears on campus. Astin does an immense disservice to imply that the problems of education for the disadvantaged student will be alleviated by admitting him to a "quality" institution. The real problem is not admission, but educational programs, and the recognition that the goal is not a degree conferred, but an education earned. This process requires struggle and effort on the part of both the students and the faculty members involved to overcome deficiencies in student motivation, self-image, and educational background, and to improve our totally inadequate methods for teaching students from disadvantaged backgrounds.

ROBERT I. WALTER

Department of Chemistry,
University of Illinois, Chicago 60680

For the record, my editorial states (i) that segregation is one of the undesirable by-products of ability tracking, that its elimination is "the central issue in education today"; and (ii) that selec-

What do you want in a CO₂ Incubator?



Lab-Line has it!

Do You Want A radiant hot-wall heated chamber? No water jacket. **Lab-Line has it!**

Do You Want A built-in automatic De-Gradientator and De-Stratifier which completely eliminates gradients and stratification of CO₂-Air mixture throughout the chamber? **Lab-Line has it!**

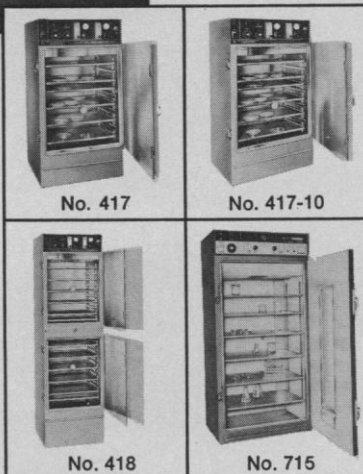
Do You Want . . . Controlled humidities from ambient to 98% RH? **Lab-Line has it!**

Do You Want . . . Dual chambers and controls that permits each chamber to operate at separate temperatures, humidities and CO₂ tensions or identical operating conditions? **Lab-Line has it!**

Do You Want . . . An automatic Kwik-Inject mechanism which injects the exact amount of CO₂ into the chamber when door is closed for speedy recovery of CO₂ Atmosphere? **Lab-Line has it!**

Do You Want . . . An exclusive "Window-dor", for full visibility of chamber without disturbing contents or CO₂ Atmosphere? **Lab-Line has it!**

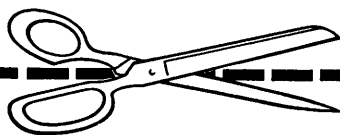
Lab-Line combines these exclusive features and more in a complete line of CO₂ Incubators, in all sizes to fit your exact requirements. Please write for additional information and specifications.



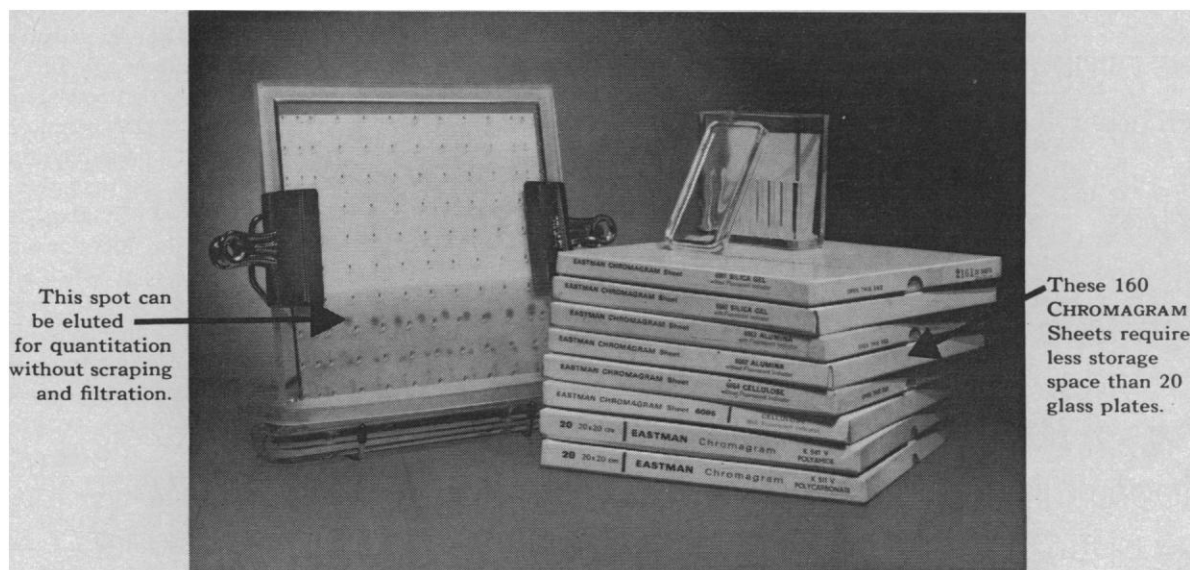
LAB-LINE INSTRUMENTS, Inc.
Designers and Manufacturers
Lab-Line Plaza
Melrose Park, Illinois 60160

FIRST IN INSTRUMENTS
SERVING SCIENCE, INDUSTRY,
AND EDUCATION SINCE 1908

S-6



Fill yourself in on supplies for TLC



- ☐ A choice of eight types of precoated EASTMAN CHROMAGRAM Sheet—convenient, uniform, flexible.
- ☐ A choice of two developing chambers.
 - ☐ EASTMAN CHROMAGRAM Developing Apparatus—fast equilibrating, easy to use and store.
 - ☐ EASTMAN CHROMAGRAM Developing Jar—small and inexpensive; just right for pre-testing and short migrations.
- ☐ Conveniently located local stocks of these TLC supplies are available from:

Use the coupon below to request information on these specific subjects:

- *TLC Visualization Reagents and Chromatographic Solvents* (Kodak Publication No. JJ-5)
- *TLC with EASTMAN CHROMAGRAM Sheet and Developing Apparatus* (Kodak Publication No. JJ-6)
- *Bibliography on the Use of EASTMAN CHROMAGRAM Sheet in TLC*, revised August, 1970 (Kodak Publication No. JJ-7)
- *TLC Analysis of Toxic Drugs Using EASTMAN CHROMAGRAM Sheet* (Kodak Publication No. JJ-37)

**CURTIN
FISHER
NORTH-STRONG
PREISER**

**SARGENT-WELCH
SCIENTIFIC PRODUCTS
VWR SCIENTIFIC (EAST)**

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

Please send me: ☐ JJ-5 ☐ JJ-6 ☐ JJ-7 ☐ JJ-37

Name _____

Address _____

City _____

State _____

Zip _____

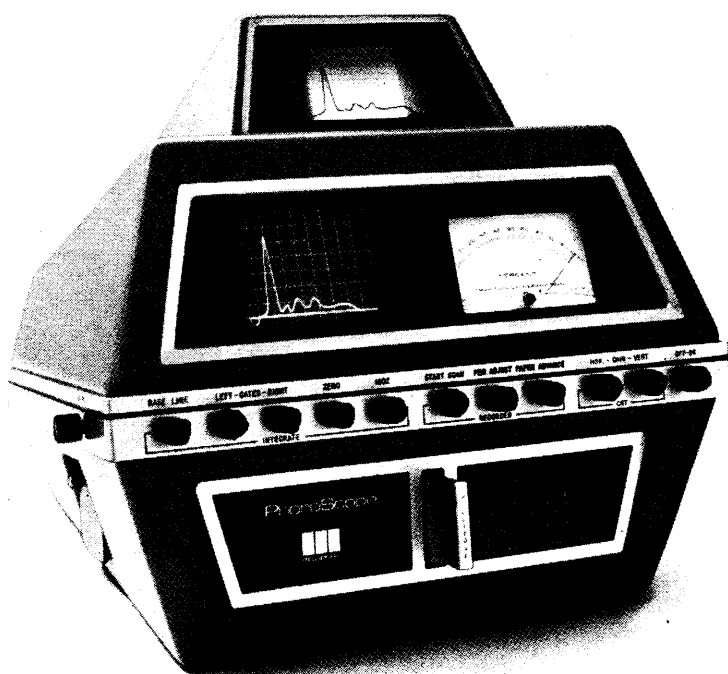
5-65





the technology that separates

Three reasons why you should consider the Millipore system for **electrophoresis** in the clinical laboratory. One, you have an instant picture of the separation pattern on a cathode ray tube. Two, you can read integration values directly from a meter (no blips to count). Three, it takes only six seconds to produce a precise densitometric trace. These advantages for the **clinical laboratory** are partly why the Millipore clinical electrophoresis system is the optimum combination of convenience speed and cost. Send for details. Millipore Corporation, Bedford, Mass. 01730.



tive institutions can develop effective programs for students in the lower ability ranges, not that such programs will alleviate "the problems of education for the disadvantaged student."

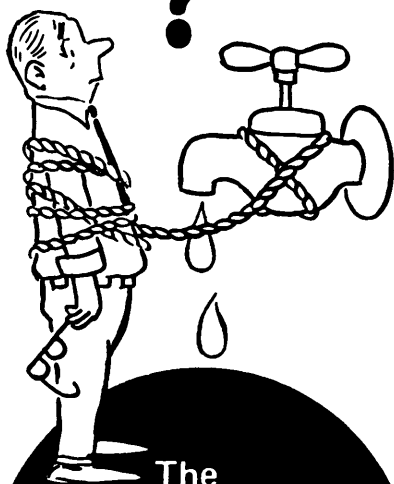
Walter makes a serious mistake if he assumes that open admissions and "special" admissions programs for "disadvantaged" students are one and the same thing. Indeed, these special programs have often created problems precisely because they are superimposed on an otherwise selective admission policy; a dichotomy is thus created in which most of the best-prepared students are white and practically all of the most poorly prepared students are black. Much of the explosive potential in this type of situation could be eliminated by the adoption of an open admissions policy, in which all students are admitted on the same basis, regardless of racial or other considerations.

ALEXANDER W. ASTIN
*American Council on Education,
One Dupont Circle,
Washington, D.C. 20036*

Controlling the Earth's Temperatures

The dialogue between Rasool and Schneider and Charlson *et al.* (7 Jan., p. 95) on the question of whether an increasing aerosol content of the atmosphere, caused by man's activities, may produce a long-term increase or decrease in global temperature, has illuminated a theoretical solution to this conjectural problem. If the sign of the temperature change depends rather sensitively on the particle size, its complex index of refraction, and the altitude distribution, then one can imagine that the atmosphere could be seeded with aerosols of appropriate size and composition to offset any temperature changes resulting from man's impact (including release of aerosols and carbon dioxide or any other activity that affects the albedo). Before any attempt to tune the atmosphere could be made, of course, detailed calculations and pilot experiments would have to be performed, so that we understood the side effects and could completely control the result. There also are questions of how much material would be needed and what mechanism of distribution could be employed. One or both could be impractical; however, if man's activities can inadvertently deposit aerosols that have measurable effects, then presumably any intentional seeding could be much more efficient and

tied to tap water?



The environmentalists are right. We have a water problem. . . and it's not only fish that are affected!

If your water supply is too warm, too hard, too dirty, or subject to pressure and shut off problems, call Neslab.

We can supply a variety of closed loop recirculating systems with capacities from a few hundred watts to 10,000 watts—a wide choice of pumping flow and pressure—and even choices of control stability. Besides you can save water.

Currently in wide use with all manner of laboratory and production equipment from X-ray to Laser to Electron Microscopes and NMR's.



NESLAB
INSTRUMENTS INC.

871 Islington Street
Portsmouth, N. H. 03801

Circle No. 82 on Readers' Service Card

19 MAY 1972

therefore in the realm of practicality.

The idea of polluting our atmosphere on purpose may seem horrifying, and one obvious price would be a 5 percent decrease in the brightness of a cloudless day. This might be acceptable, though, if we were faced with evolving climatic changes that threatened to bring on an ice age or inundation through the melting of the polar ice caps. Hopefully we will learn how to lessen man's impact on the environment so that threats of this kind will never materialize, but inasmuch as there have been natural ice ages, it might be useful to understand whether we are capable of artificially controlling the climate in this manner.

