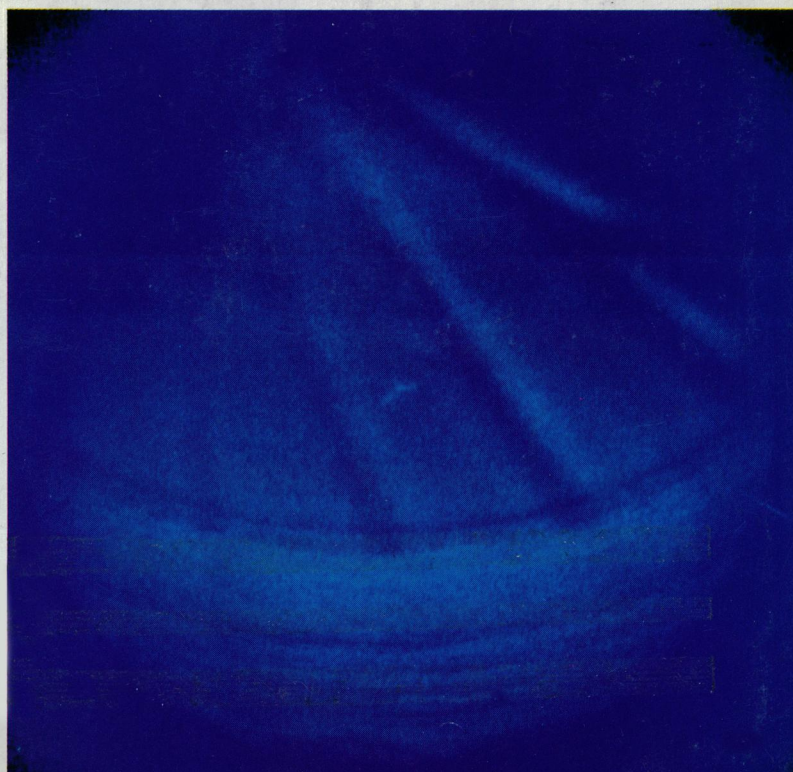
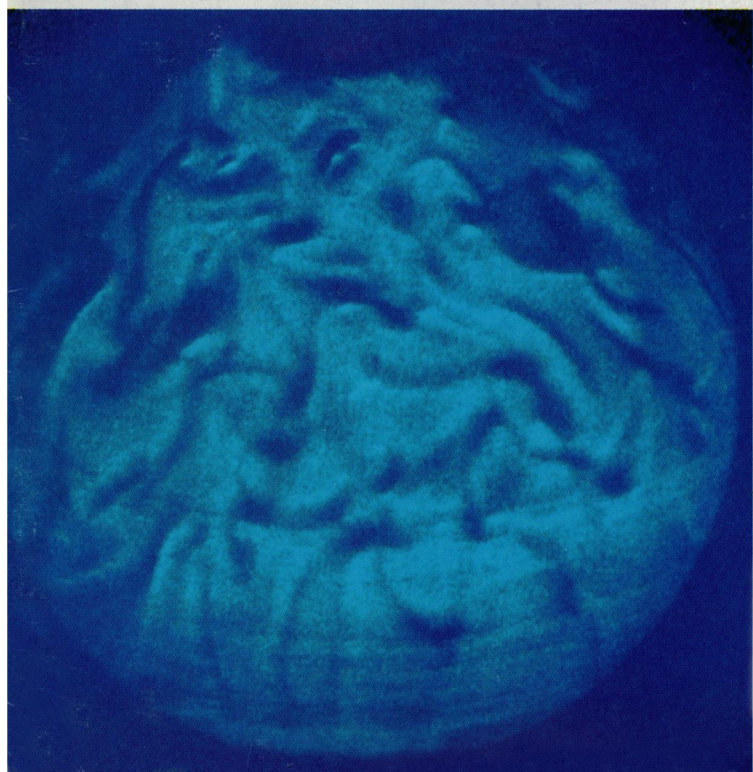
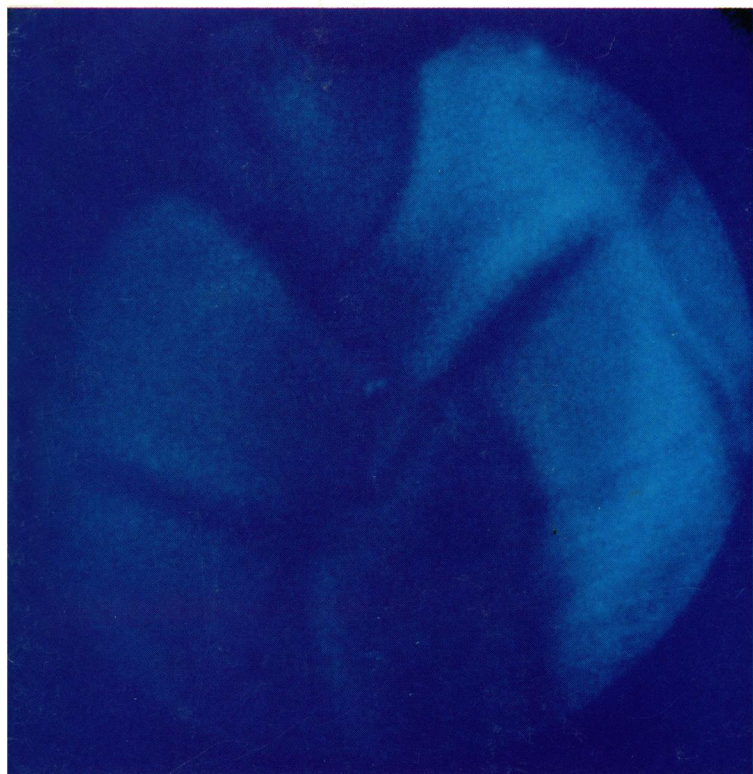


AMERICAN
ASSOCIATION FOR THE
ADVANCEMENT OF
SCIENCE

SCIENCE

3 OCTOBER 1986
VOL. 234 ■ PAGES I-II16

\$2.50



Come out of the "Ice Age" of electrophoresis.

You've coped with cumbersome, unreliable temperature control long enough.

Announcing the E-C Isothermal Controlled Electrophoresis System — I-C-E for short.

I-C-E's new high tech Quantum digital readout control provides temperatures from 0° C to 80° C with setpoint stability of ($\pm$) 0.1° C.

Want to cool **and** heat rapidly in one undisturbed sequence? With I-C-E, for example, you can separate at 4° C and follow immediately with *in situ* enzyme incubation at 37° C, or use ramp heating to 60° C for rapid overlay development.

Need one versatile system that will do it all? That's I-C-E. For 1-D, 2-D, immuno, SDS, isoelectric focusing, and standard horizontal electrophoresis.

Exclusive! I-C-E system includes isoelectric focusing cover with moveable platinum electrodes, and two L-shaped buffer tanks with platinum electrodes for standard 1-D and 2-D immuno separations without turning the gel.

Be kind to your budget. I-C-E, today's state of the art in electrophoresis systems, is only \$1595 fob St. Petersburg, FL

Call Technical Service at 1-800-624-2232 (in Florida 1-800-282-7932) for more information.



E-C Apparatus Corp.
3831 Tyrone Boulevard N.
St. Petersburg, FL 33709
813-344-1644 Telex: 51-4376 HALA



With OMEGA®

**Laboratory Benchtop
pH and Specific Ion Readout**

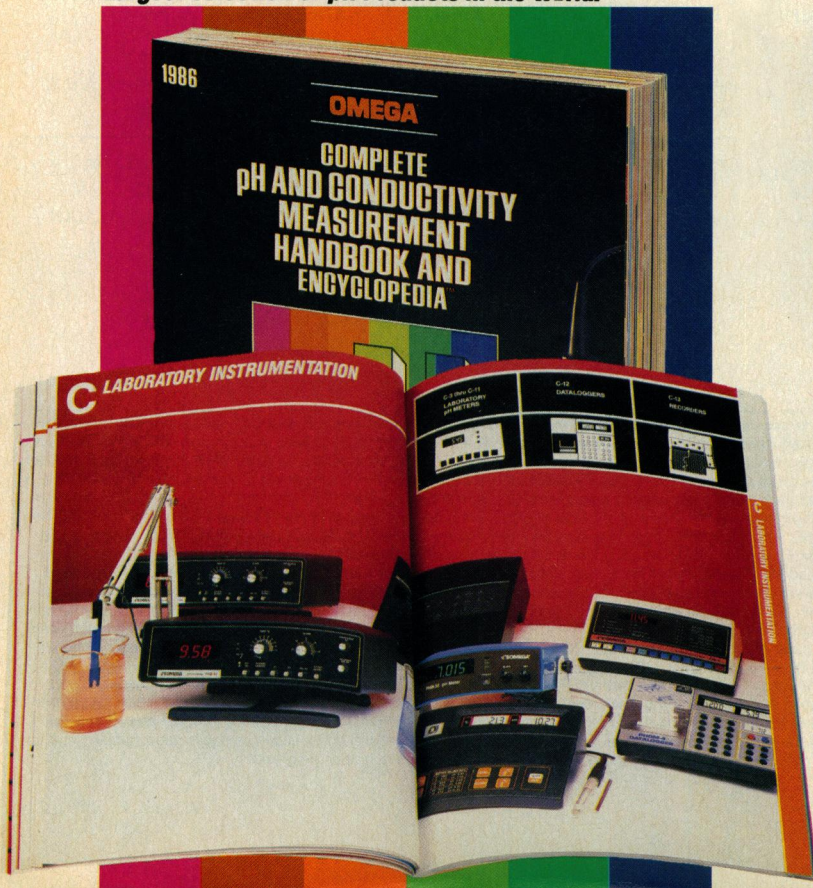


Microprocessor Based Laboratory Benchtop pH Meter



Conductivity and pH Meter/Calibration Kits

**Three of the Hundreds of pH Products in this Handbook!
Largest Selection of pH Products in the World!**



Nothing in pH is Beyond Measure

- ALL NEW! ALL FREE!
- FULL COLOR!
- PRICES INCLUDED!
- OFF-THE-SHELF FOR IMMEDIATE DELIVERY!

