

# SCIENCE

27 October 1972

Vol. 178, No. 4059

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



# LOW-COST ULTRAMICROTOMY

Low-cost ultramicrotomy for electron microscopy depends on being able to choose the right instrument for each particular task.

LKB offer a COMPLETE range of ultramicrotomy instruments for you to choose from.

The economical LKB-Huxley ultramicrotome allows you to cut good quality sections for electron microscopy at

low cost. Its simple and easily-learned controls make it ideal for training as well as research.

For ultrathin sectioning of your more difficult specimens, the Universal Ultratome III gives you a wider range of variable parameters than any other ultramicrotome on the market today.

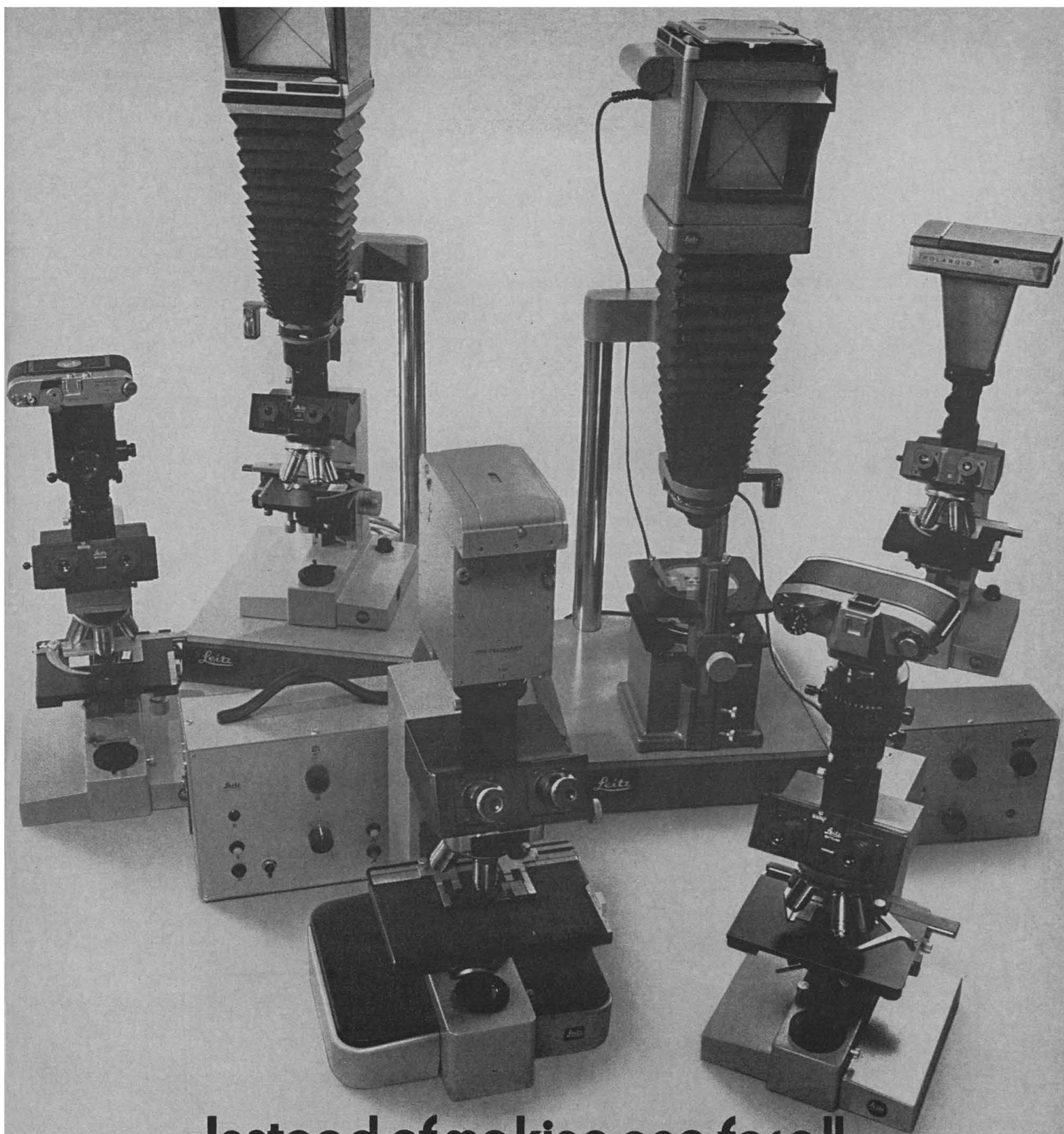
## LKB

IN THE SERVICE OF SCIENCE

LKB Instruments Inc. 12221 Parklawn Drive, Rockville MD. 20852  
11744 Wilshire Blvd. Los Angeles Calif. 90025  
6600 West Irving Park Road, Chicago Ill. 60634  
260 North Broadway, Hicksville N.Y. 11800

Circle No. 1 on Readers' Service Card





## Instead of making one for all, we let you choose one from all.

As certainly as no single microscope can serve all disciplines, no single photomicrographic camera can meet all needs. Your preference may be a large format, small format, Polaroid®, automatic, manual, without camera back, with camera back, single frame, multiple frame, or time-lapse.

Leitz lets *you* choose. And whether it's your budget or your specific need that dictates

preference, you get the same common denominator... optical performance second to none, precision and dependability.

To help you make a decision, let us send you our brochure. There is *one* that's just right for you.

**Leitz**® E. Leitz, Inc., Rockleigh, N.J. 07647  
**Leica**®

126272

Circle No. 6 on Readers' Service Card

27 October 1972

Vol. 178, No. 4059

# SCIENCE

<b>LETTERS</b>	Population Ethics: <i>L. J. Johnson; G. Nettler; J. C. Montgomery; T. D. Perrine; O. Vaartaja; L. G. Humphreys; D. Callahan</i> ; Research Natural Areas: <i>S. D. Veirs</i> ; Safety at Rocky Flats: <i>E. A. Martell</i> ; Understanding Science: <i>M. Goran</i> . . . . .	347
<b>EDITORIAL</b>	Energy Conservation . . . . .	355
<b>ARTICLES</b>	Aging: Noncycling Cells an Explanation: <i>S. Gelfant and J. G. Smith, Jr.</i> . . . . .	357
	Fourier Transform Spectroscopy: <i>E. D. Becker and T. C. Farrar</i> . . . . .	361
	The Ortega Hypothesis: <i>J. R. Cole and S. Cole</i> . . . . .	368
<b>NEWS AND COMMENT</b>	Scientists in Politics: A Late Entry for Nixon's Group . . . . .	375
	Medicine at Michigan State (IV): Osteopaths and Allopaths . . . . .	377
	Health Fad Underworld Surveyed . . . . .	379
	Europe and the Environment: Cooperation a Distant Prospect . . . . .	381
<b>RESEARCH NEWS</b>	The 1972 Nobel Prize for Physiology or Medicine . . . . .	384
	Magnetohydrodynamic Power: More Efficient Use of Coal . . . . .	386
	Polychlorinated Biphenyls: Still Prevalent, but Less of a Problem . . . . .	388
<b>BOOK REVIEWS</b>	Geographical Ecology, reviewed by <i>T. W. Schoener</i> and by <i>S. A. Boorman</i> ; Nongcun yisheng shouce (Peasant Village Physician's Handbook), <i>H. Agren</i> ; Books Received . . . . .	389

## BOARD OF DIRECTORS

MINA REES  
Retiring President, Chairman

GLENN T. SEABORG  
President

LEONARD M. RIESER  
President-Elect

DAVID BLACKWELL  
RICHARD H. BOLT

LEWIS M. BRANSCOM  
BARRY COMMONER

## VICE PRESIDENTS AND SECTION SECRETARIES

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

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

PHARMACEUTICAL SCIENCES (Np)  
Linwood F. Tice  
John Autian

PHYSICS (B)  
Herbert Friedman  
Rolf M. Sinclair

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

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

CHEMISTRY (C)  
Martin Paul  
Leo Schubert

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

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

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

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

J. Linton Gardner  
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 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 \$; 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 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

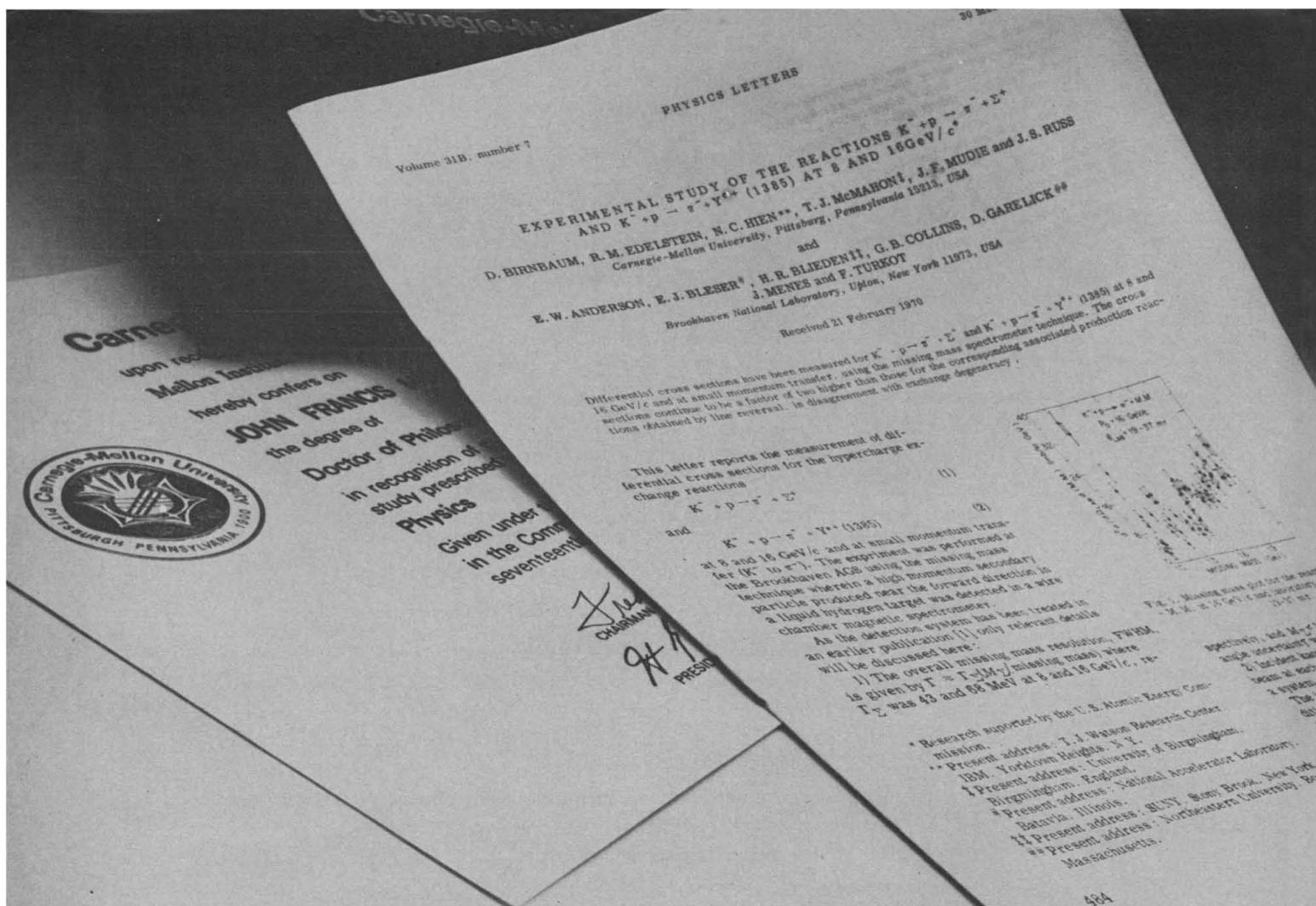
<b>REPORTS</b>	Precision Geodesy via Radio Interferometry: <i>H. F. Hinteregger et al.</i> . . . . .	396
	Quaternary Paleotemperatures and the Duration of the High-Temperature Intervals: <i>C. Emiliani</i> . . . . .	398
	Lead Aerosol Baseline: Concentration at White Mountain and Laguna Mountain, California: <i>T. J. Chow, J. L. Earl, C. B. Snyder</i> . . . . .	401
	Siliceous Algal and Bacterial Stromatolites in Hot Spring and Geyser Effluents of Yellowstone National Park: <i>M. R. Walter, J. Bauld, T. D. Brock</i> . . . . .	402
	Polar Motion from Laser Tracking of Artificial Satellites: <i>D. E. Smith et al.</i> . . . . .	405
	Interferometric Observations of an Artificial Satellite: <i>R. A. Preston et al.</i> . . . . .	407
	Incised River Meanders: Evolution in Simulated Bedrock: <i>R. G. Shepherd</i> . . . . .	409
	Survival of Mouse Embryos Frozen to $-196^{\circ}$ and $-269^{\circ}\text{C}$ : <i>D. G. Whittingham,</i> <i>S. P. Leibo, P. Mazur</i> . . . . .	411
	Brain Serotonin Content: Physiological Regulation by Plasma Neutral Amino Acids: <i>J. D. Fernstrom and R. J. Wurtman</i> . . . . .	414
	Thyrotropin Releasing Hormone: Enhancement of Dopa Activity by a Hypothalamic Hormone: <i>N. P. Plotnikoff et al.</i> . . . . .	417
	Arthropod Molting Hormone: Radioimmune Assay: <i>D. W. Borst and J. D. O'Connor</i> . . . . .	418
	Coherin: A New Peptide of the Bovine Neurohypophysis with Activity on Gastrointestinal Motility: <i>I. Goodman and R. B. Hiatt</i> . . . . .	419
	Eyes Have a Role in Photoperiodic Control of Sexual Activity of <i>Coturnix</i> : <i>K. Homma, W. O. Wilson, T. D. Siopes</i> . . . . .	421
	Echinoid Spawning Induced by a Radial Nerve Factor: <i>R. C. Cochran and</i> <i>F. Engelmann</i> . . . . .	423
<b>AAAS ANNUAL MEETING</b>	The Growth Question and Environmental Policy Issues; Limits to Growth? Achieving Public Interests in Management of Land Resources: NEPA: In Context, in Detail, in Court . . . . .	425

