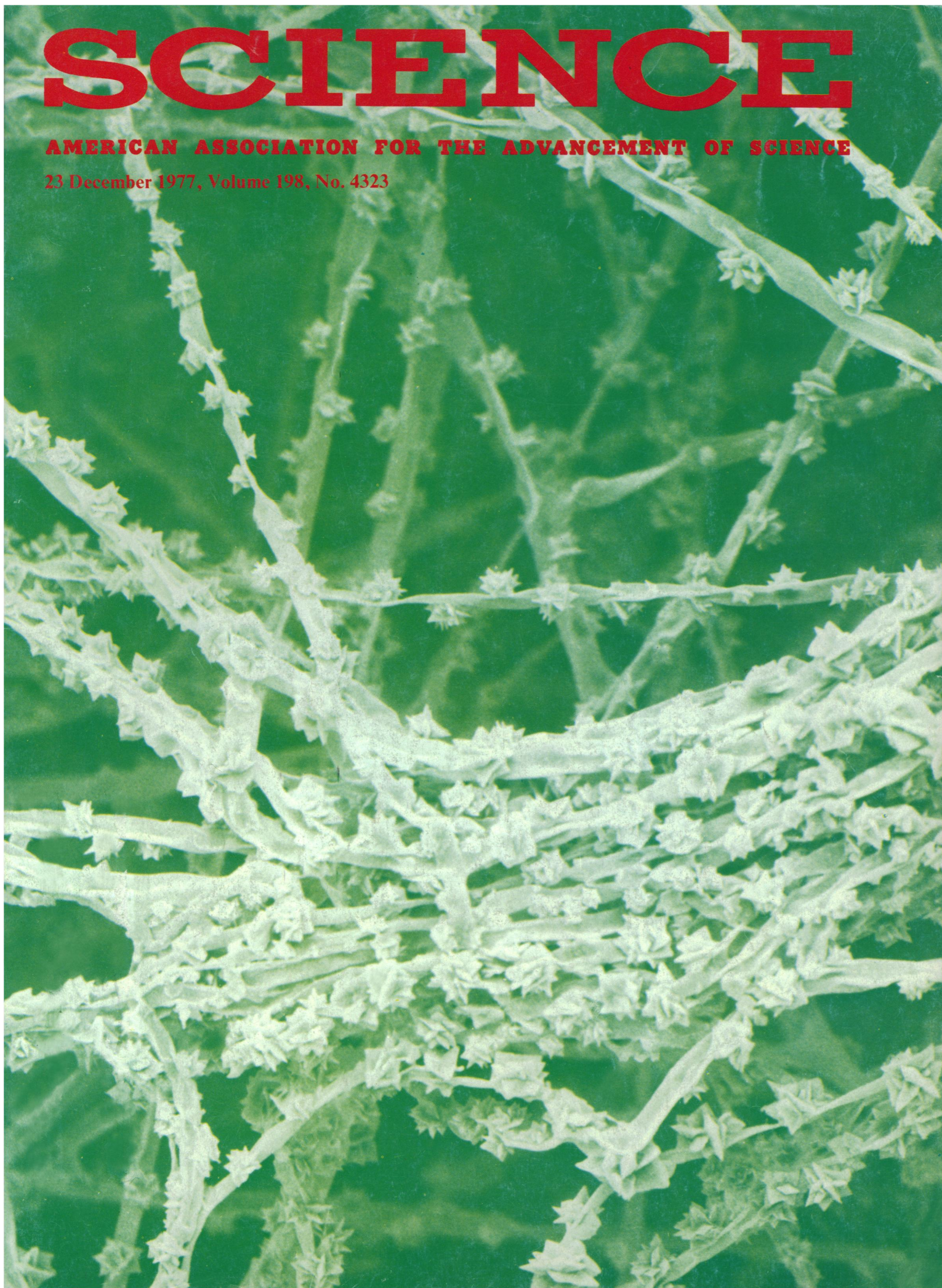


SCIENCE

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

23 December 1977, Volume 198, No. 4323



How Beckman Ultracentrifuges can save you time.

There are many reasons to own a Beckman Preparative Ultracentrifuge. One of the most important is that it can help you get your work done faster.

Superior Acceleration/Deceleration. Beckman ultracentrifuges have a powerful, efficient electric DC drive that gets rotors to speed and down again in a hurry. For pelleting runs, set the acceleration rate control to maximum. You may save as much as 20 minutes per run compared to drive systems which cannot accelerate and decelerate rapidly.

For density gradient experiments where mixing might occur, use a lower acceleration rate setting. For experiments requiring even slower starts and stops, the L-5 Slow Acceleration Accessory is available.

$\int \omega^2 dt$ Integrator. This accessory continuously accumulates the total centrifugal effect ($\int \omega^2 dt$) experienced by the sample during a run. You will find this particularly valuable when a substantial part of the run occurs while the rotor speed (ω) is changing—that is, for runs in which appreciable sedimentation takes place during acceleration and deceleration of the rotor. In fact, it is common practice to program a run so that the rotor runs at constant speed most of the time, in order to minimize the uncertainty in

$\int \omega^2 dt$ associated with acceleration and deceleration. The integrator makes such concern unnecessary: you can save time by running the rotor to the highest possible speed. It further allows you to reproduce band positions precisely under different run programs. And it saves calculation time in determining sedimentation coefficients.



75,000 rpm Operation. Beckman offers the Model L5-75 ultracentrifuge for the fastest possible separations. The increase in rotor speed from 65,000 to 75,000 rpm generates a third more centrifugal force. With the Type 75 Ti fixed-angle rotor, forces in excess of 500,000 g are available.

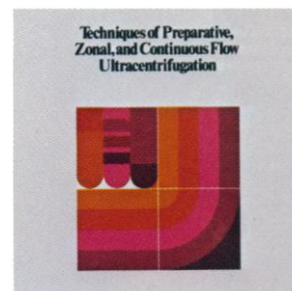
Full Line of Rotors. The right rotor gives you the most desirable combination of force, volume, number of tubes, and separation efficiency—as well as the preferred rotor material. Beckman

offers by far the industry's widest choice: 18 fixed angle, 9 swinging bucket, 3 vertical tube, and 6 zonal and continuous flow rotors.

Thick-wall Tubes. Assembling and filling tubes with tube caps takes time. Beckman noncollapsing thick-wall polycarbonate and polyallomer tubes can be run partially filled without tube caps. You can easily save a half hour or more in loading tubes if no caps are used.

Beckman also offers thin-wall tubes in three different tube materials, including cellulose nitrate, plus a wide variety of polycarbonate bottles.

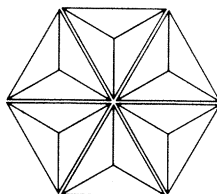
For full information on Beckman Ultracentrifuges, Rotors, Tubes, and Accessories, ask for Data File L5-400/174. For a copy of the booklet "Techniques of Preparative, Zonal, and Continuous Flow Ultracentrifugation," which contains a wealth of helpful information, ask for DS-468. Write Beckman Instruments, Inc., Spinco Division, 1117 California Ave., Palo Alto, CA 94304.



BECKMAN®

Circle No. 170 on Readers' Service Card

BRISTOL-MYERS AWARD FOR DISTINGUISHED ACHIEVEMENT IN CANCER RESEARCH



The Bristol-Myers Company will present an annual award to a scientist making an outstanding contribution in cancer research. The candidates for the Award are to be nominated by medical schools, free standing hospitals and cancer research centers. Only one nomination from each institution will be permitted.

DEADLINE FOR RECEIPT OF NOMINATIONS: MARCH 1, 1978
ANNOUNCEMENT OF AWARD RECIPIENT: MAY, 1978, WASHINGTON, D.C.

AWARD: \$25,000.00

SELECTION COMMITTEE

John E. Ultmann, M.D., Chairman
Director, Cancer Research Center, University of Chicago

Harris Busch, M.D., Ph.D.
Professor and Chairman, Department of Pharmacology
Baylor College of Medicine

Albert H. Owens, Jr., M.D.
Director, Oncology Center, The Johns Hopkins University

Saul A. Rosenberg, M.D.
Professor of Medicine and Radiology, and Chief, Division of Oncology
Stanford University School of Medicine

Alan C. Sartorelli, Ph.D.
Professor and Chairman, Department of Pharmacology
Yale University School of Medicine

Rules and special nomination forms are available from:
Secretary, Awards Committee, Room 43-30,
345 Park Avenue, New York, New York 10022.

23 December 1977

Volume 198, No. 4323

SCIENCE

LETTERS	Chrysotile Asbestos: Effects of Human Exposure: <i>A. N. Rohl, A. M. Langer, I. J. Selikoff</i> ; Outer Continental Shelf Operating Regulations: <i>D. D. Smith</i> and <i>K. F. Graham</i> ; Prigogine at the University of Texas: <i>J. D. Swartz</i>	1202
EDITORIAL	Conservation: The Minnesota Plan: <i>J. P. Millhone</i>	1207
ARTICLES	Oxygen and Hydrogen Isotopic Ratios in Plant Cellulose: <i>S. Epstein, P. Thompson, C. J. Yapp</i>	1209
	Metals as Regulators of Heme Metabolism: <i>M. D. Maines</i> and <i>A. Kappas</i>	1215
	Anaerobiosis and a Theory of Growth Line Formation: <i>R. A. Lutz</i> and <i>D. C. Rhoads</i>	1222
NEWS AND COMMENT	Creative Penmanship in Animal Testing Prompts FDA Controls	1227
	<i>Science in Europe</i> /Attack on Marxists Stirs Controversy	1230
	Laetrile at Sloan-Kettering: A Question of Ambiguity	1231
	<i>Briefing</i> : Waterfowl Hunters Must Give Up Lead Shot; A Mixed Verdict on NBC Nuclear Waste Documentary; More Burning of Coal Offsets Gains in Air Pollution Control	1233
RESEARCH NEWS	Big Astronomy in Chile: The Southern Observatories Come of Age	1235
ANNUAL MEETING	Meeting Program—Part III; Science Film Festival: <i>B. Grey</i> ; Registration and Housing Forms.	1240
BOOK REVIEWS	Birth Defects and Drugs in Pregnancy, <i>reviewed by I. Leck</i> ; Peptides in Neurobiology, <i>L. Iversen</i> ; Grasshoppers and Locusts, <i>M. J. D. White</i> ; Cell Hybrids, <i>T. B. Shows</i>	1246
REPORTS	Meteorite Impact Ejecta: Dependence of Mass and Energy Lost on Planetary Escape Velocity: <i>J. D. O'Keefe</i> and <i>T. J. Ahrens</i>	1249