OMEGA
ENGINEERING, INC.
(203) 359-RUSH

One Omega Drive, Box 4047, Stamford, CT 06907
Telex 996404 Cable OMEGA FAX (203) 359-7700

For placing orders, dial (203) 359-1660!

Circle Reader Service Number
to Receive Your NEW! FREE! Handbooks.

© COPYRIGHT 1986 OMEGA ENGINEERING, INC.

Circle No. 19 on Readers' Service Card

	7	This Week in <i>Science</i>
Editorial	9	On Institutional Memory
Letters	11	Hominid Evolution: R. B. ECKHARDT; D. FALK ■ Reproducing Results: A. H. NEUFELD ■ The Landau Theory: A. L. MACKAY ■ AIDS Control: K. HENRY ■ Reporting of Biotechnology Allegations: J. BEDBROOK, P. DUNSMUIR, J. LINDEMANN, K. STEINBACK, T. SUSLOW, G. WARREN; M. SUN
News & Comment	14	A Mass Extinction Without Asteroids
	15	Promising Results Halt Trial of Anti-AIDS Drug
	17	Return of the Locust: A Cloud Over Africa ■ Going With the Wind
	19	<i>Briefing:</i> ICSU Gives Green Light to Global Change Study ■ Regulating Software for Medical Devices ■ Congress Critical of Foot-Dragging on Critical Materials ■ The M.D. Class of '86: Smaller, Deeper in Debt ■ Software Engineering Research Center Has Florida-Purdue Axis ■ Activists Rebuffed in Monkey Court Case ■ Senate Committee Boosts NSF's Budget Prospects
Research News	22	New Growth Industry in Human Growth Hormone?
	24	Quantum Jumps Seen in a Single Ion
	25	Supply-Side Ecology
Articles	35	NMR Studies of Simple Molecules on Metal Surfaces: P.-K. WANG, J.-P. ANSERMET, S. L. RUDAZ, Z. WANG, S. SHORE, C. P. SLICHTER, J. H. SINFELT
	41	Interpreting Interpersonal Behavior: The Effects of Expectancies: E. E. JONES
Research Articles	47	Purification and Biochemical Characterization of the Promoter-Specific Transcription Factor, Sp1: M. R. BRIGGS, J. T. KADONAGA, S. P. BELL, R. TJIAN
	53	A Genetic Approach to Promoter Recognition During trans Induction of Viral Gene Expression: D. M. COEN, S. P. WEINHEIMER, S. L. MCKNIGHT
Reports	61	Laboratory Experiments on Planetary and Stellar Convection Performed on Spacelab 3: J. E. HART, J. TOOMRE, A. E. DEANE, N. E. HURLBURT, G. A. GLATZMAIER, G. H. FICHTL, F. LESLIE, W. W. FOWLIS, P. A. GILMAN

■ **SCIENCE** is published weekly on Friday, except the last week in December, and with an extra issue in May by the American Association for the Advancement of Science, 1333 H Street, NW, Washington, DC 20005. Second-class postage (publication No. 484460) paid at Washington, DC, and at an additional entry. Now combined with **The Scientific Monthly**® Copyright © 1986 by the American Association for the Advancement of Science. The title **SCIENCE** is a registered trademark of the AAAS. Domestic individual membership and subscription (51 issues): \$65. Domestic institutional subscription (51 issues): \$98. Foreign postage extra: Canada \$24, other (surface mail) \$27, air-surface via Amsterdam \$65. First class, airmail, school-year, and student rates on request. Single copies \$2.50 (\$3 by mail); back issues \$4 (\$4.50 by mail); Biotechnology issue, \$5.50 (\$6 by mail); classroom rates on request; Guide to Biotechnology Products and Instruments \$16 (\$17 by mail). **Change of address:** allow 6 weeks, giving old and new addresses and seven-digit account number. Authorization to photocopy material for internal or personal use under circumstances not falling within the fair use provisions of the Copyright Act is granted by AAAS to libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that the base fee of \$1 per copy plus \$0.10 per page is paid directly to CCC, 21 Congress Street, Salem, Massachusetts 01970. The identification code for *Science* is 0036-8075/83 \$1 + .10. **Postmaster:** Send Form 3579 to *Science*, 1333 H Street, NW, Washington, DC 20005. *Science* is indexed in the *Reader's Guide to Periodical Literature* and in several specialized indexes.

■ 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 foster scientific freedom and responsibility, 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.



COVER Patterns of convection cells and wavy disturbances, as observed in laboratory experiments of global-scale planetary and stellar convection. A rotating hemispherical shell of fluid is heated on the inside and cooled on the outside, and an electrostatic radial "gravity" field is imposed. The resulting flows are viewed by Schlieren imaging, providing circular views extending from pole (top) to equator (bottom) and covering a quadrant in longitude. Experiments were carried out in the Spacelab 3 microgravity laboratory flown aboard the space shuttle Challenger in May 1985. See page 61. [J. E. Hart and J. Toomre, University of Colorado, Boulder, CO 80309]

- 65 The Proterozoic Ophiolite Problem, Continental Emergence, and the Venus Connection: E. M. MOORES
- 68 Does the Binding of Cyclosporine to Calmodulin Result in Immunosuppression?: S. J. LEGRUE, R. TURNER, N. WEISBRODT, J. R. DEDMAN
- 71 Leucosulfakinin, a Sulfated Insect Neuropeptide with Homology to Gastrin and Cholecystokinin: R. J. NACHMAN, G. M. HOLMAN, W. F. HADDON, N. LING
- 73 Neurons Containing NADPH-Diaphorase Are Selectively Resistant to Quinolate Toxicity: J.-Y. KOH, S. PETERS, D. W. CHOI
- 77 Identification of Specific Transducin α Subunits in Retinal Rod and Cone Photoreceptors: C. L. LEREA, D. E. SOMERS, J. B. HURLEY, I. B. KLOCK, A. H. BUNT-MILAM
- 80 Stimulation of Neuronal Acetylcholine Receptors Induces Rapid Gene Transcription: M. E. GREENBERG, E. B. ZIFF, L. A. GREENE
- 83 Cliff Swallow Colonies as Information Centers: C. R. BROWN

AAAS News

- 87 Association's Work in Argentina Featured in NOVA's Season Premier: J. WRATHER ■ AAAS Travelers ■ Ethics Society Group Meets This Month ■ AAAS' Malcom Receives Award ■ Proposals and Resolutions Invited for 1987 Council Meeting ■ D.C. Members—TV and Radio Reviewers Needed ■ Philadelphia Science Seminar Series for Teachers Under Way This Fall ■ AAAS Publication Catalog Available ■ Reminder to Members—AAAS Elections Are Under Way

AAAS Meetings

- 33 *Annual Meeting*: Chicago 14–18 February 1987 ■ Advance Registration Form
- 90 *National Forum for School Science*: Forum '86: The Science Curriculum ■ Advance Registration Form

Book Reviews

- 92 American Professors, *reviewed by* R. T. BLACKBURN ■ An Invitation to Law and Social Science, N. VIDMAR ■ Group Structure of Gauge Theories, S. M. BARR ■ Ices in the Solar System, M. J. GAFFEY ■ Reprints of Books Previously Reviewed ■ Books Received

Products & Materials

- 96 Microtiter Plate Washers ■ Synthetic Growth Factor ■ Restriction Map Computer Program ■ Sequencing Software ■ Touchscreen DNA Synthesizer ■ Precise Temperature-Controlled Electrophoresis ■ Data Analysis Software System ■ Automatic Amino Acid Analyzer ■ Oxygen Consumption Monitor

Board of Directors

Gerard Piel
*Retiring President,
Chairman*
Lawrence Bogorad
President
Sheila E. Widnall
President-elect

Robert McC. Adams
Robert W. Berliner
Floyd E. Bloom
Mary E. Clutter
Mildred S. Dresselhaus
Donald N. Langenberg
Dorothy Nelkin
Linda S. Wilson
William T. Golden
Treasurer
William D. Carey
Executive Officer

Editorial Board

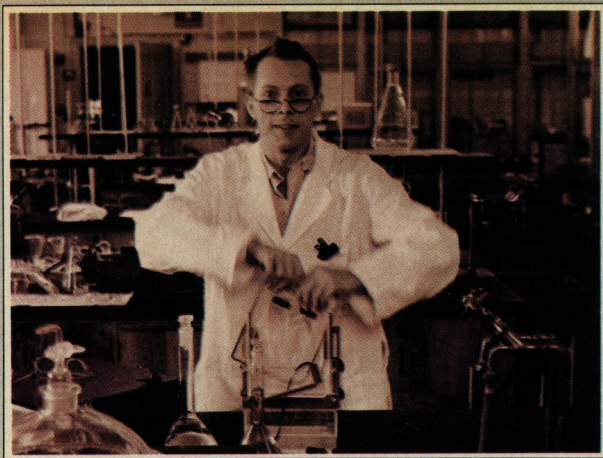
David Baltimore
William F. Brinkman
Ansley J. Coale
Joseph L. Goldstein
James D. Idol, Jr.
Leon Knopoff
Seymour Lipset
Walter Massey
Oliver E. Nelson
Allen Newell
Ruth Patrick
David V. Ragone
Vera C. Rubin
Howard E. Simmons
Solomon H. Snyder
Robert M. Solow

Board of Reviewing Editors

Qais Al-Awqati
James P. Allison
Luis W. Alvarez
Don L. Anderson
C. Paul Bianchi
Elizabeth H. Blackburn
Floyd E. Bloom
Charles R. Cantor
James H. Clark
Bruce F. Eldridge
Stanley Falkow
Theodore H. Geballe
Roger I. M. Glass

Stephen P. Goff
Robert B. Goldberg
Patricia S. Goldman-Rakic
Corey S. Goodman
Richard M. Held
Gloria Heppner
Eric F. Johnson
Konrad B. Krauskopf
Karl L. Magleby
Joseph B. Martin
John C. McGiff
Alton Meister
Mortimer Mishkin
Peter Olson
Gordon H. Orians
John S. Pearce
Yeshayau Pocker
Jean Paul Revel

Frederic M. Richards
James E. Rothman
Thomas C. Schelling
Ronald H. Schwartz
Stephen M. Schwartz
Otto T. Solbrig
Robert T. N. Tjian
Virginia Trimble
Geerat J. Vermeij
Martin G. Weigert
Harold Weintraub
Irving L. Weissman
George M. Whitesides
Owen N. Witte
William B. Wood
Harriet Zuckerman



Electrophoresis then and now

Then, in the early 70's, this was the latest thing in electrophoresis.