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

"Frozen-thawed" mouse pups and the albino foster mother who gave birth to them. The pups developed from eight-cell embryos that had been surgically removed from brown genetic mothers, frozen to  $-196^{\circ}\text{C}$  for 21 hours, thawed, and then transferred to the oviduct of the foster mother. See page 411. [P. Whittingham, S. Leibo, and P. Mazur, Oak Ridge National Laboratory]

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.



- 1964 B.S. in physics, summa cum laude, Pennsylvania State University
- 1966 M.S. in high-energy physics, Carnegie Mellon University
- 1970 Ph.D. in high-energy physics, Carnegie Mellon University
- 1967-69 High-energy physics research, Brookhaven National Laboratory and Argonne National Laboratory.
- 1966-72 Co-author of 10 papers, including:
- "Experimental Study of the Reactions  $K^- + p \rightarrow \pi^- + \Sigma^+$  and  $K^- + p \rightarrow \pi^- + Y^{*+} (1385)$  at 8 and 16 GeV/c"
- "Upper Limits on Rare Two-body Processes in  $K^- p$  and  $\bar{p} p$  Scattering at High Energies"
- 1970 Marketing manager, Digital Equipment Corporation

This man knows what computers can do for scientists.

He works for Digital.

So when you call Digital, you can talk to someone who understands your language. Someone who knows laboratories as well as he knows computers. Someone who can help you.

There are many other scientists like him at Digital. Gas chromatog-

raphy specialists. Life science specialists. Behavioral scientists. Engineers. Among others.

They can tell you all about our complete systems for a wide range of specialized scientific applications. Our library of laboratory software packages, second to none. Our full line of interfacing equipment and our 12 years of experience in the laboratory computer business.

Any time you're thinking about using a computer in your lab, call your Digital representative. He'll arrange for you to talk to one of our scientists in your area of specialization.

In your own language.

Digital Equipment Corporation, 146 Main St., Maynard, Mass. 01754. (617) 897-5111. European headquarters: 81 route de l'Aire, 1211 Geneva 26. Tel: 42 79 50.

**digital**

Circle No. 10 on Readers' Service Card



# SEVENTH MILES INTERNATIONAL SYMPOSIUM:

## ROLE OF IMMUNOLOGICAL FACTORS IN VIRAL AND ONCOGENIC PROCESSES

Roland F. Beers, Jr., M.D., Ph.D., Chairman  
to be held in two Sections

**WESTERN HEMISPHERE SECTION:**

May 31-June 1, 1973

Johns Hopkins Medical Institutions  
Baltimore, Maryland

**EASTERN HEMISPHERE SECTION:**

June 6-7, 1973

Hotel Inter-Continental  
Vienna, Austria

**FOR INFORMATION AND  
RESERVATIONS CONTACT:**

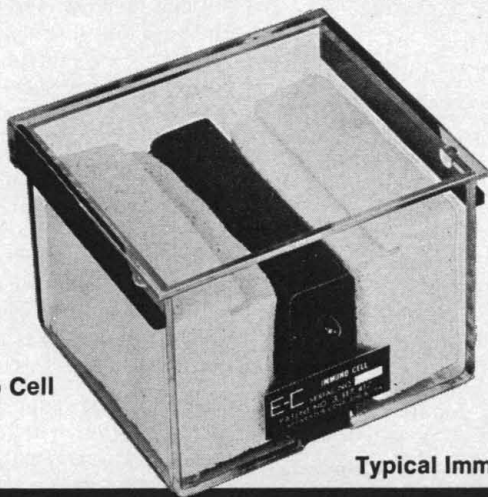
C. J. O'Donovan, M.D., Symposium Coordinator

Circle No. 52 on Readers' Service Card



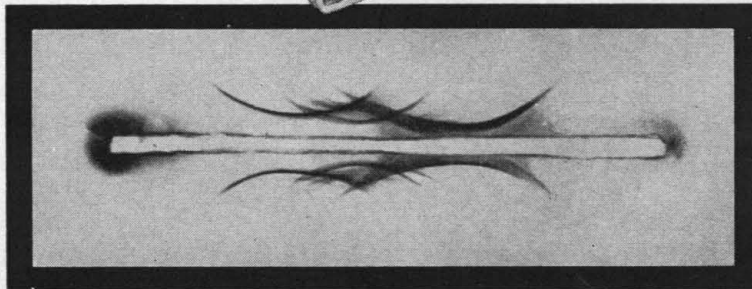
Miles Laboratories, Inc.  
Elkhart, Indiana 45614 • U.S.A.

## Check This Electrophoresis Value!



E-C Immuno Cell

Typical Immuno Result



For only \$165 you get a versatile  
E-C Immuno cell—capable of either  
immunoelectrophoresis or general  
protein separation and analysis

Check these features:

- built-in power supply
- platinum electrodes
- safety interlock
- accepts plates, cellulose acetate
- no adjustment, no mistakes
- documented procedures

Studying antigens? General proteins?  
Need easy-to-operate equipment?  
Then check us!

E-C Apparatus Corporation  
3831 Tyrone Blvd. N.  
St. Petersburg, Florida 33709  
813-344-1644



Circle No. 50 on Readers' Service Card

Actual Size



**NALGENE® FORCEPS.  
THE GRIPPER.  
THE GRABBER.  
THE PINCHER.  
THE HOLDER.**

You get a powerful grip on tiniest, tissue-thin objects . . . a positive clamp on vinyl or rubber tubing. Use with hot or corrosive materials. May be autoclaved or gas-sterilized for re-use, yet low enough in cost to be disposable. This is the unique multi-purpose, all-plastic Nalgene forceps . . . remarkably efficient and inexpensive.

Convenient ratchet on scissors-type handle locks jaws securely. Sturdy, one-piece, double-action "living hinges" have cantilever construction for extra leverage. Serrated jaws equipped with tight-fitting teeth, open to  $\frac{3}{4}$ ". Only  $4\frac{3}{4}$ " long.

A great little pickup. Carry a pair in your pocket—weighs less than one ounce. Forceps also available pre-sterilized, individually packaged in peel-back pouch, ready for instant use in hospitals and clinics by physicians, veterinarians, nurses. Order from your labware dealer. Cat. No. 6320-0010, 12 per pkg., 72 per case. Cat. No. 6321-0010, Nalgene sterile forceps in individual pouch, 12 pouches per pkg., 72 per case.

**FREE SAMPLE!** Sterilized forceps in individual peel-back pouch. Write Nalgene Labware Division, Dept. 4222, Rochester, N. Y. 14602.

NALGENE LABWARE DIVISION  
**NALGE**  
SYBRON CORPORATION  
Nalgene® Labware...the permanent replacements.

Circle No. 62 on Readers' Service Card

that it is the cause of all our urban woes, a thesis lacking empirical support.

Humphreys is incorrect in asserting that I claimed freedom of choice now exists. I said that it is a value which should be given primacy, under the aegis of voluntaristic information and contraception programs. The work of implementing that value has hardly begun.

DANIEL CALLAHAN  
*Institute of Society, Ethics and the  
Life Sciences,  
Hastings-on-Hudson, New York 10706*

### Research Natural Areas

In his article "Natural areas" (4 Aug., p. 396), William Moir refers briefly to a publication that should receive more attention. *A Directory of Research Natural Areas on Federal Lands of the United States of America* (1) is a list of more than 300 research natural areas with their descriptions, locations, and individual information sources. It is cross-referenced by type, state, and species of note and serves as an announcement of the availability of natural areas for appropriate use by scientists and educators.

STEPHEN D. VEIRS  
*Redwood National Park,  
Drawer N,  
Crescent City, California 95531*

### Reference

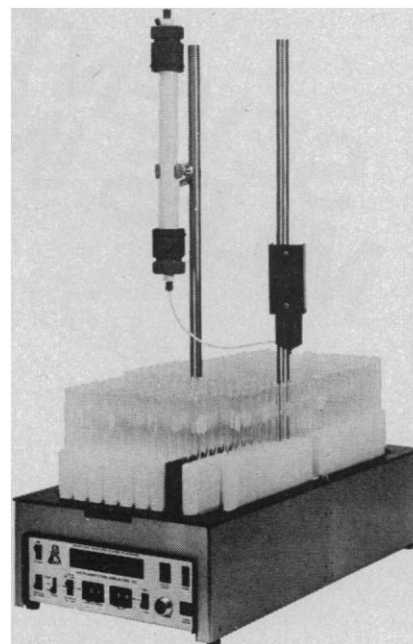
1. Federal Committee on Research Natural Areas, *A Directory of Research Natural Areas on Federal Lands of the United States of America* (Government Printing Office, Washington, D.C., 1968).

### Safety at Rocky Flats

Donald Michels (Letters, 21 July, p. 208) takes issue with Deborah Shapley's disturbing report (News and Comment, 5 Nov. 1971, p. 569) on safety at Dow Chemical Company's Rocky Flats plutonium plant in Colorado. Michels is on the Rocky Flats staff (an affiliation not mentioned in his letter) and thus is hardly a disinterested observer.

