

AMERICAN
ASSOCIATION FOR THE
ADVANCEMENT OF
SCIENCE

SCIENCE

4 AUGUST 1989
VOL. 245 ■ PAGES 441-564

\$3.50



Beckman Sets the P/ACE for Automated Electrophoretic Separations...

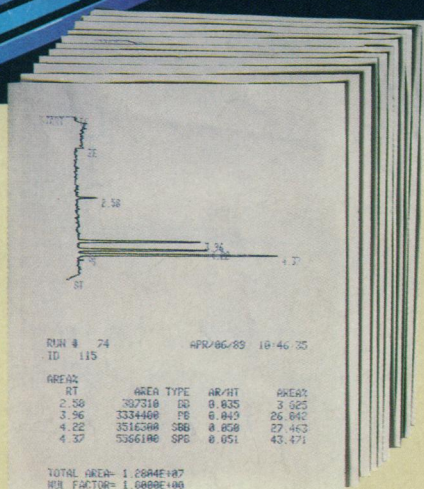
Reproducibility
Nanoliter Samples

Results in Minutes
High Resolution

Femtomole Quantitation



The modular P/ACE™ System 2000 offers optional PC control for record archiving, link-up with mainframe LIMS-type system, and transfer to a program for publication-quality output. System Gold™ Chromatography Software provides easy-to-use data acquisition, integration and manipulation.



Shows 11 injections in 90 min from a total sample of 5 μ L, accomplished with P/ACE™ Migration time CV less than .25%.

The P/ACE™ System 2000 from Beckman is designed for today and tomorrow. A modular system, P/ACE leads the evolution of capillary electrophoresis.

A removable detector allows multiple future detection options. Interchangeable cartridges let you change capillaries in minutes. Temperature control provides unmatched reproducibility. And sealed vials minimize sample evaporation. All unique to P/ACE. Unique too—the surprisingly affordable price.

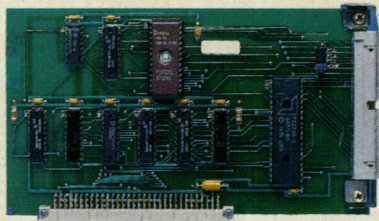
Keep P/ACE with the latest in electrophoretic separation techniques! And achieve rapid success separating proteins, peptides, synthetic oligonucleotides, DNA fragments, and more. Call 800/742-2345, or write to Beckman Instruments, Inc., Spinco Division, Customer Service Department, 1050 Page Mill Rd., Palo Alto, CA 94304. Offices in major cities worldwide.

BECKMAN

A SMITHKLINE BECKMAN COMPANY

© 1989 Beckman Instruments, Inc.

Circle No. 124 on Readers' Service Card

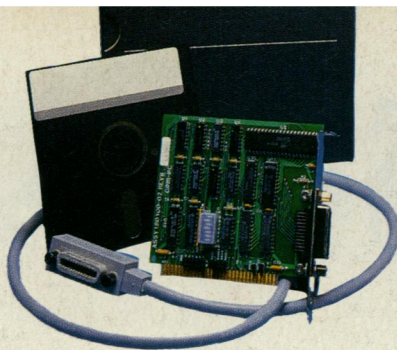


NEW!

NB-DIO-24 Macintosh II Digital I/O Interface

\$245

- 24 TTL Digital I/O Lines Organized into 3 8-bit Ports
- 50-pin Digital I/O Connector
- Transfer rates up to 300K Bytes/Sec

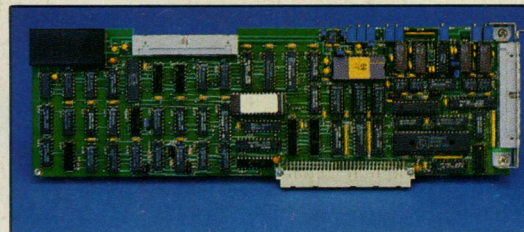


NEW!

GPB-PC II/IIA Interface for IBM PC

From \$395

- Transfer rates over 300K Bytes/Sec
- RF-Shielded IEEE-488 Receptacle
- Choice of 3 DMA Channels
- Transparent DMA Enabling/Disabling

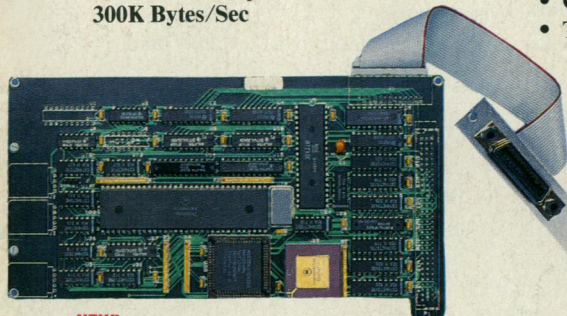


NEW!