Now, it's the mid 80's, and there's a powerful new concept in high resolution electrophoresis.

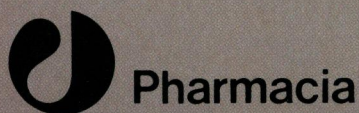
PhastSystemTM

Run and stain SDS-PAGE gels in about 1 hour

PhastSystem combines precision equipment and new high-performance PhastGelTM media to give you:

- **Fast results:** from short separation times and quick protein staining. In total, SDS-PAGE and IEF each take about 1 hour. The resolution is superb.
- **Quick staining:** coomassie takes about 30 minutes, and silver staining about an hour.
- **Reproducibility:** you have automated, programmable control over running and staining conditions.

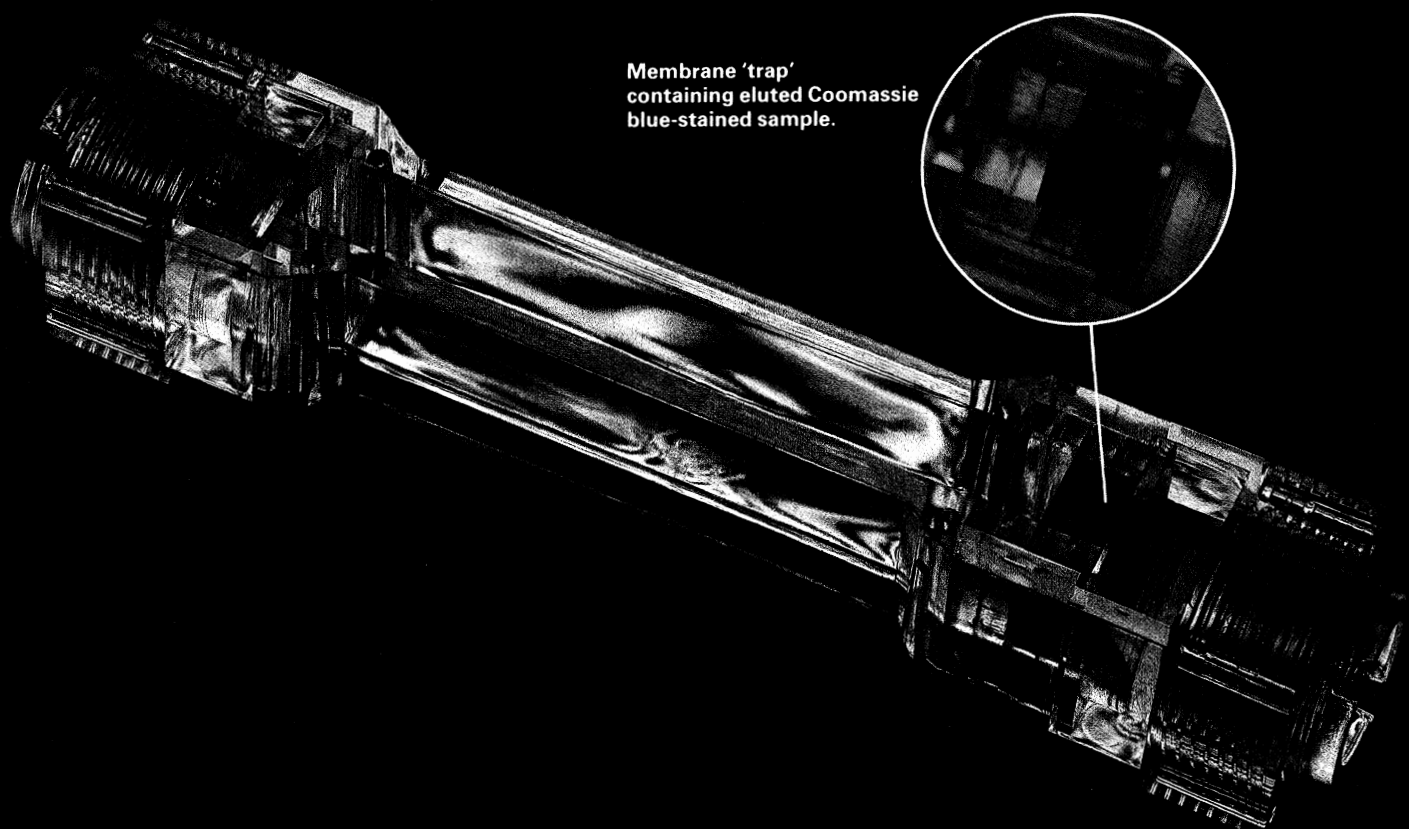
Try it for yourself!



Laboratory Separation Division
Piscataway, New Jersey 08854
Information: (800) 526-3618
In NJ: (201) 457-8000
Circle No. 180 on Readers' Service Card



THE TENDER TRAP.



Membrane 'trap'
containing eluted Coomassie
blue-stained sample.

The new Elutrap™ chamber— for the highest possible recovery of purified macromolecules.

Great advances often come in small packages—obviously the case with the new Elutrap chamber from S&S. This unique device represents a major step forward in the use of filtration for rapid elution, isolation and purification of nucleic acids and proteins from gels and for the concentration of biologicals from solutions.

Unique because, unlike other methods, it requires no membrane pre-treatment and minimal sample pre- and post-treatment.

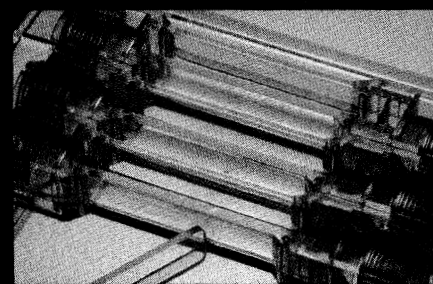
Unique in its efficiency—because it delivers high concentrations of charged molecules, at high purity levels, with recovery rates greater than 90%.

Unique in its simplicity—operating in any standard horizontal electrophoresis chamber; no need to purchase a separate power supply.

Operation is simple. Sample molecules migrate through the device's elution chamber into a small "trap" formed by two inert exclusion membranes which allow current to pass through the device. Large particulates and contaminants are excluded by the first membrane; molecules larger than 5000 D are retained by the second one. Both membranes allow passage of buffer when an electric field is present, yet prevent buffer flow when there is no current. When elution or concen-

tration is complete, the sample is simply removed from the trap with a standard pipet.

Call or write for more information on how to put the Elutrap chamber to work for your application.



Simultaneous use
of multiple Elutrap chambers.

Sold under 'Biotrap' trademark outside the U.S. and Canada. Patent pending.

Schleicher & Schuell

Schleicher & Schuell, Inc., Keene, NH 03431 • 800-245-4024 • 603-352-3810

Schleicher & Schuell GmbH, D-3354 Dassel, West Germany • Schleicher & Schuell AG, CH-8714 Feldbach ZH, Switzerland

• Schleicher & Schuell Nederland BV, 5201 AH 's-Hertogenbosch, The Netherlands

Circle No. 83 on Readers Service Card

THE TENDER TRAP.



Membrane 'trap'
containing eluted Coomassie
blue-stained sample.

The new Elutrap™ chamber— for the highest possible recovery of purified macromolecules.

Great advances often come in small packages—obviously the case with the new Elutrap chamber from S&S. This unique device represents a major step forward in the use of filtration for rapid elution, isolation and purification of nucleic acids and proteins from gels and for the concentration of biologicals from solutions.

Unique because, unlike other methods, it requires no membrane pre-treatment and minimal sample pre- and post-treatment.

Unique in its efficiency—because it delivers high concentrations of charged molecules, at high purity levels, with recovery rates greater than 90%.

Unique in its simplicity—operating in any standard horizontal electrophoresis chamber; no need to purchase a separate power supply.

Operation is simple. Sample molecules migrate through the device's elution chamber into a small "trap" formed by two inert exclusion membranes which allow current to pass through the device. Large particulates and contaminants are excluded by the first membrane: molecules larger than 5000 D are retained by the second one. Both membranes allow passage of buffer when an electric field is present, yet prevent buffer flow when there is no current. When elution or concen-

tration is complete, the sample is simply removed from the trap with a standard pipet.

Call or write for more information on how to put the Elutrap chamber to work for your application.



Simultaneous use
of multiple Elutrap chambers.

Sold under 'Biotrap' trademark outside the U.S. and Canada. Patent pending.

