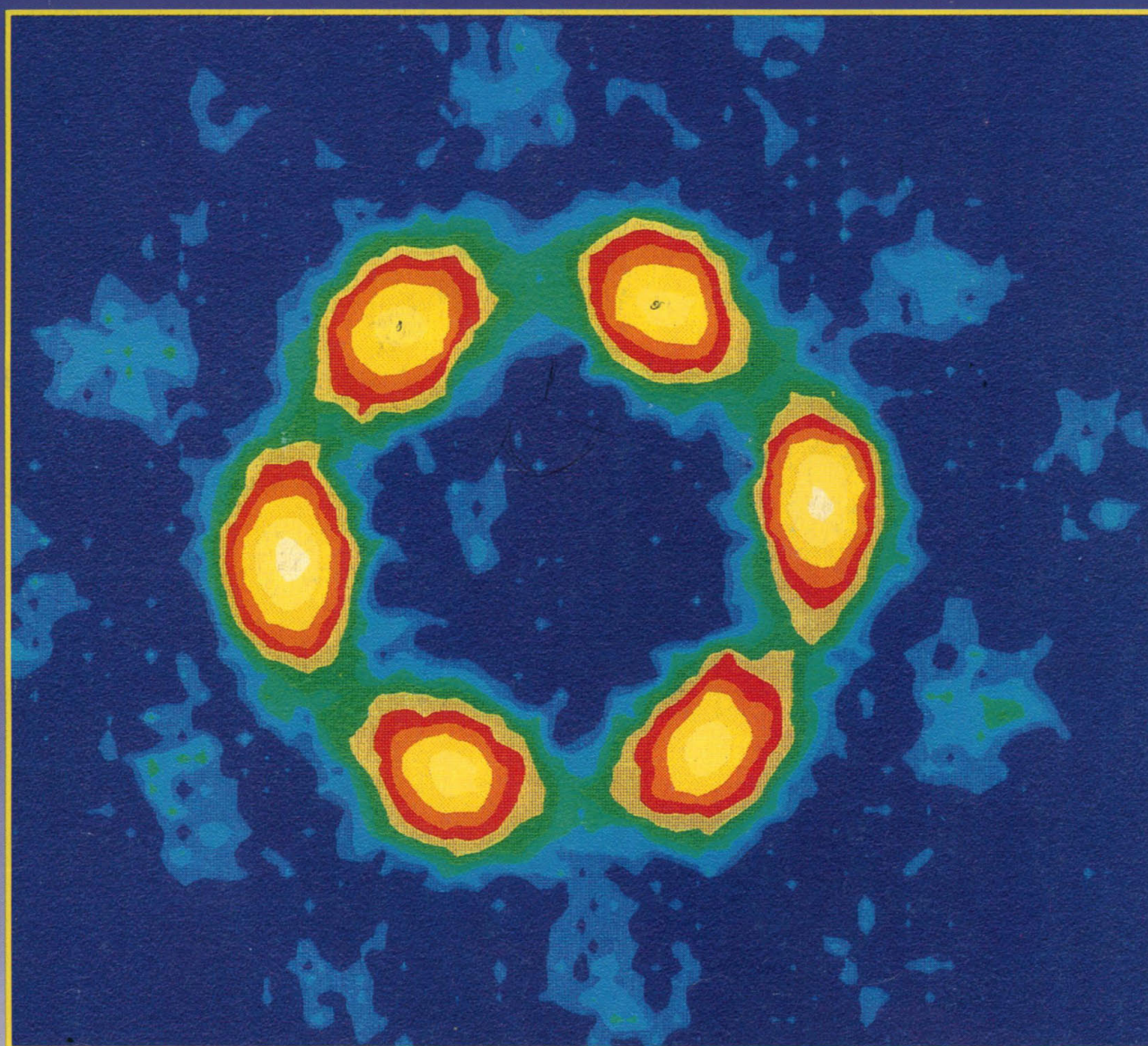


AMERICAN
ASSOCIATION FOR THE
ADVANCEMENT OF
SCIENCE

SCIENCE

22 FEBRUARY 1991
VOL. 251 ■ PAGES 845-992

\$6.00



Polymers

ANNOUNCING THE DAWN OF A NEW ERA IN LABORATORY ANIMAL IDENTIFICATION

Simplicity itself: a programmable stand-alone system that doesn't require a computer hookup and uses *your* animal identification number.

Background

Some two years ago Bio Medic Data Systems revolutionized laboratory animal identification by introducing an implantable micro-identification device with an encoded number. An interrogation system activates the implantable chip which then transmits its number. In effect: a truly foolproof system akin to adding a unique electronic "universal product code" to each animal.

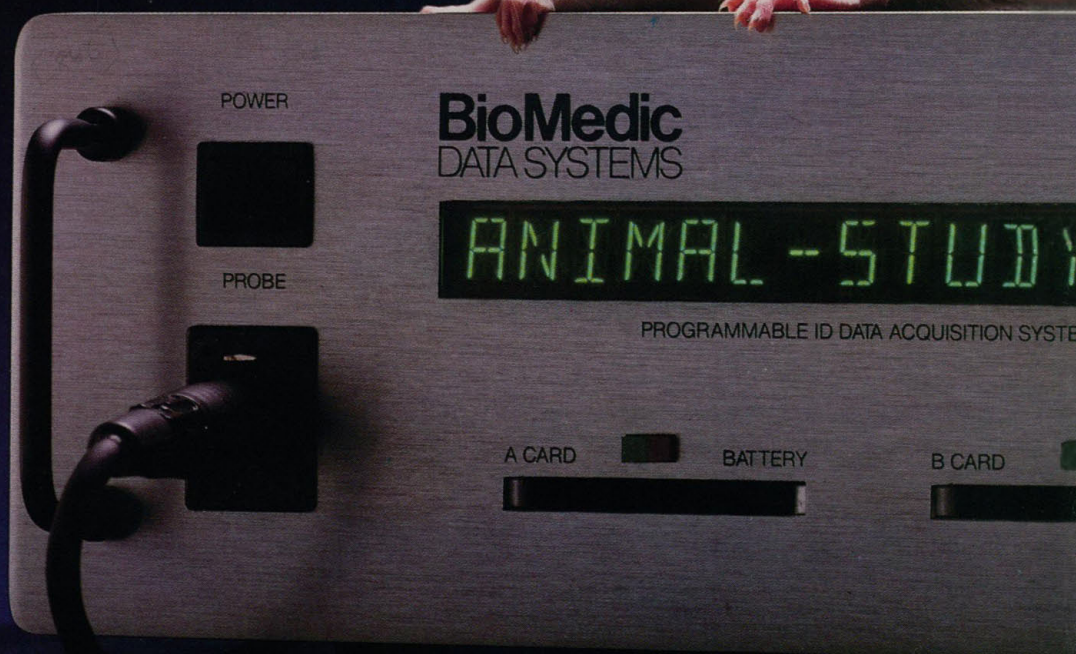
What are the Benefits?

This simple system obsoletes the traditional ear punching or tagging, toe clipping, and tail tattooing. As such, the age-old labor intensive techniques—in terms of the initial identification, the subsequent reading, and the inevitable re-dos—are replaced by a simple, easy, humane and remarkably efficient system. (A dramatic example: 200 animals can be identified in about 45 minutes.)

In addition: the imprecision of the conventional methods is replaced by *positive animal identification*. Animal misidentification or infection can indeed be catastrophic should they delay, impede, or destroy a crucial investigation. This simple foolproof system now converts ear punching or tagging, toe clipping, and tail tattooing into unacceptable risks... and who needs that when a positive animal identification system is now available!



Microchip implant
shown at 8X
magnification



What about Tissue Response?

As a result of a 105-week subchronic evaluation in rats and mice, there have been:

- no significant effects on normal body weights.
- no palpable masses observed.
- no visible tissue reaction.

The tissue response to the implanted microchips is considered to be completely non-adverse.

Announcing the Dawn of a New Era in Laboratory Animal Identification

You are now looking at the complete ELAMS™ (Electronic Laboratory Animal Monitoring System): the injection handle with 10 implantable microchips, the scanning wand that interrogates the chips, and the Programmable ID Data Acquisition System. Simplicity itself: Implant this chip, interrogate it, and key in *your* number. This stand-alone system does *not* require coupling to a computer. Nor does this system ask you to abandon *your* animal identification numbers; when an animal is identified, *your animal code is always subsequently displayed*.

Further: Since this system is not tied in to a computer, it can be used anywhere, even in hostile environments. However, should you choose, it can *easily* be coupled to a computer or a printer. For your additional protection, a back-up record can always be created in seconds. And this system works with *any* animal species.



Microchip is subcutaneously injected into the animal.

What about GLP Compliance?

ELAMS™ meets and exceeds the GLP guidelines providing a positive animal identification method that is cost effective and accurate.

To Learn More about the ELAMS™

We invite you to learn more about this new user-friendly (i.e., to both animals and people), state-of-the-art system. Just call our toll free number or drop us a line at ...

BioMedic
DATA SYSTEMS
a **BioMedic** company

Bio Medic Data Systems, Inc.
255 West Spring Valley Avenue
Maywood, New Jersey 07607
Phone: 201/587-8300, Fax: 201/843-8816
Toll free number: 1-800-526-BMDS

European Distributor: UNO bv
P.O. Box 15, 6900 AA Zevenaar, Holland
Marconistraat 31, 6942 PX Zevenaar
Phone: 08360-24451, Fax: 08360-23785

Japanese Distributor:
Yuasa Shoji Co., Ltd.
13-10 Nihombashi-Odemmacho
Chuo-Ku, Tokyo 103, Japan
Phone: 03-665-6742, Fax: 03-665-6994

Who is Using Bio Medic Data Systems' Implantable Micro Identification (IMI™)?