Michels appeals to the reader to imagine that plutonium plant safety has evolved somewhat over the past 25 years and that there is no inconsistency in the claims of the Atomic Energy Commission (AEC) that the Rocky

Only ISCO  
fraction collectors  
have the  
time-saving  
delay.



Effluent peaks between recorded event marks aren't always deposited in the indicated test tube. Event marks locate tube changes, but the adjacent curve monitors the effluent as it is passing through the flow cell, not into the tubes. The resulting discrepancy can be quite large if the effluent tubing, flow rate, and collected sample size are not perfect. Manual chart corrections are inaccurate and time consuming.

ISCO linear and circular fraction collectors are available with an automatic time delay. This solid state, electronic timer will delay the tube change the required period after event marking the recorder curve. Easy adjustment from one second to 9.9 minutes gives you synchronized event marks and peaks for any run.

The automatic delay is only one of the many features of ISCO fraction collectors. Completely solid state circuitry, easy cleanup after spillage, and low cost are other features described in the current ISCO catalog.



ISCO

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

Circle No. 65 on Readers' Service Card

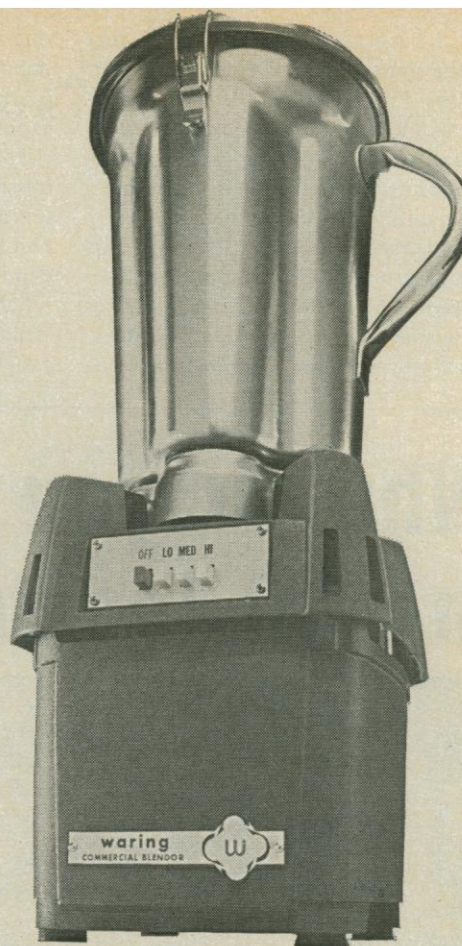
Flats plant is safe and the AEC request for funds to make it safer. However, most improvements at Rocky Flats have been made since the nearly disastrous plutonium fire of May 1969 and the discovery of off-site plutonium contamination. Despite improvements, both plant safety and public safety remain uncertain because (i) the AEC has not complied with the request of the Environmental Protection Agency for a detailed plant-safety analysis, and (ii) neither the National Committee on Radiation Protection and Measurements nor the International Commission on Radiation Protection has recommended plutonium inhalation standards applicable to the general public, including children.

In comments on reports by me and my associates (1, 2) Michels is careless with facts and makes statements out of context, based largely on unpublished sources. Michels claims that plutonium soil data must show a bimodal distribution to establish the presence of plutonium from Rocky Flats. This unsubstantiated speculation is incorrect because it is at odds with unequivocal evidence from  $^{239}\text{Pu}/^{90}\text{Sr}$  ratio data for soils (2). Duplicate small soil samples, obtained using carefully tested procedures, have variations attributable to differences in the size and number of plutonium particles present (2). Without basis, Michels implies that our data are unreliable because of such variations. Our experimental methods and results have been reported (2). If, as Michels suggests, members of the Health and Safety Laboratory of the AEC take exception to some of our conclusions, they should publish their own views.

In January 1970, I attributed the off-site plutonium to the May 1969 fire at Rocky Flats (1). The possibility that the off-site plutonium resulted from a 1957 fire or a plutonium-contaminated oil spill was first admitted by Dow representatives on 10 February 1970. Subsequently it was shown (2, 3) that most of the off-site plutonium was due to the oil spill.

Michels incorrectly states that only 17 percent of the winds at Rocky Flats have an easterly component. Possibly he was misled by uncritical consideration of the wind data in Figure 1 of HASL Report No. 235 (3), in which the wind frequency scale is incorrect. About 35 percent of the winds have an easterly component, justifying my statement that about one-third of normal stack effluent is carried to the west. Further-

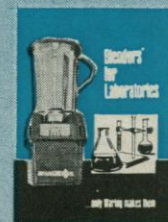
**GRIND  
EMULSIFY  
DISINTEGRATE  
HOMOGENIZE  
SHRED  
BLEND  
OR MIX  
IN SECONDS!**



Waring's exclusive cloverleaf shape is hydrodynamically designed for perfect blending action . . . the solid one-piece cover with molded gasket assures a perfect seal . . . our 3-speed, 1725-watt motor furnishes power to spare. Container, cover, and blending assembly are stainless steel: easy to clean and trouble free. An ingenious adapter lets you use the smallest container on the one-gallon base. Like all Waring Laboratory Blenders, this model is warranted for one year of laboratory use.



Waring also makes a complete line of explosion-proof Blendors, one-quart Blendors for every use, and a complete line of accessories. Write for our catalog.



Waring Blendors® are unique . . .  
no wonder we registered the name!

 **waring**

Waring Products Division, Dynamics Corporation of America  
New Hartford, Connecticut 06057

more, I have never questioned the fact that the most frequent winds in Denver over the Platte River valley are southerly to southwesterly. I only question the argument that such winds somehow protect Denver from Rocky Flats plutonium contamination.

In justifying the few Rocky Flats employees on the Transuranium Registry (450 of 7700) Michels makes indefensible statements: "Studies of exposures to workers must naturally be

restricted to those persons involved in incidents" and "... few of those [plutonium workers] collect significant exposures during their tenure." Cancer risks applicable to the maximum permissible lung burden (MPLB) for plutonium are very uncertain (4), and chronic effects of low level plutonium exposure are unknown. Cancer from inhaled plutonium may be due to the irradiation of cells within the short range of alpha radiation around each

plutonium particle. If so, the lung cancer risk would depend on the number, size, and persistence of plutonium particles in the lung. On this basis the MPLB is a meaningless concept, and plutonium lung burdens below detectable levels would involve significant risk. Not only plutonium workers, but all others exposed to airborne plutonium at Rocky Flats and its environs, have received plutonium exposures of uncertain consequences.

If the AEC is to be allowed to pursue a plutonium fast breeder program, we must first obtain an adequately comprehensive evaluation of the chronic effects of low levels of plutonium on man. I agree with Shapley that the limited program of medical follow-up of past and present employees of Rocky Flats falls woefully short of the mark.

E. A. MARTELL

*National Center for Atmospheric Research, Laboratory of Atmospheric Research, Post Office Box 1470, Boulder, Colorado 80302*

#### References

1. "Report on the Dow Rocky Flats fire: Implications of plutonium releases to the public health and safety" (Colorado Committee for Environmental Information, Boulder, 1970).
2. S. E. Poet and E. A. Martell, *Health Phys.* **23**, 537 (1972).
3. P. W. Krey and E. P. Hardy, "Plutonium in soil around the Rocky Flats plant" (Report No. HASL-235, Health and Safety Laboratory, Atomic Energy Commission, New York, 1970).
4. A. B. Long, *Nucl. News* **14**, 69 (1971).

#### Understanding Science

The important effort reported in the editorial "Understanding of science" by Amitai Etzioni (4 Aug., p. 391) needs more than the membership of the AAAS to be successful. Those disenchanted with technology may view the explanations of scientists as propaganda, while similar activities by attorneys, educators, bankers, and other nonscientist professionals could be meaningful to them. A start was made in 1966, with the pamphlet "Education and the spirit of science" issued by the National Education Association (1). Why not work with other friendly groups?

MORRIS GORAN

*Roosevelt University,  
Chicago, Illinois 60605*

#### Reference

1. Educational Policies Commission, "Education and the spirit of science" (National Education Association, Washington, D.C., 1966), now out of print.

## What do you want in a CO<sub>2</sub> 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 CO<sub>2</sub>-Air mixture throughout the chamber? **Lab-Line has it!**

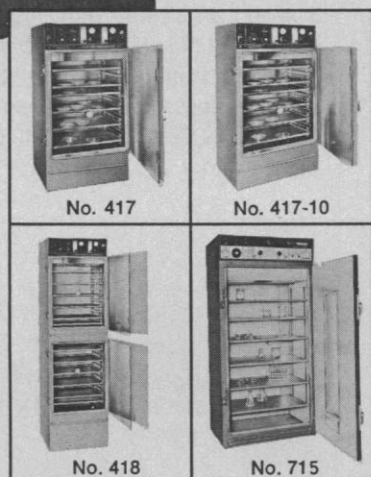
**Do You Want** ... Controlled humidities from ambient to 98% RH? **Lab-Line has it!**

**Do You Want** ... Dual chambers and controls that permits each chamber to operate at separate temperatures, humidities and CO<sub>2</sub> tensions or identical operating conditions? **Lab-Line has it!**

**Do You Want** ... An automatic Kwik-Inject mechanism which injects the exact amount of CO<sub>2</sub> into the chamber when door is closed for speedy recovery of CO<sub>2</sub> Atmosphere? **Lab-Line has it!**

**Do You Want** ... An exclusive "Window-dor", for full visibility of chamber without disturbing contents or CO<sub>2</sub> Atmosphere? **Lab-Line has it!**

Lab-Line combines these exclusive features and more in a complete line of CO<sub>2</sub> Incubators, in all sizes to fit your exact requirements. Please write for additional information and specifications.



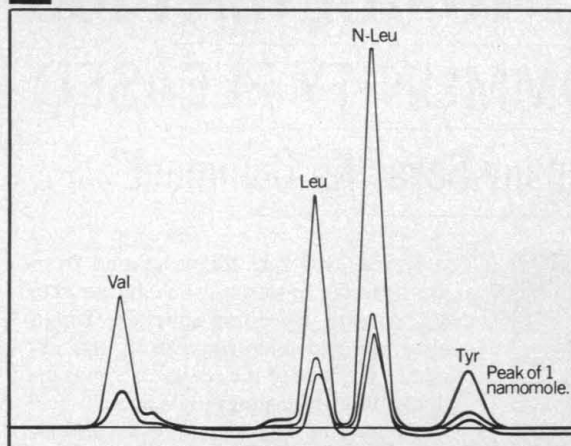
**LAB-LINE INSTRUMENTS, Inc.**  
Designers and Manufacturers  
Lab-Line Plaza  
Melrose Park, Illinois 60160

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

S-10

Circle No. 53 on Readers' Service Card

# Peak performance.



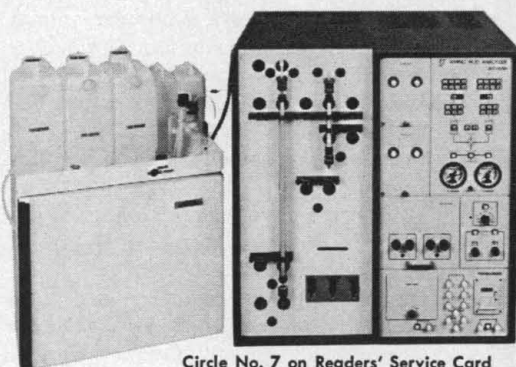
This is an Insulin A-Chain after a 12 step degradation. The instrument that provided the analysis was our 6AH Amino Acid Analyzer. Peaks like this are just part of the performance on the 6AH and our 47K Sequence Analyzer.