Schleicher & Schuell

Schleicher & Schuell, Inc., Keene, NH 03431 • 800-245-4024 • 603-352-3810

Schleicher & Schuell GmbH, D-3354 Dassel, West Germany • Schleicher & Schuell AG, CH-8714 Feldbach ZH, Switzerland

• Schleicher & Schuell Nederland BV, 5201 AH 's-Hertogenbosch, The Netherlands

Circle No. 83 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.

Publisher: William D. Carey

Editor: Daniel E. Koshland, Jr.

Deputy Editors: Philip H. Abelson (*Engineering and Applied Sciences*); John I. Brauman (*Physical Sciences*); Gardner Lindzey (*Social Sciences*)

EDITORIAL STAFF

Managing Editor: Patricia A. Morgan

Assistant Managing Editors: Nancy J. Hartnagel, John E. Ringle

Senior Editors: Eleanor Butz, Ruth Kulstad

Associate Editors: Martha Collins, Barbara Jasny, Katrina L. Keiner, Edith Meyers, David F. Voss

Letters Editor: Christine Gilbert

Book Reviews: Katherine Livingston, *editor*; Deborah F. Washburn

This Week in Science: Ruth Levy Guyer

Chief Production Editor: Ellen E. Murphy

Editing Department: Lois Schmitt, *head*; Caitilin Gordon, Mary McDaniel, Barbara E. Patterson

Copy Desk: Lyle L. Green, Sharon Ryan, Beverly Shields, Anna Victoreen

Production Manager: Karen Schools

Graphics and Production: John Baker, *assistant manager*; Holly Bishop, Kathleen Cosimano, Eleanor Warner

Covers Editor: Grayce Finger

Manuscript Systems Analyst: William Carter

NEWS STAFF

News Editor: Barbara J. Culliton

News and Comment: Colin Norman, *deputy editor*; Mark H. Crawford, Constance Holden, Eliot Marshall, Marjorie Sun, John Walsh

Research News: Roger Lewin, *deputy editor*; Deborah M. Barnes, Richard A. Kerr, Gina Kolata, Jean L. Marx, Arthur L. Robinson, M. Mitchell Waldrop

European Correspondent: David Dickson

BUSINESS STAFF

Associate Publisher: William M. Miller, III

Business Staff Manager: Deborah Rivera-Wienhold

Classified Advertising: Leo Lewis

Membership Recruitment: Gwendolyn Huddle

Member and Subscription Records: Ann Ragland

Guide to Biotechnology Products and Instruments: Shauna S. Roberts

ADVERTISING REPRESENTATIVES

Director: Earl J. Scherago

Production Manager: Donna Rivera

Advertising Sales Manager: Richard L. Charles

Marketing Manager: Herbert L. Burkland

Sales: New York, NY 10036: J. Kevin Henebry, 1515 Broadway (212-730-1050); Scotch Plains, NJ 07076: C. Richard Callis, 12 Unami Lane (201-889-4873); Chicago, IL 60611: Jack Ryan, Room 2107, 919 N. Michigan Ave. (312-337-4973); San Jose, CA 95112: Bob Brindley, 310 S. 16 St. (408-998-4690); Dorset, VT 05251: Fred W. Dieffenbach, Kent Hill Rd. (802-867-5581).

Instructions for contributors appears on page xi of the 26 September 1986 issue. Editorial correspondence, including requests for permission to reprint and reprint orders, should be sent to 1333 H Street, NW, Washington, DC 20005. Telephone: 202-326-6500.

Advertising correspondence should be sent to Tenth Floor, 1515 Broadway, NY 10036. Telephone 212-730-1050.

On Institutional Memory

For four postwar decades U.S. science has done quite well at the hands of government. Fundamental research has experienced a few thrills and chills along the way, but the course of federal funding has edged upward. Oddly, the question that was asked in the early years—how much support is enough—is still with us. The most striking statement in the recent Packard-Bromley panel report* is that the nation's needs for new knowledge will not be met without a much greater federal investment in university research—that is, a growth path that matches the still rising overall investment in national research and development, which implies, on the basis of current trends, a doubling of funds in 10 years.

Such an investment strategy, if it is not extruded from the thickets of Gramm-Rudman-Hollings and the politics of deficit reduction, is bound to be stalled. White House panels come and go, and their reports seldom drive budgetary decisions. Presidents, for their part, like to keep open their options, and hence the prognosis for a long-range growth policy for basic research is best described, in the absence of aggressive public support, as guarded.

We have a complicated situation on our hands as we look ahead. The result of decades of constructive investment in science is the presence of an awesome research capacity. This capacity requires unremitting and increasing financial nutrition to keep it healthy and productive, and its health and productivity are critical to the technology base on which the nation's economic and national security depend. What is more, the problem is not entirely one of finding new money for investigative science alone. It is equally a problem of halting and reversing the cumulative reinvestment shortfall in the tools, equipment, and facilities that science requires. And beyond all that, the technology base will deplete if precollege and advanced science and mathematics education continue to draw the short straw in national investment choices.

As current budget practices go, civil research and development is the steady loser to national security funding. Support for basic research has been the redeeming exception, but in the face of three-fourths of the research and development budget earmarked for defense requirements it is doubtful that the distribution of scientists and engineers in the years ahead will favor equilibrium in the disposition of scientific and technical assets. The quantity of federal funding is only part of the issue, the larger part bearing on the quality of the investment choices.

In all these dilemmas, institutional memory serves an important purpose. In Congress, science has had the luck through the years to have had the attentive ear of enough members and senior committee staff to hold high ground despite political turnover. On the Executive side, the built-in career memory that has characterized the Office of Management and Budget under successive presidencies has also provided immense, if underappreciated, support for basic research, and it is not good news to learn of the retirement after 35 years of Hugh Loweth. Institutional memory likewise resides, to science's benefit, in the Office of Technology Assessment, the Congressional Research Service, and the General Accounting Office, and it is worth noting that few of these assets existed, as we see them today, in the formative years of federal involvement in research and development. A great deal hangs on their grasp of the nation's heavy stake in research and education, and upon their reading of the messages emerging from the National Academy of Sciences, the National Science Foundation, and the White House panel.

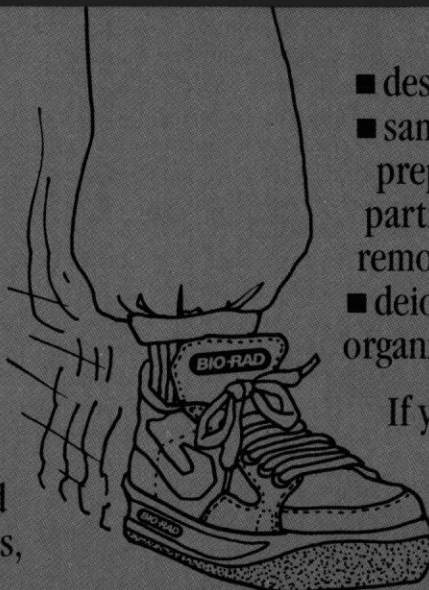
The present Administration, which has an exceptional record in supporting basic research, whatever one may think of the overall shape of its research and development priorities, has a dwindling life of 2 years. What will follow is anyone's guess, and it would make a salient difference were the Packard-Bromley panel report to be the focus of a presidential initiative on science policy that would become embodied in government's institutional memory as we prepare for the future.—WILLIAM D. CAREY

*Report of the White House Science Council Panel on the Health of U.S. Colleges and Universities (Office of Science and Technology Policy, Washington, DC, February 1986).

Start your separations off on the right foot.

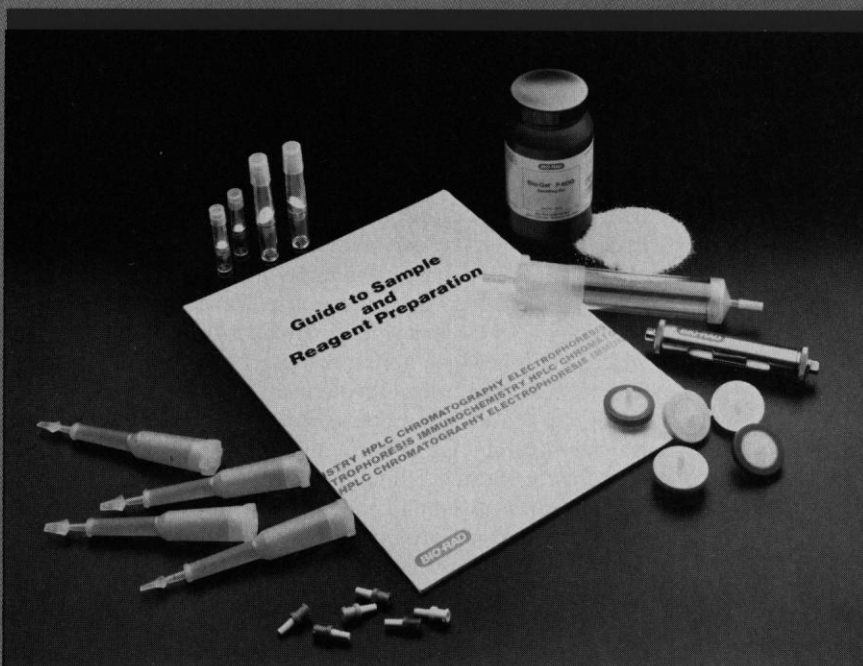
Start with Bio-Rad's sample preparation products.