More than 45 organizations now have the Bio Medic Data Systems Implantable Micro Identification including Sandoz Research Institute, Schering Plough, C.I.T., General Motors, N.S.I. Technical Services, Stanford University, University of Miami, M.I.T. (Note that the Sandoz Research Institute has submitted the results of the first year of a two-year study for publication.)

851 This Week in *Science*

Editorial

853 Polymers: J. I. BRAUMAN

Letters

854 Views of the Genome Project: D. D. BROWN; M. SYVANEN ■ Aging Studies: J. MEITES ■ Adaptive Optics: P. LÉNA ■ Correction: R. A. ZALUTSKY AND R. A. NICOLL

ScienceScope

863 Review of electromagnetic fields at EPA; freedom of information at NIH; etc.

News & Comment

864 The Geopolitics of Nuclear Waste
866 Flap Erupts Over Dioxin Meeting
868 U.S. Bites Greenhouse Bullet and Gags ■ Bumpy Road to a Climate Treaty
869 AAAS Meeting Opens With Views From the Top ■ Science and Real Politik ■ Lederman and His Critics
870 *Briefings*: World Bank Environment Fund ■ Cruising the Digital Highway ■ Proving Einstein Right (or Wrong) ■ Looking for Planets ■ Campus Drinking ■ PMA Launches Ad Campaign ■ Public Attitudes Toward Gene Splicing ■ Physicists Hurting ■ How to Win a Westinghouse

Research News

872 Systematics Goes Molecular
874 Plastics Get Oriented—and Get New Properties
876 Mutation Identified as a Possible Cause of Alzheimer's Disease
878 Transgenic Crops Get a Test in the Wild

Articles

Polymers

887 Living Polymerization Methods: O. W. WEBSTER
893 DNA: A Model Compound for Solution Studies of Macromolecules: R. PECORA
898 Polymer-Polymer Phase Behavior: F. S. BATES
905 Polymer Brushes: S. T. MILNER

Research Article

915 Recoverin: A Calcium Sensitive Activator of Retinal Rod Guanylate Cyclase: A. M. DIZHOOR, S. RAY, S. KUMAR, G. NIEMI, M. SPENCER, D. BROLLEY, K. A. WALSH, P. P. PHILIPPOV, J. B. HURLEY, L. STRYER

Reports

919 Free Energy and Temperature Dependence of Electron Transfer at the Metal-Electrolyte Interface: C. E. D. CHIDSEY
922 Charge Separation in a Reaction Center Incorporating Bacteriochlorophyll for Photoactive Bacteriopheophytin: C. KIRMAIER, D. GAUL, R. DEBEY, D. HOLTEN, C. C. SCHENCK
927 Chemical Sensors Based on Controlled-Release Polymer Systems: S. M. BARNARD AND D. R. WALT

■ **SCIENCE** (ISSN 0036-8075) is published weekly on Friday, except the last week in December, 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 additional mailing offices. Copyright © 1990 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): \$82 (\$50 allocated to subscription). Domestic institutional subscription (51 issues): \$150. Foreign postage extra: Canada \$46, other (surface mail) \$46, air freight \$90. First class, airmail, school-year, and student rates on request. Canadian GST Number: 125488122. **Change of address**: allow 6 weeks, giving old and new addresses and 11-digit account number. **Postmaster**: Send change of address to *Science*, P.O. Box 1723, Riverton, NJ 08077. **Single copy sales**: \$6.00 per issue prepaid includes surface postage; Guide to Biotechnology Products and Instruments, \$20. Bulk rates on request. **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, 27 Congress Street, Salem, Massachusetts 01970. The identification code for *Science* is 0036-8075/83 \$1 + .10. *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 objectives 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, to advance education in science, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.



COVER Small-angle neutron scattering pattern obtained from a diblock copolymer after the application of an oscillatory shearing deformation. The hexagonal symmetry of the scattered neutrons derives from the long-range ordering of cylindrical microdomains (see p. 898). This issue of *Science* focuses on the physics and chemistry of polymers. [Data and image by K. Almdal, K. Mortensen, and F. S. Bates at the Riso National Laboratory in Denmark]

- 929 High Winds of Neptune: A Possible Mechanism: V. E. SUOMI, S. S. LIMAYE, D. R. JOHNSON
- 932 Nylon Production: An Unknown Source of Atmospheric Nitrous Oxide: M. H. THIEMENS AND W. C. TROGLER
- 934 Distinctive Cranial and Cervical Innervation of Wing Muscles: New Evidence for Bat Monophyly: J. G. M. THEWISSEN AND S. K. BABCOCK
- 936 A Heparin-Binding Growth Factor Secreted by Macrophage-Like Cells That Is Related to EGF: S. HIGASHIYAMA, J. A. ABRAHAM, J. MILLER, J. C. FIDDES, M. KLAGSBRUN
- 939 Mutations Affecting Internal TEA Blockade Identify the Probable Pore-Forming Region of a K⁺ Channel: G. YELLEN, M. E. JURMAN, T. ABRAMSON, R. MACKINNON
- 942 Exchange of Conduction Pathways Between Two Related K⁺ Channels: H. A. HARTMANN, G. E. KIRSCH, J. A. DREWE, M. TAGLIALATELA, R. H. JOHO, A. M. BROWN
- 944 Reshaping the Cortical Motor Map by Unmasking Latent Intracortical Connections: K. M. JACOBS AND J. P. DONOGHUE
- 947 D1 Dopamine Receptors in Prefrontal Cortex: Involvement in Working Memory: T. SAWAGUCHI AND P. S. GOLDMAN-RAKIC

Technical Comment

- 950 Form, Motion, and Binocular Rivalry: V. S. RAMACHANDRAN

Inside AAAS

- 952 Access to Engineering: New Project for Students and Faculty with Disabilities ■ Interview with Fang Lizhi: China, Science, and Human Rights ■ Art That Computes ■ AAAS Writes for Life

AAAS Meetings

- 954 Science & Technology in a Time of National Challenge: 16th Annual AAAS Colloquium on Science & Technology Policy ■ Program ■ Registration and Housing Form

Book Reviews

- 957 Space Technology and Planetary Astronomy, *reviewed by* R. HIRSH ■ The Kaiser's Chemists, E. N. TODD ■ Books Received

Products & Materials

- 959 Electroelution Apparatus ■ Peptide Synthesis and Purification ■ SFE Sample Preparation System ■ Laser Desorption Mass Spectrometer ■ Purge and Trap Concentrator ■ Personal Integrator for Chromatography ■ Cylindrical Draft Chamber Balances ■ Equilibrium Titrator ■ Luminescence Spectrometer ■ Electrochemical Detector for HPLC ■ Tunable Absorbance Detector ■ Curve-Fitting Software ■ Variable Wavelength Detector ■ Universal HPLC Autosampler ■ Chromatography Workstation Software ■ Nylon Blotting Membranes

Board of Directors

Donald N. Langenberg
*Retiring President,
Chairman*

Leon M. Lederman
President

F. Sherwood Rowland
President-elect

Mary Ellen Avery
Francisco J. Ayala
Eugene H. Cota-Robles
Robert A. Frosch
Joseph G. Gavin, Jr.
Florence P. Haseltine
Jean'ne M. Shreeve
Warren M. Washington

William T. Golden
Treasurer

Richard S. Nicholson
Executive Officer

Editorial Board

Charles J. Arntzen
Elizabeth E. Bailey
David Baltimore
William F. Brinkman
E. Margaret Burbidge
Pierre-Gilles de Gennes
Joseph L. Goldstein
Mary L. Good
Harry B. Gray
F. Clark Howell
Paul A. Marks
Yasutomi Nishizuka
Helen M. Ranney
Robert M. Solow
Edward C. Stone
James D. Watson

Board of Reviewing Editors

John Abelson
Frederick W. Alt
Don L. Anderson
Stephen J. Benkovic
Gunter K-J Blobel
Floyd E. Bloom
Henry R. Bourne
James J. Bull
Kathryn Calame
Charles R. Cantor
Ralph J. Cicerone
John M. Coffin
Robert Dorfman
Bruce F. Eldridge
Paul T. Englund
Fredric S. Fay

Harry A. Fozzard
Theodore H. Geballe
Roger I. M. Glass
Stephen P. Goff
Corey S. Goodman
Stephen J. Gould
Eric F. Johnson
Stephen M. Kosslyn
Konrad B. Krauskopf
Charles S. Levings III
Richard Losick
John C. McGiff
Anthony R. Means
Mortimer Mishkin
Roger A. Nicoll
William H. Orme-Johnson III
Yeshayau Pocker

Dennis A. Powers
Erkki Ruoslahti
Thomas W. Schoener
Ronald H. Schwartz
Terrence J. Sejnowski
Thomas A. Steitz
Robert T. N. Tjian
Emil R. Unanue
Geerat J. Vermeij
Bert Vogelstein
Harold Weintraub
Zena Werb
George M. Whitesides
Owen N. Witte
William B. Wood
Keith Yamamoto

Pure nucleic acids – QIAGEN does them all !

QIAGEN is all you need

No matter what type of nucleic acid you want to isolate – QIAGEN columns are all you need.

It's this fast

1. **Adsorb** a cell lysate
2. **Wash** away contaminants
3. **Elute** pure nucleic acid

It's this convenient

Ready-to-use kits for all types of nucleic acids –
4 Column sizes for any size prep –
Gravity flow alone results in optimal separations –
Numerous lab-tested protocols are included in our booklet THE QIAGENOLOGIST.