NB-MIO-16 Macintosh II Multifunction Input/Output Board

From \$1195

- Fast 12-bit A/D Converter
- 2 Multiplying 12-bit D/A Converters
- 16 Word FIFO A/D Buffer
- 8 Digital I/O Lines
- Other Models Available for PC/AT and PS/2 Computers



NEW!

GPB-SE GPIB Interface for Macintosh SE

From \$495

- Onboard Turbo 488 Custom IC
- DMA Rates as High as 1M Bytes/Sec
- High-speed CMOS Technology

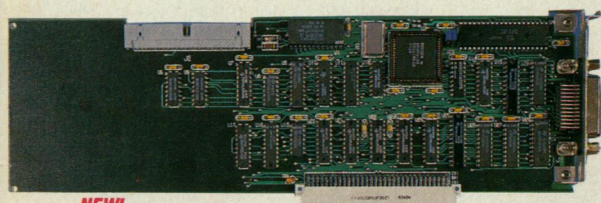


NEW!

MC-GPIB IEEE-488 Interface for IBM Personal System/2

\$495

- Turbo 488 Custom IC
- 1M Bytes/Sec GPIB Reads
- 700K Bytes/Sec GPIB Writes



NEW!

NB-GPIB PC NuBus IEEE-488 Interface for Macintosh II

\$495

- High-Performance RTSI Bus Interface
- Onboard ROM for Configuration Information
- I/O Data Rates as High as 400K Bytes/Sec

Circle No. 16 on Readers' Service Card

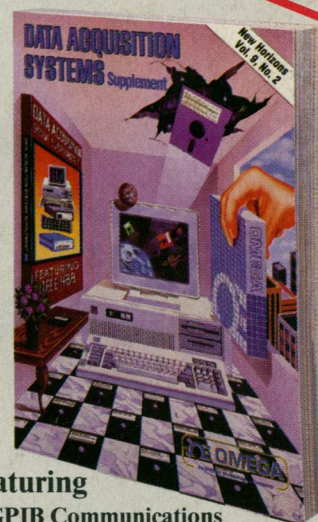
OMEGA Introduces IEEE Computer Interfaces

NEW!



Featuring

- Data Acquisition
- Software
- Data Logging Systems
- Recorders



Featuring

- GPIB Communications
- Data Acquisition
- Accessories
- Software
- All Made-In-USA!
- All Full Color Pages
- All Prices Listed
- Complete Technical Information Included
- In-Stock for Fast Delivery



**NEW!
FREE!**

For complete
information on
Thousands of Products,
Write for Your FREE
Handbooks.

ENCYCLOPEDIA OMEGUS™

Dial (203)359-RUSH to Request Your Free Handbooks



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

To Order Products, Call Toll Free

1-800-T C OMEGA
1-800-826-6342
IN CT (203) 359-1660

© Copyright 1989, OMEGA Engineering Inc.
All Rights Reserved. Printed in USA

447 This Week in *Science*

Editorial

449 Global Change

Letters

451 Hansen and the Greenhouse Effect: W. S. BROECKER; M. E. SCHLESINGER; J. RISBEY; R. A. KERR ■ NASA's Objectives: G. M. WOODWELL ■ Elephant Management: R. W. KASTEN, JR.

News & Comment

461 Soul-Searching After China Crackdown ■ Stories of Repression from China
463 Alaskan Oil Spill: Health Risks Uncovered
464 Fetal Tissue Transplants Win U.K. Approval ■ Germany to Ban Embryo Use
465 Funding Fight Over Facilities
466 Should States Regulate Biotechnology?

Research News

467 Big First Scored with Nerve Diseases
468 Deep Holes Yielding Geoscience Surprises ■ Drilling Has Its Rewards
470 Circumcision May Protect Against the AIDS Virus
472 *Briefings*: Layoffs Ahead at Brookhaven? ■ Scientists as Brainy as MBAs ■ Free NIH ■ Animal Activists Get Stony Brook Files ■ Worm Bites Dad ■ Hipparchos on the Launch Pad

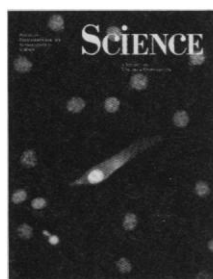
Articles

477 Translocation as a Species Conservation Tool: Status and Strategy: B. GRIFFITH, J. M. SCOTT, J. W. CARPENTER, C. REED
480 What Has Caused the Secular Increase in Solar Nitrogen-15?: J. F. KERRIDGE
486 Drugs from Emasculated Hormones: The Principle of Syntopic Antagonism: J. BLACK