Almost every separation or analysis requires treatment of the sample. Because of this, Bio-Rad offers a complete line of quality sample preparation products. These well-established tools include ion exchange resins, filtration products, disposable columns, and cartridges. Among the many sample prep applications that we satisfy are:



■ desalting ■ buffer exchange
■ sample concentration ■ buffer
preparation ■ metal removal ■
particulate removal ■ detergent
removal ■ deproteinization
■ deionization ■ adsorption of
organics ■ HPLC deashing

If you're involved in chroma-
tography, electrophoresis,
immunochemistry,
molecular biology, or
HPLC, you'll find
the "Guide to Sample and Reagent
Preparation" invaluable. Contact us
for your free copy.

**BIO-RAD**

1414 Harbour Way South
Richmond, CA 94804
(415) 232-7000
800-4-BIO-RAD

Also in Rockville Centre, NY; Hornsby, Australia; Vienna,
Austria; Mississauga, Canada; Watford, England; Munich,
Germany; Milan, Italy; Tokyo, Japan; Utrecht, The Nether-
lands; and Glattbrugg, Switzerland.

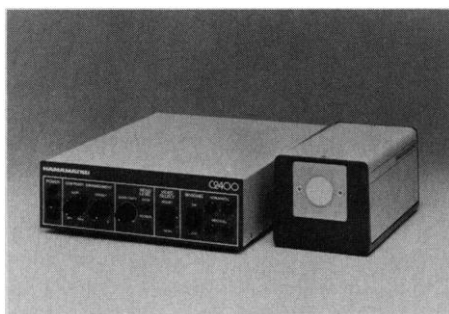
Answers.

Four ways to improve your image.

PMI lets you choose from high performance cameras to advanced imaging systems designed specifically for videomicroscopy.

C2400 VIDEO CAMERA. Exceptional performance characteristics plus a variety of unique, user-oriented features enable the C2400 Video Camera to accurately detect details that are invisible with conventional video cameras. A modular control unit supports all available camera heads, and application-specific configurations are easily obtained through a wide choice of options and imaging tubes.

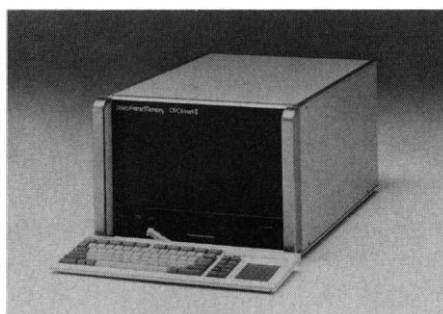
Circle No. 152 on Readers' Service Card



C1901 IMAGE PROCESSOR. This unique digital image processor employs two 16-bit video frame memories and executes a wide range of processing functions. Real-time features such as image integration, background subtraction and shading

correction, as well as 3-D graphics and pseudocolor, make this system ideal for both image enhancement and low light level imaging.

Circle No. 154 on Readers' Service Card

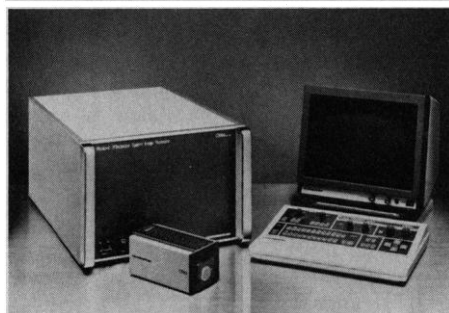


C1966 AVEC SYSTEM.

A totally integrated, turnkey imaging system with extensive enhancement and real-time digital processing capabilities. The C1966 AVEC

system can dramatically improve image quality and detectability when visualizing low contrast, low intensity and dynamic specimens. A wide selection of video detectors is available, with characteristics ranging from high resolution to high sensitivity, from UV to IR. Highly flexible and easy to use.

Circle No. 153 on Readers' Service Card

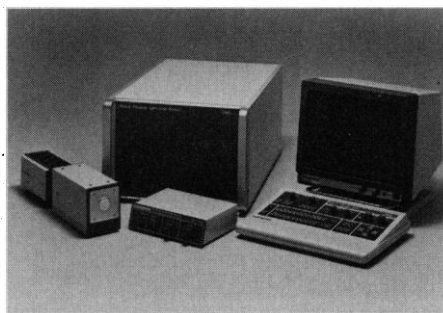


C1966 VIM SYSTEM.

Employing a unique ultra high sensitivity camera capable of photon-counting imaging, this system permits high quality quantitative imaging at light

levels far below those attainable with conventional low light level cameras (10^{-1} lux to single photons). Spectral sensitivities ranging from 140 to 850nm and Peltier cooling allow the system to be configured for numerous applications. An integral processor provides advanced image processing and analysis functions.

Circle No. 155 on Readers' Service Card



Tell us about your application.

The Photonic Microscopy family of imaging products is engineered by Hamamatsu Photonics, a world leader in imaging detectors and systems.

To learn how these products can be useful to you, contact us today.



Achieving the Ultimate Image.

PHOTONIC MICROSCOPY, INC.

2625 Butterfield Road/204 South/Oak Brook, Illinois 60521

Telephone: 312/571-1241/Facsimile: C3 312/571-1244

A Hamamatsu Company

1986

AAAS-WESTINGHOUSE

SCIENCE JOURNALISM

AWARDS

For 35 years the AAAS-Westinghouse Science Journalism Awards have recognized outstanding reporting on the sciences and their engineering and technological applications (excluding medicine). Award honor science reporting in newspapers and general circulation magazines and on radio and television.

Entries are judged on the basis of their initiative, originality, scientific accuracy, clarity of interpretation, and value in promoting a better understanding of science by the public.

Five awards of \$1,000 each are made in the categories of: over 100,000 daily circulation newspapers; under 100,000 circulation newspapers; general circulation magazines; radio; and television.

The 1986 Contest Year is 1 January — 31 October. All entries must be postmarked before midnight, 14 November 1986.

The 1986 Awards will be presented at the National Association of Science Writers' banquet during the Annual Meeting of the American Association for the Advancement of Science in Chicago in February 1987.

The Awards are administered by the American Association for the Advancement of Science under a grant from the Westinghouse Educational Foundation.

For further information and entry forms, contact the AAAS Office of Communications, 1333 H Street, N.W., Washington, D.C. 20005 or call (202) 326-6440.

Western gold...

Immunogold blotting reagents to make your mark — permanent!

AuroDye*

An easy to use reagent to stain transferred proteins — Western or dot blots. Sensitivity is twenty times greater than conventional stains on nitrocellulose... and, it won't fade.

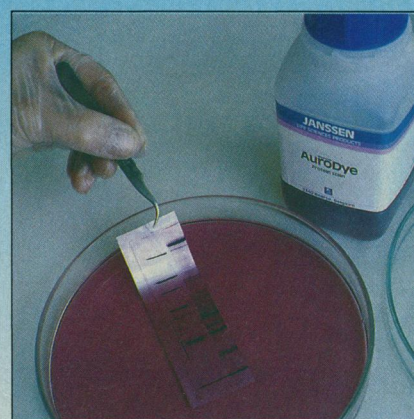
AuroProbe* BL

Superior reagent system for antigen detection — without enzyme development.

Choose from a menu of the most popular secondary antibodies or Streptavidin. And, for even greater visualization...

IntenSE*

A silver enhancement kit that maximizes sensitivity. Amplification of the signal develops in natural light, so you don't have to change your protocols.



For more information about our golden reagents, please call, toll free 1-800-624-0137.

* Trademark

JANSSEN
LIFE SCIENCES PRODUCTS

40 Kingsbridge Road
Piscataway, NJ 08854, USA
Tel.: 800-624-0137
Telex: 6853051

Turnhoutseweg 30
B-2340 Beerse, BELGIUM
Tel.: 014/60.33.85
Telex: 32.540

Circle No. 41 on Readers' Service Card

JANSSEN

pioneering in Life Sciences technology

The Olympus Polarizing Microscopes for Mineralogy, Chemistry, Pharmacology...

The quality of any microscope system relies on the interrelationship of optical performance, mechanical capability and a component system that increases its versatility as your needs grow. That is the Olympus advantage.

Never has the advantage been greater than in the Olympus series of polarizing microscopes—fundamental tools for researchers working with materials with birefringent properties.

These are microscopes of sophisticated design and exceptional performance. The BHS-P has a choice of two highly refined series of strain-free long barrel objectives—