It's this pure

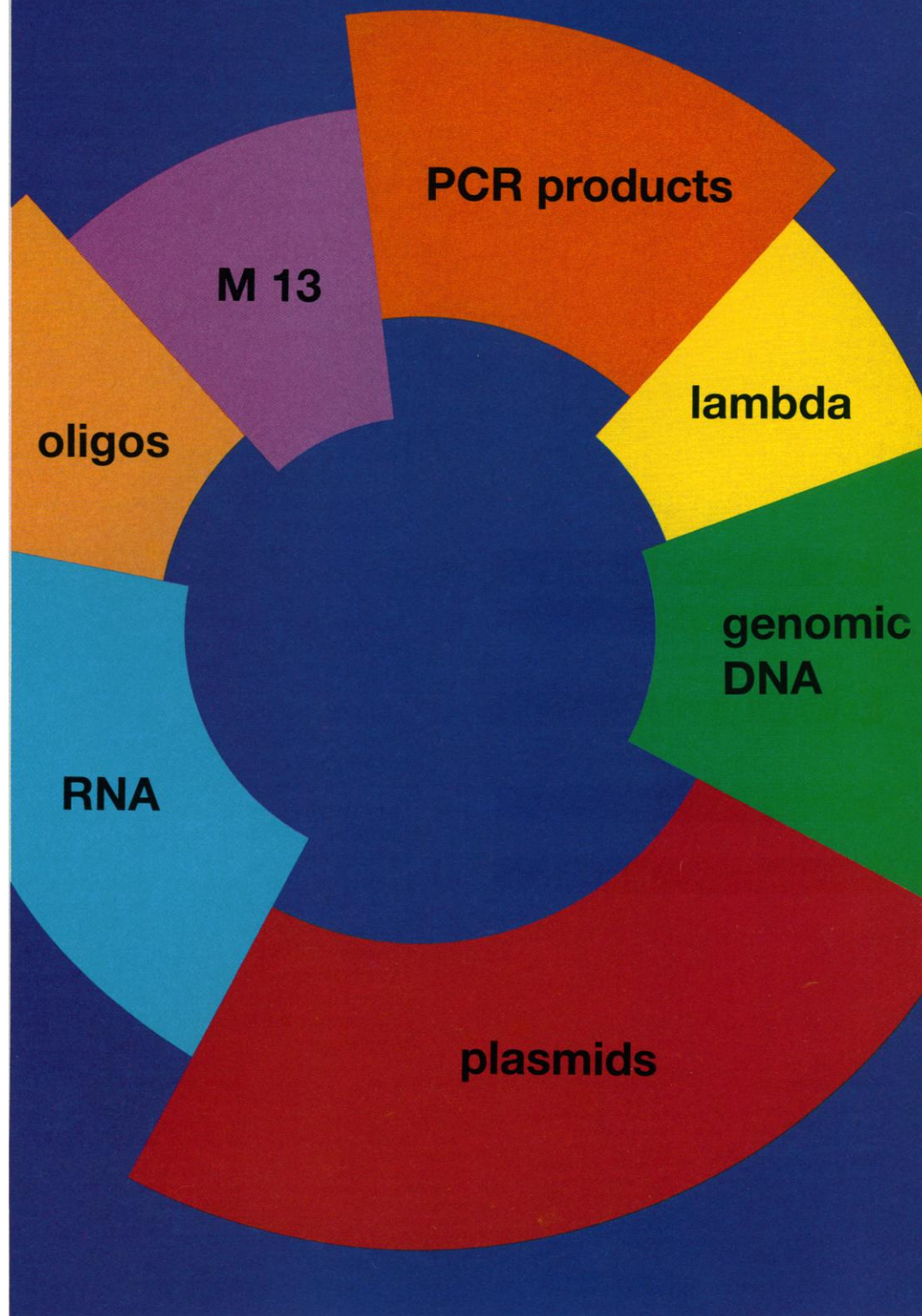
QIAGEN-purified nucleic acids are equal in purity to those isolated on CsCl gradients.
Subsequent applications such as transfections, clonings, sequencing, transcription and translation reactions proceed with optimal efficiency.

It's this versatile

At the heart of the system is a unique anion exchange resin with the broadest possible separation range – QIAGEN.
It enables the selective isolation of the various classes of nucleic acids, including dsDNA, ssDNA and RNA.

For more information

call or write to QIAGEN Inc.,
QIAGEN GmbH or your nearest distributor.



USA/CANADA: QIAGEN Inc., Chatsworth, CA 91311, Phone (800) 426-8157, (818) 718-9870, Fax (818) 718-2056
GERMANY: QIAGEN GmbH, Niederheider Str. 3, D-4000 Düsseldorf 13, Phone (0211) 79 30 37, Fax (0211) 79 04 44
DISTRIBUTORS: **AUSTRALIA:** Phoenix Stansens Scient.Div. (3) 544 8022 **AUSTRIA:** Bio-Trade (222) 828 46 94
BENELUX: Westburg B.V. (NL-33) 95 00 94 **FRANCE:** Cogec (1) 45 33 67 17 **ISRAEL:** Bio-Lab Laboratories Ltd. (2) 52 44 47 **ITALY:** Genenco (M-Medical) (55) 67 64 41 **JAPAN:** Funakoshi Co., Ltd. (3) 5684 1622
KOREA: LRS 924-8697 **PORTUGAL:** Izasa Portugal, S.A. 758 07 40 **SCANDINAVIA:** Kebo Lab: Denmark: (44) 68 18 00, Finland: (90) 437 56 40, Norway: (02) 30 11 20, Sweden: (08) 621 34 00 **SPAIN:** Izasa S.A. (3) 401 01 01
SWITZERLAND: Kontron Instruments AG (1) 733 5 733 **TAIWAN:** Formio (2) 736 7125 **UK:** Hybaid Ltd. (81) 977 3266



Circle No. 222 on Readers' Service Card

This Week in SCIENCE

Recoverin

A protein that is central to the response of the eye to light and dark has been identified and characterized (page 915). The protein, which has been named recoverin because of its role in recovery of the dark state, is present in both rods and cones of the eye. Dizhoor *et al.* report that recoverin molecules are sensitive to calcium ion concentrations: specifically, when freed from calcium, the recoverin molecules activate target enzymes—guanylate cyclase molecules. Guanylate cyclase then promotes the resynthesis of cyclic GMP, the cyclic GMP opens cation channels that were closed by light, and the dark state of the rod or cone is restored. The activity of recoverin thus depends on its liberation from rather than binding to calcium; another calcium-dependent protein, visinin, may operate in a similar fashion. The recovery cascade is triggered when recoverin is exposed to very low (submicromolar) levels of calcium ions.

Sensor

SENSORS can be used for the continuous measurement of chemical concentrations in “remote” locations, such as the inside of the human body or deep within the ground. Many chemical and biological assays are difficult to adapt for sensor applications because one or more of the reagents must be regularly replenished. Barnard and Walt have overcome this difficulty with a fluorescence energy transfer assay. The reactants are released in steady fashion for long periods (many weeks) from an ethylene-vinyl acetate polymer reservoir (page 927). The prototype experiments were carried out with fluorescein-labeled antibodies and Texas Red-labeled antigens. When antigen and antibody combined, energy was transferred from fluorescein to Texas Red; the quenching of the fluorescence and the shift in excitation could be monitored with an optical fiber. Detection of unlabeled antigen in the reaction mixture is then straightforward: as unlabeled antigen competes with labeled

antigen for antibody sites, it interferes with the standard transfer-of-energy signals. This type of sensor permits study of essentially irreversible reactions, because reagents are continuously replenished and bound molecules are continuously washed away.

Atmospheric pollution from nylon

NITROUS oxide is a greenhouse gas that is increasing in the atmosphere by about 0.2% each year. It is also a gas that contributes to the catalytic destruction of ozone. The budget of nitrous oxide has been uncertain, in part because some 30% of the sources have yet to be identified. Thiemens and Trogler report that nitrous oxide is generated and emitted during the manufacture of nylon and that this source may account for up to 10% of the increased atmospheric nitrous oxide (page 932). They tracked isotopic composition, stoichiometry, and output of nitrous oxide in laboratory experiments that simulated the industrial process for making nylon. The technology already exists for eliminating emissions of nitrous oxide from nylon production, and its global use would seem indicated. Once nitrous oxide enters the atmosphere, its lifetime there is on the order of 150 years.

Innervation of bat wing muscles

THE wings of bats contain a specialized propatagial muscle complex. The morphologic similarities of this complex in fruit bats (Megachiroptera) and insect bats (Microchiroptera) have been considered support for the hypothesis that these two subdivisions of *Chiroptera* are descendants of a common ancestor. The hypothesis is strengthened by the work of Thewissen and Babcock, who evaluated which nerves link up with the muscles of the propatagial complexes in fruit and insect bats and in Dermoptera (flying lemurs), which also have propatagial complexes (page 934). In bats,

both cranial nerve VII and cervical spinal nerves innervate the propatagial muscle complexes; such dual innervation, involving nerves from both the brain and the spinal column, is unknown for other mammalian muscles and is not likely to have evolved twice. In Dermoptera, the complex is also innervated by cranial nerve VII, thus providing support for the proposal that flying lemurs are structural intermediates between flying bats and quadrupedal mammals.