BOARD OF DIRECTORS

WILLIAM D. MC ELROY
Retiring President, Chairman

EMILIO Q. DADDARIO
President

EDWARD E. DAVID, JR.
President-Elect

MARTIN M. CUMMINGS
RUTH M. DAVIS

RENEE C. FOX
BERNARD GIFFORD

CHAIRMEN AND SECRETARIES OF AAAS SECTIONS

MATHEMATICS (A)
Dorothy M. Stone
Truman A. Botts

PHYSICS (B)
Norman Ramsey
Rolf M. Sinclair

CHEMISTRY (C)
Norman Hackerman
Leo Schubert

ASTRONOMY (D)
Beverly T. Lynds
Arlo U. Landolt

PSYCHOLOGY (J)
Donald B. Lindsley
Edwin P. Hollander

SOCIAL AND ECONOMIC SCIENCES (K)
Matilda W. Riley
Daniel Rich

HISTORY AND PHILOSOPHY OF SCIENCE (L)
Ernan McMullin
George Basalla

ENGINEERING (M)
Ernst Weber
Paul H. Robbins

EDUCATION (Q)
Herbert A. Smith
James T. Robinson

DENTISTRY (R)
Harold M. Fulmer
Sholom Pearlman

PHARMACEUTICAL SCIENCES (S)
Stuart Eriksen
Raymond Jang

INFORMATION, COMPUTING, AND COMMUNICATION (T)
Lawrence P. Heilprin
Joseph Becker

DIVISIONS

ALASKA DIVISION

David M. Hickok
President

Keith B. Mather
Executive Secretary

PACIFIC DIVISION

Mildred Mathias
President

Alan E. Leviton
Secretary-Treasurer

SOUTHWESTERN AND ROCKY MOUNTAIN DIVISION

Erik K. Bonde
President

Max P. Dunford
Executive Officer

SCIENCE is published weekly, except the last week in December, but with an extra issue on the third Tuesday in September, 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., and additional entry. Copyright © 1977 by the American Association for the Advancement of Science. Member rates on request. Annual subscriptions \$60; foreign postage: Canada \$10; other surface \$13; air-surface via Amsterdam \$30. Single copies \$2 (back issues \$3) except Guide to Scientific Instruments \$6. School year subscriptions: 9 months \$45; 10 months \$50. Provide 6 weeks' notice for change of address, giving new and old addresses and postal codes. Send a recent address label, including your 7-digit account number. Postmaster: Send Form 3579 to Science, 1515 Massachusetts Avenue, NW, Washington, D.C. 20005. Science is indexed in the Reader's Guide to Periodical Literature.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Evidence for a Pollination-Drop Mechanism in Paleozoic Pteridosperms: <i>G. W. Rothwell</i>	1251
Calcium Oxalate: Occurrence in Soils and Effect on Nutrient and Geochemical Cycles: <i>W. C. Graustein, K. Cromack, Jr., P. Sollins</i>	1252
Oxygen Isotopic Analysis of the Size Fraction Between 62 and 250 Micrometers in Caribbean Cores P6304-8 and P6304-9: <i>C. Emiliani</i>	1255
Polychlorobornane Components of Toxaphene: Structure-Toxicity Relations and Metabolic Reductive Dechlorination: <i>M. A. Saleh, W. V. Turner, J. E. Casida</i>	1256
Histone Occurrence in Chromatin from <i>Peridinium balticum</i> , a Binucleate Dinoflagellate: <i>P. J. Rizzo and E. R. Cox</i>	1258
Chemical Evidence for Separating the Psilotaceae from the Filicales: <i>G. Cooper-Driver</i>	1260
<i>Spiroplasmavirus citri</i> 3: Propagation, Purification, Proteins, and Nucleic Acid: <i>R. M. Cole, W. O. Mitchell, C. F. Garon</i>	1262
Noninvasive, Infrared Monitoring of Cerebral and Myocardial Oxygen Sufficiency and Circulatory Parameters: <i>F. F. Jöbsis</i>	1264
Neuronal Architecture of On and Off Pathways to Ganglion Cells in Carp Retina: <i>E. V. Famiglietti, Jr., A. Kaneko, M. Tachibana</i>	1267
Structural Basis for On- and Off-Center Responses in Retinal Bipolar Cells: <i>W. K. Stell, A. T. Ishida, D. O. Lightfoot</i>	1269
Body Weight: Reduction by Long-Term Glycerol Treatment: <i>D. Wirtshafter and J. D. Davis</i>	1271
Methylphenidate in Hyperkinetic Children: Differences in Dose Effects on Learning and Social Behavior: <i>R. L. Sprague and E. K. Sleator</i>	1274
Masking of Electrical by Acoustic Stimuli: Behavioral Evidence for Tonotopic Organization: <i>C. J. Frederickson and G. M. Gerken</i>	1276
Receptive Fields of Auditory Neurons in the Owl: <i>E. I. Knudsen, M. Konishi, J. D. Pettigrew</i>	1278
<i>Technical Comments</i> : Neoplastic Skin Lesions in Salamanders from a Sewage Lagoon Containing Perylene: <i>J. G. Windsor, Jr., R. E. Laflamme, R. A. Hites; F. L. Rose</i> ; Potassium Accumulation in Frog Muscle: The Association- Induction Hypothesis versus the Membrane Theory: <i>G. N. Ling; J. Gulati and L. G. Palmer</i> ; The Nematode <i>Caenorhabditis elegans</i> : A New Organism for Intensive Biological Study: <i>R. S. Edgar and W. B. Wood</i>	1280
PRODUCTS AND MATERIALS	
Tissue Sample Holder; Sterilizers; Sphygmomanometer; Microbiological Hood; Heat Flow Sensor; Computing Planimeter; Sodium-Potassium Detector; Recorders; Centrifuge Rotor; Stereomicroscope; Microtitrator; Literature	1287

MIKE MC CORMACK FREDERICK MOSTELLER	CHAUNCEY STARR CHEN NING YANG	WILLIAM T. GOLDEN Treasurer	WILLIAM D. CAREY Executive Officer
GEOLOGY AND GEOGRAPHY (E) Howard R. Gould Ramon E. Bisque	BIOLOGICAL SCIENCES (G) Mary E. Clark Jane C. Kaltenbach	ANTHROPOLOGY (H) Raymond H. Thompson Philleo Nash	
MEDICAL SCIENCES (N) Robert W. Berliner Richard J. Johns	AGRICULTURE (O) John P. Mahlstede J. Lawrence Apple	INDUSTRIAL SCIENCE (P) Joseph H. Engel Robert L. Stern	
STATISTICS (U) John W. Pratt Ezra Glaser	ATMOSPHERIC AND HYDROSPHERIC SCIENCES (W) Robert G. Fleagle Stanley A. Changnon, Jr.	GENERAL (X) Mary Louise Robbins Joseph F. Coates	

COVER

Crystals of weddellite (calcium oxalate dihydrate) adhering to hyphae of the fungus, *Hysterangium crassum*, in a soil developed under Douglas fir in the Oregon coast ranges. Masses of hyphae are actually white. (Field of view about 70 micrometers). See page 1252. [Scanning electron micrograph by Alan Pooley, Yale University, New Haven, Connecticut]

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.

Spend your next twelve months with **SCIENCE**



The AAAS Calendar, the first in an annual series, is beautifully adorned by spectacular and unusual color and black & white covers from Science. This useful wall calendar is ideal for noting your appointments and remembering important dates in science.

The AAAS Calendar makes the ideal gift!

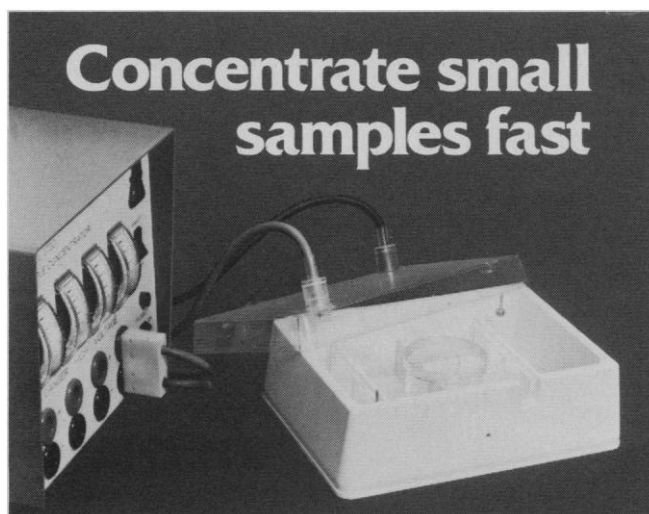
Order your calendar today while copies are still available.

Price per calendar: \$5.00

Special AAAS Member price: \$4.00

For your copy of the 1978 AAAS Science Cover Calendar, which will be mailed in early December, send your name and address (plus remittance) to

AAAS Calendar
1515 Massachusetts Avenue, N.W.
Washington, D.C. 20005



Conventional methods of concentrating macromolecules from biological extractions or separations are often a time-consuming problem, especially with dilute solutions. Samples may be contaminated, inactivated, or partially lost. And working with small samples is difficult.

The ISCO Model 1750 Electrophoretic Sample Concentrator offers you a new way to concentrate macromolecules. It's fast, convenient, inexpensive, non-disruptive, and adaptable to a wide variety of samples.

The Model 1750 will handle 1 to 10 ml samples, normally produces 50-fold concentrations in 90 minutes or less, and allows quick and easy recovery of concentrates. It uses no pumps or gases — samples are concentrated by a combination of electrophoresis and filtration.

The instrument is suitable for concentrating proteins, nucleic acids, certain whole cells and fragments, or any other water soluble macromolecule larger than 3500 MW and having electrophoretic mobility. During concentration, samples may also be separated from non-ionic media such as polyacrylamide gels or sugar solutions from density gradients.