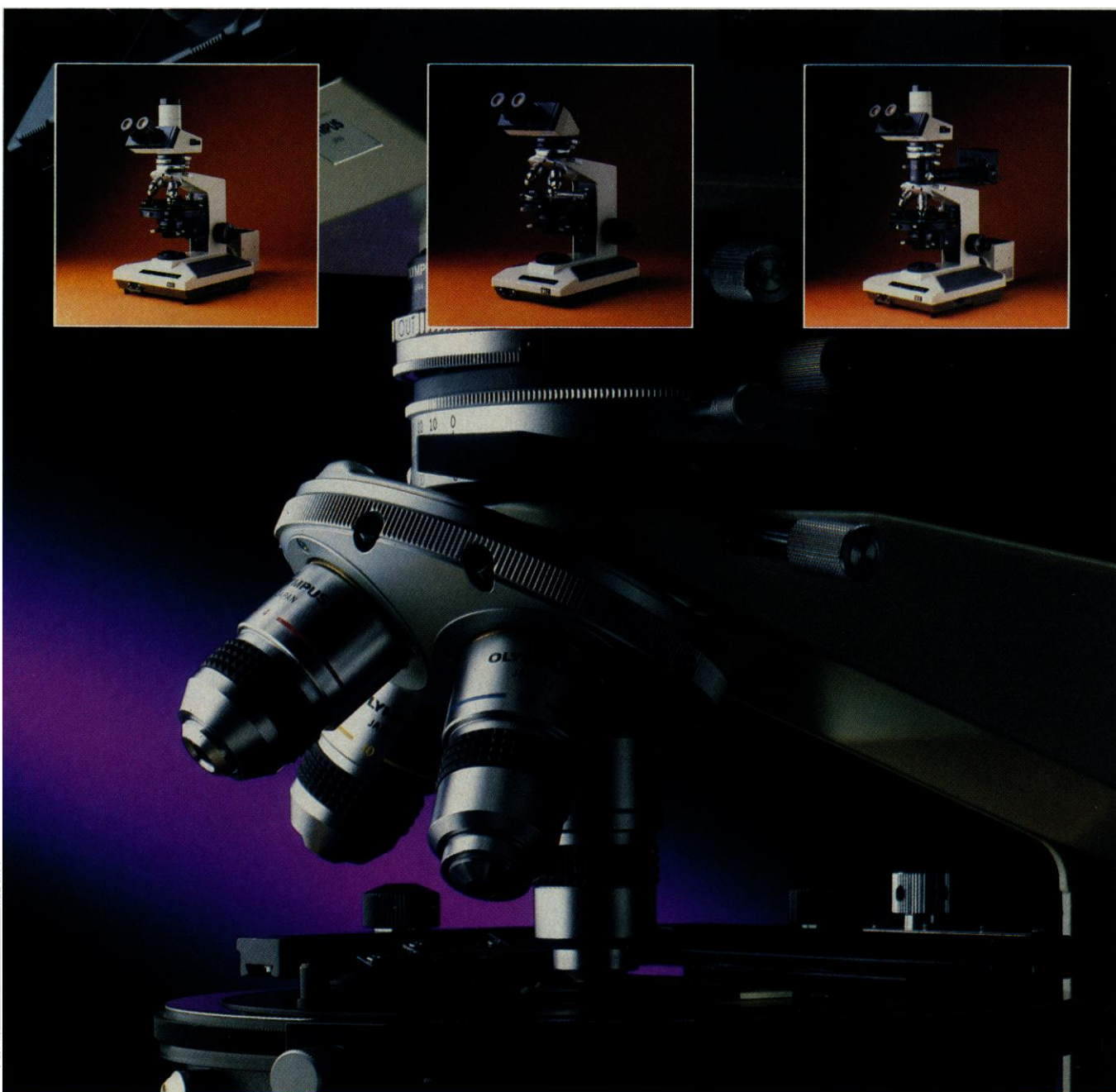
PO D Plan and PO D Achromat—to offer highest resolution, excellent image contrast, and a completely flat, wider field. With a choice of modular components for unexcelled flexibility.

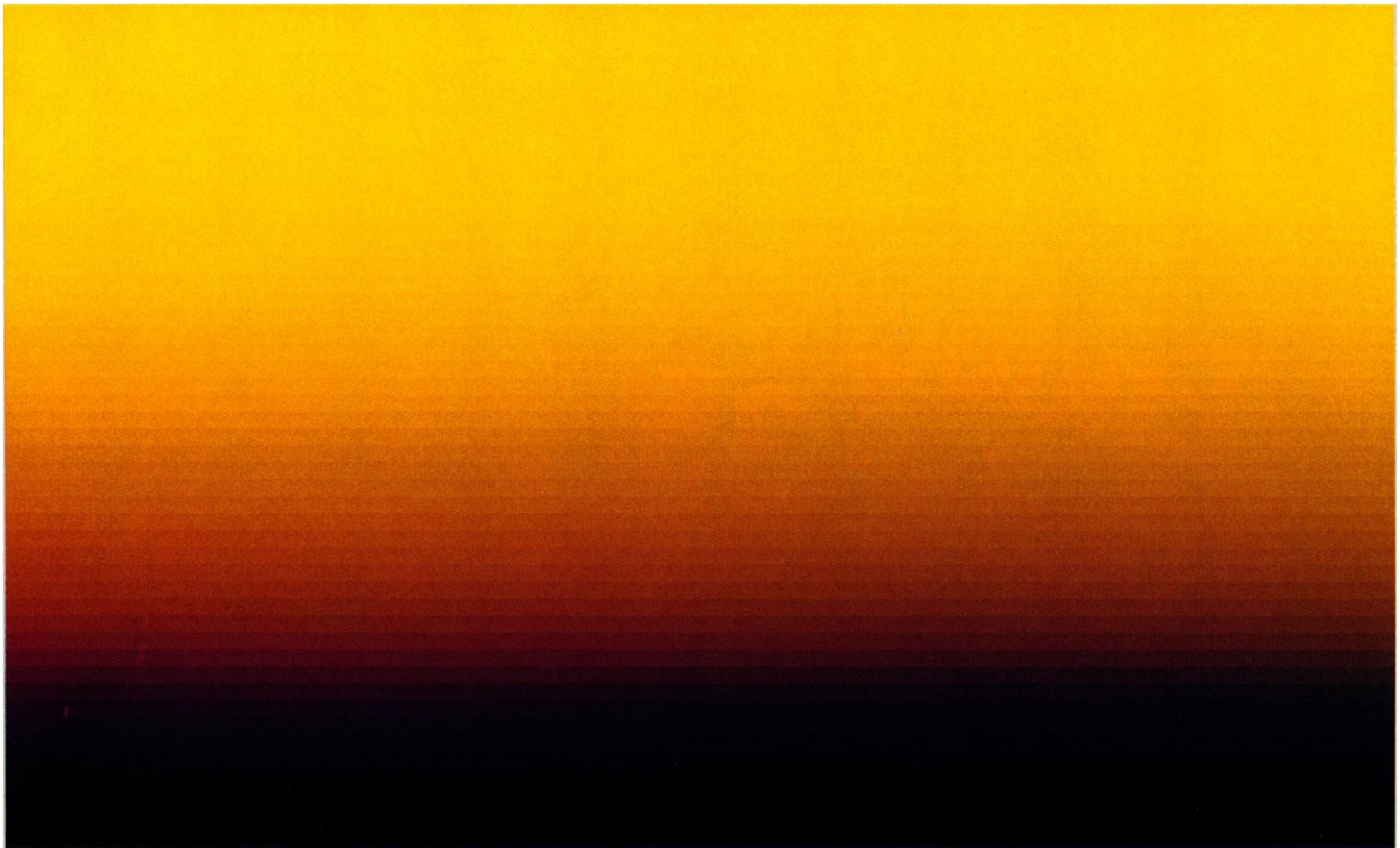
Other models in the Olympus Polarizing Series are equally designed to help you do your job better. The BHT-P is built with enhanced sturdiness and stability for more demanding conditions, while the CHA-P provides an exceptionally economical model for educational and less demanding laboratory applications. BHT-P and BHS-P are also available in models

with a significant Olympus innovation—a vertical illuminator that permits switching between transmitted and reflected light modes with only the flick of a lever.

For a demonstration of any of the Olympus Polarizing Microscope Series, call toll-free 1(800) 446-5967. Or write for literature to Olympus Corporation, Precision Instrument Division, 4 Nevada Drive, Lake Success, NY 11042-1179. In Canada: W. Carsen Co., Ltd., Ontario.

OLYMPUS





● **Red Horizon** (1981), acrylic on canvas, 10' x 6'. Norman Zammitt. In mixing and preparing colors for a painting, the artist uses computer generated logarithmic progressions; a kind of electronic palette. These mathematical sequences help determine the exact relationships of individual colors that collectively achieve a "blend." Following these calculations, he weighs precise amounts of color together on a gram scale. Five colors are used to create a total of forty-eight differentiated colors. After they are mixed and painted in order, they represent a harmony of extremes; of light and gravity.

● **The art and science of innovation.** Given the talent and the technical tools, an individual can see what lies beyond the known. Determine its most effective use. And precisely measure its impact.

Through the technology and creativity of the Aerojet Propulsion Research Institute, exotic aerospace concepts are being transformed into tangible reality. Our Future Missions Group is exploring what will be humankind's boldest endeavors, while our Scientific Groups are determining how to overcome any obstacles that may exist.

Dr. William Heiser, Institute Vice President and Director, "The individuals here have the freedom to pursue their own innovative ideas because we have the long-term commitment to research that such freedom requires."

Particular emphasis is being placed on advances in Supercomputing, Propulsion Materials and Propulsion Chemistry. Professionals with expertise in these areas are invited to write us for more information. The Aerojet Propulsion Research Institute, Dept. 121, P.O. Box 13502, Sacramento, California 95853-4502. We are an equal opportunity/affirmative action employer. U.S. citizenship required.

Aerojet Propulsion Research Institute

THE WORLDS OF **AEROJET GENERAL** ELECTRONICS • ORDNANCE
PROPULSION • RESEARCH
A GENCORP COMPANY

Endocrinology Under 35.

A large amount of the experimental work is performed by young scientists who produce ideas, technology and results. These scientists do not have many opportunities to talk to each other since normally they participate in general meetings involving all of the scientific community.

Therefore, Ares-Serono Symposia has decided to introduce a biannual appointment for the young scientist. The scientific committee, scientific secretaries and invited speakers will all be researchers under the age of 35. Of course, participants from all age groups will be welcome. The first biannual meeting has been organized with the Postgraduate School in Endocrinology of the University of Florence and recent advances in endocrinology will be discussed.

The Symposium "Endocrinology Under 35" will be held in Florence, Italy, May 23-25, 1988.