Tuning in to ion channels

WHAT makes it possible for potassium ions to cross cell membranes? The protein that forms the voltage-gated potassium ion channel has been characterized in a number of studies; two papers this week point to a highly conserved region of the molecule as the specific site for ion passage. Yellen *et al.* used the blocker substance TEA to identify which amino acids at the external and internal entries to the pore were directly involved in ion transport (page 939). They found that only eight amino acids separate the two critical amino acids at the pore's opposite ends, and most of the transmembrane electric potential falls across this eight-amino acid stretch. Hartmann *et al.* transplanted the putative pore region from one channel to a related channel and found that the resulting chimeric channel protein had the conductance properties and the TEA blocking features of the transplanted pore (page 942). Both groups propose that the most feasible structures for these aqueous ion pores are β strands.

■ RUTH LEVY GUYER

Polymers

Polymers are everywhere. Their synthesis, properties, and uses are described on pages 853, 874, and 887 to 914.

Pure Power x96.



SECOND GENERATION PCR TECHNOLOGY.

Speed. The new GeneAmp® PCR System 9600 combines thin-walled MicroAmp™ Reaction Tubes, a 96-well format, unique



sample block design and high performance PCR protocols. Our second generation PCR technology provides the fastest amplification system available, unleashing the power you need to accelerate your research.

Precision. The GeneAmp PCR System 9600's integrated design accurately controls sample temperature and completely eliminates the need for oil, providing unparalleled uniformity and the highest reproducibility of your results.

Confidence. The GeneAmp PCR System 9600 is backed by the Perkin-Elmer Cetus PCR Performance Guarantee. A commitment that brings you the expertise and resources of the industry leader. For technical information and to order in the U.S., call 1-800-762-4001. Or call 1-800-762-4000 for literature. Outside the U.S., contact your local Perkin-Elmer representative.



PERKIN ELMER CETUS

Europe Vaterstetten, Germany Tel: 49-8106-381-112 Fax: 49-8106-6897
Canada Montreal, Canada Tel: 514-737-7575 Fax: 514-737-9726
Far East Melbourne, Australia Tel: 61-3-560-4566 Fax: 61-3-560-3231
Latin America Mexico City, Mexico Tel: 52-5-651-7077 Fax: 52-5-593-6223

GeneAmp is a registered trademark and MicroAmp is a trademark of Cetus Corporation.
The PCR process is covered by U.S. patents issued to Cetus Corporation.

Econo System Simplifies Chromatography



**Complicated
Chromatography**

**Econo System and
Econo-Pac® Cartridges**



Before the Econo System, chromatography was a complicated process. You spent a lot of money, read a lot of manuals, made connections, made adjustments, measured, mixed, stirred, tapped, sat, watched, waited, hoped.

With the Econo System and Econo-Pac cartridges chromatography is easy: twist on a prefilled cartridge, push some buttons, and that's it.

Econo System features, such as automatic gradient formation and fraction collection, simplify chromatography. Prepacked Econo-Pac cartridges for ion exchange, desalting, and hydrophobic interaction meet all protein and nucleic acid purification needs.

Call us now at 1-800-4BIORAD for more information.

BIO-RAD

**Chemical
Division**

U.S. (800) 4BIORAD • California • Ph. (415) 232-7000 • Fx. (415) 232-4257; New York • Ph. (516) 764-2575 • Fx. (516) 764-2186; Canada • Ph. (416) 624-0713 • Fx. (416) 624-3019; Australia • Ph. 61-2-805-5000 • Fx. 61-2-805-1920; Austria • Ph. 43/222/82 89 010 • Fx. 43/222/82 85 629; Belgium • Ph. 32/2/91 85 55 11 • Fx. 32/2/91 82 65 54; France • Ph. 33/1/49 60 68 34 • Fx. 33/1/46 71 24 67; Germany • Ph. 49/89/31 88 40 • Fx. 49/89/31 88 41 00; Kowloon • Ph. 852/789/3300 • Fx. 852/789/1257; Italy • Ph. 39/2/213 87 51 • Fx. 39/2/213 90 32; Spain • Ph. 34/1/661 7085 • Fx. 34/1/661 9698; Japan • Ph. 81-3-534-7240 • Fx. 81-3-534-8037; The Netherlands • Ph. 31/8385-40666 • Fx. 31/8385-42216; Switzerland • Ph. 41/1/810 16 77 • Fx. 41/1/810 19 33; England • Ph. 44/442/23 25 52 • Fx. 44/442/59118; New Zealand • Ph. 64/9/443/3099 • Fx. 64/9/443/3097

Circle No. 118 on Readers' Service Card

Versatile, Reliable cDNA

Solid Technology that Towers Above the Rest.

The Librarian™ cDNA library construction kits are the most versatile and reliable cloning systems available. Only Librarian kits offer direct eukaryotic or prokaryotic expression, unidirectional or bidirectional cDNA insertion, and electrocompetent or chemically competent *E. coli* transformation for libraries of unsurpassed size and representation. Each kit provides every reagent needed to turn RNA into recombinants and is completely guaranteed.

■ Versatile expression cloning

Our multifunctional vectors are driven by strong promoters to give high level expression in mammalian cells, yeast and *E. coli*. These vectors offer useful features and convenient multiple cloning sites.

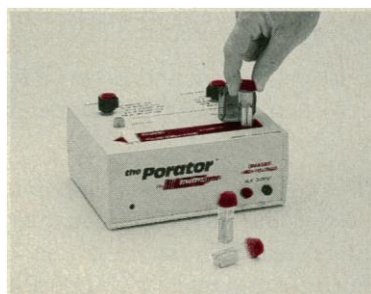
Librarian Vectors Features	pcDNA I	pcDNA II	pYES 2	2-gr10	2-gr11
Eukaryotic	●				
Prokaryotic		●			●
Yeast			●		
Unidirectional	●	●	●		
Bidirectional	●	●	●	●	●
RNA Promoters	●	●	●		
M13 Origin	●	●	●		
NA Screening	●	●	●	●	●
Ab Screening	●	●	●		●
Panning	●	●	●		●

■ Unsurpassed library size

Invitrogen's unique cDNA synthesis and non-palindromic ligation strategy allows production of the largest, most representative libraries and eliminates side reactions common to other systems. The Porator™, Invitrogen's economical bench-top electroporation device makes it possible to generate libraries containing greater than 10^7 primary recombinants.

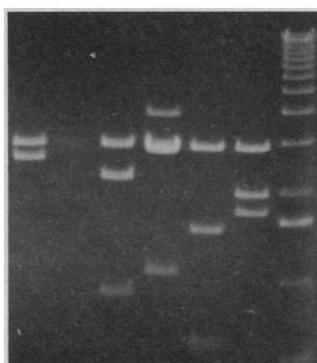
mRNA* SAMPLE	LIBRARY SIZE (CHEMICAL)	LIBRARY SIZE (ELECTROPORATION)
Fetal Eye Lens	2.3×10^5	3.5×10^6
HL60 Cells	2×10^6	8×10^6
Umbilical Vein Endothelial Cells	3×10^6	1.2×10^7

*Libraries were constructed from cDNA shown in cDNA synthesis gel entitled: Full length cDNA.



High efficiency, economical, electroporation device for bacterial, yeast and mammalian cells. Compatible with standard electroporation cuvettes and most power supplies.

■ Accurate sizing of full length cDNA

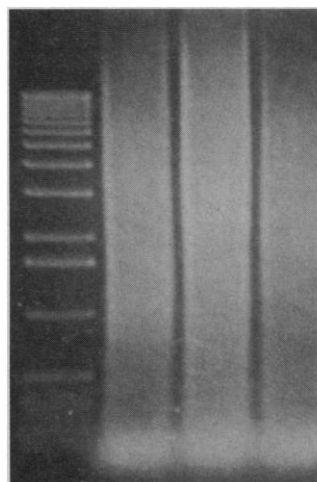


Random mini-preps from library sized at >3Kb. 95% of inserts were >2.5Kb. Lane 5: 1Kb ladder (BRL)

Efficient gel sizing guarantees greater average insert size and more information per cDNA clone. The Librarians are the only systems that allow size selection in any range between 500 base pairs and >10Kb, and generate libraries with >90% of inserts within the selected size range.

■ Full length cDNA >10Kb

The Librarians utilize the denaturant MeMgOH to remove mRNA secondary structure in conjunction with equilibrated ratios of enzymes to ensure production of full length, highly active cDNA.



Lane 1: 1Kb markers (BRL). Lane 2-4: cDNA from fetal eye lens tissue, HL60 cells and umbilical cord endothelial cells, respectively.

AMS BIOTECH
UK/Switzerland
44-993822786

BDH, INC
Canada
800-268-2129

BIO-TRADE
Austria
43-2228284694

BRITISH BIO-TECH
UK
44-235529449

CELBIO
Italy
39-24048646

FINNZYMES OY
Finland
358-154375312

FUNAKOSHI
Japan
81-356841622

ITC BIOTECH GMBH
Germany
(06221) 303907

KEBO LABS AB
Sweden
46-86213400

MEDOS COMPANY
PTY LTD

Australia
61-380809077

SANBIO BV
Nederland
31-413251115

Invitrogen's cDNA cloning technology has set the industry standard for over three years. Every reaction has been optimized to provide the highest efficiencies attainable and every Librarian kit is completely guaranteed. Call our technical service personnel to discuss which Librarian kit is right for you. At Invitrogen, we not only guarantee satisfaction, we guarantee success.

Circle No. 135 on Readers' Service Card

Cloning...