DAVID D. ELLIOTT

7029 Barkwater Court,
Bethesda, Maryland 20034

Herzberg in Canada

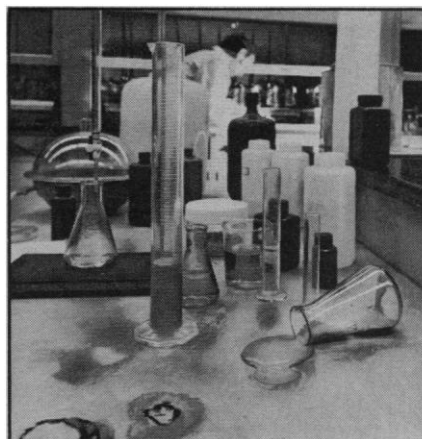
Although I endorse with enthusiasm A. E. Douglas's account of the spectroscopic achievements of Nobel prize-winner Gerhard Herzberg (*Research Topics*, 12 Nov. 1971, p. 672), I take issue with him about Herzberg's activities during World War II. It is exceptional when a specialist of Herzberg's caliber can show the versatility that he did during the period from 1941 to 1945.

Herzberg was not treated scientifically as an alien in Canada, and he responded at once to Canadian requests for a study of detonation phenomena. When he soon ascertained that such a study could not be made spectroscopically, he turned to high-speed photography and then demonstrated and measured the hitherto unknown threshold rate of acceleration to maximum rate of detonation in high explosives. As a native-born German, he was not permitted to enter the United States, but his reports were of sufficient interest to U.S. experts that they met with Herzberg in my laboratories in Toronto.

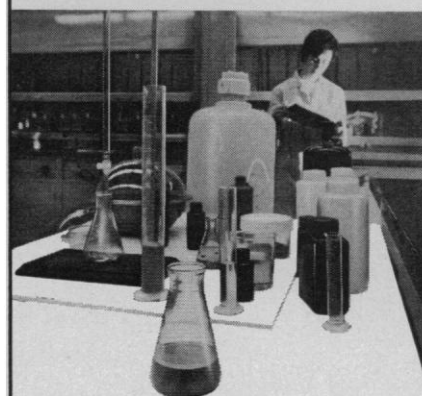
A charming sidelight on Herzberg's character is exemplified by the laboratory that he built in Saskatoon for his detonation studies. While others were planning fancy facilities, Herzberg's helpers built a sod-hut similar to those used as homes by the early settlers of Saskatchewan. He finished the study while others were still deliberating about it.

GEORGE F. WRIGHT

Department of Chemistry, University
of Toronto, Toronto 5, Canada



LAB MESSY?



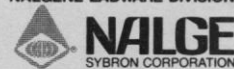
DRESS IT UP, CLEAN IT UP FAST WITH NALGENE® CLEAN-SHEETS

Put Nalgene Clean-Sheets™ work surface on your bench tops and they'll sparkle. You'll enjoy a morale boost. Years of unsightly stains disappear. New spills? Wipe 'em away! Use them as drawer liners to eliminate vibration, reduce glass breakage.

Nalgene laboratory Clean-Sheets: a white, closed-cell, cross-linked polyethylene foam with a smooth, firm, non-absorbent matte surface. Inner resilience makes them pleasant to work on, cushions sensitive instruments. Excellent titration background. Unaffected by chemical spills. Can be cut to any size. Ideal as sink and drawer liners as well as a work surface.

Clean-Sheets come in pre-cut mats and 50 ft. rolls. For free sample and catalog with complete details, write Nalgene Labware Division, Dept. 4117B, Rochester, N. Y. 14602.

NALGENE LABWARE DIVISION



NALGE
SYBRON CORPORATION

Nalgene® Labware...the permanent replacements.

Circle No. 92 on Readers' Service Card



finger- printing



separate:

POLYPEPTIDES

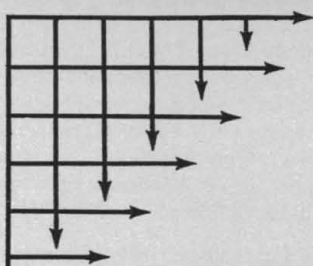
ALL AMINO ACIDS

NUCLEOTIDES

MANY OTHER COMPOUNDS

MODEL D
high-voltage

ELECTROPHORATOR



◀ ELECTROPHORESIS IN ONE DIMENSION

on 18 $\frac{1}{4}$ " x 22 $\frac{1}{2}$ " sheets of filter paper (Chromatography may be done in second dimension). Many complex mixtures can be rapidly resolved by electrophoresis in one dimension on papers up to 4 feet long.

Developed in the Laboratory of Cellular Physiology and Metabolism, National Heart Institute, National Institutes of Health, Bethesda, Maryland. Special thanks are due to Dr. William J. Dreyer, whose co-operation and suggestions are gratefully acknowledged by Gilson Medical Electronics.

★ Easy loading with folding rack

★ 5,000 volts at 300 ma.

★ Paper immersed in bifurcated fiberglass tank containing Varsol

★ Varsol, a light petroleum fraction, has a high flash point (over 100° F.), does not conduct electricity, and has the proper degree of volatility

★ Cold tap water run through stainless steel coils at top of tank is only coolant necessary

★ Safety features:

✓ Strong, joint-free fiberglass tank eliminates electrical and fluid leaks

✓ High voltage connected to inside of tank by Nylon and stainless steel plugs attached to edge of tank

✓ Highly reliable interlock provided by an extension of the cover handle

✓ When cover is removed, high voltage is ipso facto turned off

✓ No capacitors to sneakily store electricity in apparatus



GILSON MEDICAL ELECTRONICS

Middleton, Wisconsin 53562 • Telephone 608/836-1551

GILSON products are also manufactured in Europe:
GME • 69, Rue Gambetta — 95, Villiers-Le-Bel, FRANCE

Circle No. 14 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

1972

ALFRED BROWN	FRANK PRESS
JAMES F. CROW	FRANK W. PUTNAM
THOMAS KUHN	WALTER O. ROBERTS
ELLIOTT W. MONTROLL	

1973

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

Editorial Staff

Editor

PHILIP H. ABELSON

Publisher

WILLIAM BEVAN

Business Manager

HANS NUSSBAUM

Managing Editor: ROBERT V. ORMES

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

Assistant to the Editor: NANCY TEIMOURIAN

News and Comment: JOHN WALSH, DEBORAH SHAPLEY, ROBERT GILLETTE, NICHOLAS WADE, CONSTANCE HOLDEN, BARBARA J. CULLITON, SCHERRAINE MACK

Research News: ALLEN L. HAMMOND, WILLIAM D. METZ

Book Reviews: SYLVIA EBERHART, KATHERINE LIVINGSTON, KATHRYN MOUTON

Cover Editor: GRAYCE FINGER

Editorial Assistants: MARGARET ALLEN, ISABELLA BOULDIN, BLAIR BURNS, ELEANORE BUTZ, RONNA CLINE, ANNETTE DIAMANTE, MARY DORFMAN, JUDITH GIVELBER, MARLENE GLASER, CORRINE HARRIS, OLIVER HEATWOLE, CHRISTINE KARLIK, MARSHALL KATHAN, MARGARET LLOYD, JANE MINOR, DANIEL RABOVSKY, PATRICIA ROWE, LEAH RYAN, LOIS SCHMITT, YA LI SWIGART, ALICE THEILE

Guide to Scientific Instruments: RICHARD SOMMER

Membership Recruitment: LEONARD WRAY; Subscriptions: BETTE SEEMUND; Addressing: THOMAS BAZAN

Advertising Staff

Director

EARL J. SCHERAGO

Production Manager

BONNIE SEMEL

Advertising Sales Manager: RICHARD L. CHARLES

Sales: NEW YORK, N.Y. 10036: Herbert L. Burklund, 11 W. 42 St. (212-PE-6-1858); SCOTCH PLAINS, N.J. 07076: C. Richard Callis, 12 Unami Lane (201-889-4873); MEDFIELD, MASS. 02052: Richard M. Ezequelle, 4 Rolling Lane (617-444-1439); 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*, 24 December 1971. ADVERTISING CORRESPONDENCE: Room 1740, 11 W. 42 St., New York, N.Y. 10036. Phone: 212-PE-6-1858.

Can Stockholm Succeed?

With the opening of the Stockholm Conference only days away, it has become obvious that what is most needed now is a severe cutback in our expectations—else the affair will go down as a failure.

How have we got into this bind? Quite logically. Early misgivings that the conference could come to be regarded as the "rich men's club," laying down to the rest of the world the rules of appropriate environmental behavior, led to a decision to define human environment in very broad terms. While toxic emissions and mine tailings degraded the quality of life in the rich countries, the formula went, lack of drinkable water and the ravages of pathogens imperiled life itself in the rest of the world. All of these problems qualified as conference material.

The strategy accomplished its primary purpose: the initial hostility of the less-developed countries abated, and "environmental concern" was proclaimed to be a necessary dimension of development, not a competitor for funds and attention. Conflicts caused by the impact of environmental policies on trade, investment, and aid were recognized early, and this led to intelligent discussion and some guidelines to remedial action and acquisition of necessary knowledge.

Unhappily, the structure has proved to be shaky. Once development had become a dimension of the environmental problem, it quickly attained prominence. The ensuing argument began to focus on obstacles to development and who was to blame for them, increasingly so as the technicians active in the preparations for the conference gave place to their political superiors. Varying with who is discussing it, the conference is expected to do something about poverty, hunger, discrimination, disease, and inequalities of income, education, and opportunity—in sum, the human condition. New demands are still surfacing; for example, several African countries announced in mid-April their intention to have the conference condemn apartheid and endorse their demand for reparations from the colonial powers responsible for damage done in the past to their natural and human resources. All this comes on top of systems of worldwide monitoring, agreements on avoiding such damaging activities as dumping waste in oceans, preservation of areas or elements of value to mankind as a species, and a declaration of principles on the human environment to be pungent, inspiring, comprehensive, and agreeable to all. Nor is the level of expectations reduced by the expected influx of interested observers—on the contrary. Apart from the forum set up with the cooperation of the conference to accommodate the various environmental, conservationist, and scientific organizations that cannot operate in an intergovernmental meeting, one or more counter-forums will be set up by and for those who view the official forum as dominated by the "establishment." These counter-forums can be expected to highlight whatever they judge to be the shortcomings of the conference. The rumor mill has it that 10,000 to 50,000 people, mostly young, will be converging on Stockholm to engage in this task. Whether this is reason to rejoice or despair we shall not know until the conference is over.