**Highest sensitivity.** The 6AH matches unmatched sensitivity and automatic operation. It's rated at 5 nanomoles/2 mm and 1 nanomole/10 mm. It automatically accommodates 12 samples or 36 with accessories. You can employ either single or dual column methodology for protein hydrolyzate research and for work with physiological fluids. And like the 6AH, the integrator we feature is a product of JEOL design and manufacture. ☐ Our 47K should be part of your work if your work includes short peptide or long protein analysis. The patented

design of the overflow reaction cup system makes this research possible. The automatic fractionation of residual peptides and dual fraction collectors make both Edman and Dansyl subtractive methods routine.

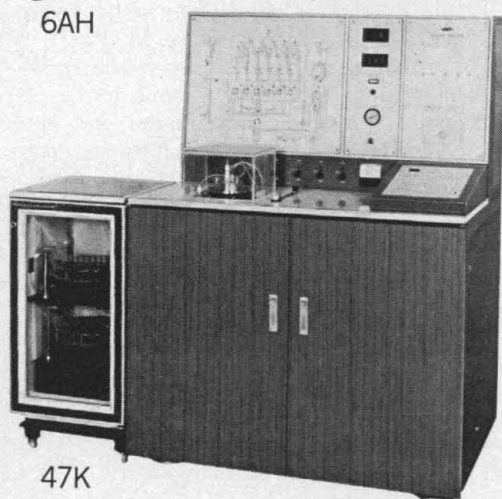
**Top support.** More than routine is JEOL service that comes with every instrument. It's the equal of the instruments in refinement, speed and accuracy. Our service stands

ahead of others and behind our 47K and 6AH. All are at the top of their field, individually or working together. ☐ Learn more from the Automated Analyzer Division, JEOL, 235 Birchwood Ave., Cranford, N.J. 07016. Tel. (201) 272-8820.



6AH

Circle No. 7 on Readers' Service Card



47K

Circle No. 8 on Readers' Service Card

# JEOL

**INSTRUMENTATION:** Scanning Electron Microscopes / Electron Microscopes / X-ray Microprobes / NMR Spectrometers / Mass Spectrometers / ESR Spectrometers / Laser Raman Spectrophotometers / Gas Chromatographs / Laboratory Computers / X-ray Diffractometers / Amino Acid Analyzers / Sequence Analyzers / Electron Beam Apparatus.

**WORLDWIDE:** 16, Avenue de Colmar, 92 Rueil-Malmaison (Paris) / Grove Park, Edgware Road, Colindale, London N.W.9 / 3-3-1 Marunouchi, Chiyoda-ku, Tokyo 100 / 477 Riverside Avenue, Medford, (Boston) Massachusetts 02155 / Australia and New Zealand, Austria, Benelux, Brazil, Canada, Colombia, Germany, Italy, Scandinavia and Finland, South Africa, Spain and Portugal, Switzerland, Venezuela.

"Animal News  
That's Fit  
to Print."

# The New City Times

Late City  
Edition

NEW CITY, ROCKLAND COUNTY, N.Y.

## THE NEW CARWORTH CATALOGS MYTH OR REALITY?

In the course of this newspaper's investigations into the new Carworth guinea pigs, our reporters have also uncovered the fact that Carworth is about to release two new catalogs.

The first of these catalogs presumably deals with Carworth rats and mice and, we suspect, the "secret" guinea pigs, too.

The second catalog seems to cover Carworth's extensive line of laboratory animal care equipment including: animal housing systems, contamination control products like laminar flow devices, bedding, cleaning materials and other accessories and supplies.

We queried the Carworth advertising agency about the existence of these new catalogs and were told by a representative that they know nothing (Editor's Note: an unusual agency admission!), but that if Carworth were to issue new catalogs soon, "they would be likely to be beauties," they stated with characteristic immodesty.

The New City Times can't help but wonder what other surprises these Carworth people have in store for us. In any event, for now we suggest that you write Carworth, New City, (Rockland County), N.Y. 10956 (or call 914/634-8931) and say: "if these new catalogs are not a myth, please send!"

## CARWORTH INTO GUINEA PIGS RESEARCH COMMUNITY PLEASED

### Surprisingly, Company Says "No Comment"



The guinea pig, believed to be a tame form of the cavy, *Cavia cutleri*. The capybara, the largest rodent alive (or even dead, for that matter), is also a well-known cavy.

The New City Times today learned from an unidentified but usually reliable source, that Carworth, a leading supplier of high quality rats and mice since 1935, has expanded its service to the research community by adding guinea pigs to its line.

Calls by this newspaper to a random selection of research people indicate that the guinea pig, always a popular animal for bacteriologic and vitamin C work, is now also being widely used in immunologic, pharmacologic, virologic, and endocrinologic studies of all types.

Thus, it seems obvious to this paper that the entry into this field of a quality house like Carworth provides researchers with a valuable new source for this important laboratory animal.

Our investigative reporters have also uncovered the fact that the Carworth guinea pigs are actually Dunkin/Hartley animals from a closed colony meticulously maintained for over 15 years.

Carworth personnel have routinely responded to our inquiries about this development with enigmatic smiles and "no comment" and will neither affirm nor deny any of the above allegations.

Despite this uncharacteristic reticence, our reporters are firm in their conviction that all researchers interested in Carworth-quality guinea pigs are entitled to know more. The New City Times suggests, therefore, that interested parties demand more data. Write CIA (Carworth Information Agency), c/o Carworth, New City, (Rockland County), New York, 10956 (or call 914/634-8931). They'll get the message.

## Rats and Mice by the Thousands

### THOSE OTHER CARWORTH ANIMALS

Surreptitious investigation of the multiple Carworth facilities indicates that the company's apparent entry into guinea pigs has in no way diminished their activity in—or apparent enthusiasm for—supplying researchers with quality rats and mice.

Carworth mice include the well-known CF 1, CFW, and BALB/c CF inbred strain. The Carworth rats are the widely-used CFN and CFE strains.

Rumor also has it that Carworth supplies researchers with surgically-modified mice and rats at prices far below that which can be achieved by the purchaser in his own institution. (Can that be?)

The New City Times has learned that if you write to Carworth, New City, (Rockland County), New York 10956 (or call 914/634-8931) and ask for further information on their rats and mice, you'll get it.

Circle No. 4 on Readers' Service Card

## Carworth

Division of Becton, Dickinson Company   
New City, New York 10956

## 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
RUDDOLF 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, THOMAS H. MAUGH II, JEAN L. MARX

Book Reviews: SYLVIA EBERHART, KATHERINE LIVINGSTON, KATHRYN MOUTON

Cover Editor: GRAYCE FINGER

Editorial Assistants: MARGARET ALLEN, ISABELLA BOULDIN, BLAIR BURNS, ELEANORE BUTZ, ANNETTE DIAMANTE, MARY DORFMAN, JUDITH GIVELBER, CORRINE HARRIS, OLIVER HEATWOLE, CHRISTINE KARLIK, MARSHALL KATHAN, MARGARET LLOYD, DANIEL RABOVSKY, JEAN ROCKWOOD, PATRICIA ROWE, LEAH RYAN, JOHN SCHAUER, LOIS SCHMITT, YA LI SWIGART

Guide to Scientific Instruments: RICHARD SOMMER

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

### Advertising Staff

#### Director

EARL J. SCHERAGO

#### Production Manager

PATTY WELLS

Advertising Sales Manager: RICHARD L. CHARLES

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

EDITORIAL CORRESPONDENCE: 1515 Massachusetts Ave., NW, Washington, D.C. 20005. Phones: (Area code 202) Central Office: 467-4350; Book Reviews: 467-4367; Business Office: 467-4411; Circulation: 467-4417; Guide to Scientific Instruments: 467-4480; News and Comment: 467-4430; Reprints and Permissions: 467-4483; Research News: 467-4321; Reviewing: 467-4440. Cable: Advancesci, Washington. Copies of "Instructions for Contributors" can be obtained from the editorial office. See also page xv, *Science*, 29 September 1972. ADVERTISING CORRESPONDENCE: Room 1740, 11 W. 42 St., New York, N.Y. 10036. Phone: 212-PE-6-1858.

## Energy Conservation

The series of articles on energy appearing currently in *Science* points up the long-range importance of this topic and many problems connected with it. If we are to solve our energy problems, the public and the government must give these matters an enduring high priority. This is chancy. When there is a dramatic crisis, the public usually behaves well. For example, during some of the recent power shortages, the public responded to pleas for conservation. Once the immediate crisis passed, though, the public returned to its old habits. Consumption of energy continued to grow exponentially. And use of gasoline is growing at a fast rate because emission controls are making automobiles less efficient.

Importation of petroleum and its products has been increasing rapidly. The Bureau of Mines now estimates that by 1985 imports alone will amount to 15 million barrels a day, which is our current total use. Such a volume could only be met by drawing heavily on the Middle East. Demand from Europe and Japan has already created a seller's market. Recently the Oil Producing and Exporting Countries have obtained substantial increases in their take. The most aggressive has been Libya, which in 2 years has doubled its return per barrel.

What will the Middle Eastern countries do with the enormous wealth that they will extract? The example of one is disquieting. Libya has chosen to devote part of its revenues to financing terrorist activities. The largest petroleum reserve is found in Saudi Arabia. That country has a small population and limited demand for goods. It has already begun to move toward controlling interest in some of the great International Petroleum companies. At the moment it seems to be a force for stability in the Middle East. However, who knows for how long? Prudence dictates that we examine alternatives to massive dependence on foreign oil.

One alternative that has not had much attention is conservation of energy. A recent useful 250-page government study\* points to many possible measures that could be taken to reduce energy demand without great interference with life styles. It provides data on the various categories of energy consumption—transportation (25 percent), industry (29 percent), electric utilities (25 percent), and residential/commercial (21 percent) as well as the many components of these categories. The report discusses in detail possible short-term and mid-term savings in energy. For example, better insulation of houses provided at nominal cost would save very substantial amounts of both energy and money. The study suggests that energy conservation measures could reduce U.S. energy demand in 1980 by as much as the equivalent of 7.3 million barrels of oil per day. To achieve these economies in energy would require voluntary public cooperation on a scale that has heretofore not been sustained for long.

The surest way of obtaining public cooperation in the expenditure of energy is to make energy costly, and this is likely to occur whether we wish it or not. If present trends continue, a doubling or trebling in cost of oil and gasoline could occur in this decade.

Ultimately we will find that we must rethink our attitude about automobiles. Most of us would be reluctant to part with our mobile castles. But must these castles weigh 2 tons or more? If the government can dictate exhaust standards, safety features and more, why can't it exert pressure for lighter weight and greater mileage. Indeed it is likely that history will record that instead of its push on manufacturers to cut emissions, the government should be pressing now for sharply better fuel economy.—PHILIP H. ABELSON

\* "The Potential for Energy Conservation," A staff Study, October 1972 (Office of Emergency Preparedness, Executive Office of the President).