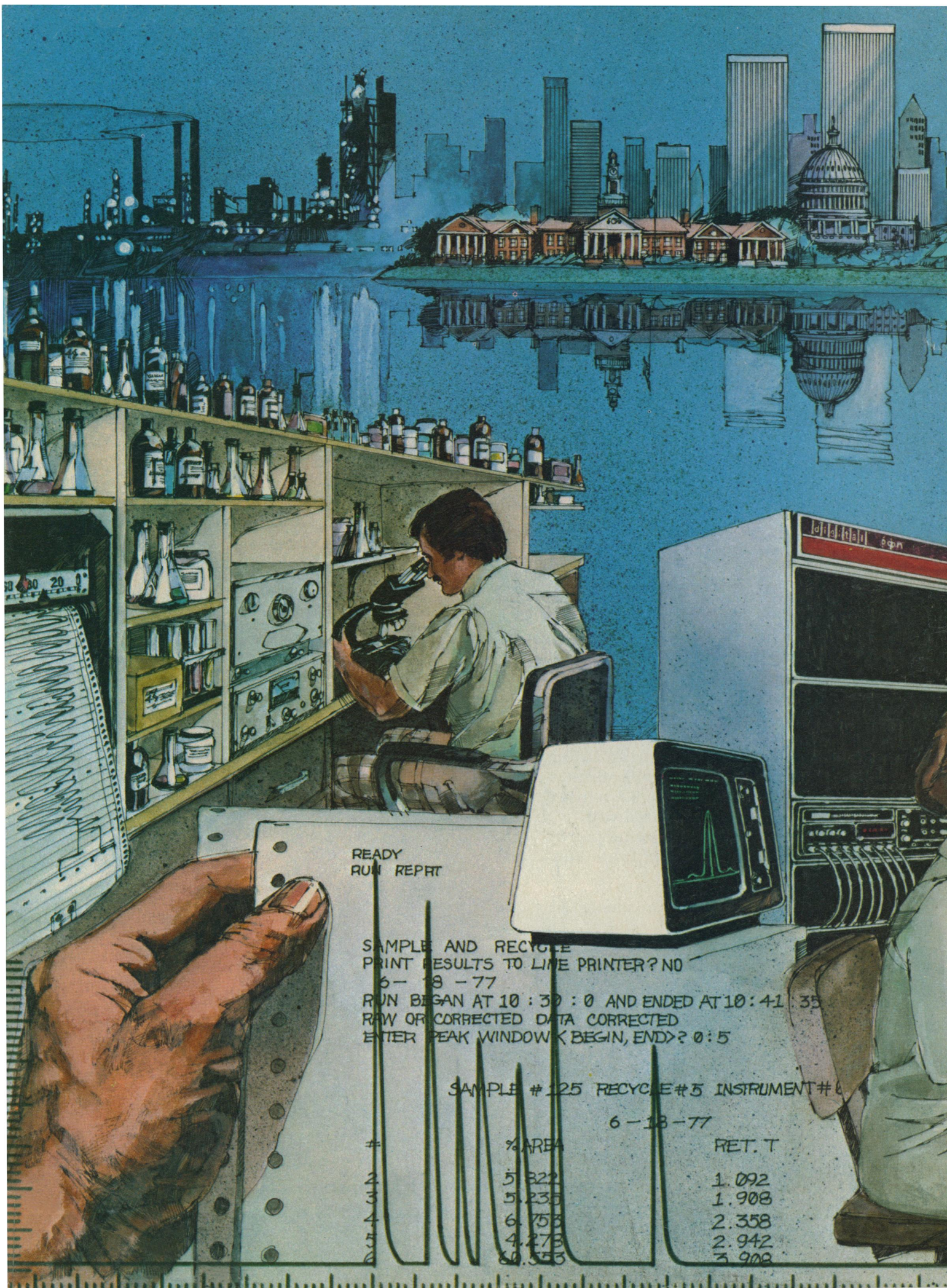
Setup time is minimal and four or more samples can be concentrated simultaneously. Cleaning is simple, too — a quick rinse with deionized water is all that's necessary.

Learn more about the versatile Model 1750 Electrophoretic Sample Concentrator and other ISCO instruments. Send for your copy of our catalog today: Instrumentation Specialties Company, P.O. Box 5347, Lincoln, Nebraska 68505. Or dial direct, toll free (800) 228-4250 (continental U.S.A. except Nebraska).



Instruments with a difference

Circle No. 198 on Readers' Service Card



DECLAB-11/34.

Designed to take the labor out of your laboratory.

Most of the problems facing labs today come from the paperwork required by new industry and government regulations, guidelines and restrictions.

And until now, you had to use high level staff to do low level tasks. But now, there's a powerful, economical computer system that can free up your high-level staff. Digital's DECLAB-11/34. It takes the labor out of paperwork.

DECLAB-11/34 saves money by saving time.

DECLAB-11/34 can save you a lot of time simply by doing the busy work like strip chart marking, data reduction, basic record keeping and report generation. What's more, the DECLAB-11/34 can do these time-consuming tasks in a fraction of the time it takes now.

In addition, DECLAB-11/34 helps cut costs by cutting costly errors. Since it can be hooked directly to your instruments, everything can be done automatically. There are fewer

steps involved in acquiring and analyzing data. So there are fewer errors involved. And that means greater productivity.

DECLAB-11/34 lets you pick the lab system that fits your lab.

You can choose a small system for real-time, dedicated applications. Or our larger systems that let you distribute computer power throughout your lab, without distributing computers throughout your lab. You can even start small and add more memory, terminals, graphics, lab interfaces and other peripherals as you need them.

For peak processing applications, we've developed PEAK-11.

It's a special multi-terminal system that lets you automatically collect, process and simultaneously analyze data from peak-producing devices - GC, LC, AA, IR and UV-VIS instruments.

DECLAB-11/34. Just one member of the DECLAB family.

You can also choose our easy-to-use, low-cost DECLAB-11/03. Or if you need more power, our powerful mid-range DECLAB-11/60.

Or our large scale, multi-functional DECLAB-11/70.

No matter whether you want a system for dedicated or multi-task applications, concurrent program development, high-speed computation or lab networking, the DECLAB Family offers you the right system for your lab. And since they're all compatible, you never have to worry about today's DECLAB becoming too small for tomorrow's needs.

To find out more about the DECLAB-11/34 or any of our other systems, fill out the coupon and send it to Laboratory Data Products, MR2-4 M16, Digital Equipment Corporation, Marlborough, MA 01752. Telephone: (617) 481-9511, ext. 6951. European headquarters: 12, av. des Morgines, 1213 Petit-Lancy/Geneva. Tel: 93 33 11. In Canada: Digital Equipment of Canada, Ltd.

digital
Computers in Research.

Digital Equipment Corporation, MR2-4 M16, Marlborough, MA 01752.

Please send me information on:

- ☐ DECLAB-11/34 ☐ PEAK-11 ☐ the DECLAB Family
☐ Please have a Digital lab system specialist contact me.

Name _____

University or Company _____

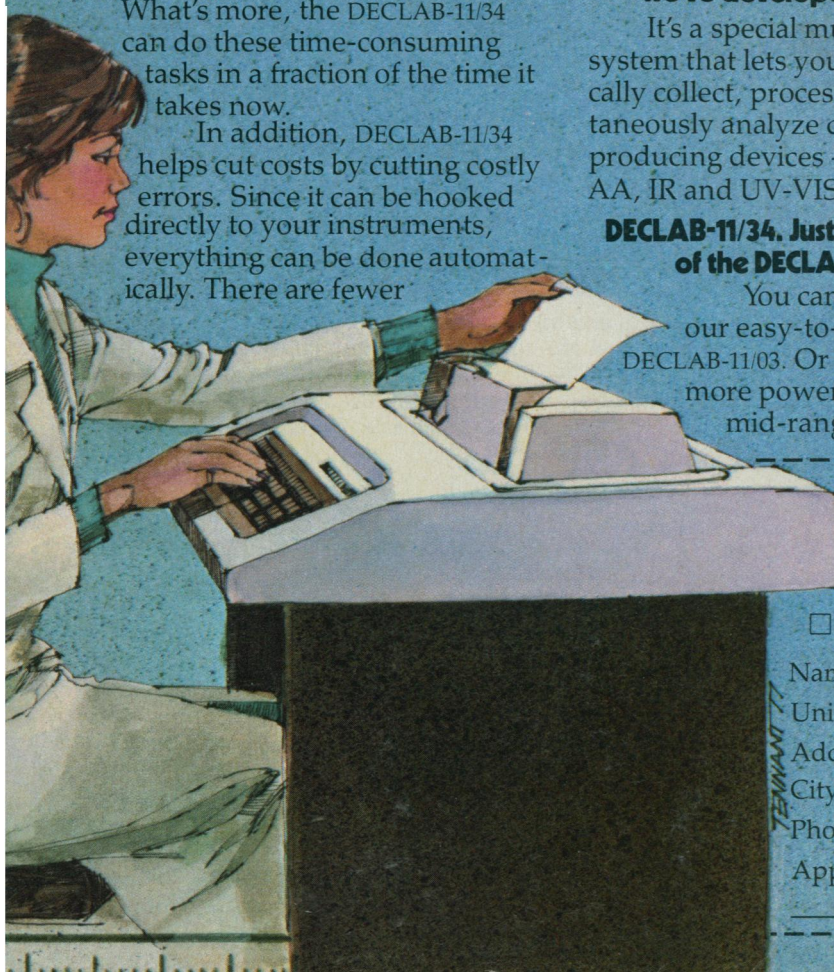
Address _____

City _____ State _____ Zip _____

Phone _____ Ext. _____

Applications _____

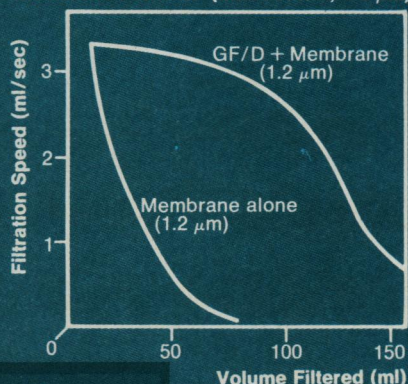
S-12237





LAB ASSISTANTS

Membrane Pre-filter (Milk Protein, 1-6 μm)



Prefilters

If you're using membranes or other relatively low capacity filters, you can more than double filtered volume by using a Grade GF/D Glass Microfibre® prefilter. The correct GF/D sizes related to membrane sizes are:

Membrane dia.	GF/D dia.	Membrane dia.	GF/D dia.
13 mm	1.0 cm	47 mm (Ger.)	4.0 cm
25 mm	2.0 cm	100 mm	9.0 cm
47 mm (USA)	3.5 cm	293 mm	25.7 cm

® Registered trademark of Balston Ltd.