Research Articles

494 Lutropin-Choriogonadotropin Receptor: An Unusual Member of the G Protein-Coupled Receptor Family: K. C. MCFARLAND, R. SPRENGEL, H. S. PHILLIPS, M. KÖHLER, N. ROSEMBLIT, K. NIKOLICS, D. L. SEGALOFF, P. H. SEEBURG
500 Neptune's Story: P. GOLDBREICH, N. MURRAY, P. Y. LONGARETTI, D. BANFIELD

- **SCIENCE** is published weekly on Friday, except the last week in December, and with an extra issue in February 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 © 1989 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): \$75. Domestic institutional subscription (51 issues): \$120. Foreign postage extra: Canada \$46, other (surface mail) \$46, air mail via Amsterdam \$85. First class, airmail, school-year, and student rates on request. **Single copy sales**: Current issue, \$3.50; back issues, \$5.00; Biotechnology issue, \$6.00 (for postage and handling, add per copy \$0.50 U.S., \$1.00 all foreign); Guide to Biotechnology Products and Instruments, \$18 (for postage and handling add per copy \$1.00 U.S., \$1.50 Canada, \$2.00 other foreign). 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. **Change of address**: allow 6 weeks, giving old and new addresses and 11-digit account number. **Postmaster**: Send Form 3579 to *Science*, P.O. Box 1722, Riverton, NJ 08077. *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 C3H10T1/2 cells transfected with a MyoD1 expression vehicle. Nuclear expression of transfected MyoD1 was localized by antisera to MyoD1 and a rhodamine-conjugated secondary antibody (red). Expression of MyoD1 converted this fibroblast to a muscle cell, as shown by the expression of myosin heavy chain [visualized with a fluorescein-conjugated secondary antibody (green)]. DAPI staining shows the nuclei of untransfected cells (blue). See page 532. [Photograph by Stephen J. Tapscott]

Reports

- 505 Melting Inhibition and Superheating of Ice by an Antifreeze Glycopeptide: C. A. KNIGHT AND A. L. DEVRIES
- 507 Disorder-to-Order Transition in Settling Suspensions of Colloidal Silica: X-ray Measurements: K. E. DAVIS, W. B. RUSSEL, W. J. GLANTSCHNIG
- 510 Hydrophobic Organization of Membrane Proteins: D. C. REES, L. DEANTONIO, D. EISENBERG
- 513 Interpretation of Cloud-Climate Feedback as Produced by 14 Atmospheric General Circulation Models: R. D. CESS, G. L. POTTER, J. P. BLANCHET, G. J. BOER, S. J. GHAN, J. T. KIEHL, H. LE TREUT, Z.-X. LI, X.-Z. LIANG *et al.*
- 516 β -Adrenergic Inhibition of Cardiac Sodium Channels by Dual G-Protein Pathways: B. SCHUBERT, A. M. J. VANDONGEN, G. E. KIRSCH, A. M. BROWN
- 519 The Effect of Deprenyl (Selegiline) on the Natural History of Parkinson's Disease: J. W. TETRUD AND J. W. LANGSTON
- 522 Triggering of Allostery in an Enzyme by a Point Mutation: Ornithine Transcarbamoylase: L. C. KUO, I. ZAMBIDIS, C. CARON
- 525 Cloning and Sequencing of Porcine LH-hCG Receptor cDNA: Variants Lacking Transmembrane Domain: H. LOOSFELT, M. MISRAHI, M. ATGER, R. SALESSE, M. T. V. H.-L. THI, A. JOLIVET, A. GUIOCHON-MANTEL, S. SAR *et al.*
- 528 Domain Separation in the Activation of Glycogen Phosphorylase α : E. J. GOLDSMITH, S. R. SPRANG, R. HAMLIN, N.-H. XUONG, R. J. FLETTERICK
- 532 5-Bromo-2'-Deoxyuridine Blocks Myogenesis by Extinguishing Expression of MyoD1: S. J. TAPSCOTT, A. B. LASSAR, R. L. DAVIS, H. WEINTRAUB

Inside AAAS

- 538 Providing Journals: L. A. LEVEY ■ Electronic Networking: B. GOLD ■ Sri Lanka Bound? ■ Repairing Equipment: S. BURNS ■ Seen Any Good TV Lately?: J. WRATHER

Book Reviews

- 541 Models of Nature, reviewed by D. JORAVSKY ■ Disenchanted Night, N. HARRIS ■ Some Other Books of Interest ■ Books Received

Products & Materials

- 546 3-D Molecular Simulation and Modeling ■ Blotting Apparatus ■ Numeric Computation Software ■ Portable Computer with Desktop Features ■ Object-Oriented Pascal ■ Literature