For suggestions on the topics and information, please contact:
Mario Maggi, M.D.
Endocrinology Unit
Department of Clinical Physiopathology
University of Florence
Viale Morgagni, 85
50134 Florence, Italy
Tel. (55) 411177

Main Topics

- Research horizons on steroid hormones, peptide and amine hormones
- Endocrine rhythms
- Immunoendocrinology
- Hormones and cancer

AAAS

ANNUAL MEETING

I. Physical Sciences and Technology

Frontiers of the Natural Sciences

Mathematics: Ramanujan's Centenary; Population Models; Knotting Phenomena

Computing: Graphics; Brain Research; Programs that Reason; Expert Systems

Physics & Astronomy: Particle Physics & Cosmology; Solar Interior; Origin of Planets; Materials

Space Science & Technology: Prospects after Challenger; Future of Space Science

Technology & Industry: High-Tech Quality; Future of Automobile; Fiber Optics; Factory Automation; Industrial Disasters

Climate: Desertification; Weather Information for Agriculture; Climate and Water Resources

Environment—Nuclear: High-Level Wastes; Chernobyl; Is Nuclear Winter Real?

Environment—Chemical: Acid Rain; Hazardous Wastes

Popular Science: Chemistry Is Fun; Science for the Naked Eye; Night Baseball at Wrigley Field; Plants for People

Watch this space for
advance notices
of the Meeting

See 12 December
issue of *SCIENCE*
for full program or write:
AAAS Meetings Office
1333 H St NW,
Washington DC 20005

CHICAGO

14-18 FEBRUARY 1987

Other subject areas of Meeting:

- II. Life Sciences and Technology
- III. Social and Behavioral Sciences
- IV. International Science and Policy

Advance Registration Form

S1

AAAS Annual Meeting ♦ Chicago ♦ 14 – 18 February 1987

Mail to: AAAS Meetings Office, Annual Meeting Registration, 1333 H Street, NW, Washington, DC 20005

Please Print or Type

Name of registrant _____
(Last) (First & initial)

Name of spouse registrant _____
(Last) (First & initial)

Institution/Company _____
(To be printed on badge) (Registrant)

(Spouse registrant)

Mailing address _____
(Street)

(City/State) (Zip code) (Telephone number)

Convention address _____
(Where you can be reached) (Hotel and/or telephone number)

Sat Sun Mon Tue Wed

Check days on which you will attend meeting: ☐ ☐ ☐ ☐ ☐

☐ Check here if you need special services due to a handicap. We will contact you before the meeting.

■ Your registration badge, receipt, and voucher for full Program and Abstracts will be mailed to you in early January. ■ Registrations received after 30 January will be held at the Advance Registrants' Desk at the Hyatt Regency Hotel. ■ Refund requests must be made by letter or telegram to the above address before 6 February 1987 and will be honored after the Meeting. No refunds are made on cancellations received after this date. ■ Student registration fees apply to full-time undergraduate or graduate students only.

*Membership includes 51 issues of *Science*. Inquire for Canadian and other foreign rates.

Name(s) of new member(s): _____

Registration Fees:

Members (check appropriate box):

☐ Regular (\$65) \$ _____

☐ Student ☐ Retired ☐ H.S. Teacher

or ☐ Spouse of registrant (\$35) \$ _____

Nonmembers (check appropriate box):

☐ Regular (\$90) \$ _____

☐ Student ☐ Retired ☐ H.S. Teacher

or ☐ Spouse of registrant (\$45) \$ _____

Join AAAS — register as a member:

(Add dues to member registration fee above)

*Single membership dues (\$65) \$ _____

*Double [member & spouse] (\$82) \$ _____

*Single student or retired (\$40) \$ _____

*Double student or retired (\$57) \$ _____

Retired or spouse membership

without *Science* (\$17) \$ _____

TOTAL AMOUNT \$ _____

☐ Check enclosed

Charge my ☐ VISA ☐ MasterCard
(no other cards accepted)

Card number _____ Expires _____

Signature _____

Hotel Reservation Form ♦ Hyatt Regency Chicago AAAS Annual Meeting ♦ Chicago ♦ 14 – 18 February 1987

Mail to: Reservations, Hyatt Regency Chicago, 151 East Wacker Drive, Chicago, IL 60601

Send confirmation to:

Name _____
(Last) (First & initial)

Mailing address _____
(Street)

(City/State) (Zip code) (Telephone number)

Other occupant(s) of room: _____
(Name) (Name)

Indicate special housing needs due to a handicap:

☐ wheelchair accessible room; other _____

Charge my major credit card (card type): _____

Card No. _____ Expires _____

Signature _____

Hyatt Regency Hotel Rates: Add 10.1% state and city sales tax. Check appropriate box for type of room desired.

Room Category	Single	Double or Twin	Parlor + 1 Bedrm.	Parlor + 2 Bedrms.
Standard	☐ \$79	☐ \$96	☐ \$300 & up	☐ \$379 & up
Club Level	☐ \$102	☐ \$118		

Arrival date _____

Time _____ ☐ a.m. ☐ p.m.

Departure date _____

Time _____ ☐ a.m. ☐ p.m.

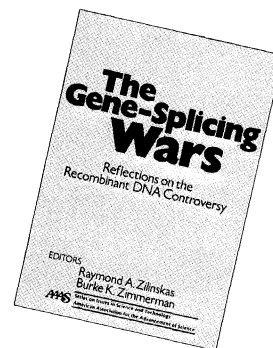
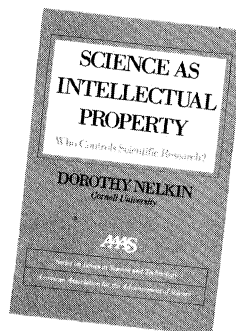
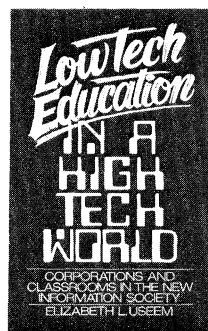
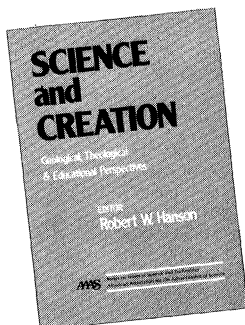
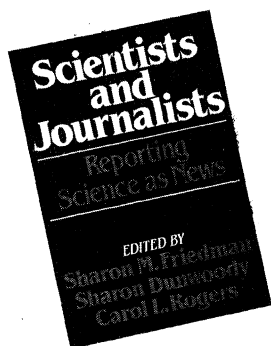
Be sure to list definite arrival and departure dates and times. reservations will be held only until 6 p.m. unless accompanied by 1 night's deposit or major credit card guarantee.

■ Reservations must be submitted to the Hyatt Regency (address above) on this official form by **23 January 1987**. Reservations received after this cut-off date are conditional on space availability. ■ Make any changes or cancellations directly with the hotel, which will also confirm your reservations.

■ Rollaway bed or extra person in room: \$15.

■ Children to age 18 free of charge in same room with parents.

New Titles Available from AAAS



Scientists and Journalists: Reporting Science as News

*Edited by Sharon M. Friedman,
Sharon Dunwoody, and Carol L. Rogers*

The public is interested in science and depends largely on the mass media for the latest information. But how well do scientists and journalists connect to communicate to the public? This book examines the human aspect of the links between scientists and journalists through the eyes of both.

1985, 352 pp., hardcover; \$24.95, AAAS members \$19.95

Science and Creation: Geological, Theological, and Educational Perspectives

Edited by Robert W. Hanson

The creation/evolution controversy is examined by scientists, theologians, educators, and historians. These authors view the controversy as a false dichotomy and as an attempt to force a choice between two ideas that are not mutually exclusive. Includes case studies from several states.

1986, 240 pp., hardcover; \$24.95, AAAS members \$19.95

Low Tech Education in a High Tech World: Corporations and Classrooms in the New Information Society

Elizabeth L. Useem

Are students in the U.S. developing the skills necessary for a high technology society, or will it be technological boom, educational gloom? Useem examines education in California's "Silicon Valley" and Boston's Route 128, two of the country's leading high tech centers, and suggests ways for education and industry to forge a stronger partnership for the future.

1985, 256 pp., hardcover; \$19.95, AAAS members \$15.95

Science as Intellectual Property: Who Controls Scientific Research?

Dorothy Nelkin

Who controls research? A growing number of legal and administrative disputes raise critical issues of professional sovereignty, scientific secrecy, and proprietary rights. Nelkin offers cases illustrating the dilemmas that arise as the interests of scientists, the rights of citizens, and the security needs of government and industry come into increasing conflict.

1984, 130 pp., softcover; \$10.00, AAAS members \$8.00

The Gene-Splicing Wars: Reflections on the Recombinant DNA Controversy

*Edited by Raymond A. Zilinskas and
Burke K. Zimmerman*

Questions of safety and ethics about recombinant DNA techniques continue to surface. This book takes a look at historical, political, industrial, scientific, and international aspects of these issues. The authors show how lessons learned from the experience can be used to cope with similar issues in the future.

1986, 256 pp., hardcover; \$24.95, AAAS members \$19.95



All orders must be prepaid. VISA, MasterCard, and Choice accepted; include account number, expiration date, and signature.

Send orders to: AAAS Marketing, 1333 H Street, NW, Dept. M, Washington, DC 20005. Please add \$1.50 postage and handling per order. Allow 4-6 weeks for delivery.

*Published by Macmillan, Inc., for the American
Association for the Advancement of Science*



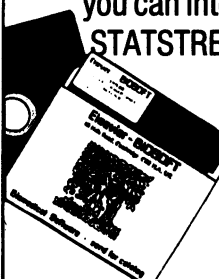
STATSTREAM

Data Analysis for the Apple II series

Probably the most powerful integrated tool available for numerical, graphical and statistical analysis with Apple II (48K RAM minimum, 1 or 2 drives).