Extraction Thimbles

These are seamless, high purity cellulose thimbles available in single or double thickness. Used for extraction of organic compounds from reaction mixtures, fat analysis in meats, and many other applications. Sizes to fit most Soxhlet extractors.



In-Line Filter Units

Gamma-12. Small, high efficiency units with disposable/replaceable filter tubes. Tubes give effective filtration over range 0.3 μm to 25.0 μm (liquids) and penetration ratings from 0.0001% to 90% (gases). Housing withstands line pressures to 200 psi. Autoclavable. Wide application. Inexpensive.



Filter Tubes

Small, convenient, disposable units. Retention in liquids of 2 μm . High wet strength, high loading capacity. Immerse in liquid or gas to be filtered. Very high flow rates. Ideal for clarifying solutions and solvents. Pure resin-bonded borosilicate glass. Inexpensive. Discard to avoid contamination after long use.



Benchkote®

For use on lab benches to protect against spillage of solvents, toxic liquids, pathogens, radiochemicals. High purity, highly absorbent paper backed with polyethylene film. Can reduce breakage of expensive lab glass. For lining fume hoods, animal cages, etc. Widely used to recover expensive spilled materials. Cuts clean-up time.

® Registered trademark of Whatman Ltd.

All available through your laboratory supply dealer or call:
Whatman Inc. ■ 9 Bridewell Place, Clifton, New Jersey 07014
 ■ (201) 777-4825.

Circle No. 143 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

1977: WARD GOODENOUGH, CLIFFORD GROBSTEIN, H. S. GUTOWSKY, N. BRUCE HANNAY, DONALD KENNEDY, NEAL E. MILLER, RAYMOND H. THOMPSON

1978: RICHARD E. BALZHISER, JAMES F. CROW, HANS LANDSBERG, EDWARD NEY, FRANK W. PUTNAM, MAXINE SINGER, PAUL E. WAGGONER, F. KARL WILLENBROCK

Publisher

WILLIAM D. CAREY

Editor

PHILIP H. ABELSON

Editorial Staff

<i>Managing Editor</i> ROBERT V. ORMES	<i>Business Manager</i> HANS NUSSBAUM
<i>Assistant Managing Editor</i> JOHN E. RINGLE	<i>Production Editor</i> ELLEN E. MURPHY

News and Comment: BARBARA J. CULLITON, *Editor*; LUTHER J. CARTER, CONSTANCE HOLDEN, DEBORAH SHAPLEY, R. JEFFREY SMITH, NICHOLAS WADE, JOHN WALSH, *Editorial Assistant*, SCHERRAINE MACK

Research News: ALLEN L. HAMMOND, *Editor*; RICHARD A. KERR, GINA BARI KOLATA, JEAN L. MARX, THOMAS H. MAUGH II, WILLIAM D. METZ, ARTHUR L. ROBINSON, *Editorial Assistant*, FANNIE GROOM

Associate Editors: ELEANORE BUTZ, MARY DORFMAN, SYLVIA EBERHART, JUDITH GOTTLIEB

Assistant Editors: CAITILIN GORDON, RUTH KULSTAD, LOIS SCHMITT

Book Reviews: KATHERINE LIVINGSTON, *Editor*; LINDA HEISERMAN, JANET KEGG

Letters: CHRISTINE KARLIK

Copy Editors: ISABELLA BOULDIN, OLIVER HEATWOLE

Production: NANCY HARTNAGEL, JOHN BAKER; YA LI SWIGART, ELEANOR WARNER; JEAN ROCKWOOD, LEAH RYAN, SHARON RYAN

Covers, Reprints, and Permissions: GRAYCE FINGER, *Editor*; CORRINE HARRIS, MARGARET LLOYD

Guide to Scientific Instruments: RICHARD SOMMER

Assistant to the Editors: RICHARD SEMIKLOSE

Membership Recruitment: GWENDOLYN HUDDLE

Member and Subscription Records: ANN RAGLAND
EDITORIAL CORRESPONDENCE: 1515 Massachusetts Ave., NW, Washington, D.C. 20005. Area code 202. General Editorial Office, 467-4350; Book Reviews, 467-4367; Guide to Scientific Instruments, 467-4480; News and Comment, 467-4430; Reprints and Permissions, 467-4483; Research News, 467-4321; Cable: *Advances*, Washington. For "Instructions for Contributors," write the editorial office or see page xv, *Science*, 30 September 1977.

BUSINESS CORRESPONDENCE: Area Code 202. Business Office, 467-4411; Circulation, 467-4417.

Advertising Representatives

Director: EARL J. SCHERAGO

Production Manager: MARGARET STERLING

Advertising Sales Manager: RICHARD L. CHARLES

Sales: NEW YORK, N.Y. 10036: Herbert L. Burklund, 1515 Broadway (212-PE-6-1858); SCOTCH PLAINS, N.J. 07076: C. Richard Callis, 12 Unami Lane (201-889-4873); CHICAGO, ILL. 60611: Jack Ryan, Room 2107, 919 N. Michigan Ave. (312-DE-7-4973); BEVERLY HILLS, CALIF. 90211: Winn Nance, 111 N. La Cienega Blvd. (213-657-2772); DORSET, VT. 05251: Fred W. Dieffenbach, Kent Hill Rd. (802-867-5581)

ADVERTISING CORRESPONDENCE: Tenth floor, 1515 Broadway, New York, N.Y. 10036. Phone: 212-PE-6-1858.

Conservation: The Minnesota Plan*

Energy conservation is a broad, vague, high-minded notion. Virtually everyone is for it. Yet our commitment to conservation remains shallow. When opposed by an entrenched special interest group, conservation proposals usually come off second best. This is because we have not given conservation the hard, analytical thought necessary to establish it as a high-priority, public-priority objective.

The State of Minnesota considers energy policies and programs a *major state responsibility* calling for a strong, focused state response. In the wake of the 1973 OPEC oil embargo, the Minnesota legislature, with the support of then-Governor Wendell R. Anderson, created the Minnesota Energy Agency. The Agency has broad responsibility for conservation, information, education, and outreach programs, data gathering, supply and demand forecasting, policy development, research, and emergency management and the regulatory responsibility to determine the need for large new energy facilities. The state has provided adequate personnel and funds for these activities. The Agency has a staff of 70 persons, some 50 of them at the professional level, and a budget of \$2.6 million, 80 percent from state funds.

As a result, Minnesota has a strong, comprehensive, and coordinated state energy program, of which conservation efforts are a product. There are six energy goals: (i) to obtain adequate and secure supplies of petroleum; (ii) to seek our share of the available natural gas and help direct it to the highest-priority users; (iii) to develop a coal use plan that balances energy, environmental, and economic considerations; (iv) to promote alternative energy sources; (v) to obtain adequate supplies of electricity and achieve the greatest possible efficiency in the generation, transmission, and end-use of electricity; and (vi) to implement a comprehensive conservation plan.

Many of the Agency's programs are aimed at achieving immediate savings—establishment of air-conditioning standards, a ban on decorative gas lamps as well as on pilot lights on new stoves, in new forced-air furnaces, and in new dryers, a prohibition against new heated commercial garages. The Agency this year is undertaking 119 different conservation projects, some of the most interesting of which involve longer-term horizons.

A popular program has been infrared flyovers. Last winter, 27 Minnesota cities were flown. Thermograph pictures show the heat loss through the roofs of individual buildings and homes. Viewing centers have been opened in these cities where homeowners can see the amount of heat and money going through their roofs. The centers also provide weatherproofing information and facts about various loan programs for home insulation.

The growing interest in energy conservation in Minnesota was apparent earlier this month when the Agency, in cooperation with Northern States Power and Minnegasco, sponsored a 4-day Energy Savers Show in the Minneapolis Auditorium. The show featured exhibits, training films, and demonstrations of residential energy-saving measures. Admission was \$2 for adults. More than 35,000 attended the show.

Energy conservation is of the utmost importance. Man has survived and flourished because he has been able to adapt to vastly different environments. Our environment is again changing—far more rapidly than many of us recognize. We are changing from an energy-affluent people to an energy-deficient people. Energy permeates virtually everything we do. The implications of this change are monumental.

But we know that change offers opportunities as well as dangers. The greatest danger we face is that we will not recognize change fast enough and will not know what to do about it. The greatest opportunity will be realized if with foresight and understanding we recognize a need for adjustments in man's relationship to his environment and to his fellow man.—JOHN P. MILLHON, *Director, Minnesota Energy Agency, St. Paul 55101*

*Adapted from an address presented at the fifth annual Illinois Energy Conference, Chicago, 28 September 1977.

Prize competition

announced by the

Anna Monika Foundation

for the investigation of the physical substrate and functional disturbances of endogenous depressions by approval of the Minister of the Interior of Nordrhein-Westfalen, Düsseldorf, on 9th June, 1965. The Foundation announces the following prizes:

FIRST PRIZE 10.000,- US Dollars

SECOND PRIZE 5.000,- US Dollars

THIRD PRIZE 2.500,- US Dollars

preferably for studies of biochemical, histological, neurophysiological, neuropathological, psychopharmacological, psychiatric or psychosomatic nature. The studies should be carried out in close co-operation with a psychiatric clinic, a university institute or an equivalent scientific institution. So far as possible, *the papers should give information about recent advances* in knowledge that would be helpful in promoting treatment and would open up new paths of progress. The papers may be written in German, French or English and should be submitted to the Chairman of the Committee, Professor Dr. P. Kielholz, Basle, Switzerland. Besides hitherto unpublished studies, papers published in the past two years in a German or international professional journal may also be submitted. *Deadline for submission to the Committee is 30th September, 1978.* To help the Committee to come to a speedy decision it is requested that at least four copies *including an abstract* covering the content of all papers should be submitted. Prizes will be awarded on the 30th June, 1979. If, in the opinion of the Committee, no papers of sufficient merit are submitted, it reserves the right to make no award. Prizes and their amount will be awarded according to the merits of the study in question. Subject to the Committee's decision, each prize can be divided between two papers.

The Committee of Judges Includes:

Chairman: Professor Dr. P. Kielholz, Director of the Psychiatric Clinic of the University of Basle, Wilhelm-Klein-Strasse 27, CH-4056 Basle, Switzerland.