Can the environmental donkey carry the load that is now accumulating on its back? Stockholm is an important way station. It was not designed to solve the problems of mankind. In what sense, then, can Stockholm "succeed"? It will be a success if it can tread water from 5 to 16 June and keep from sinking under the weight of highly motivated, ill-addressed, and altogether exaggerated expectations.—HANS H. LANDSBERG, *Director, Appraisals Program, Resources for the Future, Inc., Washington, D.C. 20036.*

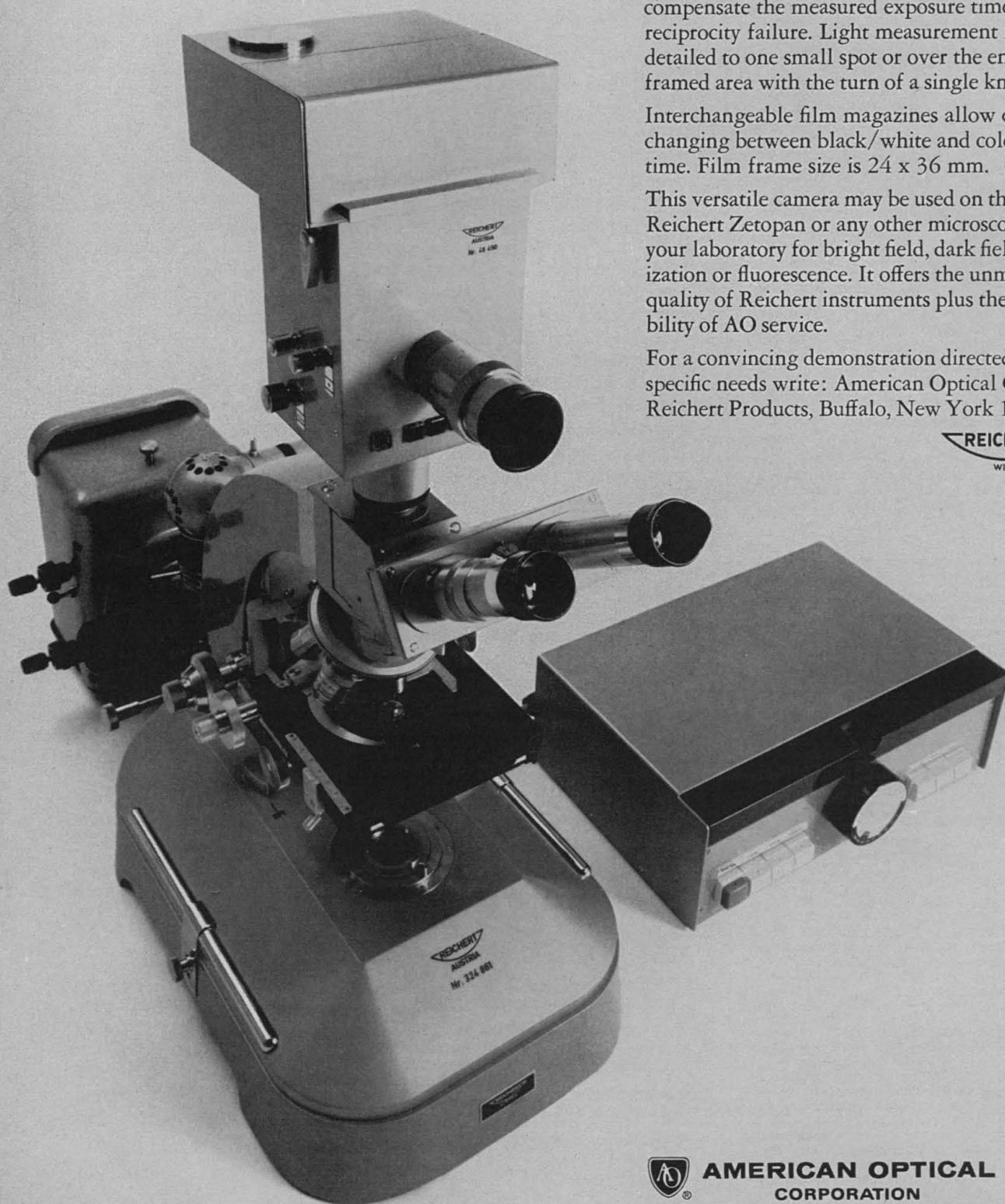
Reichert Automatic Camera: first to give you direct exposure read-out.

The Reichert Automatic Camera is the only automatic camera available with direct exposure read-out. Built-in factor keys allow you to compensate the measured exposure time for film reciprocity failure. Light measurement may be detailed to one small spot or over the entire framed area with the turn of a single knob.

Interchangeable film magazines allow quick changing between black/white and color at any time. Film frame size is 24 x 36 mm.

This versatile camera may be used on the Reichert Zetopan or any other microscope in your laboratory for bright field, dark field, polarization or fluorescence. It offers the unmatched quality of Reichert instruments plus the reliability of AO service.

For a convincing demonstration directed to your specific needs write: American Optical Corporation, Reichert Products, Buffalo, New York 14215.



**AMERICAN OPTICAL
CORPORATION**

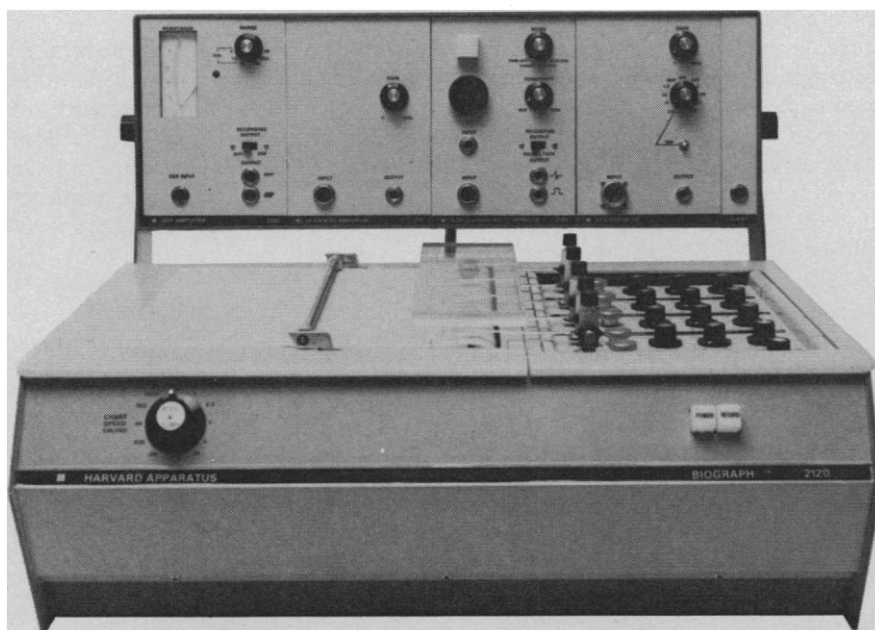
SCIENTIFIC INSTRUMENT DIVISION • BUFFALO, N.Y. 14215

Circle No. 1 on Readers' Service Card

The New Harvard Biograph™ Recording System.

for physiology, psychology
and all the life sciences.

One of the most versatile recording systems
you can buy, certainly the most economical
you can own.



Send for full details.

Gentlemen: I want to learn more about the new Harvard Biograph.

☐ Please send a no-obligation quote on a new Harvard Biograph recording system with 1, 2, 3 or 4 (circle one) recording channels plus couplers and accessories for measuring:

- ☐ Blood Pressure (direct); ☐ Blood Pressure (indirect); ☐ Pulse;
☐ ECG; ☐ Heart Rate; ☐ Respiration; ☐ EEG; ☐ GSR; ☐ Eye Blink;
☐ Isotonic Muscle Contraction; ☐ Isometric Muscle Contraction;
☐ Electromyography; ☐ Other_____

Name_____Tel. No._____

Department_____

Institution_____

Address_____

City_____State_____Zip_____

Harvard Apparatus Company, Inc.
P.O. Box 24-28, Millis, Massachusetts 02054
Telephone 617-376-2987

**HARVARD
APPARATUS**

most cases mediated by regulators acting near the terminal step rather than on earlier gene expression. A computer model containing relevant biochemical data has been built to identify the critical variable, or bottleneck, that limits the metabolism of trehalose and uridine diphosphoglucose during development of *Dictyostelium*. This method has suggested that substrate supply rather than enzyme synthesis may be the factor relevant to rate of end product synthesis.

Another approach was presented by W. Loomis (La Jolla). During development of *Dictyostelium*, a variety of enzymes of amino acid and carbohydrate metabolism have been found to appear in orderly sequence. The effects of each enzyme on morphogenesis and accumulation of later enzymes could be determined if appropriate temperature-sensitive mutants were available. Loomis described a series of temperature-sensitive mutants affected in one of these enzymes (acetylglucosaminidase). The loss of the enzyme in each of the mutant strains resulted in aberrant pseudoplasmodial function at the nonpermissive temperature.

Related to this work are electrophoresis studies very similar in outlook by D. Francis (Delaware), who described multiprotein changes during development of cellular slime molds and by R. Siegel who applied electrophoresis and other techniques to the study of conidiation in *Neurospora*. Siegel asked whether there are genes that must be turned off for development to occur, in addition to those that must be turned on. In a parallel study in *Saccharomyces*, L. Hartwell (Washington) described a series of temperature-sensitive mutants that arrest at different stages of the cell cycle. He concluded that each event depends on the completion of a preceding event, and asked what controls are necessary for starting the cycle and whether there is a unique event that acts as a trigger.

A. Jacobson (M.I.T.) and J. Haber (Brandeis) presented evidence that ribosomal RNA may change during development of *Dictyostelium* and sporulation of *Saccharomyces*, respectively. The implication of these findings to transcriptional and translational controls was discussed.

These several studies have the strength of dealing with the regulation of a series of genes or a series of proteins and, hence, truly approach the complexity of reality. Likewise, they all suffer from being nonspecific to a

greater or lesser degree, in that the physiological role of the gene or protein is not identified.

The study of cell differentiation has long been the anarchic field par excellence. Perhaps now we are coming out of the era of technique-oriented research on cell problems, in which newly popular techniques have been applied to every available system with little regard to whether they provide significant insight. It appears that many members of the La Jolla group have set their sights on the large biological problems, toward whose solution any relevant technique can be brought to bear.

The meeting was organized by S. Brody and W. F. Loomis, Jr., and was supported by a grant from the National Science Foundation to the University of California, San Diego.

DAVID FRANCIS

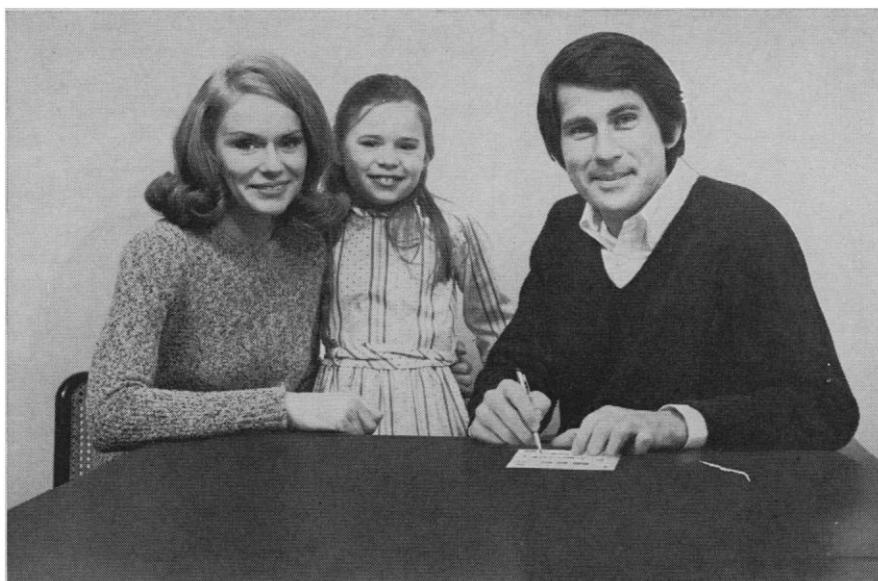
*University of Delaware,
Newark 19711*

Bryozoology II

The second international conference on bryozoology was held in Durham, England, from 6 to 16 September 1971. It was attended by 68 scientists from 14 countries, about a third of the membership of the International Bryozoology Association (IBA). The IBA includes those chiefly concerned with any aspect of the biology and paleobiology of the approximately 3,500 extant and 15,000 extinct species of bryozoa (ectoprocts and endoprocts). The conference had as its dominant theme the necessity of first understanding the life processes of living forms before trying to unravel the significance of fossil forms.