The Librarian

V
EUKARYOTIC OR PROKARYOTIC
EXPRESSION

IV
LARGEST LIBRARY SIZE
VIA ELECTROPORATION
AND TRANSFORMATION

III
GEL SIZING FOR
FULL LENGTH INSERTS

II
NON-PALINDROMIC ADAPTORS
ELIMINATE CONCATEMERIZATION

I
FULL LENGTH
cDNA SYNTHESIS

 **Invitrogen**
CORPORATION

Call 1-800-544-4684



We can help you get your absorbable

If your plans to explore absorbable polymers aren't moving fast enough, do what scores of companies—including 8 of the world's top 10 pharmaceutical firms—have already done. Team up with Medisorb Technologies International.

MTI is a partnership of Stolle Medical Products and The Du Pont Company.

So we have the resources it takes to get controlled-release drugs and bioabsorbable devices to market fast. In fact, we can assist you every step of the way: from



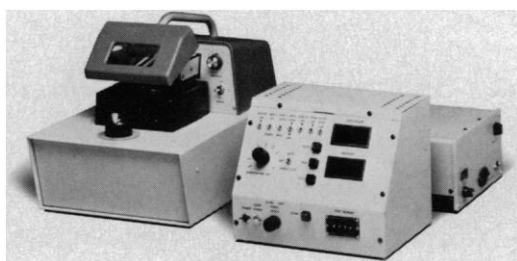
polymer program off to a faster start.

concept, design, and development, right through to FDA approvals and production. Small wonder that many of our projects are already in advanced clinicals. And that four others are expected to gain FDA approval later this year. To get

a program of your own started, call us at 1-800-772-5091, or send us a fax at 513-489-7267. But please don't delay. Because the only thing less fortunate than missing out on absorbables would be getting in too late.



**Seven
reasons
why
Vibratome®
Series 2000
is the
clear cut
choice
for
fresh tissue
sectioning.**



- 1.** Vibratome's patented vibrating blade principle moves the blade in a reciprocating arcuate path allowing sectioning without freezing or embedding. Elastic deformation of delicate soft tissue is minimized.
- 2.** Vibratome's liquid bath lubricates the blade, maintains specimen temperature and enhances and preserves desirable specimen characteristics.
- 3.** Vibratome's built-in bath refrigeration cools without compressors, refrigerant fluids, expansion valves or condensing coils.
- 4.** Vibratome's motorized digital control and readout of section thickness take the labor intensity out of specimen height control while allowing sections to be cut to any desired thickness from ten microns up.
- 5.** Vibratome's serial sectioning mode raises the stage by pre-selected increments, automatically.
- 6.** Vibratome's step function allows manual set-up in any increment in 1/2 micron steps at the push of a button.
- 7.** TPI provides assured delivery, on-demand technical service, and complete repair and replacement should you need it.

When your research demands sectioning of fresh or fixed animal or plant tissue without the creation of artifacts, alteration of morphology and destruction of enzyme activities inherent in freezing or embedding procedures, turn to Vibratome.

Vibratome Series 2000—the new standard in automated fresh tissue sectioning.

Vibratome Series 1000—semi-automated sectioning for tighter budgets, retrofittable to Series 2000 status.



**TECHNICAL
PRODUCTS
INTERNATIONAL, INC.**

Finally, get performance, flexibility, and ease of use in a single data acquisition package. Without programming. Without compromising.

Awaken your 386/486.

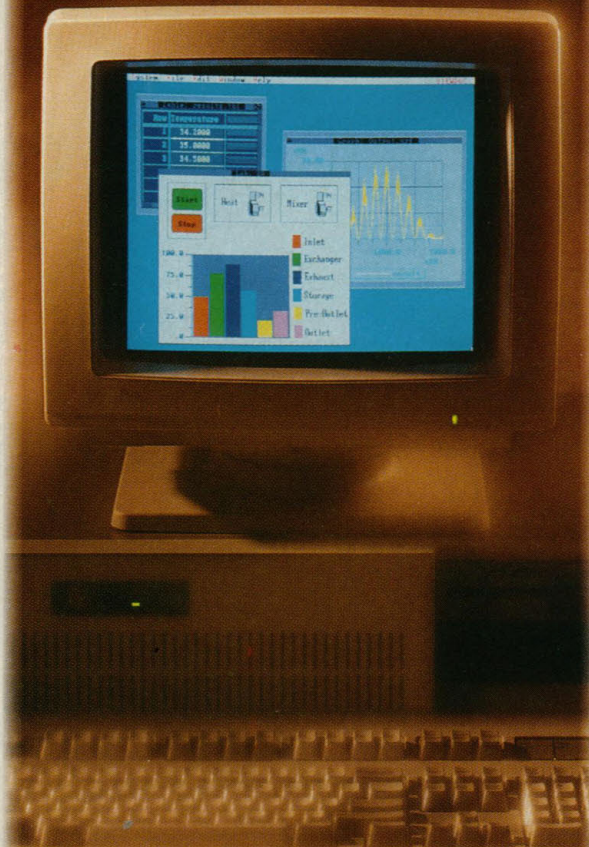
VIEWDAC lets you explore the full power of your 386/386SX/486. Become more productive with less effort.

Acquire, analyze, and graph huge arrays. Run multiple acquisitions concurrently. Even set up new applications while running others. VIEWDAC's user-friendly windowing environment lets you do it all with ease.

User power that's not just for the power user.

With VIEWDAC, you don't have to write code to get performance. Integrated applications with custom front panels, simultaneous real-time calculations and display, and user input are just mouse clicks away.

**FOR YEARS,
YOUR 386™/486™ PC
HAS BEEN DREAMING
ABOUT SOFTWARE
LIKE THIS.**



**INTRODUCING
VIEWDAC™, THE FIRST
DATA ACQUISITION
AND CONTROL
SOFTWARE FOR
THE 386/486.**

**Your wake-up call:
1-800-348-0033.
Free demo disk.**

Data acquisition for your 386/486 is no longer a dream. It's real. It's VIEWDAC. Call today.

**Key VIEWDAC
acquisition tools:**

- Vary acquisition rates on any channel during a run
- Mix high- and low-speed acquisition over any combination of channels in the same application
- Enjoy built-in specialized acquisition and control tasks (thermocouples, PID control, pulse output, etc.)
- Use up to 20 acquisition boards simultaneously – even with all channels active
- Select hardware from a broad range of suppliers
- GPIB and RS-232 coming soon

**Key VIEWDAC
analysis/graphics tools:**

- Time and frequency domain processing
- Arbitrary wave form generation
- Curve fitting
- Basic statistical reporting
- Interactive graphics, including bar charts

Be sure to ask about our other software products: ASYST™, ASYSTANT®, and EASYEST®. Thirty-day money-back guarantee on all Keithley Asyst software.

KEITHLEY ASYST

Nalge Shifts

Introducing Nalgene UltraPlus Centrifuge Ware. The New Force in Centrifugation from Nalge.

Today's revolutionary technologies—including molecular biology, analytical chemistry, and immunology—are changing the way you work. They're the driving force behind new procedures and new products to help you maximize your lab's performance.

Now, there's a line of ultra-centrifuge ware as advanced as your separation techniques. From Nalge, the first name in advanced labware.

Low, High and Now Ultra.

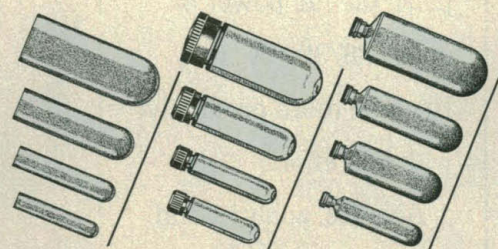
You already know us in the best of circles for high quality low- and high-speed centrifuge ware. And Nalge's turning on the speed from 1,500 to 80,000 RPM!

Nalgene UltraPlus Centrifuge Ware features an innovative sealable tube system, thin- and thick-wall open-top tubes, bottle assemblies, racks, tools, and accessories. Nothing less than ultrasensational. An ultravalue, too.

UltraPerformers!

Like our low- and high-speed tubes and assemblies, Nalgene UltraPlus is designed with the dimensional tolerances you demand for optimum handling.

Sealable tubes, open-top tubes, bottle assemblies— the full line of Nalgene UltraPlus Centrifuge Ware is designed to fit the most popular Beckman rotors. UltraCompatible!



Nalgene UltraPlus Centrifuge Ware gives your lab a choice of popular types, sizes, and resins. In a complete system of sealable tubes, thin- and thick-wall open-top tubes, and bottle assemblies. UltraVersatile!

In fact, we've performance-tested our tubes and bottles in Beckman rotors. So you can count on the highest quality and reliability every time you give us a spin.

Nalgene UltraPlus Centrifuge Ware holds its own against max-rated centrifugal forces. Leakproof at ultra speeds, so you can take it to the limit!

UltraConvenient!

What's your application? Choose from tubes and bottles in popular sizes from 6.5 to 94 mL.

Nalgene UltraTubes are available in disposable thin-wall open-top polyallomer tubes. Plus, reusable thick-wall open-top tubes of polyallomer and polycarbonate. (Compatible with the popular ultracentrifuge rotors and tube caps you're already using.)

Nalgene UltraBottles and UltraBottle Assemblies are

Wide-mouth Nalgene UltraLok Tubes allow easy filling with a pipet. Sample retrieval is easy, too. Just pierce or slice tube walls or plug. UltraConvenient!



Into Ultra!

molded of transparent, autoclavable polycarbonate. They work great with most popular screw closures. And our plugs and O-rings create a seal you can trust at ultra speeds.

UltraSimple!

The heat is off with the Nalgene UltraLok™ Tube system. Simplified sealing at your fingertips! No expensive heating unit is required. So there's no warmup time, and no risk of heating your sample or burning your fingers.