Professor Dr. Karl Bernhard, Institute for Physiological Chemistry, Basle, Switzerland

Professor Dr. Otto Creutzfeldt, Director of the Max-Planck-Institute of Biophysical Chemistry, Göttingen, Germany

Professor Dr. H. J. Dengler, Director of the Medical Clinic of University Bonn, Germany

Professor Dr. Fritz A. Freyhan, M.D., F.A.P.A. Washington, D.C. 20009, USA

Professor Dr. K. Heinrich, Director of the Psychiatric Clinic of the University of Düsseldorf, Germany

Professor Dr. H. Hippus, Director of the Psychiatric Clinic and Out-patient Clinic Munich, Germany

Professor Dr. Horst Jatzkewitz, Director of the Max-Planck-Institute for Psychiatry, Neurochemical Department, Munich, Germany

Professor Dr. D. Palm, Director of the Pharmacological Institute of the University of Frankfurt/Main, Germany

Professor Pierre Pichot, Head of Medical Psychology, Centre Psychiatrique Sainte-Anne, Paris, France

Professor Dr. Wilhelm Stoffel, Director of the Institute of Physiological Chemistry, University of Cologne, Germany.

Director of the Foundation: PETER REHME, TÖLLNERSTR. 9/11, D-4600 DORTMUND.



Annual Meeting Washington

12-17 February 1978

Meeting Program — Part III

The theme for the forthcoming AAAS Annual Meeting in Washington is "Science and Technology: New Tools, New Dimensions." In previous issues of *Science* this month (2 and 16 December), we have listed those symposia for the Meeting dealing with developments in the natural and social sciences, including those which deal with the "Tools of Science," the theme of our exhibit. Listed below are the 47 symposia in the areas of science policy and education, many of which attempt to define the dimensions of science, its limits *vis-à-vis* governments, businesses, and the public at large, as well as the internal limits built into its very structure. Some of the specific areas in which these limits show themselves are also considered in the General Interest sessions (listed in the 2 December issue), as well as in the various sessions devoted to the specific sciences.

Read through this material and that presented earlier; we are sure that you will find a large amount not only of interest to you but of sufficient importance to warrant your attendance at the Meeting. Reserve your place early; fill in and return the housing and registration forms at the end of the listing.

—ARTHUR HERSCHMAN

13. Methodology of Science

The Role of Models in Scientific Inquiry (13 Feb., SA): Theoretical physics, geology, economics.

Ernan McMullin, Robert S. Cohen, Charles W. Misner, David B. Kitts, Edward J. Nell.

Can Mathematics Be Applied to the Social Sciences? (14 Feb., SA): Computer models, economics, social theories, structure of mathematics, outside the natural sciences, critical theory, problem of meaning.

Sanjoy K. Mitter, Héctor J. Sussmann, Joseph Weizenbaum, Pravin Varaiya, David Berlinski, Roger W. Brockett, Thomas A. McCarthy.

Mathematical Models of Information Systems (15 Feb., SA): Calculus and value of information, uncertain decision, software engineering.

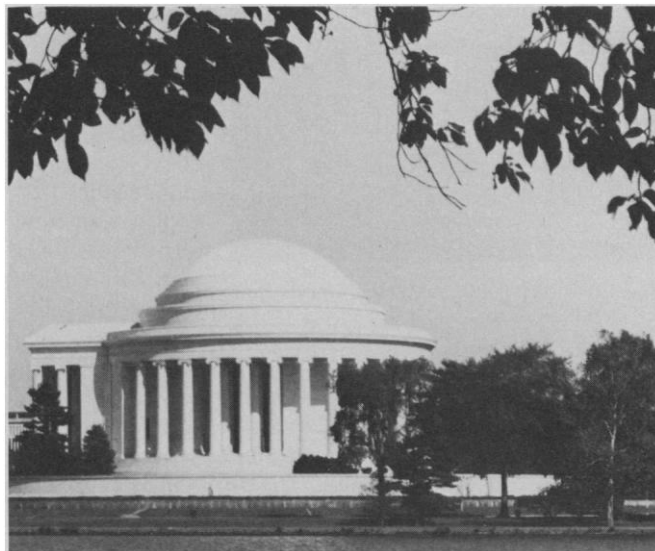
Andrew Vazsonyi, William T. Ziemba, Harlan D. Mills.

Limits on Scientific Progress (16 Feb., SA): Controversies, completeness, limits of growth, limits of science.

Nicholas Rescher, Eugene P. Wigner, Laurens Laudan, Richard Schlegel, Mario Bunge.

The Reception of Unconventional Science by the Scientific Community (16 Feb., SA): Acausality, continental drift, acupuncture, parapsychology.

Seymour H. Mauskopf, Paul Forman, Henry R. Frankel, John Z. Bowers, Marcello Truzzi.



Jefferson Memorial—situated on the Tidal Basin. [Washington Area Convention and Visitors Bureau]

Replicability and Experimenter Influence (17 Feb., SA): Quantum mechanics, behavioral and parapsychological research, replicability, scientific method.

Charles Honorton, Irvin Child, Henry Margenau, Robert Rosenthal, Harry M. Collins.

The Rhetoric and Language of Science (17 Feb., SA): Implied audience, technology, neutral description.

Berel Lang, Arthur Quinn, J. C. Mathes, Gary H. Stahl, Bernard Kaplan.

14. Scientific Freedom and Responsibility

Appraising Peer Review (13 Feb., SA): NIH, citation data, NSF.

Harriet Zuckerman, Ruth L. Kirschstein, Grace M. Carter, Stephen Cole, Jonathan R. Cole, Felix Chayes.

Participation and Expertise in a Democratic Society (13 Feb., SA): Citizens court, science court, political actor, federal agencies, European countries.

Dorothy W. Nelkin, Sheldon Krinsky, Allan C. Mazur, Jerome E. Milch, Daniel S. Metlay.

Science and the "Isms" of the 20th Century (14 Feb., SA): Marxism, fascist state, Nazi Germany, Kapitza and Sakharov.

Robert E. Filner, Derek de Solla Price, Judith R. Goodstein, Alan D. Beyerchen, Lawrence Badash, Robert S. Cohen.

Whistle-Blowing and Scientific Responsibility: The Management of Technical Dissent (15 Feb., SA): Regulatory agencies:

HOTEL CODES: Sheraton Park . . . SP; Shoreham Americana . . . SA.

FDA, HEW, NRC; administrator's congressional and reviewer's perspective; nuclear safety; scientific dissent.

Frank von Hippel, Rosemary A. Chalk, Harold P. Green, Carol S. Kennedy, Marc Novitch, Lawrence C. Horowitz, Norman Dorsen, H. Bentley Glass, Ronald M. Fluegge, Roger J. Mattson, Henry R. Myers, Robert J. Baum, Jeremy J. Stone.

Regulation of Scientific Inquiry: Societal Concerns with Research (16 Feb., SA): Need for regulation, ethical dilemmas, value conflicts, secrecy and the individual, privacy regulations, human subject, accountability and power.

Hans O. Mauksch, Rosemary A. Chalk, Keith M. Wulff, André E. Hellegers, Barry M. Casper, Kurt W. Back, Lee N. Robins, Albert J. Reiss, Jr., Harold P. Green, Eliot Freidson.

Human Rights and Scientific Freedom: Are Scientists Special? (17 Feb., SA): Human issues, Argentina, Soviet scientists, congressional activities.

John T. Edsall, Joel R. Primack, Robert W. Kates, Mark S. Mellman, Robert F. Drinan.

15. Education and Opportunities

Issues in Science Education (13, 14, and 15 Feb., SP): Public education, impact of legislation, policies, NSF curriculum programs, research.

James T. Robinson, Arthur H. Livermore, Herbert A. Smith, Harold L. Hodgkinson, F. James Rutherford, Fletcher G. Watson, James W. Symington, Lester G. Paldy, Robert W. Howe, David H. Ost, Robert L. Silber, Thomas A. Shannon, Donald Barr, Fenwick W. English, J. Dudley Herron, Rodger W. Bybee, Robert E. Stake, Beth K. Dawson, Iris R. Weiss, Wayne W. Welch, Marjorie H. Gardner, Stanley L. Helgeson, James G. Greeno, Laura Nader, Mary Budd Rowe.

New Trends in Interpreting Science to the Public (14 Feb., SP): Daily newspaper, newsletter, magazine, television, radio.

Eugene H. Kone, George Alexander, Daniel S. Greenberg, Peter Gwynne, Robert Bazell, Ira Flatow.

Meeting Educational Needs Through Broadcasting Satellites (14 Feb., SP): NASA satellites, regional medical education, graduate level and continuing education, Appalachian, public services.

Frank W. Norwood, Wasyl M. Lew, Patricia I. Boyce, M. Roy Schwarz, Marion H. Johnson, Kenneth S. Down, Harold E. Morse, John P. Witherspoon.

Communication with Science's Publics: Prerequisite to Public Support (14 Feb., SP): Interpersonal linkage, changing perceptions, scientific hubris, consumers, reporters and the establishment.

Harold F. Osborne, Philip H. Abelson, Albert Rosenfeld, Alton L. Blakeslee, Lewis Thomas, Michael J. O'Neill.

Early Intervention: Matching Programs to Children (15 Feb., SP): Delivery systems, long-range effects, preschool attendance.

Bernard Brown, Irving Lazar, Ruth V. Hubbell, Ira Gordon, David P. Weikart, Francis H. Palmer, Shirley G. Moore.

Culturally Based Science Education: Needs and Strategies for Science Literacy (15 Feb., SP): Ethnoscience approach, Appalachian, Latin American and American Indian education, Northern Plains Indian.

Rayna D. Green, Eliot Wigginton, Ubiratan D'Ambrosio, Alan Goodman, Mary E. Bluemle.

Civil Rights of the Handicapped: Access to Higher Education (16 Feb., SP): 504 regulations, services, alterations of facilities, enforcement.

Jack Martin, Wayne E. Fortunato-Schwandt, Roger R. Revelle, Pat Marx, Ronald L. Mace, John Wodatch.

Post-High School American Youth—Results from Analyses of the National Longitudinal Survey of the High School Class of 1972 (16 Feb., SP): Postsecondary education, work, female participation, financial aid, access to higher education.

George J. Nolfi, Marie D. Eldridge, Elmer F. Collins, Karl L. Alexander, Gail E. Thomas, B. K. Eckland, Stephen P. Dresch, Alan P. Wagner.