The old question of why does species A live in place X rather than in place Y is still being asked, but with a new frame of reference. Although much of the evidence remains anecdotal, some facts useful for a deductive theory are beginning to emerge. The rate of budding of new individuals appears to differ widely from one species to the next. New discoveries of larvae that initially become three to nine individuals—rather than the single individual commonly assumed—show that certain species obtain a flying start on preempting space on which to grow (F. J. S. Mauro, University of Florida; P. L. Cook, British Museum; G. Eitan, Hebrew University). In some forms, the capacity for retaining space is aug-

19 MAY 1972



YOU MEAN I CAN GET \$50,000 OF TIAA LIFE INSURANCE FOR LESS THAN \$100?

That's what an Assistant Professor asked us when he heard about TIAA's low life insurance costs.

It's true. At his age 30 the annual premium for a 20-Year Home Protection policy providing \$50,000 initial amount of insurance is \$159.00. The first-year dividend, based on our current dividend scale, is \$61.50, making a net payment of \$97.50. Dividends, of course, are not guaranteed.

The Home Protection plan is level premium Term insurance providing its largest amount of protection initially, reducing by schedule each year to recognize decreasing insurance needs. This is just one example of the many low-cost TIAA plans available. If you need more protection for your family, ask us to mail you a personal illustration with figures for a policy issued at your age. We'll also send the Life Insurance Guide describing other TIAA policies.

ELIGIBILITY

Eligibility to apply for this or other TIAA life insurance is limited to persons employed at the time of application by a college, university, private school, or other nonprofit educational or scientific institution that qualifies for TIAA eligibility.

TEACHERS INSURANCE AND ANNUITY ASSOCIATION
730 Third Avenue, New York, N. Y. 10017



pi

Please mail the new Life Insurance Guide and a personal illustration.

Name _____ Your Date of Birth _____

Address _____ Street _____

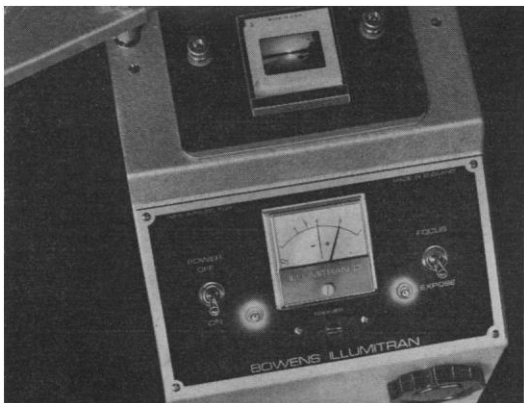
City _____ State _____ ZIP _____

Dependents' Ages _____

Nonprofit Employer _____ college, university, or other educational or scientific institution

Circle No. 40 on Readers' Service Card

823



**With the ILLUMITRAN
you can copy,
crop, correct,
enlarge or reduce;
make film strips
or internegatives
from transparencies
up to 4 x 5
faster than we can
tell you about it.**

The Illumitran, technically far ahead of anything in its field, is the quickest, simplest and most economical means of producing top quality duplicate transparencies.

Reason? The guesswork is taken out of the operation by an automatically controlled variable intensity electronic flash which provides a repeatable, constant color temperature light source. [No more guessing exposure or lens apertures.] A coupled, direct reading meter assures consistent exposure compensation for copying originals of varying density or for color balancing filters.

The Illumitran isn't just for 1:1 copies on 35mm film. Using your own camera you can reduce or enlarge at will, copy originals up to 4 x 5 in size; make sectional blowups, internegatives or superpositions.



Maybe there's a job the Illumitran can do for you. Ask your dealer about it or drop us a line, we'll send you a brochure and magazine articles which may give you some useful ideas.

BOGEN PHOTO CORP.

100 So. Van Brunt St., P.O. Box 448
Englewood, N.J. 07631

mented by extensive budding on the frontal surface, the occurrence of which in several species was emphasized for the first time (W. C. Banta, American University; D. Soule, University of Southern California). Other species appear capable of breeding after only a few zooids form. Thus even within as "uniform" a group as the ectoprocts, one can in all probability separate out species specialized for habitat utilization and those specialized for reproduction.

Other ecologists stressed the autecology of encrusting forms. Unlike other fouling organisms (for instance, barnacles and polychaets), encrusting ectoprocts do not space themselves out during settlement, although they do show gregariousness (J. S. Ryland and P. J. Hayward, University of Swansea). Colonies of the same species never overgrow each other but may in fact merge to form a single large colony (A. R. D. Stebbing, Plymouth). Colonies of different genotypes within a species fuse; in contrast, colonies of different species overgrow each other. Perhaps ectoprocts would be excellent material for studying immunological responses in natural populations. With regard to predation on ectoprocts, the stalking and lunging behavior of feeding pycnogonids was described in detail for the first time (P. E. King and D. Wyer, University of Swansea). The rare association of ectoprocts growing on sea snakes was discussed in the light of the proposed sea-level canal in Central America (R. J. Cuffey, Pennsylvania State University).

Studies on the growth and formation of colonies elicited the most interest and argument at Durham. The address by O. M. B. Bullman on growth in graptolites illustrated the several points of comparison that apparently are typical of growth in many colonial animals. The skeletons of many ectoprocts also appear to form in the same general manner as do the brachiopods, even to the point of equivalent structures for attachment of the walls of the coelom (A. Williams and R. Tavener-Smith, University of Belfast). Accordingly, the simplification and unification of terminology (periostracum; primary, secondary, and tertiary calcified layers; and so forth) was considered.

Since skeletal wall (or shell) structure is regarded as a key complex of taxonomic characters for cheilostomes, an understanding of the many modes of skeletal wall formation is obviously necessary. With the use of the scanning electron microscope, several new basic

CONTROLLED ENVIRONMENTS

for your
Scientific Research

- Environmental Rooms and Chambers
- Plant Growth Chambers and Benches
- Incubators and Seed Germinators

Installations & Representatives
throughout the world
backed by
Unconditional one-year warranty

Write for:

- NEW complete catalog MC3S
- Prompt competitive quotation
- Specimen unconditional warranty
- Engineering planning assistance

CONTROLLED ENVIRONMENTS INC.

601 Stutsman St., Pembina, N.D. 58271

In Canada:
661 Century St., Winnipeg R3H 0L9

In Europe:
20 St. Dunstan's Hill, London EC3R 8PH

Circle No. 121 on Readers' Service Card

"The Estuary—

Septic Tank of the Megalopolis"

This is but one of 71 scientific papers making up the comprehensive volume

ESTUARIES

published by AAAS in 1967 and reprinted in 1968. Based on the 1964 Conference on Estuaries, Jekyll Island, Georgia, the volume treats basic considerations, physical factors, geomorphology, sediments and sedimentation, microbiota, nutrients and biological production, ecology and populations, physiology and evolution, fisheries, human influences; a summary is included. 776 pages. 2036 literature citations, 525 illustrations, 85 tables, over 14,000 index entries.

Cash orders by AAAS members, \$24; regular price, \$27.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

1515 Massachusetts Ave., NW
Washington, D.C. 20005

← Circle No. 89 on Readers' Service Card

SCIENCE, VOL. 176

patterns of ultrastructure have been discovered (P. A. Sandberg, University of Illinois). This evidence, together with detailed histological studies of the relation of mineralized to unmineralized tissue, yielded several models of skeletal growth (W. Banta; R. Tavener-Smith; E. Håkensson, University of Copenhagen).

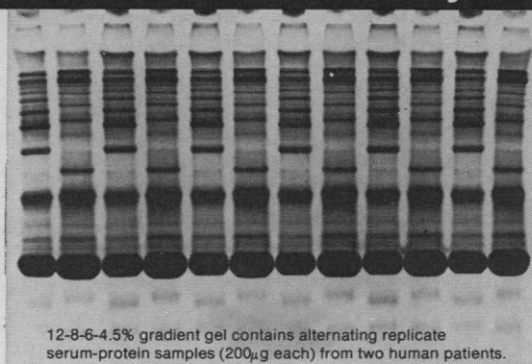
For tubular ectoprocts, the emphasis is on describing the basic morphological features of the skeletons and deducing the mode of growth in both living and fossil species. Analysis of the remains of organic material discovered in colonies of several Paleozoic ages permitted the further interpretation necessary for growth models (R. S. Boardman, Smithsonian Institution). These reports reaffirmed that the conceptual basis for understanding the growth of tubular ectoprocts resides in the studies of F. Borg, published chiefly in the first third of this century.

The teratological yet widespread occurrence of two polypides in various degrees of fusion and functional integrity living together in the same skeletal chamber was discussed (S. Oda and R. Mano-Nakamura, St. Paul's University, Tokyo, for freshwater species; D. Jebram, Zoological Institute, Kiel, for several cheilostome species).

A surprise of the Durham conference was the increased research on other aspects of the biology of bryozoans. The routine outbreeding of ectoproct species was indicated by the Hardy-Weinberg distribution of gene frequencies; genotypes were recognized from enzyme variants, which were determined by electrophoresis (T. J. M. Schopf, University of Chicago).

Modern methods of histology and determination of ultrastructure were applied to the nervous network of colonies, to tentacles, to brown bodies (degenerated polypides), and to cells occupying the pores of the stalks of entoprocts. Expert silver staining revealed the continuation of nervous strands into the bases of spines as well as through lateral communication pores (G. Lutaud, Faculté des Sciences, Paris). Tentacles were discovered to contain a supporting tube of collagen together with striated muscle and to have on the outside numerous microvilli with mucus (L. W. Smith, University of Swansea). Brown bodies were found to be characterized by large amounts of glycogen, which result from the degeneration of muscle and other tissue (D. P. Gordon, University of Dalhousie). "Chloride cells" for regulating ionic concentration in pores of the stalk

Ortec flat-slab acrylamide electrophoresis. The difference is rather easy to see.



- 12 easily-compared samples side-by-side in the same gel slab, 24 samples per run.
- Precision glass cells maintain even cross-sectional field strength, bond firmly to gel to give far better results than plastic cells or round tubes.
- You can move from analytical to preparative separations without changing cells.
- Pulsed constant power controls heating—no need for external cooling, even when separating labile enzymes.
- No pH discontinuities required in unique Ortec electrochemical system.

- Ideal for isoelectric focusing and two-dimensional work.
- Separations can be easily watched taking place in clear Ortec tank unencumbered by cooling coils.

Write for Bulletin LS-100, which tells the whole story about really high-resolution electrophoresis. Ortec Incorporated, 110 Midland Road, Oak Ridge, Tenn. 37830; or phone (615) 482-4411. In Europe: Ortec Ltd., Dallow Road, Luton, Bedfordshire, England; or Ortec GmbH, 8 München 13, Frankfurter Ring 81, West Germany.

ORTEC
AN EG&G COMPANY

Circle No. 85 on Readers' Service Card

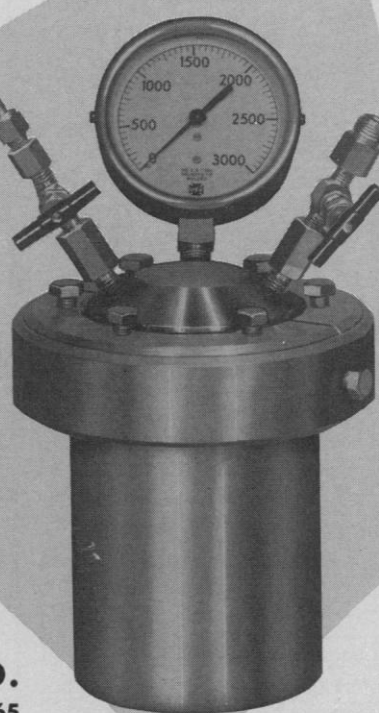
5326

CELL DISRUPTION BY NITROGEN DECOMPRESSION

The ideal way to release the contents of cells, tissues and micro-organisms.

Using rapid nitrogen decompression techniques, the PARR® Cell Disruption Bomb will produce either complete or selective rupture without heating, without ionization and without subjecting the system to high mechanical stress. Sample size is not critical. Volumes ranging from a few to 500 ml can be treated rapidly with the action varied to produce either partial rupture or complete homogenization by simply adjusting the nitrogen pressure.