# Marine Products

as possible sources of

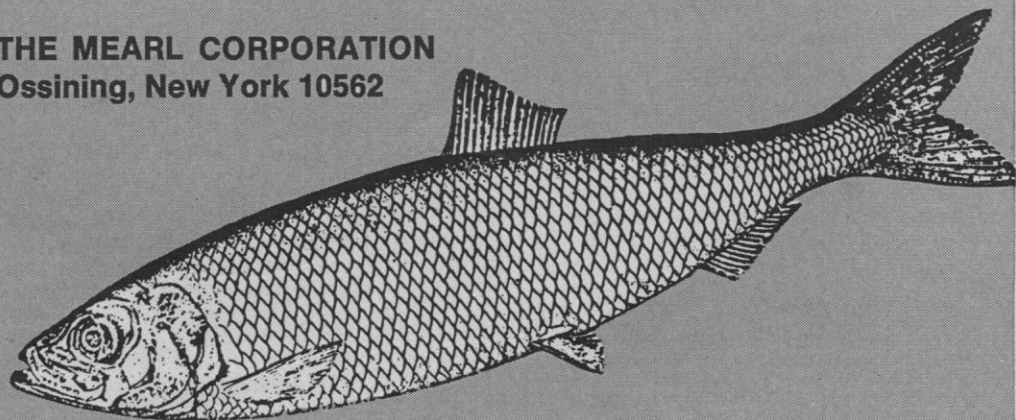
# Biologically Active Substance

- from ☐ **CLUPEA HARENGUS**  
Fish Heads • Milt • Roe • Skin (Frozen or Dried)  
Herring Scales (Dried and Pulverized)
- ☐ **OIL FREE FISH MEAL**  
(Solvent Extracted)
- ☐ **SEA URCHIN ROE**
- ☐ **ROCKWEED**  
(*Ascophyllum Nodosum*)  
Dried at Low Temperature to Preserve Natural Pigments

The products listed above originate in the **COLD WATERS** of the Bay of Fundy and are processed in our plant at Eastport, Maine.

We are receptive to suggestions on custom treatment for products listed, or other available marine products.

**THE MEARL CORPORATION**  
Ossining, New York 10562



#8572

# The Brinkmann Gel Column

## Slicing It Pretty Thin

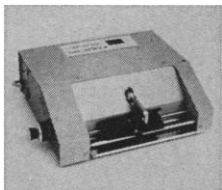
It's a safe bet you won't find one in every household. Or in every laboratory. But if you're moving in the sort of specialized area of electrophoretic analysis of RNA, for example, and you have to serve up slices of polyacrylamide gels, a lot of laboratory types think the MICKLE GEL SLICER is the best thing since delicatessens.

It figures.

How else can you cut a frozen gel column up to 10 cm long and 1 cm thick into flawless slices of less than 1.0 mm, in increments of 0.1 mm, and leave the rest of the column undisturbed?

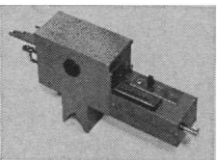
Cutting force and blade angle are adjustable for hard-frozen dilute gels, or softer, concentrated cylinders. Slices are easily collected for processing and scintillation counting.

Twenty cuts per minute. Foot switch leaves hands free. Electromagnetic counter keeps score on slices. Write for complete details.



## How To Look Good, Fast.

Costs being what they are today, the guy (or gal) who can save a few dollars gets the hero medal. Here's a way to look good while you're looking good and fast (while you're rapidly scanning polyacrylamide gel columns optically, that is).



Be the first to recommend purchase of the VICON LINEAR GEL SCANNER—the attachment that fits right into your Zeiss PMQ II Spec. cell compartment without modification (and avoids costly instrument duplication).

It scans at 6 mm/min—even faster (25 mm/min) for coarser separations—in either direction. Resolution? Slit aperture is 100 u thin to catch those narrow bands. Columns to 10 x 100 mm can be handled. Wavelength is variable from 200 to 750 mu. And there are a host of options available to meet your specific needs. Want to scan fast? Want to look good? Get the details. Write:

Dept. B.G.C.  
Brinkmann Instruments, Inc.  
Cantiague Road,  
Westbury, N.Y. 11590  
(516/334-7500)



Brinkmann Instruments  
(Canada), Ltd.  
50 Galaxy Boulevard,  
Rexdale (Toronto), Ontario

## BOOKS RECEIVED

(Continued from page 395)

of Environmental Consultants, P.O. Box 8002, St. Louis, Mo. 46 pp. Paper, \$6.

**Documentation Manual.** J. Van Duyn. Auerbach, Philadelphia, 1972. xvi, 158 pp., illus. Paper, \$6. Auerbach Computer Science Series.

**The Early Transition Metals.** K. L. Kepert. Academic Press, New York, 1972. x, 500 pp., illus. \$25.

**Electric Melting Practice.** A. G. E. Robiette in collaboration with A. G. Allen, I. George, and J. Ravenscroft. Halsted (Wiley), New York, 1972. x, 412 pp., illus. \$35.

**Elements of Geology.** James H. Zumberge and Clemens A. Nelson. Wiley, New York, ed. 3, 1972. xiv, 432 pp., illus. + maps. \$11.95.

**The Encyclopedia of Geochemistry and Environmental Sciences.** Rhodes W. Fairbridge, Ed. Van Nostrand Reinhold, New York, 1972. xxii, 1322 pp., illus. \$49.50. Encyclopedia of Earth Sciences Series, vol. IVA.

**Encyclopedia of Library and Information Science.** Vol. 7, Derunov to Egypt, Libraries in. Allen Kent, Harold Lancour, and William Z. Nasri, Eds. Dekker, New York, 1972. viii, 588 pp., illus. \$50; to subscribers, \$40.

**Errors of Observation and Their Treatment.** J. Topping. Chapman and Hall, London, ed. 3, 1972 (U.S. distributor, Barnes and Noble, New York). 120 pp., illus. Paper, \$2.50. Reprint of the 1962 edition.

**The Evolution of Population II Stars.** Proceedings of a conference, Stony Brook, N.Y., Dec. 1970. A. G. Davis Philip, Ed. Dudley Observatory, Albany, N.Y., 1972. viii, 216 pp., illus. Paper. Dudley Observatory Report No. 4.

**Evolutionary Biology.** Stanley N. Salthe. Holt, Rinehart and Winston, New York, 1972. x, 436 pp., illus. \$11.50.

**Exobiology.** Cyril Ponnampuram, Ed. North-Holland, Amsterdam; Elsevier, New York, 1972. xx, 484 pp., illus. \$32. Frontiers of Biology, vol. 23.

**Experiments in Molecular Genetics.** Jeffrey H. Miller. Cold Spring Harbor Laboratory, Cold Spring Harbor, N.Y., 1972. xvi, 466 pp., illus. Spiral bound, \$11.95.

**Exploring the Ocean World.** A History of Oceanography. C. P. Idyll, Ed. Crowell, New York, ed. 2, 1972. viii, 296 pp., illus. \$14.95.

**Family, Marriage, and the Struggle of the Sexes.** Hans Peter Dreitzel, Ed. Macmillan, New York; Collier-Macmillan, London, 1972. 350 pp. \$2.95. Recent Sociology, No. 4.

**Gene Mapping in Laboratory Mammals.** Part A. Roy Robinson. Plenum, New York, 1971. viii, 152 pp. \$15.

**Geochemical Environment in Relation to Health and Disease.** A conference, Oct. 1971. Howard C. Hopps and Helen L. Cannon, Eds. New York Academy of Sciences, New York, 1972. 352 pp., illus. Paper, \$25. *Annals of the New York Academy of Sciences*, vol. 199.

**Geography.** A Modern Synthesis. Peter

Haggett. Harper and Row, New York, 1972. xxii, 484 pp., illus. \$10.95. Harper and Row Series in Geography.

**The Geology and Paleontology of the Marine Pliocene of San Diego, California (Paleontology: Pelecypoda).** Leo George Hertlein and U. S. Grant, IV. San Diego Society of Natural History, San Diego, 1972. viii pp. + pp. 143-410 + plates. Paper, \$15. Memoir 2 (Part 2B).

**A God Within.** René Dubos. Scribner, New York, 1972. x, 326 pp. \$8.95.

**A Health Care Plan for East Harlem—Now.** A workshop, Dec. 1970. Margaret C. Olendzki and Charles H. Goodrich, Eds. New York Academy of Sciences, New York, 1972. 136 pp., illus. Paper, \$14. *Annals of the New York Academy of Sciences*, vol. 196, article 2, pp. 39-175.

**Horizons of Bioenergetics.** Proceedings of a symposium, Bloomington, Ind., Oct. 1970. Anthony San Pietro and Howard Gest, Eds. Academic Press, New York, 1972. xii, 290 pp., illus. \$9.50.

**How Computers Affect Management.** Rosemary Stewart. M.I.T. Press, Cambridge, Mass., 1972. x, 244 pp. \$12.50.

**How Long Have We Got?** Ritchie Calder. McGill-Queen's University Press, Montreal, 1972. x, 88 pp. Paper. \$2.95. Beatty Memorial Lectures.

**Interstellar Molecules and Cosmochemistry.** A conference, June 1971. Fred M. Johnson, Ed. New York Academy of Sciences, New York, 1972. 102 pp., illus. Paper, \$18. *Annals of the New York Academy of Sciences*, vol. 194.

**Introduction à la Physique du Rayonnement Cosmique.** J. E. Dupuy. Doin, Paris, 1972. 2 vols. Vol. 1, Détection des Particules. Physique des Hautes Énergies (Grandes Gerbes de l'Air). pp. 1-174, illus., + table of contents. Vol. 2, Physique des Basses Énergies. pp. 175-338, illus., + index. Paper, each vol., 66 F.

**Introduction to Applied Quantum Chemistry.** S. P. McGlynn, L. G. Vanquickenborne, M. Kinoshita, and D. G. Carroll. Holt, Rinehart and Winston, New York, 1972. viii, 472 pp., illus. \$13.95.

**Introduction to Biochemistry.** John W. Suttie. Holt, Rinehart and Winston, New York, 1972. xiv, 366 pp., illus. \$11.

**Introduction to Magnetic Materials.** B. D. Cullity. Addison-Wesley, Reading, Mass., 1972. xx, 666 pp., illus. \$19.95. Addison-Wesley Series in Metallurgy and Materials.

**Introductory Chemistry.** Edmund J. Leddy and Don Roach. Rinehart (Holt, Rinehart and Winston), San Francisco, 1972. xviii, 478 pp., illus. \$10.95.

**Introductory Linear Algebra.** M. A. Aklav and V. V. Goldberg. Translated from the Russian edition (Moscow, 1969) and edited by Richard A. Silverman. Prentice-Hall, Englewood Cliffs, N.J., 1972. viii, 168 pp., illus. \$9.

**Ions in Solution (2).** An Introduction to Electrochemistry. J. Robbins. Oxford University Press, New York, 1972. xii, 128 pp., illus. Paper, \$4.95. Oxford Chemistry Series.

**The Josephson Effect in Superconductive Tunneling Structures.** I. O. Kulik and I. K. Yanson. Translated from the Russian

# The interchangeable back. It's just as important as the interchangeable lens.

In the beginning the camera was a one-piece unit.

Then somebody had an idea. If the lenses could be made to change, then the camera could be made to see more. And the interchangeable lens was born.

Victor Hasselblad had an equally interesting idea when he set out to build his 2 1/4" single lens reflex. If the back could be made to change, he reasoned, then you could build other backs for other purposes.

Then if you could also change the viewer, and the focusing screen and the film advance mechanism, and then could add on all kinds of accessories, you'd have much more than a camera. You'd have a whole system of photography. And the Hasselblad System was born.

Today, many good cameras have interchangeable lenses. Some have interchangeable viewers. But few have interchangeable film magazines.

Which is puzzling. Because a fixed back really ties a camera down, by letting it do only one thing at a time.

For example, with other cameras you have to finish or waste your roll of black and white before you can change to color. With Hasselblad you can switch from black and white to color, or from

color negative to color reversal film at any time, simply by switching backs. Each back is like having an extra camera.

And while other cameras can take only one size of film (such as 35mm), Hasselblad can take 120, 220 and 70mm film, as well as any of the cut films. It's all done with interchangeable backs.

And where other cameras take film in a limited number of shots per roll, there are Hasselblad backs that give you 12, 16, 24 and even 70 exposures per roll.

Other cameras take pictures in one size only. Hasselblad gives you three choices of picture size, 2 1/4"x2 1/4", 1 1/2"x2 1/4", 1 1/2"x1 1/2" (for making superslides). It's all done with the same camera. Only the backs change.