Every Nalgene UltraLok Tube comes with its own plastic plug. Just squeeze for a permanent, leakproof seal. Then add UltraLok Spacers to the neck for a sure fit every time. UltraSimple!



Break-resistant, see-through racks (three sizes) hold Nalgene UltraLok Tubes in place for filling. Then you're ready to use the Nalgene UltraLok Sealer for a permanent, leakproof tube. UltraSecure!

Hold your single-use UltraLok Tubes tight and upright in a sturdy acrylic Nalgene UltraTube Rack. Fill them easily. (Nalgene UltraLok Tubes are wide enough for a pipet.)

Then squeeze with a Nalgene UltraLok Tube Sealer for a permanent seal.

You can't beat the system!

Take a Test Spin.

Now it's our turn to show you what precision, performance, and value in ultra-centrifuge ware are all about.

Do your lab a favor. Ask for a demo of new Nalgene

UltraPlus Centrifuge Ware. Available from authorized Nalgene Labware Dealers worldwide.

Attach your business card or letterhead to the coupon and mail today. Get the details on the full line of low-, high-, and ultra-speed Nalgene Centrifuge Ware.

© 1989 Nalge Company Nalgene UltraLok™ Tubes—pat. pending.

☐ **Yes!** Please rush me more information on Nalgene UltraPlus Centrifuge Ware, and low- and high-speed Nalgene Centrifuge Ware. Send to: Nalge Company, A Subsidiary of Sybron Corporation, P.O. Box 20365, Rochester, NY 14602-0365

Nalge Company

Nalgene® Brand Products

SCI-2

Nalgene® UltraPlus™

Centrifuge Ware

Circle No. 184 on Readers' Service Card
See us at Pittcon Booth #'s 4609 and 4709.

You'll appreciate the quality of our balances the minute you try one. We'll give you 30 days anyway.



© 1990 Denver Instrument Company

Since 1880, we've designed and manufactured high-quality balances for critical applications all over the world, although not always under our own name. ■ Some things have remained remarkably stable. We're still in Denver. Fisher Scientific Company is still our partner in national distribution after providing our customers with outstanding service continually, for 82 years. And because we are American made we're still the best value in the market. ■ A lot has changed, too. The performance of our AB Series analytical balance and IR-100 moisture analyzer was undreamed of 111 years ago. Both have won top honors as examples of outstanding American industrial design. ■ Today, we're so sure of our instruments, we back them up with a no-nonsense, two-

year warranty. Should any product fail under normal use, we'll replace it. ■ **The 30 day demo. We'll send you any of our products to try in your lab—with absolutely no obligation—for 30 days. Just contact your Fisher Scientific representative, or call Denver Instrument Company at 1-800-321-1135.**



Denver Instrument Company

You know our products, now you know our name.

6542 Fig Street, Arvada, CO 80004-9903 (303) 431-7255 • fax (303) 423-4831

Circle No. 194 on Readers' Service Card

THE BUCHLER EVAPORATOR OUTMUSCLES, OUTPERFORMS, AND OUTLASTS THE EVAPORATOR YOU'RE USING NOW OR YOUR MONEY BACK.

Dare to compare a Buchler Evaporator feature for feature and dollar for dollar with the brand you are using now. If you're not completely satisfied with its performance, we'll take it back, no questions asked.

The drive's capacitor motor is the industry's most powerful. It delivers constant 150Ncm torque over the entire speed range from 20-250 rpm, regardless of sample viscosity or vacuum conditions. All standard and digital models are equipped with a strong electronic lift.

Our performance is unsurpassed. By simply changing the glassware set, the Buchler Evaporator can be adapted to any application from simple distillation to reflux or Dewar procedures. Removing the control pad from our digital rotary evaporator will allow you to operate the unit up to six feet away.

No evaporator is built for longer life. We guarantee it with a full one year warranty. The same applies to our micro and pilot plant evaporators, and vortex evaporators for multiple sample processing.

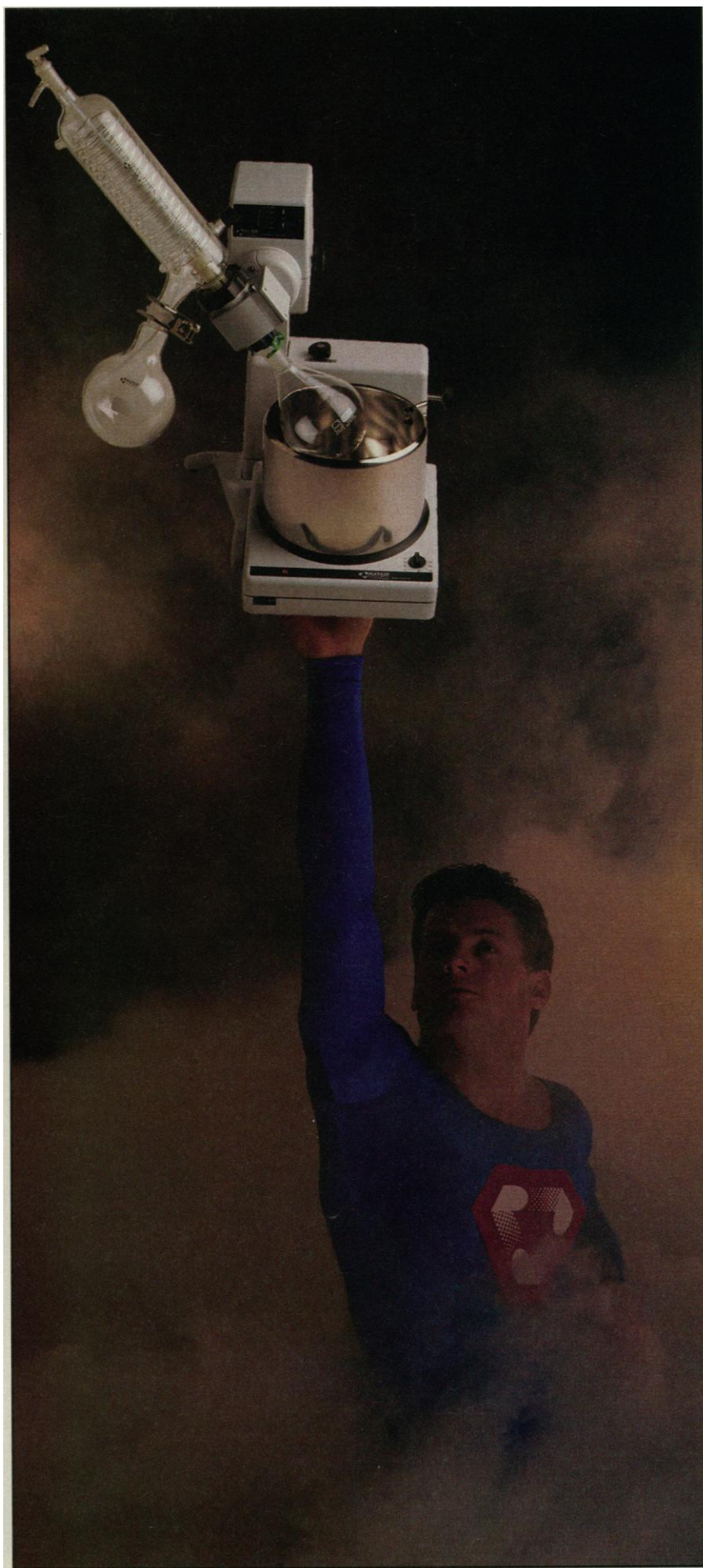
If evaporation is part of your research, make Buchler Instruments part of your lab.

Available through laboratory supply dealers worldwide or call BUCHLER-MAN toll free at 800-732-0031.



8811 Prospect • Kansas City, Missouri 64132
Phone 816/333-8811 • FAX 816/363-0130

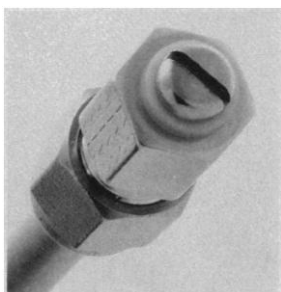
Circle No. 193 on Readers' Service Card



No Matter Where Your Chromatography Takes You...



Bio-Rad Puts You on the Road to Success in HPLC with Our HRLC® Column Line for Biomolecule Purification



- ◆ Size Exclusion Chromatography
- ◆ Ion Exchange Chromatography
- ◆ Reversed Phase Chromatography
- ◆ Hydrophobic Interaction Chromatography
- ◆ Affinity Chromatography
- ◆ Hydroxylapatite Chromatography