Problems and Solutions—Science Education for the Deaf (16 Feb., SP): Elementary and high school science, college programs, among hearing students.

B. Edward Cain, Robert S. Menchel, Doris E. Hadary, Robert Wherlie, Francis C. Higgins, Tracy A. Hurwitz.

Science and the Needs of the Handicapped (17 Feb., SP): Research, education, and counselling needs; technology needs, assessment, diffusion, and transfer.

E. C. Keller, Jr., Robert W. Mann, Robert Larsen, Richard H. Johnson, John Gavin, Doris Hadary, Phyllis Stearner, Kenneth Ricker, R. A. Dudek, Jerry Turen, Lex Frieden, Ralf Hotchkiss, Hadi Madjid, H. Myron Weinberger.

Models of Learning and Their Implications for Science Education (17 Feb., SP): Object-person dichotomy, information processing, social factors, mass media, future environments, limits on knowledge.

Joseph I. Lipson, F. James Rutherford, Karl H. Pribram, Diane McGuinness, Jill H. Larkin, Harry C. Triandis, Allen Newell, Gregg Edwards, Kenneth E. Boulding.

16. Policy Development

Assessment of Technological Risk (13 Feb., SP): Pharmaceuticals, regulatory agencies and Congress, the Judiciary.

Richard A. Scribner, William A. Thomas, W. Brown Morton, Jr., Emilio Q. Daddario, William W. Lowrance, Donald Kennedy, Howard T. Markey, Harold P. Green, Richard H. Bolt.

The Technical Basis for Regulatory Decision-Making (13 Feb., SP): Health, safety, and environmental matters; technical, economic, political, and social considerations.

John M. Logsdon, Michael Baram, David Bazelon, Raphael Kasper, Albert H. Teich, Monte Throdahl, Eula Bingham.

Bureaucratic Maladies and Remedies (14 Feb., SP): Discontents, decentralization, competition, policy research and analysis, political control.

Carol H. Weiss, Allen H. Barton, Graham Allison, Robert K. Yin, William A. Niskanen, Charles E. Lindblom, Francis E. Rourke.

The State of Academic Science (14 Feb., SP): NSF report, basic research.

Harvey M. Sapolsky, Carl Kaysen, Bruce L. R. Smith, Joseph J. Karlesky, Albert H. Teich, Harvey Brooks, Sanford A. Lakoff.

Methodological Issues in Technology Assessment (15 Feb., SP): Context, strategy, methods, integrating technology assessment.

Joshua Menkes, G. Patrick Johnson, Aaron Wildavsky, Willis W. Harman, Joe Armstrong, Joseph P. Martino, Frederick A. Rossini, Alan L. Porter, Patrick Kelly, Daryl E. Chubin, Melvin Kranzberg, Donald Michael.

The Influence of Product and Process Regulation on Technological Change (15 Feb., SP): Long- and short-term impacts, innovation in industry, technological change and innervation.

David L. Bodde, Joseph T. Ling, William J. Abernathy, Jordon D. Lewis, Glenn E. Schweitzer, Victor Berlin.

The Modeling of Social Systems: Its Uses and Limitations in Societal Problem-Solving (15 Feb., SA): Formal modes of analysis, vehicle for public policy, large-scale social systems, explication and judgment.

A. George Schillinger, John Crecine, Nathaniel J. Mass, Garry Brewer, Anthony J. Wiener.

OMB and OSTP in American Science Politics: What Really Happens in RD & D Budgeting (16 Feb., SP): Agricultural research, post-embargo energy RD & D policy, issue-making and issue development, long-range planning.

Thane Gustafson, Philip M. Smith, Thomas P. Grumbly, Jack Appleman, Patricia Evans Perry.

Energy Sources, Technological Options, and Environmental Repercussions: Spatial and Temporal Assessment (16 Feb., SA): Industrial emissions, locational adjustment, planning at the state level.

Manoucher Parvin, Allen V. Kneese, Richard Tepel, Salvador R. Bozzo, Leonard D. Hamilton, Owen Carroll, Melvin Kranzberg, Sanford Bordman, Ralph D'Arge, Richard Dusansky, Dennis Young.

Avoiding Societal Catastrophes and Maximizing Social Opportunities: The General Systems Challenge (16 Feb., SA).

Richard F. Ericson, Russell Ackoff, Hazel Henderson, Margaret Mead, John H. Sutherland, John N. Warfield, Gerald M. Weinberg.

Advising the Congress on R & D: The OTA Role (16 Feb., SP): Institutional experiment, analytical capabilities, congressional influence, national needs.

Carolee McBee, Jerome B. Wiesner, Ellis R. Mottur, Harvey Brooks, Lewis M. Branscomb, Gilbert F. White, Charles Mosher, John Stewart.

Investing in Integrated Systems in Communications, Health, and Energy (17 Feb., SA): Electronic communication, social alternatives, system considerations.

George K. Chacko, Sherry Arnstein, Piet B. Bos, Kenneth F. Gordon, Charles D. Flagle, Morton B. Prince.

Federal Regulations: Ethical Issues and Social Research (17 Feb., SP): Human subjects, dilemmas, ensuring confidentiality, costs and benefits.

Murray L. Wax, Bradford H. Gray, Joan Cassell, Robert F. Boruch, Joseph S. Cecil, Virginia L. Olesen, Clark C. Abt.

17. Policy Issues

Population, Resources, Energy, and the Environment: Reports on the Debates (13 Feb., SP): Fertility decline, growth-equity, nuclear, environmental, leisure.

David L. Sills, Leon Tabah, Denton E. Morrison, Robert C. Mitchell, Meinolf Dierkes, Thomas K. Burch, Herman E. Daly, Dorothy W. Nelkin, Charles T. Unseld, C. P. Wolf.

Drug Crops, Public Policy, and International Control (13 Feb., SA): Turkish poppy cultivation, U.S.-Mexican relations, herbicide use, human biology, opium ecology, Southeast Asia.

Joel M. Jutkowitz, Karen Kerner, Donald L. Dahlsten, Sean Swezey, Arthur W. Galston, David A. Feingold.

US-USSR Exchanges in Science and Technology: Working with Soviet Scientists (13 Feb., SP): Myocardial infarction, magnetohydrodynamics, earthquake hazard research.

Egon E. Loebner, John Turkevich, Joseph S. Nye, James E. Muller, Peter R. Maroko, Eugene Braunwald, William D. Jackson, Brian E. Tucker, Milton J. Wilkinson.

Solar System Exploration: Should It Be a National Commitment? (14 Feb., SP).

Daniel H. Herman, Edward P. Boland, A. Thomas Young, Carl Sagan, Albert D. Wheelon, Charles A. Mosher, Michael B. McElroy, Eliot Cutler.

International Trends in Applying Science and Technology: Problems, Opportunities, and Policies (14 Feb., SP): Historical highlights, priorities, industrial sector, organized labor, scientific community, UN conference, multinationals, Kenya, Algeria.

Rodney W. Nichols, Franklin Huddle, Lucy Benson, Charles Dennison, Elizabeth Jager, Walter Orr Roberts, Frederick Seitz, Hugh Miller, John Stewart, John Logsdon, João Franck da Costa, Raymond Vernon, Joseph Mungai, Ali Khamis, Jean Wilkowski, Harvey Wallender, Victor Rabinowitch, Gilbert S. Omenn.

Neighborhoods, Cities, and Regions: Governing the Future of Urban Spaces (15 Feb., SA): Urban government, community boundaries, dimensions of space, community design, self-help housing, energy and information, conservation strategies, continuous transformations.

Robert Warren, Michael N. Albanes, Louis F. Weschler, Ben H. Bagdikian, Roger M. Downs, Pierre Clavel, Mitchell L. Moss, Roland L. Warren, Gregg Edwards, Don Terner, John P. Eberhard, Woody Rainey, Don Schon.

Domestic and International Scientific Aspects of Extended Marine Jurisdiction (15 Feb., SP): Scientific challenge, fishery, marine and social science, coastal zone, information requirements, forensic aspects, ocean policy.

Brian J. Rothschild, Dayton L. Alverson, Harvey R. Bullis, Jr., Edward Miles, Robert W. Knecht, Robert L. Edwards, Izadore Barrett, William C. Brewer, Jr., James W. Curlin.

Creative Tensions: Federal Energy Policies versus State Energy Policies (16 Feb., SP): U.S. Department of Energy, consuming state, federal land-leasing, states' rights, conservation, alternative technologies, ERDA program.

Frank M. Graves, Jon M. Veigel, Hermann P. Bretsch, Alvin Alm, Richard Maullin, George Turcott, James Monahan, Gary Wicks, John A. Roth, Sumner Myers, John P. Millhone, James S. Kane, Maxine L. Savitz, Richard Werthamer, Gene Mannella.

Problems and Progress in Scientific and Technical Advising for Policy Formulation at the State Level (17 Feb., SP): Strengthening capacity, regional resources, Rocky Mountain States, Michigan, Maryland, Louisiana, Colorado, Iowa.

Robert W. Hanson, Edward L. Helminski, E. Gerald Meyer, William C. Taylor, Harry Kriemelmeyer, William B. De Ville, Floyd C. Mann.

Some Views from Inside Congress on Water, Pollution, Biohazards, and Nutrition (17 Feb., SP): Water, CO₂, biohazard control, nutrition issues.

Richard A. Scribner, Allan Hoffman, Yacov Y. Haimes, Thomas Moss, Haven Whiteside, R. Darryl Banks, George Jacobson, Kristen W. McNutt.

AAAS

Science Film Festival

The AAAS *Science Film Festival* has been a feature of the Annual Meeting since 1947. Traditionally, the Festival aims to bring the best new science films available to the attention of meeting participants as well as the interested general public.

The 1978 Festival includes a wide range of films which vary both in their content and interest levels. A few major themes included are:

The structure and recent exploration of the Universe

The development of alternate energy sources and the utilization of the remaining fossil fuels

The recent discoveries of the functions and capabilities of the human brain

The preservation of wildlife and their natural habitat and other issues of conservation and ecology

The problem faced by both the mentally and

physically handicapped and the elderly in our society.