With other cameras re-loading is time consuming. Which can cost you a lot of good shots. With Hasselblad you can carry a few

extra pre-loaded backs and just snap them on as needed, for uninterrupted shooting. That's how the astronauts re-loaded their Hasselblads in space and on the moon.

We make five interchangeable film magazines in all.

And ten interchangeable Carl Zeiss lenses, from 40mm to 500mm (each lens has a built-in Compur shutter synchronized for flash and strobe at all speeds).

And five interchangeable viewfinders.

And three interchangeable film advance handles.

And a wide range of accessories, all the way from an underwater housing to a flashcube holder that attaches right to the sunshade.

We even make three different Hasselblad bodies. A standard SLR, an electrically-driven SLR and a super wide angle camera with 38mm lens attached.

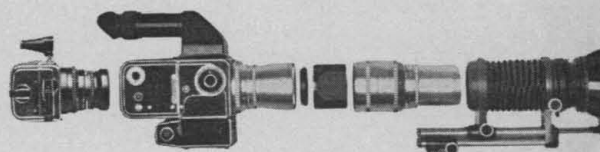
Many of these components are recent developments. But the interchangeable film magazine is as old as the Hasselblad itself. It was developed more than twenty years ago. Which has certainly given other cameras enough time to catch up.

In this day and age, if a camera has interchangeable lenses, but doesn't have interchangeable film magazines, then the back of the camera is behind the front of the camera.

For more information, see your Hasselblad dealer. For his name, and a free 48-page catalog on The Hasselblad System, write to address below.

## H A S S E L B L A D

Paillard Incorporated,  
1900 Lower Road, Linden, N.J. 07036.  
Other products: Bolex movie equipment,  
Hermes typewriters and figuring machines.



The System

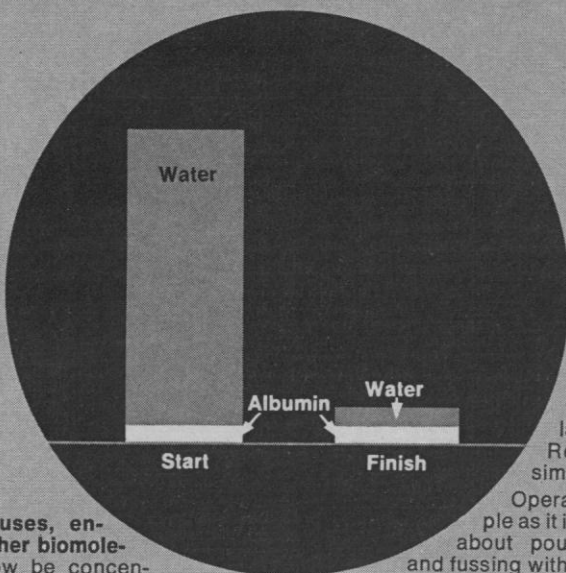
Circle No. 3 on Readers' Service Card



# Concentrate!

20-fold concentration in just 100 min. with new Hollow Fiber Devices

Proteins, viruses, enzymes and other biomolecules can now be concentrated (also desalted or fractionated) quickly and easily with Hollow Fiber Devices. Using the latest in



membrane technology, these unique devices are self-contained and compatible with existing lab equipment. Re-use after a simple wash.

Operation is as simple as it is rapid. Forget about pouring columns and fussing with dialysis bags.

A complete starting set-up costs under \$30. For "how to use" literature with prices, contact:

**BIO-RAD Laboratories**

32nd and Griffin Avenue/Richmond, CA 94804/(415) 234-4130

Circle No. 63 on Readers' Service Card

## Pye Unicam SP1800



**The basic unit:** Manual, double-beam UV-Vis. Range: 190-700nm or 190-850nm.

Four absorbance scales & concentration presentation

High resolution monochromator

Second sample position for turbid solutions

Base line compensation

**As a system:** Multiple sample handling

(plug-in additions) Digital readout & printer

Temperature programming

**PHILIPS ELECTRONIC INSTRUMENTS**

Circle No. 100 on Readers' Service Card

## Research for the World Food Crisis

"...there is no equivalent collection of the separate contributions of plant science, animal science, soil science, and agricultural engineering to the phenomenal increases in post-World War II agricultural productivity."—*American Scientist*, January-February 1972, p. 91.

Edited by Daniel G. Aldrich, Jr. 320 pages. 25 illustrations. 31 tables. Index. Retail price: \$12.50. AAAS member price when payment is sent with order: \$10. ISBN 087168-092-0.

## Arid Lands in Transition

Scientists from 14 countries assess the changing conditions, the potential for development and possible solutions to problems of development of arid regions in 15 countries around the world.

Edited by Harold E. Dregne. 524 pages. 120 illustrations, 5 maps. Index. Retail price: \$15.75. AAAS member price when payment is sent with order: \$13.50. ISBN 087168-090-4.

**AAAS**

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

edition (Moscow, 1970) by P. Gluck. Israel Program for Scientific Translations, Jerusalem, 1972 [U.S. distributor, Halsted (Wiley), New York]. x, 182 pp., illus. \$20.

**Laser Interaction and Related Plasma Phenomena.** Vol. 2. Proceedings of a workshop, Hartford, Conn., Aug. 1971. Helmut J. Schwarz and Heinrich Hora, Eds. Plenum, New York, 1972. xiv, 584 pp., illus. \$27.50.

**The Living State.** With Observations on Cancer. Albert Szent-Györgyi. Academic Press, New York, 1972. x, 114 pp., illus. \$6.55.

**The Macro Implementation of SNOBOL 4.** A Case Study of Machine-Independent Software Development. Ralph E. Griswold. Freeman, San Francisco, 1972. xiv, 310 pp., illus. \$14.95.

**Magnetic Resonance.** K. A. McLaughlin. Oxford University Press, New York, 1972. xii, 106 pp., illus. Paper, \$3.95. Oxford Chemistry Series.

**Man Unfolding.** Jonas Salk. Harper and Row, New York, 1972. xxii, 118 pp. \$6.95. World Perspectives, vol. 46.

**Managing the Planet.** A conference. New York, Apr. 1970. Peter Albertson and Margery Barnett, Eds. Prentice-Hall, Englewood Cliffs, N.J., 1972. 300 pp., illus. Cloth, \$5.95; paper, \$2.45.

**Manual of Field Biology and Ecology.** Allen H. Benton and William E. Werner, Jr. Burgess, Minneapolis, ed. 5, 1972. 384 pp., illus. Spiral bound, \$6.75.

**Masks.** Their Meaning and Function. Andreas Lommel. Translated from the German edition (Zurich, 1970) by Nadia Fowler. McGraw-Hill, New York, 1972. 228 pp., illus. \$17.95.

**A Mathematical Model of Life and Living.** Li Kung Shaw. Libreria Inglesa, Buenos Aires, ed. 2, 1972. 94 pp., illus. Paper, \$3.

**Mechanism.** An Introduction to the Study of Organic Reactions. Richard A. Jackson. Oxford University Press, New York, 1972. xiv, 136 pp., illus. Paper, \$2.95. Oxford Chemistry Series.

**Mediators of the Allergic State.** Recent Investigations, 1. Papers by Ralph Snyderman and others. MSS Information Corp., New York, 1972. 200 pp., illus. \$15.

**Membrane Structure and its Biological Applications.** A conference, June 1971. David E. Green, Ed. New York Academy of Sciences, New York, 1972. 520 pp., illus. Paper, \$34. Annals of the New York Academy of Sciences, vol. 195.

**Mercury.** A History of Quicksilver. Leonard J. Goldwater. York, Baltimore, 1972. xiv, 318 pp., illus. \$15.

**Metabolism of the Hypoxic and Ischaemic Heart.** Parts 1 and 2. Proceedings of a symposium, Geneva, June 1971. P. Moret and Z. Fejfar, Eds. Karger, Basel, 1972 (U.S. distributor, Phiebig, White Plains, N.Y.). Various paged, illus. \$27.45. Reprinted from *Cardiology*, vol. 56, Nos. 1-6 and vol. 57, Nos. 1-2.

**Methods and Techniques in Clinical Chemistry.** Paul L. Wolf, Dorothy Williams, Tashiko Tsudaka, and Leticia Acosta. Wiley-Interscience, New York, 1972. xiv, 418 pp., illus. \$11.50. Stanford Series on Methods and Techniques in the Clinical Laboratory.

**Michigan Flora.** A Guide to the Identi-

SCIENCE, VOL. 178

fication and Occurrence of the Native and Naturalized Seed-Plants of the State. Part I, Gymnosperms and Monocots. Edward G. Voss. Cranbrook Institute of Science and University of Michigan Herbarium, Bloomfield Hills, 1972. xviii, 488 pp. + plates. \$7.50. Bulletin 55.

**Le Mimétisme.** Georges Pasteur. Presses Universitaires de France, Paris, 1972. 128 pp., illus. Paper, 3.95 F.

**Modern Algebra.** A First Course. Herbert A. Hollister. Harper and Row, New York, 1972. xvi, 330 pp., illus. \$9.95.

**Modern Concepts in Hematology.** Symposia of the International Committee for Standardization in Hematology. G. Izak and S. M. Lewis, Eds. Academic Press, New York, 1972. 278 pp., illus. \$9.50.

**Modern Sound Reproduction.** Harry F. Olson. Van Nostrand Reinhold, New York, 1972. xvi, 336 pp., illus. \$17.50.

**Molecular Bioenergetics and Macromolecular Biochemistry.** A symposium, Heidelberg, July 1970. H. H. Weber, Ed. Springer-Verlag, New York, 1972. vi, 198 pp., illus. \$25.10.

**Monoamine Oxidases.** New Vistas. A meeting, Cagliari, Sardinia, June 1971. E. Costa and M. Sandler, Eds. Raven, New York, 1972. xii, 454 pp., illus. \$19.75. Advances in Biochemical Psychopharmacology, vol. 5.

**Monographie der Familie Platypodidae, Coleoptera.** Karl E. Schedl. Junk, The Hague, 1972. vi, 322 pp., illus. 70 Guilders.

**The Moths of America North of Mexico.** Including Greenland. Douglas C. Ferguson. Classey and R. B. D., London, 1972 (U.S. distributor, Entomological Reprint Specialists, Los Angeles). Fascicle 20.2A, Bombycoidea, Saturniidae, Comprising Subfamilies Citheroniinae, Hemileucinae (Part). pp. 1-154 + plates. Fascicle 20.2B, Bombyconidea, Saturniidae, Comprising Subfamilies Hemileucinae (conclusion), Saturniinae. pp. 155-276 + plates. Paper. Each vol. \$39.

**Multiple Sclerosis.** Immunology, Virology, and Ultrastructure. Proceedings of a symposium, Santa Ynez Valley, Calif., Feb. 1972. Frederick Wolfram, George W. Ellison, J. G. Stevens, and John M. Andrews, Eds. Academic Press, New York, 1972. xvi, 608 pp., illus. \$19.50. UCLA Forum in Medical Sciences, No. 16.

**Muscle Biology.** A Series of Advances. Vol. 1. R. G. Cassens, Ed. Dekker, New York, 1972. x, 300 pp., illus. \$17.50.

**National Science Information Systems.** A Guide to Science Information Systems in Bulgaria, Czechoslovakia, Hungary, Poland, Romania, and Yugoslavia. David H. Kraus, Pranas Zunde, and Vladimir Slamecka. M.I.T. Press, Cambridge, Mass., 1972. xviii, 326 pp., illus. \$12.50.

**The Natural Mind.** A New Way of Looking at Drugs and the Higher Consciousness. Andrew Weil. Houghton Mifflin, Boston, 1972. viii, 230 pp. \$5.95.