Ask for Product Sheet 4635 describing this new and faster extraction method.



PARR INSTRUMENT CO.
211 Fifty-Third St. Moline, Ill. 61265
Telephone (309) 762-7716

of entoprocts were described for the first time (P. Emschermann, Albert-Ludwigs University).

In perhaps the most compelling presentation, E. Voigt (Geologisches Staatsinstitut) illustrated an exquisite Upper Cretaceous fauna, which was preserved in burrows dug by decapods in the indurated sea bottom. In more than 40 years of collecting, which was twice begun because many collections were destroyed in World War II, nearly 300 species have been excavated; many retain the most delicate of spines and processes perfectly in place. An undoubted cheilostome that definitely dates from the Upper Jurassic period has been described, the oldest representative of this extremely abundant tertiary and recent group (R. Pohowsky, University of Cincinnati); its complexity suggests that an intensive search for yet older Jurassic forms will also be rewarding. An apparent gradual evolutionary change in successive forms was documented in the cheilostomes *Poricellaria* and *Vincularia* by isometric and allometric phylogenetic trends revealed by principal-components analysis (A. Cheetham, Smithsonian Institution).

Finally, a comprehensive study of the life cycles of numerous entoprocts and several ectoprocts led to the conclusion that these groups are closely related (in the same phylum) (C. Nielsen, Marine Biological Laboratory, Helsingør). Relevant to the question of the phylogenetic placement of ectoprocts is the nature of the coelom. Surprisingly, the method of coelom formation in the widespread cheilostome species *Bugula neritina* was described as unique in the animal kingdom (R. L. Zimmer, University of Southern California). A new classification of higher taxa of entoproct and ectoproct bryozoans was proposed, and was based upon a numerical analysis of the major characters of these groups as presently known (R. J. Cuffey).

The conference facilities were provided by the University of Durham, and the conference was arranged by G. Larwood. F. J. S. Maturo was elected association president, succeeding N. Spjeltnes; P. L. Cook was reelected secretary and will answer inquiries about the IBA. The proceedings of the conference will be edited by Larwood and published by Academic Press.

THOMAS J. M. SCHOPF
Department of Geophysical Sciences
and Committee on Evolutionary
Biology, University of Chicago,
Chicago, Illinois 60637



Circle No. 88 on Readers' Service Card

Forthcoming Events

May

23-26. **Contemporary Views of Learning and Conditioning**, Raleigh, N.C. (D. B. Lumsden, Box 5096, Raleigh 27607)

25-26. **Storage Polyglucosides**, New York Acad. of Sciences, New York, N.Y. (J. F. Frederick, Research Labs., Dodge Chemical Co., Bronx, N.Y. 10469)

25-27. **Mechanisms and Regulation of Craniofacial Morphogenesis**, Nymegen, The Netherlands. (F. Van der Linden, Dept. of Orthodontics, Univ. of Nymegen, "Heyendaal," Philips van Leydenlaan 25, Nymegen)

28-2. National Conf. on **Social Welfare**, 99th, Chicago, Ill. (J. R. Hoffer, 22 W. Gay St., Columbus, Ohio 43215)

28-3. International College of **Surgeons**, 18th intern. biennial congr., Rome, Italy. (P. Stefanini, 1516 Lake Shore Dr., Chicago, Ill. 60610)

29-31. American **Ophthalmological Soc.**, 108th annual meeting, Hot Springs, Va. (S. D. McPherson, Jr., AOS, 1110 W. Main St., Durham, N.C. 27701)

30-2. International Federation of Associations of **Textile Chemists and Colorists**, 9th congr., Munich, Germany. (Secretariat, 9th FATCC Congr., Rohrbacher Str. 76, D-6900 Heidelberg-1, Germany)

30-4. **Space Simulation**, Inst. of Environmental Sciences, New York, N.Y. (IES, 940 E. Northwest Highway, Mount Prospect, Ill. 60056)

31-2. **Endotoxin** Conf., Warrenton, Va. (EC, Channing Lab., Boston City Hospital, Boston, Mass. 02118)

31-2. American Inst. of **Industrial Engineers**, Anaheim, Calif. (J. F. Jericho, AIIE, 345 E. 47 St., New York 10017)

June

1-2. **Environmental and Water Resources Engineering** Conf., Nashville, Tenn. (E. L. Thackston, Dept. of Environmental and Water Resource Engineering, Vanderbilt Univ., Nashville 37203)

1-2. **Laboratory Animal Considerations in Toxicology and Related Disciplines**, East Brunswick, N.J. (W. H. Mitchell, P.O. Box 130, New Britain, Pa. 18901)

1-3. **Cancer Chemotherapy**, natl. conf., American Cancer Soc. and Natl. Cancer Inst., New York, N.Y. (S. L. Arje, ACS, 219 E. 42 St., New York 10017)

4-8. **Special Libraries** Assoc., Boston, Mass. (F. E. McKenna, SLA, 235 Park Ave. S., New York 10003)

4-8. **Tissue Culture** Assoc., Los Angeles, Calif. (R. H. Kahn, Dept. of Anatomy, Univ. of Michigan, Ann Arbor 48104)

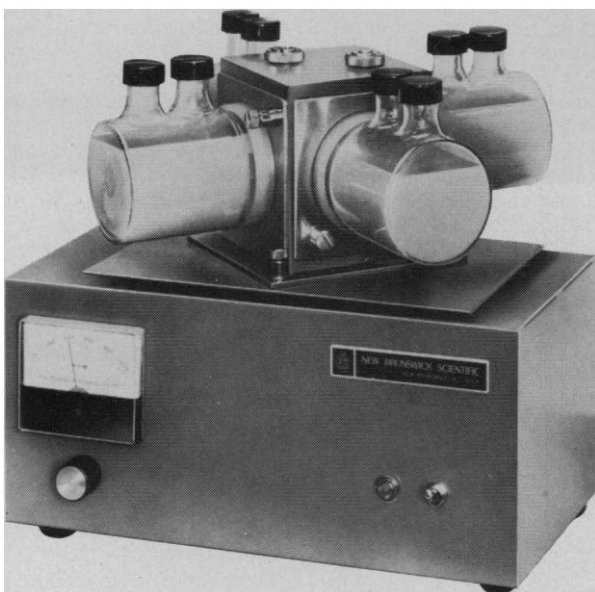
4-9. **Mass Spectroscopy and Allied Topics**, American Soc. for Mass Spectrometry, Dallas, Tex. (F. E. Saalfeld, Naval Research Laboratory, Code 6110, Washington, D.C. 20390)

5-7. **Natural Gas Research and Technology**, 2nd conf., American Gas Assoc., Atlanta, Ga. (L. A. Sarkes, AGA, 1515 Wilson Blvd., Arlington, Va. 22209)

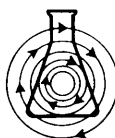
5-7. **Intestinal Microflora**, 2nd intern. symp., Columbia, Mo. (Conference Section, Continuing Medical Education, M-175 Medical Center, Columbia 65201)

PURE MIXED CULTURES

Now a Reality!



With the NBS Ecologen, you can now grow up to four pure and separate cultures in a single mixed culture system. The Ecologen permits interacting cells to grow in pure culture, while the metabolites of each population diffuse freely through filters to influence cell physiology, growth, and product yield. Because each individual culture remains homogeneous, cell growth variables are easily observed. The Ecologen simulates the natural environment by producing many of the variations found in nature. It is ideal for use in studies of soils, water, oral cavities, digestive tracts, etc.



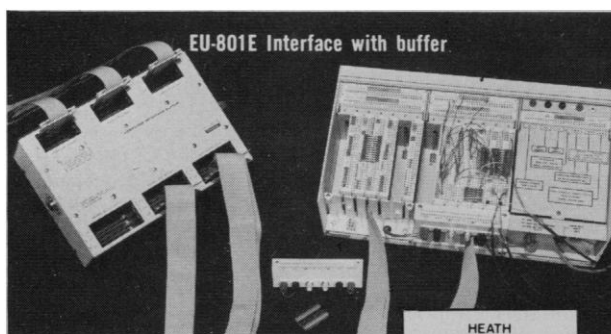
Ask for Booklet C30S/572

NEW BRUNSWICK SCIENTIFIC CO., INC.
1130 SOMERSET ST., NEW BRUNSWICK, N. J. 08903 201-846-4600
With NBS, Advanced Technology is a Way of Life
Circle No. 60 on Readers' Service Card



The new EU-801E Mini-Computer Interface allows owners of any PDP-8 family computer (with positive I/O bus) to take full advantage of their mini's capabilities...by allowing direct input of measurement data and output of processed data and control information. The 801E is ideal for interfacing a variety of digital instruments...designing complex dedicated interfaces...or just learning about interfacing. All connection points necessary for a functioning interface are readily available **outside** the computer: all signals required for any given data transfer operation are legibly and logically presented on the top of a plug-in card in the 801E ADD unit. Connection points on the card top include 12-bit digital inputs and outputs (Accumulator In, Accumulator Out and Buffered Memory Bus), three control lines, five timing lines and two status lines. And because the 801E is a patch system using positive-contact connectors and ordinary hook-up wire, there is no soldering. Simple data transfer circuits can be patched and tested in a few minutes. Signal modification and device control circuits can be quickly developed and refined. For detailed information on the new Heath/Schlumberger EU-801E Mini-Computer Interface, send coupon below for free brochure...and learn how you can turn your PDP-8 into a maxi-mini.

EU-801E System, 42 lbs.\$1250.00*



Heath/Schlumberger Scientific Instruments
Department 511-194,
Benton Harbor, Michigan 49022

☐ I'm convinced and I need a maxi-mini now. Enclosed is \$_____ plus shipping for _____ EU-801E(s).

☐ I'm interested but not convinced. Please send EU-801E brochure.

☐ Please send 1972 Instrumentation Catalog.

Name _____

Title _____

Company/Institution _____

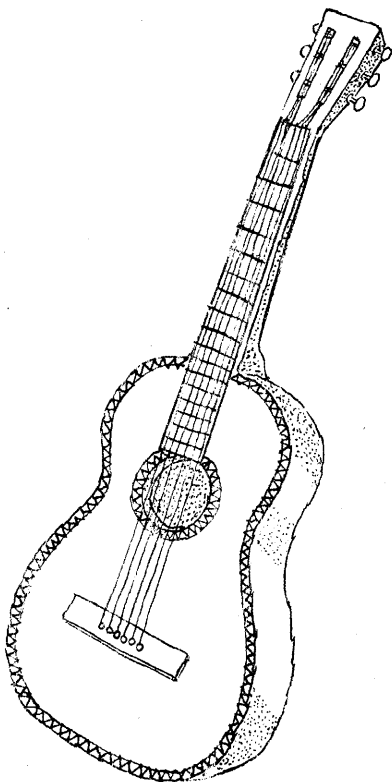
Address _____

City _____ State _____ Zip _____

*Mail Order price; F.O.B. Benton Harbor, Michigan EK-329

Circle No. 61 on Readers' Service Card

FOLK SONG STYLE AND CULTURE



A Staff Report on Cantometrics Editor: Alan Lomax

384 pp., 7½ x 10¼, Illustrations, Bibliography, Index, 1968. 2nd Printing 1971. AAAS members' cash orders \$14.50. Regular price \$16.75.

Working with a large sample of recorded songs and filmed dances from all world culture areas, the Cantometrics Project has discovered some of the ways in which song and dance style vary by culture area. Strong statistical relationships have been established between a set of basic factors of social and economic structure and performance style. The book reports on an imaginative yet rigorous exploration of the paralinguistic and parakinesic realms and a thoroughgoing test of the hypothesis that factors of culture style are primary forces in shaping all human behavior. Performance style here becomes a psychocultural indicator, and, for the first time, the social and cultural import of the expressive act is firmly established.