Two packed floppy disks incorporate 76 procedures including data editing and storage, statistical routines, curve fitting including minimisation routines, graphics, printout, text windows etc. etc. These can be used directly or called into the friendly Statpack, into the demonstration programs or into your own BASIC programs. And

you can integrate additional procedures into STATSTREAM. A comprehensive manual is provided. **Price: \$140**



Elsevier - BIOSOFT

PLEASE SEND ORDERS TO
Elsevier-BIOSOFT (JIC), 52 Vanderbilt Avenue
New York, NY 10017.

Circle No. 177 on Readers' Service Card

**Frontiers in Basic Sciences That Relate to
Heart, Lung, and Blood Diseases Symposium:**

OXYGEN-FREE RADICALS

**National Institutes of Health
Bethesda, Maryland**

December 10-12, 1986

Sponsored by:

**The National Heart, Lung, and Blood Institute of the
National Institutes of Health**

This symposium is the eighth in the series of "Frontiers in Basic Sciences That Relate to Heart, Lung, and Blood Diseases." It will also be the first in a commemorative series of conferences in honor of the 100th anniversary of the National Institutes of Health and of the 40th anniversary of the inception of the National Heart, Lung, and Blood Institute (NHLBI). The Frontiers in Basic Sciences symposia are conducted by the NHLBI to capitalize on and transfer the progress in basic science disciplines to clinical research problems. Leading experts in the field will present their views on the state of the science, the problems facing current understanding, and anticipated future developments in oxygen-free radicals.

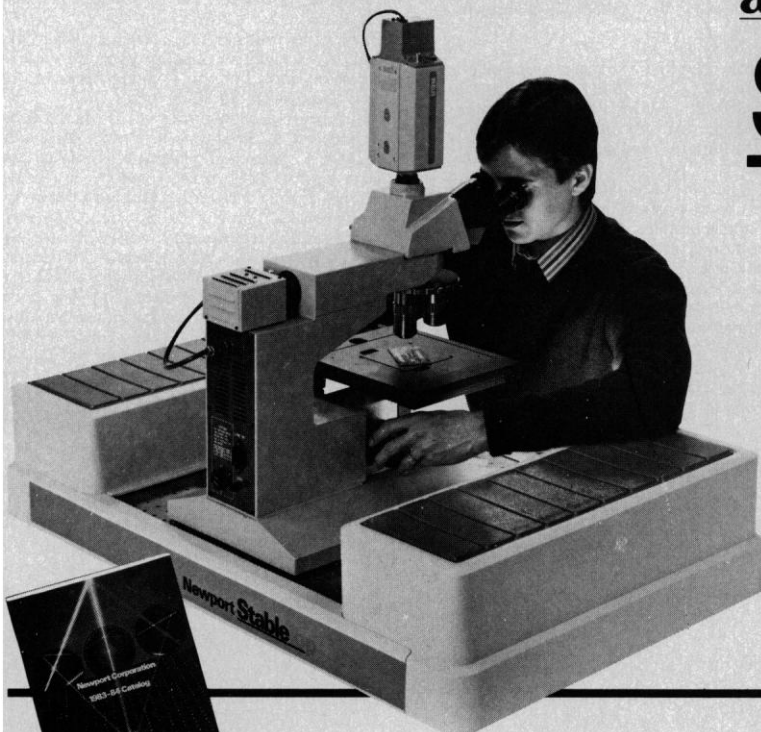
The symposium will be cochaired by Dr. Alfred P. Fishman of the University of Pennsylvania School of Medicine and Dr. Morris J. Karnovsky of Harvard Medical School. Presentations will be structured around the following topics: mechanisms of generation of oxygen-derived products, mechanisms of production of oxygen-derived products, effects of oxygen-derived products on DNA and lipid peroxidation, cellular and exogenous protective mechanisms, cell injury induced by oxygen-derived products, oxygen-derived products as mediators, effects of oxygen-derived products on microvasculature, and ischemia-reperfusion. Presentations by noted experts will be followed by commentary and open discussion.

For further information and registration materials, please contact:

Ms. Janyce N. Hedetniemi
Chief
Planning and Coordination Branch
Office of Program Planning and Evaluation
National Heart, Lung, and Blood Institute
National Institutes of Health
Building 31, Room 5A03
Bethesda, Maryland 20892
(301) 496-5031

**Newport's solution to small spaces, tight budgets
and vibration problems:**

StableTop™



- delivers superb vibration protection
- sets up quickly and easily in even cramped spaces
- makes work at your instrument comfortable, and more productive
- starts at less than \$1,000 complete

Our products for vibration control have become the standard of the laser/optics industry. Call or write us to find out how StableTop can work for you.

714 965-5400

Order Desk

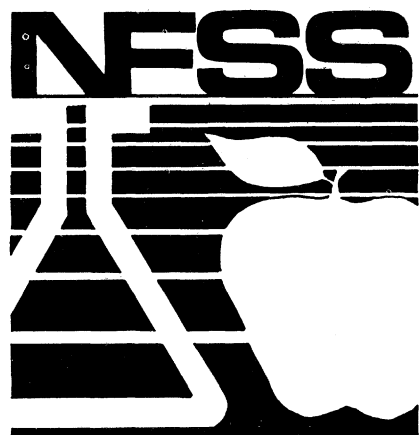
Newport Corporation

18235 Mt. Baldy Circle
Fountain Valley, CA 92708
Newport GmbH, W. Germany
Telex: NRC4197182



Get our free catalog of Laser
Research equipment & components

Circle No. 128 on Readers' Service Card



National Forum for School Science

Forum '86: The Science Curriculum

November 14 – 15, 1986

Hyatt Regency Crystal City

The National Forum for School Science is designed to encourage informed, coherent science education policy and practice. Through analysis and discussion of key issues, the annual forum focuses attention on the most enduring problems and the most promising solutions.

Forum '86 Program

Keynote Address

Paul Black, Kings College, London

The School Science Curriculum: What We Know, What We'd Like to Know

F. Joseph Crosswhite, Northern Arizona
University

Senta Raizen, National Academy of Sciences

Richard Shavelson, Rand Corporation

Iris Weiss, Research Triangle Institute

Pasquale Forgione, Jr., Connecticut Board of
Education

Daniel Koretz, Congressional Budget Office

Floraline Stevens, Los Angeles Unified
School District

Luncheon Speaker

Harold Hodgkinson, American Council on
Education

The Future School Science Curriculum

Margaret MacVicar, Massachusetts Institute
of Technology

Michael O'Keefe, Consortium for the
Advancement of Private Higher Education

Mortimer Appley, Harvard University

George Bugliarello, Polytechnic University

Mary Clark, San Diego State University

James R. Johnson, University of Minnesota

Ingram Olkin, Stanford University

Forces that Shape the Curriculum: Teachers, Texts, Tests, and Technology

Rosalie Cohen, Temple University

Robert Hampel, University of Delaware

Mary Budd Rowe, University of Florida

To register, please use the form on the
facing page.

For more information, please contact:

National Forum for School Science

AAAS Office of Science and Technology Education

1333 H Street, NW

Washington, DC 20005 • (202) 326-6620

American Association for the Advancement of Science



Forum '86: The Science Curriculum

14 – 15 November 1986

Hyatt Regency Crystal City, Arlington, VA

(at Washington National Airport)

Advance
Registration
Form
S3

Please Print or Type

Registrant's Name _____ Position _____
(last name) (first name and initial)

Organization _____ Department _____

Mailing Address _____
(street address)

(city) (state & zip) (telephone number)

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

Enclosed is a check, purchase order, or credit card information (see below) for:

- ☐ \$110 Full registration (registration materials, sessions, and two luncheons)
☐ \$ 80 Partial registration (registration materials and sessions only)
☐ \$ 40 Student registration — full-time graduate and undergraduate only (registration materials and sessions only)

Separate Meal Tickets: ☐ Lunch, Friday, 14 November (\$20) ☐ Lunch, Saturday, 15 November (\$20)

All registrants will receive a program, registration badge, and copies of background papers, and *This Year in School Science 1986: The Science Curriculum* after the conference. Registration is limited; preregistration form and payment must be received by **16 October** to ensure receipt of preliminary materials; registrations received after this date will be held at the AAAS Registration Desk in the Hyatt Regency.

Refund policy: Advance registration fees and meal tickets will be refunded for written cancellations received by **10 November**; no refunds will be made for requests received after this date.

Charge to my ☐ VISA or ☐ MasterCard. Number _____ Expiration Date _____
(no other credit cards accepted)

Cardholder's signature _____

Mail top half of registration form to: AAAS Meetings Office, Forum '86 Registration
1333 H Street, N.W., Washington, D.C. 20005

Hotel Reservation ♦ Hyatt Regency Crystal City

AAAS Forum '86 ♦ 14 – 15 November 1986

(Reservations received after 16 October cannot be guaranteed)

Send confirmation to:

Name _____ Street _____

City _____ State _____ Zip _____ Telephone No. (____) _____

Other occupants of room: Name _____ Name _____

Special housing needs due to handicap: _____

Room: ☐ Single (\$75)* ☐ Double (\$85)* ☐ Twin (\$85)* *Add 4% VA sales tax and 5% occupancy tax.

Arrival: Date _____ Time _____ Departure: Date _____ Time _____

Please list definite arrival and departure date and time. Check-in time is 3:00 p.m.; check-out time is 12 noon. Reservations will be held until 6 p.m. only, unless guaranteed by one of the credit cards below or 1 night's deposit is received. Failure to cancel 24 hrs. prior will result in 1 night's charges.

☐ American Express ☐ Diner's Club Number _____ Expiration Date _____

☐ Carte Blanche ☐ MasterCard Cardholder's signature _____

☐ Deposit (check) of \$ _____ enclosed. Make check payable to Hyatt Regency Crystal City.

Mail bottom half of reservation form to: Reservations, Hyatt Regency Crystal City
2799 Jefferson Davis Hwy., Arlington, VA 22202