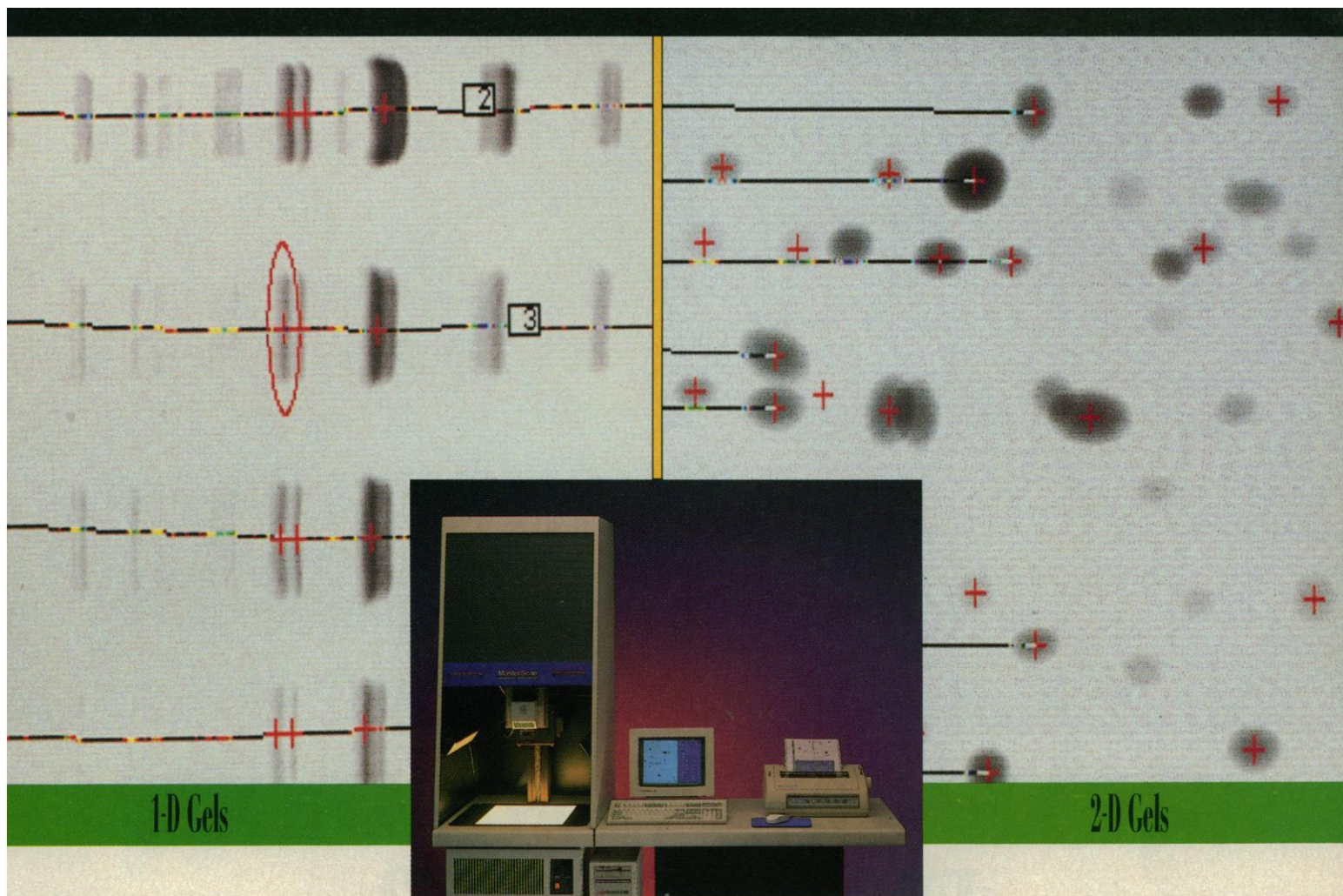
For more information on how HRLC columns from Bio-Rad can solve your biomolecule purification needs, or to order, contact your local representative, or in the U.S. call 1-800-4BIORAD.

BIO-RAD

**Chemical
Division**

U.S. (800) 4BIORAD • California • Ph. (415) 232-7000 • Fx. (415) 232-4257; New York • Ph. (516) 756-2575 • Fx. (516) 756-2594; Canada • Ph. (416) 624-0713 • Fx. (416) 624-3019; Australia • Ph. 61-2-805-5000 • Fx. 61-2-805-1920; Austria • Ph. 43/222/82 89 010 • Fx. 43/222/82 85 629; Belgium • Ph. 32/2/91 85 55 11 • Fx. 32/2/91 85 65 54; France • Ph. 33/1/49 60 68 34 • Fx. 33/1/46 71 24 67; Germany • Ph. 8/89/31 88 40 • Fx. 0/89/31 88 41 00; Kowloon • Ph. 852/789/3300 • Fx. 852/789/1257; Italy • Ph. 39/2/213 87 51 • Fx. 39/2/213 90 32; Spain • Ph. 34/1/661 7085 • Fx. 34/1/661 9698; Japan • Ph. 81-3-534-7240 • Fx. 81-3-534-8037; The Netherlands • Ph. 31/8385-40666 • Fx. 31/8385-42216; Switzerland • Ph. 41/1/810 16 77 • Fx. 41/1/810 19 33; England • Ph. 44/442/23 25 52 • Fx. 44/442/59118; New Zealand • Ph. 64/9/443/3099 • Fx. 64/9/443/3097

Circle No. 117 on Readers' Service Card



MasterScan™ has it all.

Rapid Gel Scans . . .

The MasterScan Interpretive Densitometer delivers very high image resolution and unprecedented vector processing power to analyze all your electrophoresis gels . . . rapidly, accurately, and thoroughly.

Its comprehensive software for 1-D and 2-D gel analyses is easy to use, and delivers the resultant data in the widest variety of reporting formats.

Superior image acquisition . . . complex gel analyses . . . complete data reporting . . . MasterScan has it all. And best of all, MasterScan is very affordable!

MasterScan Power . . .

MasterScan combines all the right tools for total gel analysis:

- High Resolution Images (4 Million Pixels)
- 386/AT Workstation Featuring CSPI Vector Processor
- Complete Menu-Driven Software for Both 1-D and 2-D Gels
- Full Databasing Capability with Optical Disk Image Archiving

Scanalytics
A Division of CSPI

Circle No. 88 on Readers' Service Card

Scanalytics Support . . .

Scanalytics is a division of CSPI, a company with 20 years of experience in signal and image processing. CSPI offers hardware and software solutions for many disciplines. Scanalytics offers that expertise to you with MasterScan.

For more information on putting MasterScan to work on your data, call or write:

Scanalytics/CSPI
40 Linnell Circle,
Billerica, MA 01821
617-272-6020
FAX 508-663-0150
E-MAIL cspi!scan



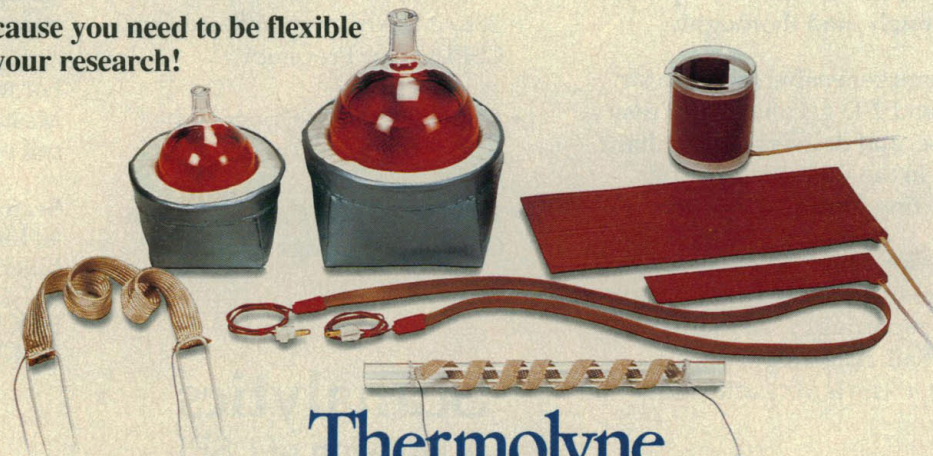
WHO KNOWS MORE ABOUT FLEXIBILITY?

When you require outstanding performance in a specialty heat source, look to Thermolyne for heating tapes, mats and mantles. We provide the convenient heat you'll need for virtually any specialty heating application. And our heating mats, mantles and tapes are made to withstand repeated flexing while maintaining their consistent, uniform heat.

So when you want to know more about flexible heat, call the heating experts at Thermolyne: **1-800-553-0039**

Or write Barnstead | Thermolyne Corporation,
2555 Kerper Blvd., Dubuque, IA 52001.

**Because you need to be flexible
in your research!**



Thermolyne

Barnstead | Thermolyne Corporation

Circle No. 172 on Readers' Service Card

Science & Technology in a Time of National Challenge

16th Annual AAAS Colloquium on Science & Technology Policy

11–12 April 1991 ♦ The Capital Hilton ♦ Washington, DC

The AAAS Science & Technology Policy Colloquium provides a forum in which federal and industrial policy-makers and members of the scientific and engineering community can participate in an open discussion of issues relating to science and technology (S&T) policy.

The Colloquium occurs after the release of the President's budget but before final congressional action, thus allowing for

the timely exchange of information about the budget and the consequences of various policy issues involving science and technology.

Who Should Attend: Scientists, administrators, industrial R&D managers, policymakers, academicians, association officials, federal grant recipients, students, and others with an interest in science and technology policy.

PROGRAM

Thursday, 11 April

Welcome: Donald N. Langenberg, *Chancellor, University of Maryland, and Chairman, Board of Directors, AAAS*

Keynote: D. Allan Bromley*, *Assistant to the President for Science and Technology and Director, OSTP*

Academic Research Funding: Is There a Crisis? (Symposium)

- ♦ The Shortfall of Research Support — Leon Rosenberg, *Dean, Yale University School of Medicine*
- ♦ Basic Research for the 1990s: Results from the OTA Study — Nancy Carson, *Program Manager, OTA*
- ♦ Optimists, Romantics, Skeptics, and Realists: Other Views of the Research "Crisis" — Erich Bloch, *former Director, National Science Foundation*
- ♦ Downstream from the Crisis: A View from Industry

A Governor's View of Science and Technology (Luncheon address)

Prospects for R&D Under the New Budget Process (Panel)

- ♦ Overview of FY 1992 R&D Budget Proposals
- ♦ Congressional Perspective on R&D in the FY 1992 Budget
- ♦ The New Budget Process: How It Will Work (or Not Work)
- ♦ The R&D Un-Budget: What's Not Being Funded?