AAAS

AMERICAN ASSOCIATION for the
ADVANCEMENT OF SCIENCE
1515 Massachusetts Avenue, N.W.
Washington, D. C. 20005

5-7. **Lexicography in English**, intern. conf., New York Acad. of Sciences, New York, N.Y. (L. R. Neville, NYAS, 2 E. 63 St., New York 10021)

5-7. **American Physical Soc.**, Albuquerque, N.M. (W. W. Havens, Jr., APS, 335 E. 45 St., New York 10017)

5-8. **Coastal Mapping Symp.**, American Soc. of Photogrammetry, Washington, D.C. (ASP, 105 N. Virginia Ave., Falls Church, Va. 22046)

5-8. **United Nations Conf. on the Human Environment**, Stockholm, Sweden. United Nations Hq., New York 10017)

5-9. **Mathematical Problems in the Biological Sciences**, sponsored by the Conference Board of the Mathematical Sciences and the National Science Foundation, East Lansing, Mich. (C. J. Martin, Dept. of Mathematics, Michigan State Univ., East Lansing 48823)

5-9. **Pleasure, Reward, Preference: Their Nature, Determinants, and Role in Behaviour**, NATO-sponsored symp., Elsinore, Denmark. (D. E. Berlyne, Dept. of Psychology, Univ. of Toronto, Toronto 181, Ont., Canada)

5-9. **Thermionic Electrical Power Generation**, 3rd intern. conf., jointly by European Nuclear Energy Agency and Intern. Atomic Energy Agency, Jülich, Germany. (P. von Handel, Kernforschungsanlage Jülich GmbH, D-5170 Jülich, Postfach 365, Germany)

5-9. **Stratigraphy, Structure, and Evolution of the Northern Piedmont**, Geological Soc. of America, Frederick, Md. (E. B. Eckel, GSA, P.O. Box 1719, Colorado Bldg., Boulder, Colo. 80302)

6-10. **Animal Reproduction**, 7th intern. congr., Munich, Germany. (H. H. Messerschmidt, Arbeitsgemeinschaft, Deutscher Rinderzüchter, e V, Adenaurallee 176, 53 Bonn/Rh, Germany)

7-8. **Nutrition Symp. on Proteins**, Ames, Iowa. (C. Roderuk, 27 MacKay Hall, Iowa State Univ., Ames 50010)

7-9. **Development Aspects of Vision**, 7th symp., Center for Visual Science, Rochester, N.Y. (J. L. Brown, CVS, University of Rochester, River Campus Sta., Rochester 14627)

7-9. **Environmental Toxicity: Behavioral Toxicology**, 5th intern. conf. Rochester, N.Y. (Public Relations, Q121, Univ. of Rochester Medical Center, 260 Crittenden Blvd., Rochester 14620)

7-10. **Genetic Mechanisms of Development**, 31st symp., Society for Developmental Biology, Middletown, Conn. (W. S. Badman, SDB, P.O. Box 502, Kalamazoo, Mich. 49005)

7-10. **American Rheumatism Assoc.**, Dallas, Tex. (Miss L. Bonfiglio, ARA, 1212 Avenue of the Americas, New York 10036)

8-9. **Cellular Modification and Genetic Transformation by Exogenous Nucleic Acids**, 6th Miles intern. symp., Baltimore, Md. (C. J. O'Donovan, Miles Labs., Inc., Elkhart, Ind. 46514)

8-10. **International Assoc. for Cereal Chemistry**, Vienna, Austria. (IACC, A-2320 Schwechat, Schmidgasse 3-7, Austria)

9-11. **American Assoc. of Neuropathologists**, Chicago, Ill. (E. P. Richardson, Jr., Neuropathology Lab., Massachusetts General Hospital, Boston 02114)

10-11. **Animal and Human Conditioning: Techniques and Theories in Drug Abuse Research**, Portland, Ore. (P. E. Blachly, Univ. of Oregon Medical School, Portland 97201)

11-15. **Medical Library Assoc., Inc.**, San Diego-Coronado, Calif. (Mrs. H. B. Schmidt, MLA, 919 N. Michigan Ave., Chicago, Ill. 60611)

11-16. **American Soc. of Medical Technologists**, Minneapolis, Minn. (S. B. Friedman, ASMT, Suite 1600, Hermann Professional Bldg., Houston, Tex. 77025)

11-16. **American Physical Therapy Assoc.**, Las Vegas, Nev. (R. Noland, APTA, 1156 15th St., NW, Washington, D.C. 20005)

12-14. **Computers in the Undergraduate Curricula**, Atlanta, Ga. (Southern Regional Education Board, 130 Sixth St., NW, Atlanta, Ga. 30313)

12-14. **Improvement of the Capabilities of Small Research and Development Firms in a Declining R&D Environment**, National Science Foundation/Small Business Administration Conf., Washington, D.C. (J. D. Johnson, Center for the Study of Private Enterprise, American Univ., Washington, D.C. 20016)

12-14. **Society for Industrial and Applied Mathematics**, 20th, Philadelphia, Pa. (H. B. Hair, SIAM, 33 S. 17 St., Philadelphia 19103)

12-14. **American Neurological Assoc.**, 97th annual, Chicago, Ill. (S. A. Trufant, Cincinnati General Hospital, Cincinnati, Ohio 45229)

12-14. **Soil Mechanics and Foundations**, American Soc. of Civil Engineers, Lafayette, Ind. (H. R. Hands, ASCE, 345 E. 47 St., New York 10017)

12-15. **American Assoc. for the Advancement of Science**, Pacific Div., Eugene, Ore. (R. C. Miller, California Acad. of Sciences, Golden Gate Park, San Francisco 94118)

12-15. **Immunology**, 3rd intern. conf., Buffalo, N.Y. (N. R. Rose, Center for Immunology, Room 203, Sherman Hall, State Univ. of New York School of Medicine, Buffalo 14214)

12-16. **Western Inst. of Drug Problems**, Portland, Ore. (P. H. Blachly, Univ. of Oregon Medical School, Portland 97201)

12-16. **Life Stress and Illness**, NATO-sponsored symp., Beito, Norway. (E. K. E. Gunderson, Operational Psychiatry Div., Dept. of the Navy, Navy Medical Neuropsychiatric Research Unit, San Diego, Calif. 92152)

12-17. **International Federation of Automatic Control**, 5th congr., Paris, France. (Meetings Officer, Inst. of Electrical and Electronics Engineers, Inc., 345 E. 47 St., New York 10017)

12-17. **Health Physics Soc.**, 17th annual, Las Vegas, Nev. (J. S. Coogan, Environmental Protection Agency, Western Environmental Research Lab., P.O. Box 15027, Las Vegas 89114)

12-17. **Pollution: Engineering and Scientific Solutions**, 1st intern. conf., Soc. of Engineering Science (cosponsored by Environmental Protection Agency, National Oceanic Atmospheric Administration, and Washington Univ.) Tel-Aviv, Israel. (E. Y. Rodin, Dept. of Applied

SINKS AND SOURCES

The Spoils of Progress:

Environmental Pollution in the Soviet Union

by Marshall I. Goldman

\$7.95

Rapid industrial growth rather than form of government is the prime agent causing environmental havoc, and in the Soviet Union the ecological balance has been upset, as it has in every major industrial country.

Marshall I. Goldman, whose articles on the subject have appeared in *Science*, *The New York Times*, and *The New Yorker*, brings this point home as he describes abuses of water, air, land, and raw materials in Russia, analyzing the forces that have brought about the current situation and describing both the drawbacks and advantages of state control and conservation.

New Energy Technology — Some Facts and Assessments

by H. C. Hottel and J. B. Howard

This report concentrates on the technological status of energy and fuel conversion processes in the United States. It assesses the technical and economic adequacy of existing and proposed processes (and their consistency with developing standards of environmental quality) and suggests where additional effort is needed to accelerate change.

\$10.00 hardcover

\$2.95 paperback

The MIT Press

Massachusetts Institute of Technology

Cambridge, Massachusetts 02142

Circle No. 105 on Readers' Service Card

PRECISION
PS
SCIENTIFIC



Thelco®
Ovens

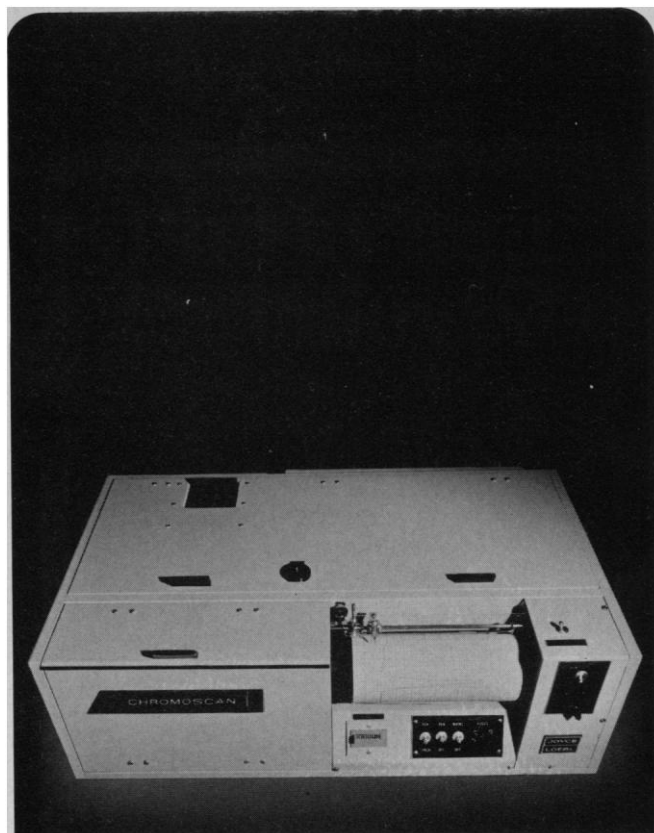
We guarantee Thelco temperature uniformity

Forced circulation models give you fast heat-up and recovery, and rapid evaporation. Uniformity is a **proven** $\pm 1.3^{\circ}\text{C}$ or better throughout the entire range. In situations where positive air circulation cannot be tolerated the gravity convection models offer uniformity of $\pm 1.7^{\circ}\text{C}$ or better. All feature stainless-steel interiors, single-knob dual safety thermostat, magnetic door closure with push-button release. Published performance figures, determined by thermocouple tests, are **guaranteed** for both types.

Get Thelco performance data from your Precision Scientific Dealer or write us. Precision Scientific Company, 3737 W. Cortland Street, Chicago, Ill. 60647.



Circle No. 103 on Readers' Service Card



Electrophoresis Scanner

*For Paper, Starch, Agar, Cellulose,
Acetate, Acrylamide Rods/Gels,
and Thin Layer Chromatograms*

The Joyce, Loeb Chromoscan is a versatile recording and integrating double beam densitometer, absorption meter and colorimeter for reflectance and transmission operation in the visible and U.V. The high resolution, repeatability and linearity are outstanding features of this Joyce, Loeb Densitometer.

The Chromoscan can be used to carry out a variety of techniques in Biochemical, Clinical and General Chemical Laboratories without hampering routine electrophoresis scanning. Specific and repeatable parameters are easily selected to deliver quantitative information in both graphical and digital form for paper chromatographs, reaction rates, thin layer, ultracentrifuge and continuous flow absorption.

An all-solid-state computing integrator, the Joyce, Loeb Computascan can be attached to the Chromoscan to automatically compute and print out either total percent, grams percent, or raw integrals.