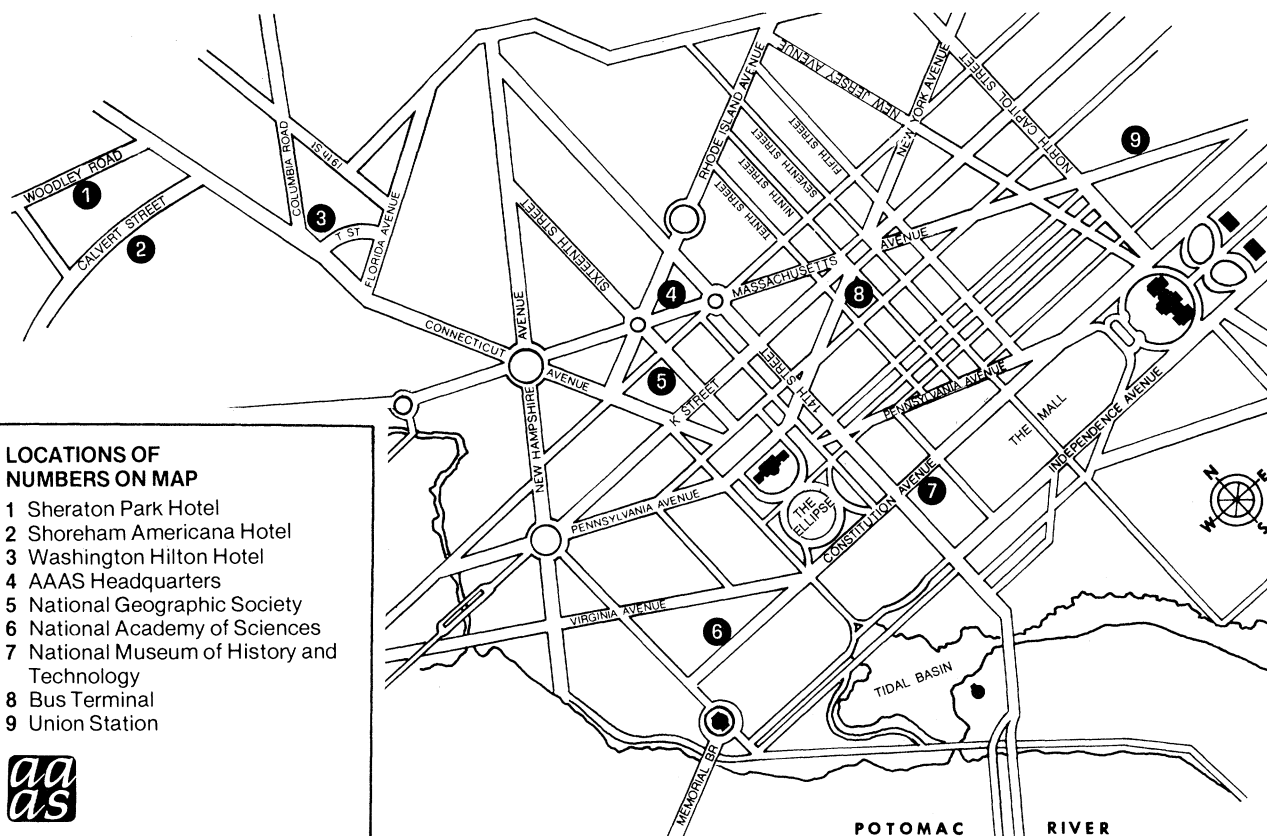
In addition to the fifty general audience and children's films mentioned above, this year's Festival includes a selection of eight research films spanning topics from cloud seeding and deep-ocean mining experimentation and research to data manipulation.

The Film Festival will run for five consecutive days, beginning Monday, 13 February, 10 a.m. to 3 p.m. (Friday, 10 a.m. to 1 p.m.) Research Films are scheduled as the last two films each day except Friday. Classes accompanied by a teacher are welcome; young people under the age of 10 must be accompanied by an adult. Admission is free.

A complete schedule of films and showing times will be published in the Annual Meeting Program. We hope that you will find these films exciting, innovative, and informative—plan to attend!

BARBARA GREY
Festival Coordinator

Map of Downtown Washington





Annual Meeting
Washington
12-17 February 1978

Advance Registration Form (E)

ENCLOSED IS:

- AAAS Member:** ☐ \$24 Single Registration Fee ☐ \$36 Double Registration Fee (attendant and spouse)
Non-Member: ☐ \$30 Single Registration Fee ☐ \$42 Double Registration Fee (attendant and spouse)
Student: ☐ \$12 Single Student Registration Fee ☐ \$18 Double Registration Fee (student attendant and spouse)

Non-Member applying for AAAS membership* and meeting registration: (Annual membership dues include 52 issues of SCIENCE. Double membership—individual and spouse—includes one subscription to SCIENCE.)

- ☐ \$52 Single Registration and Membership (\$24 registration and \$28 dues)
☐ \$64 Double Registration and Single Membership (name of applicant _____) (\$36 registration and \$28 dues)
☐ \$76 Double Registration and Membership (\$36 registration and \$40 dues)

*These rates apply to USA membership only. Inquire for Canadian or Foreign rates.

**Program and badge will be mailed to each registrant in mid-January.
Registrations received after 20 January will be held at the AAAS Information Booth.**

NAME OF REGISTRANT: _____
(Last Name) (First and Initial)

NAME OF SPOUSE REGISTRANT: _____
(Last Name) (First and Initial)

REGISTRANT'S MAILING ADDRESS: _____
(For receipt of program(s), badge(s), and SCIENCE (for new applicants))
(Street)
(City/State) (Zip Code)

ADDITIONAL REGISTRANTS: _____
(With same mailing address. Use new form if address differs)

REGISTRANT'S
INSTITUTION OR COMPANY: _____
(City) (State) (Zip Code)

CONVENTION ADDRESS: _____
(Where you can be reached) (Hotel or Street Address)
Check days attending: Sun ☐ Mon ☐ Tue ☐ Wed ☐ Thu ☐ Fri ☐

Note: Special one-day attendance registration is available at the Meeting Registration Desks (\$12 regular, \$6 student).
A book containing the abstracts of the Meeting papers will also be available at the Registration Desks at an additional charge of \$5.

☐ **Please check here if you need special services due to handicap. We will contact you prior to the meeting.**

**Mail to: American Association for the Advancement of Science, Dept. R,
1515 Massachusetts Ave., NW, Washington, D.C. 20005**

SURVEY OF ATTENDANTS

Annual Meeting, Washington, 12-17 February 1978

Your answers to the following questions will help us in planning future AAAS Annual Meetings. Please complete the following form and either return it with your registration form or send in separately (to the same address) if you wish to respond anonymously (in any case, the two forms will be processed separately).

Principal Professional Interest		Principal Professional Activity		Institutional Affiliation Type	
11 ☐ Physical, mathematical	21 ☐ Teaching, education	31 ☐ University, 4-year college			
12 ☐ Biological, medical	22 ☐ Health practice	32 ☐ Other educational			
13 ☐ Engineering	23 ☐ Other practice, consulting	33 ☐ Industrial, commercial			
14 ☐ Social, behavioral	24 ☐ Research, development	34 ☐ Other private			
15 ☐ Science policy	25 ☐ Administration	35 ☐ Government			
16 ☐ (other)	26 ☐ (other)	36 ☐ (other)			

Highest Educational Level		Age		Distance Traveled to Meeting		Last AAAS Meeting Attended	
41 ☐ Doctoral Degree	51 ☐ Under 26 years	61 ☐ Under 51 miles	71 ☐ 1972 in Washington				
42 ☐ Master's Degree	52 ☐ 26 to 35 years	62 ☐ 52 to 150 miles	72 ☐ 1973 in Mexico City				
43 ☐ Other professional	53 ☐ 36 to 45 years	63 ☐ 151 to 400 miles	73 ☐ 1974 in San Francisco				
44 ☐ Bachelor's Degree	54 ☐ 46 to 55 years	64 ☐ 401 to 1000 miles	74 ☐ 1975 in New York				
45 ☐ (other)	55 ☐ 56 to 65 years	65 ☐ 1001 to 3000 miles	75 ☐ 1976 in Boston				
	56 ☐ Over 65 years	66 ☐ Over 3000 miles	76 ☐ 1977 in Denver				

Hotel Reservations

Room Rates*

Annual Meeting Washington

12-17 February 1978



The 144th National Meeting of the American Association for the Advancement of Science will be held in Washington, DC, 12-17 February 1978. Symposia, contributed paper sessions, and all other Meeting activities are scheduled in the Sheraton-Park (headquarters) and Shoreham Americana hotels. Both hotels will have AAAS registration and information desks and provide housing at the following convention rates:

Hotel	Single	Double	Twin	Suites**	Parking
SHERATON-PARK (<i>Headquarters</i>) 2660 Woodley Road, N.W. (No. of rooms held: 1000)	\$32 35 38 40	\$42 45 48 50	\$42 45 48 50	\$85 and up	\$2.60 for daytime parking. \$3.60 per 24 hrs. (<i>inquire at the Front Desk about in and out privileges</i>).
SHOREHAM AMERICANA 2500 Calvert Street, N.W. (No. of rooms held: 600)	\$30	\$40	\$40	\$70 and up	\$3.00 per 24 hrs. (<i>with in and out privileges</i>).

STUDENT RATES: Both the SHERATON-PARK and SHOREHAM AMERICANA hotels have provided these special room rates for students:

Triple occupancy: \$15 per person; **Quadruple occupancy:** \$12 per person

Only prearranged groups of 3 or 4 students with the same arrival and departure dates qualify for these special rates. All names must appear on the Hotel Reservation Form.

*Per day; add 8% D.C. sales tax. Charge for additional person in room, \$10; rollaway beds or cots, \$10 (both hotels.) Children accommodated free in same room with parents: Sheraton-Park, age 18 and under; Shoreham-Americana, age 14 and under.

**Lowest available rate for one-bedroom/parlor suites; rates for larger suites available on request.

NOTE: If room rate specified is not available, the next available higher rate will be assigned. Confirmation will come to you directly from the hotel. Please make all reservation changes and cancellations through the Housing Bureau *in writing*. Room assignment will be delayed if any information is omitted from the Hotel Reservation Form.

HOTEL RESERVATION FORM

Please type or print

Reservations received after 20 January cannot be assured.
The Housing Bureau will not accept any reservations by telephone.