Major R&D Agency Budgets for FY 1992 (Concurrent small group sessions)

- ♦ DOD ♦ DOE ♦ NASA ♦ NIH ♦ NSF

Friday, 12 April

Breakfast Address: Jeff Bingaman* (D-NM), *Member, U.S. Senate*

Concurrent Symposia

- ♦ State Science & Technology Initiatives Under Fiscal Crisis
- ♦ Science and Engineering Indicators: What Do They (and Don't They) Tell Policymakers?
- ♦ Measuring the Payoffs from Research: The State of the Art

U.S. Science and Technology in a New Policy Environment (Luncheon address)

Closing Remarks: Richard S. Nicholson, *Executive Officer, AAAS*

*Invited speaker

Budget discussions will be based on **AAAS Report XVI: Research and Development, FY 1992**, a comprehensive analysis of the proposals for the FY 1992 budget, prepared by AAAS and a group of its affiliated scientific, engineering, and higher education associations. Registrants receive a copy of this report at (or before) the Colloquium, *Proceedings* following the Colloquium, and *Congressional Action on R&D in the FY 1992 Budget* in the fall.

Register now by completing and returning the enclosed form. For further information, contact: Directorate for Science and Policy Programs, 1333 H Street, NW, Washington, DC 20005; (202) 326-6600.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Advance Registration Form

AAAS Colloquium on Science & Technology Policy

11-12 April 1991 ♦ The Capital Hilton, Washington, DC

Please print or type:

Name _____
(last name first)

Institution/Company _____

Mailing Address _____
(number and street)

(city / state / zip) (telephone number)

[] Check here if you need special services due to a disability.

To register by mail (22 March deadline¹), send this top half (registration form) to: Registration, AAAS S&T Policy Colloquium, P.O. Box 23320, Alexandria, VA 22304-9330.

To register by FAX (22 March deadline¹; VISA or MasterCard only), send this top half (registration form) to 202-289-4021.

To register by phone (22 March deadline¹; VISA or MasterCard only), call 202-326-6600 (9am – 5pm Eastern Time).

[1] **Deadline for advance registrations** is 22 March 1991. Thereafter, register in person at the Capital Hilton beginning at 8:00 am, 11 April. [2] **Special Rates:** Nonprofit rates apply only to employees of government, academic, and nonprofit organizations. Student rates apply only to full-time undergraduate and graduate students and retirees. [3] **Refund Requests** for registration fees and meal tickets must be submitted in writing (to the address or FAX number below) by 5 April 1991, and will be honored after the Colloquium; no refunds will be made on cancellations received after 5 April. [4] **Publications:** All registrants receive *AAAS Report XVI: Research & Development, FY 1992* before (or at) the Colloquium, published *Proceedings* after the meeting, and *Congressional Action on R&D in the FY 1992 Budget*, in the fall. [5] **Program materials** will be mailed to those who preregister by 22 March.

OFFICE USE ONLY	
AMT PD _____	
CHECK # _____	
DEP. DATE _____	
SOURCE: C D	

Registration Fees

Regular (with 3 meals)	\$280	\$ _____
Regular (no meals)	\$205	\$ _____
Nonprofit ² (with 3 meals)	\$220	\$ _____
Nonprofit ² (no meals)	\$145	\$ _____
Student ² (no meals)	\$ 50	\$ _____

Separate Meal Tickets

Lunch (11 April)	\$ 30	\$ _____
Breakfast (12 April)	\$ 17	\$ _____
Lunch (12 April)	\$ 30	\$ _____

TOTAL AMOUNT \$ _____

Payment ³

[] Check enclosed [] VISA [] MasterCard
(no other cards accepted)

[] *Original institutional purchase order attached*
(facsimile POs not accepted)

Card no. _____

Expiration date _____

Signature _____

The Capital Hilton Hotel Reservation Form

AAAS S&T Policy Colloquium ♦ 11–12 April 1991

(Reservations received after 21 March cannot be guaranteed)

Send confirmation to:

Name _____ Street _____

City _____ State _____ Zip _____ Telephone No. _____

Other occupants of room: Name _____ Name _____

Special housing needs due to disability: _____

Room: [] Single (\$140)* [] Double (\$160)* [] Twin (\$160)* *Add 11% DC sales tax and \$1.50 occupancy tax.

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

Please list definite arrival and departure dates and times. Check-in time is 3:00 pm; check-out time is 12 noon.

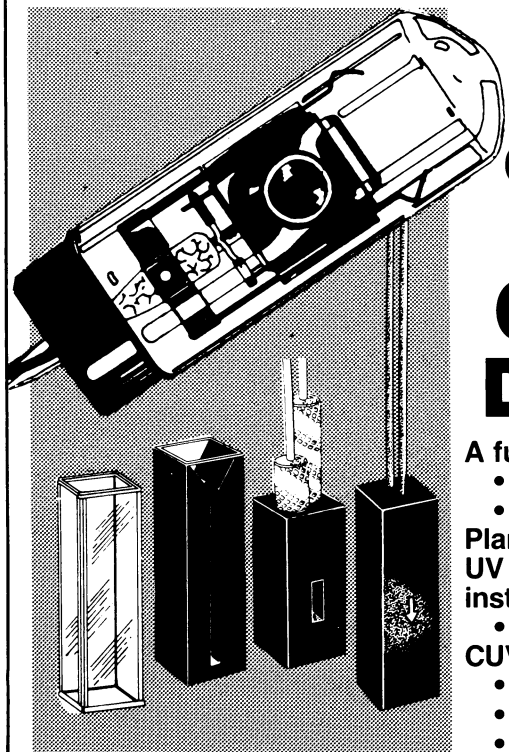
Enclose separate check, made out to **The Capital Hilton**, for first night's room deposit or provide major credit card information:

Credit card name _____ Card no. _____ Exp. date _____

Cardholder's signature _____

Mail bottom half (hotel reservation form) to: Reservations, The Capital Hilton, 16th & K Streets, NW, Washington, DC 20036

HELLMA®



Your one stop for Cells and D₂ Lamps.

A full line of quality cells:

- Stock and custom
- Dye laser

Plane Optics

UV light sources for all major instruments:

- D₂ and Hg.

CUV-O-STIR

- Mini-magnet cuvette stirrer
- Variable speed
- Multiple cell capability.

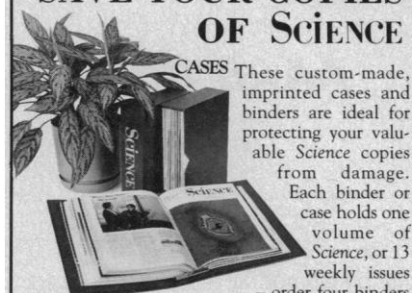
See us at Pittsburgh Conference Booth #4327.

HELLMA®

Box 544, Borough Hall Station, Jamaica, NY 11424
(718) 544-9534 or (718) 544-9166.

Circle No. 161 on Readers' Service Card

SAVE YOUR COPIES OF SCIENCE



BINDER

These custom-made, imprinted cases and binders are ideal for protecting your valuable Science copies from damage. Each binder or case holds one volume of Science, or 13 weekly issues – order four binders or cases to hold a complete year of issues. Constructed from reinforced board and covered with durable, leather-like red material and stamped in gold, the cases are V-notched for easy access; binders have a special spring mechanism to hold individual rods which easily snap in.

Cases	1 – \$7.95	2 – \$14.95	4 – \$27.95
Binders	1 – \$9.95	2 – \$18.95	4 – \$35.95

SCIENCE

Jesse Jones Industries, Dept. SCE
499 East Erie Ave., Philadelphia, PA 19134

Enclosed is \$_____ for _____ Cases;
_____ Binders. Add \$1 per case/binder for postage & handling. Outside USA \$2.50 per case/binder (US funds only). PA residents add 6% sales tax.

Print Name _____

Address _____

No P.O. Box Numbers Please

City _____

State/Zip _____

CHARGE ORDERS (Minimum \$15): Am Ex, Visa, MC, DC accepted. Send card name, #, Exp. date.

CALL TOLL FREE 7 days, 24 hours 1-800-825-6690

— SATISFACTION GUARANTEED —

MOI PRODUCT NEWS

ATTENTION RECEPTOR RESEARCHERS

Improved *erbB-2* (HER-2/*neu*)
Available Now

MOI's research scientists have developed a purified murine monoclonal antibody with advanced analytical capabilities:

- Exquisite sensitivity and high specificity for immunohistochemistry of formalin-fixed, paraffin embedded tissue.
- No cross reactivity with epidermal growth factor receptor (EGFR).
- Highly effective for biochemical analysis including Western blot and immunoprecipitation procedures.

For research use only; not to be used in diagnostic procedures.

ATTENTION COLLAGENASE RESEARCHERS

Exclusive Human Collagenase Type IV
(MMP-2, 72kDa gelatinase)
Available For The First Time

MOI's newly developed murine monoclonal antibody offers collagenase researchers these important advantages:

- First reagent commercially available for immunohistochemical analysis of formalin-fixed, paraffin embedded tissue.
- Proven efficiency in Western blot analysis.
- Superior specificity by recognition of a unique peptide epitope.

For research use only; not to be used in diagnostic procedures.

To order and to obtain additional information, call our Technical Services Department at 301-590-2658.



Molecular Oncology Inc.
Challenging cancer at the molecular level.

19 Firstfield Road Gaithersburg, Maryland 20878 Fax: 301-948-3774
Visit MOI at Booth #513 at the IAP Meeting in Chicago.

Circle No. 207 on Readers' Service Card