For more information contact: **Joyce, Loeb & Company, Northwest Industrial Park, Burlington, Massachusetts 01803, (617) 272-2000.**



JOYCE LOEBL & COMPANY

A *nech/ops* COMPANY

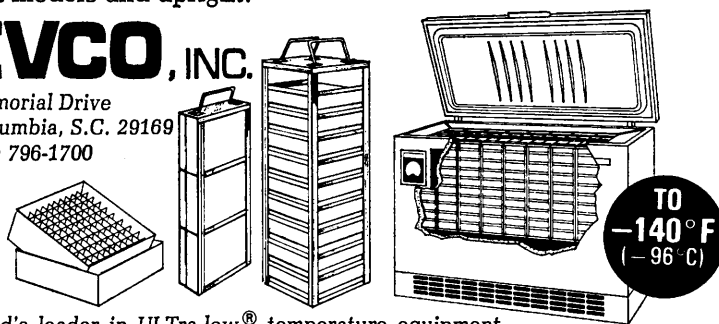
Circle No. 63 on Readers' Service Card

Revco is More than a freezer... It's a System.

You get more than dependable ULTra-low® temperature when you buy a Revco freezer. We adapt the freezer to your particular use through the proper accessories from our inventory control systems. Let us show you how Revco provides the total answer to your ULTra-low® temperature needs. Available in sizes from 1-1/2 to 25 cubic feet, including the standard 6.5, 9, 12 and 17 cubic foot sizes, in chest models and upright.

REVCO, INC.

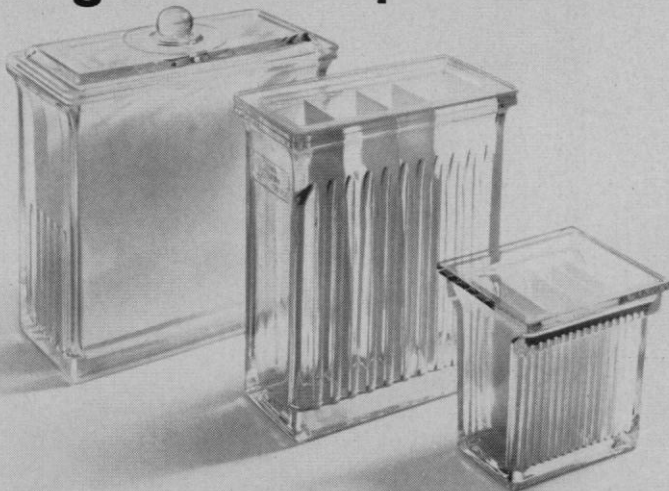
1177 Memorial Drive
West Columbia, S.C. 29169
Tel. (803) 796-1700



The world's leader in ULTra-low® temperature equipment

Circle No. 80 on Readers' Service Card

Great TLC development... Our glass multiplate tanks.



Developing numerous TLC plates simultaneously is a snap with these all-glass multiplate tanks from Brinkmann.

Our large tank accepts five home-made or pre-coated 20x20 cm plates and is available with optional stop-cock or regular cover. The middle tank holds ten 5x20 cm plates up to 6 mm thick. The small tank will

handle sixteen 5x10 cm plates or sheets up to 1 mm thick.

Need literature? Just write: Brinkmann Instruments, Cantiague Road, Westbury, New York 11590. In Canada, write: Brinkmann Instruments (Canada) Ltd., 50 Galaxy Blvd., Rexdale (Toronto), Ontario.



Circle No. 84 on Readers' Service Card

Mathematics, Washington Univ., St. Louis, Mo. 63130)

13-16. Canadian Federation of **Biological Societies** jointly with Canadian Soc. of **Microbiologists**, Quebec, P.Q., Canada. (D. T. Armstrong, Dept. of Physiology, Univ. of Western Ontario, London 72, Ont., Canada)

13-16. **Simulation Conf.**, San Diego, Calif. (M. K. Horn, Cities Service Oil Co., P.O. Box 50408, Tulsa, Okla. 74150)

14-16. International Symp. on **Metabolism and Membrane Permeability of Erythrocytes, Thrombocytes, and Leucocytes**, Vienna, Austria. (K. Moser, Wiener Medizinische Akademie, Alserstrasse 4, 1090 Vienna)

14-16. **Multienzyme Systems in Endocrinology: Progress in Purification and Methods of Investigation**, New York Acad. of Sciences, New York, N.Y. (L. R. Neville, NYAS, 2 E. 63 St., New York 10021)

14-17. **American Medical Women's Assoc.**, Seattle, Wash. (Mrs. G. F. Conroy, AMWA, 1740 Broadway, New York 10019)

14-18. **American Assoc. of Bioanalysts and California Assoc. of Bioanalysts** (joint), Scottsdale, Ariz. (D. Birenbaum, AAB, 411 N. 7 St., St. Louis, Mo. 63101)

15-17. **Society for Psychotherapy Research**, 3rd annual, Nashville, Tenn. (H. H. Strupp, Dept. of Psychology, 134 Wesley Hall, Vanderbilt Univ., Nashville 37203)

18-19. **Soc. of Wood Science and Technology**, Dallas, Tex. (E. L. Schoffer, SWST, P.O. Box 5062, Madison, Wis. 53705)

18-21. **American Dairy Science Assoc.**, Blacksburg, Va. (C. Cruse, ADSA, 113 N. Neil St., Champaign, Ill. 61820)

18-22. **International Congr. on Lipids**, Göteborg, Sweden. (R. Marcuse, Intern. Soc. for Fat Research, Lipidforum, c/o SIK, FACK, S-400 21 Göteborg 16)

18-22. **Association of Food and Drug Officials**, 76th annual, Monticello, N.Y. (K. A. Silver, Room 700, 850 Third Ave., Brooklyn, N.Y. 11232)

18-22. **American Medical Assoc.**, San Francisco, Calif. (L. W. Prang, Records Section, AMA, 535 N. Dearborn St., Chicago, Ill. 60610)

18-22. **American Nuclear Soc.**, Las Vegas, Nev. (H. Coffey, CER Geonuclear Corp., P.O. Box 15090, Las Vegas 89114)

18-23. **Clinical Chemistry**, 8th intern. congr., Copenhagen, Denmark. (Secretariat, 8th Intern. Congr. of Clinical Chemistry, Rigshospitalet, Blegdamsvej 9, DK-2100, Copenhagen 8)

18-23. **International Congr. of Endocrinology**, 4th, Intern. Soc. of Endocrinology, Washington, D.C. (G. D. Aurbach, Section on Mineral Metabolism, Natl. Inst. of Health, Bethesda, Md. 20014)

18-24. **Water Pollution Research**, 6th intern. conf., Jerusalem, Israel. (Organizing Committee, 6th Intern. Conf. on Water Pollution Research, P.O. Box 16271, Tel Aviv, Israel)

19-21. **Biometric Soc.**, western North American regional, Seattle, Wash. (J. W. Kuzma, Dept. of Biostatistics, Loma Linda Univ., Loma Linda, Calif.)

19-21. **Colloid Symp.**, 46th natl., Div. of Colloid and Surface Chemistry, Ameri-

can Chemical Soc., Amherst, Mass. (R. L. Rowell, Dept. of Chemistry, Univ. of Massachusetts, Amherst 01002)

19-21. American College of **Preventive Medicine**, San Francisco, Calif. (W. Bentley, 801 Old Lancaster Rd., Bryn Mawr, Pa 19010)

19-21. **Surface Properties and Surface States of Electronic Materials**, Rolla, Mo. (W. J. James, Graduate Center for Materials Research, Space Sciences Research Center, Univ. of Missouri, Rolla 65401)

19-21. **Watersheds in Transition**, American Water Resources Assoc., Fort Collins, Colo. (T. G. McLaughlin, Water Resources Div., U.S. Geological Survey, Denver, Colo.)

19-22. **Air Pollution Control Assoc.**, 65th annual, Miami Beach, Fla. (Public Relations Dept., APCA, 4400 Fifth Ave., Pittsburgh, Pa. 15213)

19-22. American Soc. for **Engineering Education**, Lubbock, Tex. (L. B. Williams, ASEE, Suite 400, 1 Dupont Circle, Washington, D.C. 20036)

19-22. American **Vacuum Soc.**, Pittsburgh, Pa. (AVS, 335 E. 45 St., New York 10017)

19-23. **Influence of Culture on Ergonomics**, Oosterbeek, The Netherlands. (A. Chapanis, Dept. of Psychology, Johns Hopkins Univ., Baltimore, Md. 21218)

21-23. **Experimental Medicine and Surgery in Primates**, 3rd conf., Lyon, France. (J. Moor-Jankowski, LEMSIP, New York Univ. Medical Center, 500 First Ave., New York 10016)

21-23. **Plastics in Packaging**, Pullman, Wash. (R. A. V. Raff, Research Div., College of Engineering, Washington State Univ., Pullman 99163)

21-23. Society of **Research Administrators**, Northeast Section, White Haven, Pa. (Mrs. L. Lasker, Research Administration, New York Medical College, Fifth Ave. at 106 St., New York 10029)

21-23. **Role and Value of Measurement** (jointly sponsored by American Soc. for Quality Control, Inst. for Electrical and Electronics Engineers, Instrument Soc. of America, Natl. Bureau of Standards, Natl. Conf. of Standards Labs., and Precision Measurements Assoc.), Boulder, Colo. (G. Goulette, 130 Academy Bldg., Univ. of Colorado, Boulder 80302)

22-23. **Legal Aspects of Computerized Information Systems**, intern. symp., Federal Council of Science and Technology, Washington, D.C. (J. H. Farmakides, Office of Science Information Services, COSATI, National Science Foundation, Washington, D.C. 20550)

22-24. American Assoc. of **Physics Teachers**, Albany, N.Y. (W. F. Johnson, AAPT, 1785 Massachusetts Ave., NW, Washington, D.C. 20036)

22-25. **Optical Manufacturers Assoc.**, St. Louis, Mo. (Albert A. Kohler Co., Inc., 15 Wilmot Lane, Riverside, Conn. 06878)

22-28. **Coordination Chemistry**, 14th intern. conf. (sponsored by National Research Council of Canada and Chemical Inst. of Canada), Toronto, Ont., Canada. (C. J. L. Lock, Inst. for Materials Research, McMaster Univ., Hamilton, Ont.)

24-25. American **Diabetes Assoc.**, Washington, D.C. (J. R. Connelly, ADA, 18 E. 48 St., New York 10017)

25-28. **Astronomical Soc. of the Pacific**, Santa Cruz, Calif. (L. Salanave, California Acad. of Sciences, Golden Gate Park, San Francisco, Calif. 94118)

25-30. National **Education Assoc.**, Atlantic City, N.J. (S. M. Lambert, NEA, 1201 16th St., Washington, D.C. 20036)

25-30. **Environmental Engineering in the Food Industry**, Engineering Foundation, Henniker, N.H. (EF, 345 E. 47 St., New York 10017)

25-30. American Soc. for **Testing Materials**, 75th annual, Los Angeles, Calif. (H. H. Hamilton, ASTM, 1916 Race St., Philadelphia, Pa. 19103)

25-31. American **Library Assoc.**, Chicago, Ill. (C. J. Hoy, ALA, 50 E. Huron St., Chicago, Ill.)