**Neuropharmacology and Behavior.** V. G. Longo. Freeman, San Francisco, 1972. xiv, 184 pp., illus. Cloth, \$6.95; paper, \$3.95.

**Notes for General Physics.** Gabriel Weinreich. NEO Press, Ann Arbor, Mich.,

... and versatile, Bausch & Lomb's top-of-the-line StereoZoom 7 Microscope most surely is. It can be "readily adapted for turning with ease from one to another of varied tasks," as the book says. The CHAMP is the greatest when it comes to flexibility.

Here's a list of the most wanted equipment that makes The CHAMP a real horizon (money, too) extender:

**Zooming Infinitely Variable Magnification** for application of the ideal power in successful examination of object detail. Maximum zooming range is 1X through 7X, the widest available.

**Depth of Field** at lower powers (up to 30X) is unexcelled for quickly locating the object.

**Resolution** at greater powers (up to 280X) is extremely high—making for the finest image of any 3-dimension microscope available today.

**Stands** choice of stationary or rotatable and adjustable—allows for maximum flexibility in examination of hard-to-reach areas of opaque objects.

**Supplementary Lenses** in a full range of powers, 0.25X, 0.3X and 0.5X for reducing magnification; 1.5X and 2X for increasing magnification.

**Illumination.** The CHAMP really shines!!!!

**Polarizing Accessories** for visual examination in 3-dimensions or photography of birefringent material.

**Viewing Screen** is shaded and anti-reflection coated for glare-free group viewing of a 6" diameter image.

**Integrated Cameras, Series II** feature a light sensing Exposure Meter and choice of 3 1/4" x 4 1/4" Polaroid, 4" x 5", or 35mm media.

There's much more to The CHAMP. It's all in our catalog 31-15 which we urge you to ask for. We'll also tell you about our free demonstration plan.

## THE CHAMP

... unbeatably versatile



**BAUSCH & LOMB**   
Scientific Instrument Division  
20810 Bausch Street, Rochester N. Y. 14602

Circle No. 41 on Readers' Service Card

StereoZoom. Reg. T.M. Bausch & Lomb  
Polaroid. T.M. Polaroid Corp.

## ALCOHOLISM

### Progress in Research and Treatment

edited by PETER G. BOURNE, Director, Georgia Narcotics Treatment Program, Atlanta, and RUTH FOX, Psychiatrist-in-Chief, Columbus Hospital Alcoholism Program-ACCEPT, Columbus Hospital, N.Y.

This volume—prepared by eighteen experts on alcoholism—deals with every important aspect of this complex problem. It presents the latest research data on topics that range from the biochemical effects of alcohol—including damage to the liver as well as possible genetic implications—to cross cultural studies of drinking patterns and the far-reaching social impact of alcoholism on the individual and his family, his job, and the law. It shows how non-physicians as well as private practitioners can treat the alcoholic, suggests programs for social control of alcoholism, and evaluates the success of Alcoholics Anonymous.

1972, about 400 pp., approx. \$22.50

## NONHUMAN PRIMATES AND MEDICAL RESEARCH

edited by GEOFFREY H. BOURNE, Director, Yerkes Regional Primate Research Center, Emory Univ., Atlanta, Georgia

Here is perhaps the most complete available collection of information on primates in biomedical research. It describes, in detail, not only the role primates have played in conquering diseases like yellow fever and malaria, but also the roles they are playing today in attacking problems like heart disease, cancer, degenerative diseases, and transplantation. In addition, it discusses the use of primates in more general biomedical research involving neurology, learning and performance, and human evolution.

1972, about 480 pp., \$25.00

## AVIAN BIOLOGY, Volume 2

edited by DONALD S. FARNER, Professor of Zoophysiology, Department of Zoology, Univ. of Washington, Seattle, and JAMES R. KING, Professor of Zoophysiology, Department of Zoology, Washington State Univ., Pullman

**CONTENTS:** PETER STETTENHEIM: The Integument of Birds. RALPH S. PALMER: Patterns of Molting. ROBERT B. PAYNE: Mechanisms and Control of Molt. DAVID JONES and KJELL JOHANSEN: The Blood-Vascular System of Birds. ROBERT C. LASIEWSKI: Respiration and the Respiratory System of Birds. VINZENZ ZISWILER and DONALD S. FARNER: Digestion and the Digestive System of Birds. HANS FISHER: The Nutrition of Birds. ROBERT L. HAZELWOOD: The Intermediary Metabolism of Birds. VAUGHAN H. SHOEMAKER: Excretion and Osmoregulation in Birds.

December 1972, about 575 pp., \$32.00

## STERIODS IN NONMAMMALIAN VERTEBRATES

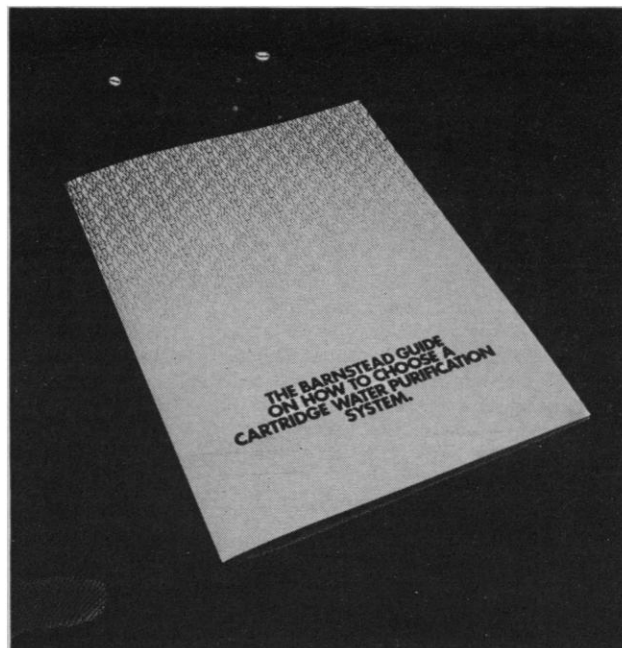
edited by DAVID R. IDLER, Fisheries Research Board of Canada, Halifax, Nova Scotia

**CONTENTS:** D. R. IDLER: Why Comparative Endocrinology? T. SANDOR and D. R. IDLER: Steroid Methodology. BRIAN LOFTS and HOWARD A. BERN: The Functional Morphology of Steroidogenic Tissues. D. R. IDLER and B. TRUSCOTT: Corticosteroids in Fish. T. SANDOR: Corticosteroids in Amphibia, Reptilia, and Aves. R. OZON: Androgens in Fishes, Amphibians, Reptiles, and Birds. R. OZON: Estrogens in Fishes, Amphibians, Reptiles, and Birds. I. CHESTER JONES, D. BEL-LAMY, D. K. O. CHAN, B. K. FOLLETT, I. W. HENDERSON, J. G. PHILLIPS, and R. S. SNART: Biological Actions of Steroid Hormones in Nonmammalian Vertebrates.

1972, 504 pp., \$28.50

## ACADEMIC PRESS

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



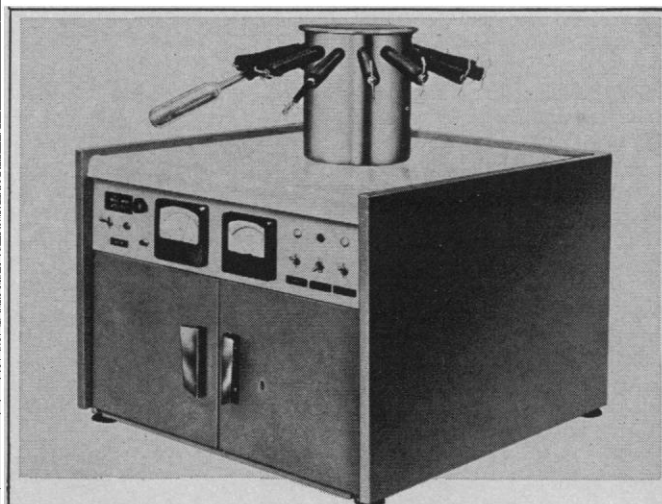
### How to choose the cartridge that removes colloids from your water.

Our guide shows you how to choose the right cartridges from all the water purification cartridges we make. And we make more kinds that adapt to make more pure water systems than anyone else. Now choosing the right cartridges is as easy as using them.



225 Rivermoor Street, Boston, Mass. 02132

Circle No. 92 on Readers' Service Card



## FREEZE DRYING WORKHORSE HAS 5 LITER CAPACITY

The Cryolizer, Model B65 is a versatile freeze dryer used for manifold or batch lyophilization. It is available with a variety of interchangeable vacuum drums and manifolds that may be rotated a full 360° while under vacuum, permitting easy access to all ports. It has its own refrigeration, vacuum and automatic defrost systems which are all interlocked electrically to prevent operating errors. Other features include a vacuum shut-off valve between the pump and trap and a continuous reading electronic vacuum gauge.



Write for catalog B65S/1072

NEW BRUNSWICK SCIENTIFIC CO., INC.

1130 SOMERSET ST., NEW BRUNSWICK, N.J. 08903 (201) 846-4600

1972. vi, 238 pp., illus. Cloth, \$6; paper, \$2.95.

**Objective Personality Assessment.** Changing Perspectives. James N. Butcher, Ed. Academic Press, New York, 1972. x, 212 pp. \$6.95. Personality and Psychopathology, 12.

**Oncogenesis and Herpesviruses.** Proceedings of a symposium, Cambridge, England, June 1971. P. M. Biggs, G. de-Thé, and L. N. Payne, Eds. International Agency for Research on Cancer, Lyon, France, 1972 (U.S. distributor, American Public Health Association, Washington, D.C.). xxiv, 516 pp., illus. \$25.

**Optics.** A Short Course for Engineers and Scientists. Charles S. Williams and Orville A. Becklund. Wiley-Interscience, New York, 1972. xvi, 398 pp., illus. \$17.95. Wiley Series in Pure and Applied Optics.

**Other Peoples, Other Customs.** World Ethnography and Its History. Wendell H. Oswalt, Holt, Rinehart and Winston, New York, 1972. xvi, 430 pp., illus. \$9.

**The Overproduction Trap in U.S. Agriculture.** A Study of Resource Allocation from World War I to the Late 1960's. Glenn L. Johnson and C. Leroy Quance, Eds. Published for Resources for the Future by Johns Hopkins University Press, Baltimore, 1972. xx, 212 pp., illus. \$10.

**Partial Wave Amplitudes and Resonance Poles.** J. Hamilton and B. Tromborg. Oxford University Press, New York, 1972. viii, 146 pp., illus. \$24. Oxford Mathematical Monographs.

**Particles and Nuclei.** Vol. 1, part 1. N. N. Bogolyubov, Ed. Translated from the Russian edition (Moscow, 1970). Consultants Bureau, New York, 1972. vi, 190 pp., illus. Paper, \$40.

**Pathology of Simian Primates.** Karger, Basel, 1972 (U.S. distributor, Phiebig, White Plains, N.Y.). 2 parts. Part 1, General Pathology. R. N. T-W-Fennes, Ed. 1, 930 pp., illus. \$95.20. Part 2, Infectious and Parasitic Diseases. R. N. T-W-Fiennes, T. C. Orihel, and J. C. Ayres, Eds. 1, 770 pp., illus. \$81.20.

**The Pathology of Transcription and Translation.** Emmanuel Farber, Ed. Dekker, New York, 1972. xii, 176 pp., illus. \$10.50. The Biochemistry of Disease, vol. 2.

**Pays et Paysages du Calcaire.** Jean Nicod. Presses Universitaires de France, Paris, 1972. 244 pp., illus. Paper, 26 F. Collection SUP, "Le Géographe", 7.