CHOICE OF HOTEL: First _____ Second _____

ROOM: ☐ Single ☐ Double ☐ Twin SUITE: ☐ 1 Bedroom ☐ 2 Bedrooms PREFERRED RATE \$ _____

STUDENTS: ☐ 3 persons per room ☐ 4 persons per room

Please indicate any special housing needs due to a handicap: _____

ARRIVAL: Date _____ ; _____ a.m. _____ p.m. Be sure to list definite arrival and departure date and time. Hotel reservations will be held only until 6 p.m. unless otherwise specified. Check out-time is 1:00 p.m. at both hotels.
DEPARTURE: Date _____ ; _____ a.m. _____ p.m.

NAMES AND ADDRESSES OF ALL OCCUPANTS OF ROOM

Name _____ Name _____

Address _____ Address _____

City _____ State _____ Zip _____ City _____ State _____ Zip _____

Name _____ Name _____

Address _____ Address _____

City _____ State _____ Zip _____ City _____ State _____ Zip _____

Hotel, confirm reservation to: _____

Mail to: AAAS Housing Bureau
1129 Twentieth Street, N.W., Washington, D.C. 20036

PRODUCTS and MATERIALS

Tissue Sample Holder

The Paraplast Processing Cassette is a disposable holder during processing, sectioning, and storage of histologic specimens. Each cassette consists of a disposable base and a lid. The lid may be washed and reused. The base is easily labeled. The high specific gravity allows submergence of the cassette in common processing agents such as formalin, tetrahydrofuran, chloroform, benzene, and acetone. Sherwood Medical. Circle 725.

Sterilizers

The Verniclave V-8000 series comprises a line of portable steam sterilizers. The models feature automatic sterilizing time cycle; steam bleeding traps to prevent excessive internal pressure; a set drying cycle; and a scale calibrated in pounds per square inch, degrees Celsius, and degrees Fahrenheit. The units are 18 inches wide for benchtop location and are easily transferred from site to site. Vernitron Medical Products. Circle 728.

Sphygmomanometer

The model 77070 Schneider Automated sphygmomanometer makes non-invasive measurements of blood pressure. Systolic or diastolic determinations are made every 3 seconds without significant venous occlusion or discomfort to the subject. The cuff is automatically inflated at 3- to 99-second intervals based on the detection of Korotkoff sounds. Accessory biofeedback monitors are available for audio, visual, or digital feedback. Lafayette Instrument. Circle 721.

Newly offered instrumentation, apparatus, and laboratory materials of interest to researchers in all disciplines in academic, industrial, and government organizations are featured in this space. Emphasis is given to purpose, chief characteristics, and availability of products and materials. Endorsement by *Science* or AAAS is not implied. Additional information may be obtained from the manufacturers or suppliers named by circling the appropriate number on the Readers' Service Card (on pages 0000A and 0000A) and placing it in the mailbox. Postage is free.

—RICHARD G. SOMMER

Microbiological Hood

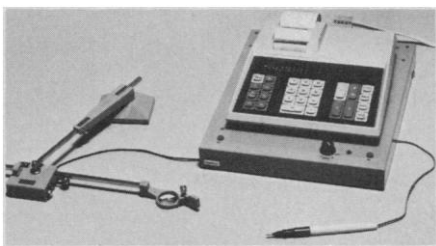
The Benchtop Bioflow Chamber is a Class II safety device that features minimum turbulence; unidirectional, vertical downflow; and recirculating laminar flow. Air that bathes the work area and all exhaust air passes through HEPA filters. The work area is 304 stainless steel and the work tray is positioned to discourage obstruction of return air flow. A viewing panel swings out for insertion of large objects and for cleaning. All power except light shuts off when the panel is opened. Chambers are available in widths from 3 to 6 feet. Germfree Laboratories. Circle 724.

Heat Flow Sensor

The HFTA-2 measures heat loss from any skin surface. It is used to study thermal stress, blood flow, or shock. It has human applications in self-contained environments such as space or diving suits or it may be implanted in experimental animals. One millivolt is generated for each 100 watts of heat flux per square centimeter. The sensor is a disk 25.4 millimeters in diameter and 1.57 millimeters thick. Thermonetics. Circle 727.

Computing Planimeter

Model 50 S-3 features fully automatic computation of area measurements in acres; square inches, feet, or miles; hectares; and square centimeters, meters, kilometers, and so forth. It also measures linear distances in standard English or metric units. It has an integral



point counter and marking pen, instant digital readout and printout, and remote control facilities for all functions. Los Angeles Scientific Instrument. Circle 722.

Sodium-Potassium Detector

Model 460 is an automated flame photometer that calibrates and monitors its own operation and fuel and reagent conditions and signals the operator when adjustments are needed. In the automatic mode, the 460 measures sodium and potassium in urine or serum. The instrument also has a manual mode for measuring lithium in serum. A sample tray holds 36 sample cups. Samples are processed at a rate of 120 per hour and results are displayed and printed. The 460 calibrates itself after every ninth sample. Corning Medical, Corning Glass Works. Circle 723.

Recorders

The Series 8000 offers recording, computing, and graphing capabilities in single instruments. Models for strip-charting and x-y plotting are available. Each model is microprocessor-based with multichannel capacity, data-processing ability, and flexible disk storage. Each channel may be set for its own sampling rate and graphic output may be selected during or after data acquisition. Incoming data are digitized and temporarily stored in a 10-kilobyte random access memory prior to being transcribed on a flexible disk. Bascom-Turner Instruments. Circle 672.

Centrifuge Rotor

The Chylomicron rotor clears blood samples of fat particles that impair the accuracy of spectrophotometric analyses. Lipemic samples are clarified by a 10-minute spin at 90,000 revolutions per minute with a 3.5-milliliter disposable liner in which chylomicrons are isolated by flotation. Fat particles may also be removed from other body fluids and tissue homogenates with this rotor. The polyethylene liner consists of a doughnut-shaped outer chamber and an inner chamber shaped like an inkwell with a hole at the top. When the liner is placed in the rotor, a spring washer inside the rotor cover compresses it and separates the chambers. During centrifugation, the liner is forced up against the washer and the low-density chylomicrons float to the

Classics From The Past

Some of our AAAS out-of-print symposium volumes are in such demand that we've made arrangements for them to be reproduced, at your request, either reprints or microfilm.

Fifty-nine volumes, among them *Cancer*, *Estuaries*, *The Future of Arid Lands*, *Research for the World Food Crisis*, and *Land and Water Use*, were selected for this collection. Some of this material was originally presented by well-known scientists at AAAS annual meetings as long ago as 1939. Prices start at \$6 for microfilm copies and \$10 for xerographic copies, and vary depending on the length of the original.

For a complete list of volumes available, prices, and ordering information, send the coupon below to: University Microfilms International, 300 North Zeeb Road, Ann Arbor, Michigan 48106.

Name _____

Title _____

Institution _____

Address _____

City _____

State/Zip _____

center of the rotor. As the rotor decelerates, the outer chamber is again sealed off and the fatty particles are trapped in the inner chamber. Beckman Instruments, Spinco Division. Circle 720.

Stereomicroscope

The M-400 Photomakroskop is a compact, binocular instrument with a zoom lens. Framing and focusing adjustments for photography at 1 to 20 power are made with the operator seated and using both eyes. A photodiode measures light intensity and exposure time is set automatically. Time indicators monitor expected exposure time and elapsed exposure time. Film is advanced after each exposure. The standard M-400 comes with a 35-millimeter camera. Other accessories are available. Wild Heerbrugg Instruments. Circle 726.

Microtitrator

Model FT2230 is a potentiometric instrument designed for microcoulombic, constant-current titration. Quantitative analyses of acid content, Cl^- , Br^- , and other ionic species that lend themselves to electrogeneration of an appropriate reagent or reactant are possible. The instrument consists of a dual differential probe electrometer, a bipolar constant-current generator, and a total charge integrator. The electrometer features high impedance (10^{15} ohms). The generator produces a direct current of from 0 to 120 nanoamperes. The integrator reads up to ± 10 microcoulombs on a digital display. W-P Instruments. Circle 738.

Literature

Ultrafiltration is the subject of a bibliography of more than 1000 references. Amicon. Circle 683.

Minicomputer features the Eclipse S/130 systems and their computation abilities, languages, operating systems, and peripherals. Data General. Circle 684.

Spectrophotometer describes the Spectronic 20 analytic instrument, its design specifications, and features. Bausch & Lomb, Analytical Systems Division. Circle 686.

Instruments for the Laboratory includes microscopes, photographic accessories, microtomes, and microprojectors. E. Leitz. Circle 687.

pH Electrodes are described in an extensive catalog. Pope Scientific. Circle 699.

Liquid Chromatography is the subject of a brochure devoted to applications. Waters Associates. Circle 688.

Laboratory Apparatus features timers, temperature controllers, stirrers, hot plates, water baths, tissue homogenizers, and sample preparation apparatus. Tekmar. Circle 689.

Lab Fume Hoods gives dimensions and operating features. United States Testing. Circle 690.

Spectrophotometer Cells lists a variety of cells in several materials. Precision Cells. Circle 691.

Scientific Processor describes the architecture and features of a computational system. Burroughs. Circle 692.

Methods of Air Sampling and Analysis comprises 130 accurate and reproducible methods for testing. (\$45 per copy). American Public Health Association. Circle 693.

Electronic Balances is devoted to seven new balances for scholastic use. Technical data are included. August Sauter of America. Circle 695.

High Performance Radial Chromatography features a spotter, a U-chamber, and a scanner. Camag. Circle 729.

Pesticides lists nearly 400 purified substances for research and analysis. Chem Service. Circle 730.

Biochemicals includes buffers and chemical diagnostics with a separate list of six new products of special interest. Calbiochem. Circle 731.

Chromatography Supplies are described in a newsletter for gas and liquid separations. Varian Associates. Circle 732.

Biochemicals features nucleosides, nucleotides, and analogs for chromatography. ICN Pharmaceuticals, Life Sciences Group. Circle 733.

Light Section Microscope gives detailed specifications for applications in electronics, metals, paper, plastic, and printing industries for surface testing. Carl Zeiss. Circle 734.

Electronic Instruments includes advice on transmission, reflection, and phase measurements and introduces a line of sweep generators. Wiltron. Circle 735.

Particle Technology and Liquid Chromatography Instruments describes two dozen items. Micromeritics Instrument. Circle 736.

Spectrum Analysis Theory is devoted to basic theory and to implementation and applications in detail. Rockland Systems. Circle 737.

Tools for Physiology is a 61-page catalog that includes kymographic, electrophysiologic, educational and other devices. Phipps & Bird. Circle 739.