26-28. **Extreme Environments: Mechanisms of Microbial Adaptation**, Moffet Field (San Francisco), Calif. (M. R. Heinrich, 239-10, National Aeronautics and Space Administration, Ames Research Center, Moffet Field 94035)

26-28. Institute of **Navigation**, West Point, N.Y. (R. E. Freeman, IN, Suite 832, 815 15th St., NW, Washington, D.C. 20005)

26-28. **Nutrient Removal—How to Do It**, American Soc. of Civil Engineers, Rochester, N.Y. (H. R. Hands, ASCE, 345 E. 47 St., New York 10017)

26-29. **Law of the Sea: Needs and Interests of Developing Countries**, 7th annual conf., Kingston, R.I. (Law of the Sea Inst., Univ. of Rhode Island, Kingston 02881)

26-29. American Assoc. of **Physicists in Medicine**, Philadelphia, Pa. (B. M. Galkin, Stein Research Center, 920 Chancellor St., Philadelphia 19107)

26-29. Society for the **Study of Reproduction**, 5th annual, East Lansing, Mich. (J. M. Yochim, Dept. of Physiology and Cell Biology, Univ. of Kansas, Lawrence 66044)

26-29. **Weather Modification**, 3rd conf., American Meteorological Soc., Rapid City, S.D. (R. A. Schleusener, Inst. of Atmospheric Sciences, South Dakota School of Mines and Technology, Rapid City 57701)

26-2. **Radiation Commission**, Intern. Assoc. of Meteorology and Atmospheric Physics, intern. symp., Sendai, Japan. (J. London, Univ. of Colorado, Boulder 80302)

27-30. Cheiron: The International Soc. for the **Behavioral and Social Sciences**, Calgary, Alta., Canada. (R. G. Weyant, Dept. of Psychology, Univ. of Calgary, Calgary 44)

27-30. International Study Group for **Research in Cardiac Metabolism**, 5th annual, Winnipeg, Man., Canada. (N. S. Dhalla, Dept. of Physiology, Faculty of Medicine, Univ. of Manitoba, Winnipeg 3)

July

1-7. International Assoc. of Medical Labs., 10th congr., Vienna, Austria. (Mrs. I. Hertz, Verband dipl und techn Assistentinnen, Spitalgasse 4, 1090 Vienna)

2-5. **Environmental Acoustics**, 2nd symp., London, England. (Meetings Officer, Inst. of Physics, 47 Belgrave Sq., London SW1X 8QX)

2-6. International Congr. of **Physical**

Praise the Lourdes.



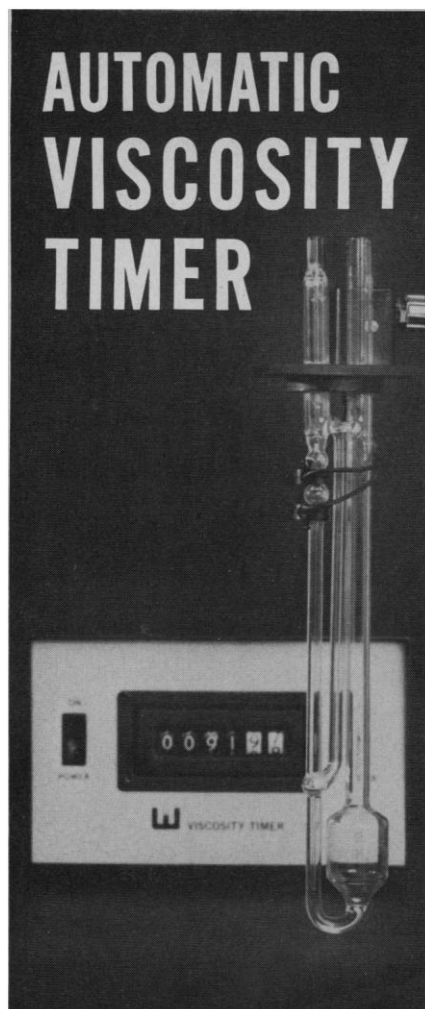
30R Clini-Fuge™

We know your laboratory produces a voluminous amount of work. And that one of your greatest concerns is time...or the lack of it. You need a centrifuge that operates smoothly no matter how great the demands—exactly what you can expect from this high-capacity unit... a Lourdes exclusive. Portable, refrigerated, with all speed ranges and a solid state speed control selector, the 30R Clini-fuge has a capacity to 6,000 ml and forces to 56,000 x G. Instrumentation includes centrifuge and refrigeration master switches, brush life indicator signals, continuous reading electric tachometer, automatic synchronous timer with "hold" position, electro-dynamic brake selector switch, push-button start switch, and temperature controller. The instrument panel for all these operations is up front for easy control.

For capacity, performance, and easy operation you can count on, bring the Lourdes Model 30R Clini-fuge into your laboratory. For more information, write Vernitron or contact your local dealer. Today. And you, too, will praise the Lourdes.

 Vernitron Medical Products, Inc.
Empire Blvd. & Terminal Lane, Carlstadt, N.J. 07072

Circle No. 81 on Readers' Service Card



- Starts and stops automatically — whether flow time is 10 seconds or 1000 seconds

- Accurate to .02% $\pm$.01 seconds with both rising and falling-level viscometers

The Wescan Model 220 Automatic Viscosity Timer measures viscosity up to ten times more accurately than manual methods — while freeing the operator for other activity. It measures flow times up to 9999.99 seconds, at temperatures from -75°C to 150°C . Changes in light reflection trigger the timer by means of photosensors.

For details about the way the Model 220 saves time and measures more precisely, write for PB 702.



WESCAN INSTRUMENTS, INC.
2968 Scott Boulevard
Santa Clara, California 95050

Circle No. 90 on Readers' Service Card

Medicine, 6th, Barcelona, Spain. (J. S. Garcia Alsina, IFPM, Ravella 4, Barcelona 6)

2-7. **Environment**, 36th annual conf., Natl. Environmental Health Assoc., New York, N.Y. (N. Pohlit, NEHA, 1600 Pennsylvania Ave., Denver, Colo. 80203)

3-6. **Shell Structures and Climatic Influences**, Intern. Assoc. for Shell Structures, Calgary, Alta., Canada. (P. G. Glockner, Dept. of Civil Engineering, Univ. of Calgary, Calgary 44)

5-8. **Shock Tube Symp.**, 8th intern., London, England. (Symp. Secretary, Dept. of Aeronautics, Imperial College, Prince Consort Rd., London, S.W. 7)

6-8. **RF Plasma Heating**, American Physical Soc., Lubbock Tex. (M. O. Hagler, Dept. of Electrical Engineering, Texas Tech Univ., Lubbock 79409)

9-12. **Molecular Beams**, 4th intern. symp., Cannes, France. (F. M. Devienne, Laboratoire de Physique Moléculaire des Hautes Energies, B.P.2 (06), Peymeinade, France)

9-14. **American Malacological Union**, Galveston, Tex. (A. S. Merrill, Biological Lab., Natl. Marine Fisheries Service, Oxford, Md. 21654)

9-14. **Power Engineering Soc.**, San Francisco, Calif. (Meetings Officer, Inst. of Electrical and Electronics Engineers, Inc., 345 E. 47 St., New York 10017)

9-14. **Public Transportation in Urban Areas**, Engineering Foundation, Henniker, N.H. (EF, 345 E. 47 St., New York 10017)

10-12. **DNA Synthesis in vitro**, 2nd annual Steenbock symp., Madison, Wis. (Mrs. M. Parker, Dept. of Biochemistry, 420 Henry Mall, Univ. of Wisconsin, Madison 53706)

10-14. **Coastal Engineering**, intern. conf., American Soc. of Civil Engineers, Vancouver, B.C., Canada. (H. R. Hands, ASCE, 345 E. 47 St., New York 10017)

10-14. **Interaction of Radioactive Contaminants with the Constituents of the Marine Environment**, Seattle, Wash. (J. H. Kane, Div. of Technical Information, U.S. Atomic Energy Commission, Washington, D.C. 20545)

10-14. **Rarefied Gas Dynamics**, 8th intern. symp., Stanford, Calif. (K. Karamcheti, Dept. of Aeronautics and Astronautics, Stanford Univ., Stanford 94305)

11-14. **Society of Nuclear Medicine**, Boston, Mass. (Mrs. M. Glos, SNM, 211 E. 43 St., New York 10017)

11-15. **National Soc. of Professional Engineers**, Denver, Colo. (P. H. Robbins, NSPE, 2029 K St., NW, Washington, D.C. 20006)

12-15. **International Soc. of Clinical Lab. Technologists**, St. Louis, Mo. (D. Bier Birenbaum, ISCLT, 805 Ambassador Bldg., St. Louis, Mo. 63101)

16-19. **American Assoc. for Clinical Immunology and Allergy**, Seattle, Wash. (S. H. Jaros, AACIA, 9705 Louis Dr., Omaha, Neb. 68114)

16-20. **American Veterinary Medical Assoc.**, New Orleans, La. (M. R. Clarkson, AVMZ, 600 S. Michigan Ave., Chicago, Ill. 60605)

16-21. **International Soc. of Hematology**, intern. congr., São Paulo, Brazil. (World Federation of Hemophilia, Suite

806, 1420 St. Mattieu, Montreal 108, P.Q., Canada)

16-28. **Technology and the People**, Inst. on Man and Science, Rensselaerville, N.Y. (G. A. Enk, IMS, Rensselaerville 12147)

17-20. **International Symp. on Sex Education**, Tel Aviv, Israel. (E. Chigier, P.O. Box 16271, Tel Aviv, Israel)

17-21. **Electron Probe Analysis Soc. of America**, 7th natl. conf., San Francisco, Calif. (C. G. Cleaver, General Electric Co., Vallecitos Nuclear Center, Bldg. 105, Pleasanton, Calif. 94566)

17-22. **American Medical Technologists**, Philadelphia, Pa. (C. B. Dziekonski, AMT, 710 Higgins Rd., Park Ridge, Ill. 60068)

18-21. **Cyclotron Conf.**, 6th intern., Vancouver, B.C., Canada. (N. Brearley, Univ. of British Columbia, Vancouver 8)

18-21. **Hormones, the Brain, and Behavior**, 3rd intern. symp., Intern. Soc. of Psychoneuroendocrinology, London, England. (R. P. Michael, Inst. of Psychiatry, De Crespigny Park, Denmark Hill, London SE5 8AF)

19-21. **Defects in Semiconductors**, intern. conf., Reading, England. (Meetings Officer, Inst. of Physics, 47 Belgrave Sq., London S.W.1, England)

19-22. **Calorimetry Conf.**, 27th, Park City, Utah. (J. M. Sturtevant, Dept. of Chemistry, Yale Univ., New Haven, Conn. 06520)

23-28. **Control Strategies for Power Systems**, Engineering Foundation, South Berwick, Maine. (EF, 345 E. 47 St., New York 10017)

23-28. **Illuminating Engineering Soc.**, Tulsa, Okla. (P. C. Ringgold, IES, 345 E. 47 St., New York 10017)

23-28. **Pharmacology and the Future of Man**, 5th intern. congr., American Soc. for Pharmacology and Experimental Therapeutics, San Francisco, Calif. (E. B. Cook, ASPET, 9650 Rockville Pike, Bethesda, Md. 20014)

24-29. **Foetal and Neonatal Physiology**, Sir Joseph Barcroft Centenary Symp., Physiological Soc., Cambridge, England. (P. W. Nathanielsz, SJBCS, Physiological Lab., Cambridge, England)

24-30. **Angiology**, 8th intern. congr., Rio de Janeiro, Brazil. (D. F. M. Bunce, Dept. of Physiology, College of Osteopathic Medicine and Surgery, Sixth at Center, Des Moines, Iowa 50309)

26-29. **American Dairy Science Assoc.**, Blacksburg, Va. (C. Cruse, ADSA, 425 Illinois Bldg., 113 N. Neil St., Champaign, Ill. 61820)

26-31. **Inter-American Meeting of Neuroradiology**, Rio de Janeiro, Brazil. (A. Tomax Rezende, Caixa Postal 9031, ZC-02, Rio de Janeiro, Gb)

27-29. **Extra-Corporeal Technology**, 10th intern. conf., New York, N.Y. (E. C. Berger, American Soc. of Extra-Corporeal Technology, Inc., 287 E. 6 St., St. Paul, Minn. 55101)

27-29. **Intracranial Pressure**, 1st intern. symp., Hannover, Germany. (M. Brock, Neurochirurgische Klinik, Medizinische Hochschule Hannover, 3 Hannover-Klee-feld, Roderbruchstrasse 101, Germany)

29-5. **Technology and Human Future**, 19th annual, Inst. on Religion in an Age of Science, Star Island, N.H. (F. Nesbett, 219 Harvard St., Brookline, Mass. 02146)