**Physical and Applied Acoustics.** An Introduction. Erwin Meyer and Ernst-Georg Neumann. Translated from the German edition (Braunschweig, 1967) by John M. Taylor, Jr. Academic Press, New York, 1972. xviii, 412 pp., illus. \$18.50.

**Physicochemical Processes for Water Quality Control.** Walter J. Weber, Jr., with contributions by Jack A. Borchardt and seven others. Wiley-Interscience, New York, 1972. xxviii, 640 pp., illus. \$19.95.

**Pictures Out of My Life.** Pitseolak. From recorded interviews by Dorothy Eber. University of Washington Press, Seattle, 1972. Unpagged, illus. \$9.95.

**Proceedings of the Second Symposium on Upper Mantle Project.** Hyderabad, India, Dec. 1970. Geophysics Research

Board, National Geophysical Research Institute, Hyderabad, 1972. xlii, 604 pp., illus. GRB and NGRI Publication No. 11.

**Ultrapurify. Methods and Techniques.** Morris Zief and Robert Speights, Eds. Dekker, New York, 1972. xx, 700 pp., illus. \$37.50.

**Uranium-234.** V. V. Cherdynstev. Translated from the Russian edition (Moscow, 1969) by J. Schmorak. Israel Program for Scientific Translations, Jerusalem, 1971 [U.S. distributor, Halsted (Wiley), New York]. vi, 234 pp., illus. \$19.50.

**Urban Police Patrol Analysis.** Richard C. Larson. M.I.T. Press, Cambridge, Mass., 1972. xii, 288 pp., illus. \$12.50.

**Urbanization and Environment.** The Physical Geography of the City. Thomas R. Detwyler and Melvin G. Marcus, Eds. Line drawings by Peter Van Dusen. Duxbury, Belmont, Calif., 1972. viii, 288 pp. Paper, \$4.95.

**The Uruk Countryside.** The Natural Setting of Urban Societies. Robert McC. Adams and Hans J. Nissen. University of Chicago Press, Chicago, 1972. xii, 242 pp., illus. \$17.50.

**Veterinary Handbook for Cattleman.** J. W. Bailey. Springer, New York, ed. 4, 1972. viii, 532 pp., illus. \$11.

**Vibrational Spectra and Structure of Silicates.** A. N. Lazarev. Translated from the Russian edition (Leningrad, 1968) by G. D. Archard. Victor C. Farmer, Ed. Consultants Bureau, New York, 1972. x, 302 pp., illus. Paper, \$37.50.

**Wallace and Natural Selection.** H. Lewis McKinney. Yale University Press, New Haven, Conn., 1972. xx, 194 pp., illus. \$12.50. Yale Studies in the History of Science and Medicine, 8.

**Water Chemistry Laboratory Manual.** David Jenkins, Vernon L. Snoeyink, John F. Ferguson, and James O. Leckie. American Association of Professors in Sanitary Engineering, Atlanta, 1972 (available from Joseph F. Malina, Jr., 305 Engineers Labs Building, University of Texas, Austin). Variously pagged, illus. Spiral bound, \$3.

**Water Quality Management.** An analysis of Institutional Patterns. David C. Ranney with the assistance of Jo Kaplan Nasoff. Published for the University of Wisconsin Water Resources Center by the University of Wisconsin Press, Madison, 1972. xii, 158 pp. \$7.50. University of Wisconsin Water Resources Studies, 2.

**What Happened in Between.** A Doctor's Story. William J. Welch. Braziller, New York, 1972. xiv, 208 pp. \$6.95.

**Where Has All the Ivy Gone?** A Memoir of University Life. Muriel Beadle. Doubleday, Garden City, N.Y., 1972. xii, 396 pp. \$8.95.

**Women in White.** Geoffrey Marks and William K. Beatty. Scribner, New York, 1972. 240 pp., illus. \$6.95.

**World Urbanization 1950-1970.** Vol. 2, Analysis of Trends, Relationships, and Development. Kingsley Davis. University of California Institute of International Studies, Berkeley, 1972. xxii, 320 pp., illus. Paper, \$3. Population Monograph Series, No. 9.

**The Year of the Intern.** Robin Cook. Harcourt Brace Jovanovich, New York, 1972. x, 246 pp. \$6.75.

member co  
vic inst  
stand  
ju  
s

# Mailing this coupon could save you \$20,000

## But nobody clips coupons.

You can't find a scissors. Your secretary is out to lunch. And besides, coupons are a lot of trouble. Too bad.

Our brochure (what you get for the coupon) proves how an automatic watering system for animals can cut 30% off animal care costs in most facilities. For the typical 5000 cage lab that comes to about \$20,000. Every year. And because these savings are proportional, Hardco equipment offers substantial cost reductions to any facility, large or small.

Our brochure also clearly explains why automatic watering is actually better for your animals. And as proof we'll list more than 500 labs across the country where it is working and working well. Quite a lot for the price of a stamp.

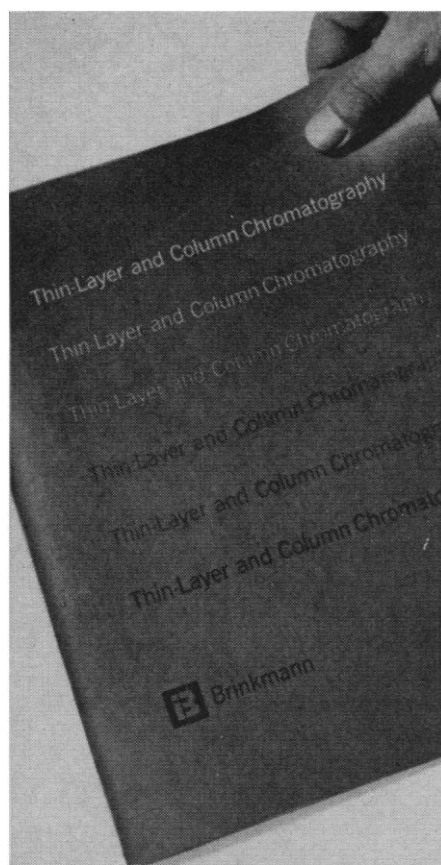
Please  
send me  
the  
brochure.



Name \_\_\_\_\_  
Title \_\_\_\_\_  
Firm \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_ Zip \_\_\_\_\_

### Animal Automatic Watering Systems

hardco scientific  
division of fieldstone corporation  
1208 Omni Drive  
Cincinnati, Ohio 45245  
Circle No. 64 on Readers' Service Card



Read any  
good books on  
TLC lately?

Try ours.  
It's free.

Write today for your free copy of the new 82-page Brinkmann TLC catalog. It contains the most complete assortment of thin-layer chromatography equipment and supplies, listing among others:

- 123 different pre-coated layers on glass plates, aluminum and plastic sheets.
- 132 different TLC sorbents.
- 15 different development tanks and numerous other completely new accessories.

Brinkmann is the most complete source for TLC, offering immediate delivery on all listed standard items. For your catalog, write: Brinkmann Instruments, Cantiague Rd., Westbury, N.Y. 11590. In Canada: Brinkmann Instruments (Canada) Ltd., 50 Galaxy Blvd., Rexdale (Toronto), Ont.

**B Brinkmann**

Circle No. 60 on Readers' Service Card

## NEWS AND COMMENT

(Continued from page 383)

University of New York, Brooklyn. . . . **James J. Feffer**, associate dean for clinical affairs, George Washington University, to vice president for medical affairs at the university. . . . **Herbert A. Stallworth**, assistant to the president, Florida Atlantic University, to vice president for academic affairs, Austin Peay State University.

## RECENT DEATHS

**Cyrus E. Burford**, 94; former director, urology department, St. Louis University; 10 July.

**Robert C. Caldwell**, 44; dean, School of Dentistry, University of California, Los Angeles; 6 July.

**Guy L. Carter**, 88; former chairman, social sciences department, Lynchburg College; 29 June.

**Kermit A. Cook**, 70; professor emeritus of education, West Virginia University; 15 June.

**George F. Donovan**, 70; professor emeritus of education, Marquette University; 16 July.

**Edgar S. Furniss**, 82; former dean, Graduate School, Yale University; 17 July.

**Mary F. C. Graustein**, 88; former professor of mathematics, Wellesley College; 18 July.

**Frank W. Hachtel**, 88; former chairman, microbiology department, University of Maryland School of Medicine; 13 July.

**Ben Kaplan**, 66; professor of sociology, University of Southwestern Louisiana; 15 July.

**Carl V. Moore**, 63; former chairman, medical department, Washington University; 13 August.

**J. Cecil Parker**, 64; professor emeritus of education, University of California; 21 June.

**John L. Parks**, 64; vice president for medical affairs, George Washington University; 5 July.

**Oscar E. Sette**, 72; fishery biologist, National Marine Fisheries Service, California; 25 July.

**Abraham A. Sherman**, 65; assistant professor of medicine and radiology, Albert Einstein Medical College; 15 August.

**Howard P. Simons**, 64; professor of chemical engineering, West Virginia University; 3 June.

## Personnel Placement

**POSITION WANTED:** 40¢ per word, minimum charge \$10. Use of Box Number Counts as 10 additional words. Payment in advance is required. These rates apply to individuals only. Personnel agencies and companies take display rate for all advertising.

**POSITIONS OPEN:** \$110 per inch. No charge for Box Number. Rates net. No agency commission allowed for ads under 4 inches. No cash discount. Ads over 1 inch will be billed to the nearest half inch. Payment in advance is required except where satisfactory credit has been established. **COPY** for ads must reach **SCIENCE** 4 weeks before issue date (Friday of every week). Send copy for Personnel Placement advertising to:

**SCIENCE**, Room 211  
1515 Massachusetts Ave., NW  
Washington, D.C. 20005

Replies to blind ads should be addressed as follows:

Box (give number)  
**SCIENCE**  
1515 Massachusetts Ave., NW  
Washington, D.C. 20005

### POSITIONS WANTED

**Aquatic Biologist**, Sc.D.; 16 years of research and teaching experience. Seeks research or research/teaching position. Research interest—water pollution, ecology, and taxonomy of aquatic invertebrates. Publications. Box 387, **SCIENCE**. X

**Biomedical Engineer:** registered, electrical instrumentation; 15 years' aerospace 7 years' hospital and medical school faculty, publications. Seeks position as research team member, principal investigator, teaching, or administration. Write Horace Castillo, 404 N. Plum St., Springfield, Ohio 45504.

**Physiologist**, Ph.D., experience in undergraduate, graduate, and medical education. Box 397, **SCIENCE**. X

### POSITIONS OPEN

#### CLINICAL MEDICINE

Syntex, an international pharmaceutical company located 35 miles south of San Francisco, adjacent to Stanford University, has immediate openings for two key individuals in its Institute of Clinical Medicine.

#### DERMATOLOGY

Associate Medical Director to handle clinical research (Phases I, II and III) in therapeutic dermatology. Prefer M.D. Dermatologist or Ph.D. Biochemist with knowledge of clinical testing procedures and some research experience in skin biology. Present research programs are concerned with sebaceous gland biochemistry, anti-inflammatory agents, skin metabolism, and allergic responses. Please describe your experience, if any, in any of these areas.

#### CORTICOSTEROIDS

Research Associate to monitor clinical investigation programs for new systemic corticosteroids. M.D. or Ph.D. in physiology, biochemistry or endocrinology. Duties include: design of clinical studies, working with outside clinical investigators, collection and analysis of data. Should have current knowledge of endocrinology with emphasis on adrenal physiology.

Please send curriculum vitae to Lynda Koval, 3401 Hillview Avenue, Palo Alto, CA 94304. We are an equal opportunity employer M/F.

#### SYNTEX

Syntex Corporation