Board of Directors

Walter E. Massey
*Retiring President,
Chairman*

Richard C. Atkinson
President

Donald N. Langenberg
President-elect

Mary Ellen Avery
Francisco J. Ayala
Floyd E. Bloom
Mary E. Clutter
Eugene H. Cota-Robles
Joseph G. Gavin, Jr.
John H. Gibbons
Beatrix A. Hamburg
William T. Golden
Treasurer

Richard S. Nicholson
Executive Officer

Editorial Board

Elizabeth E. Bailey
David Baltimore
William F. Brinkman
E. Margaret Burbidge
Philip E. Converse
Joseph L. Goldstein
Mary L. Good
F. Clark Howell
James D. Idol, Jr.
Leon Knopoff
Oliver E. Nelson
Yasutomi Nishizuka
Helen M. Ranney
David M. Raup
Howard A. Schneiderman
Larry L. Smarr
Robert M. Solow
James D. Watson

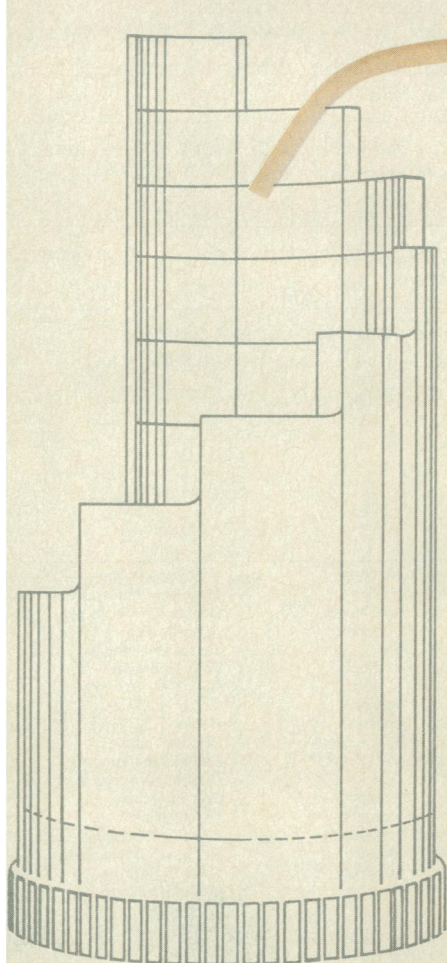
Board of Reviewing Editors

John Abelson
Qais Al-Awqati
Don L. Anderson
Stephen J. Benkovic
Floyd E. Bloom
Henry R. Bourne
James J. Bull
Kathryn Calame
Charles R. Cantor
Ralph J. Ciccerone
John M. Coffin
Robert Dorfman
Bruce F. Eldridge
Paul T. Englund
Fredric S. Fay
Theodore H. Geballe

Roger I. M. Glass
Stephen P. Goff
Robert B. Goldberg
Corey S. Goodman
Jack Gorski
Stephen J. Gould
Richard M. Held
Gloria Heppner
Eric F. Johnson
Konrad B. Krauskopf
Charles S. Levings III
Richard Losick
Karl L. Magleby
Philippa Marrack
Joseph B. Martin
John C. McGiff
Mortimer Mishkin
Carl O. Pabo

Yeshayau Pocker
Michael I. Posner
Dennis A. Powers
Russell Ross
James E. Rothman
Erkki Ruoslahti
Ronald H. Schwartz
Vernon L. Smith
Robert T. N. Tjian
Virginia Trimble
Emil R. Unanue
Geerat J. Vermeij
Bert Vogelstein
Harold Weintraub
Irving L. Weissman
George M. Whitesides
Owen N. Witte
William B. Wood

Compare the Better Bottle Top Dispenser



Swiss designed
solid calibration



Better

More Precise Volume Setting

Swiss designed solid calibration eliminates setting deviation — provides clearly visible digital setting which locks in when dispenser is operated.

Better

More Reproducible Volume Delivery

Solid calibration eliminates delivery variation — provides stairlike factory calibrated fixed stops for each volume setting.

Better

Safer Performance

Teflon® coated, glass barrel is protected against breakage by chemically resistant PPS sleeve — safety coated reservoir prevents exposure to dangerous chemicals.

Better

More Cost Effective Operation

Unique solid calibration design and high quality construction guarantees long term precision performance. Easy fail-safe operation improves productivity in the lab.

Call Wheaton today
1-800-225-1437 and compare
the **better** bottle top dispenser.
Available in a wide range of sizes
from 2 ml to 100 ml.



WHEATON

Manufacturers Since 1888

1501 N. Tenth Street
Millville, NJ 08332, USA

Call Toll-Free:

1-800-225-1437

Extension: 2527

TLX: 55-1295

(WHEATON US)

FAX: 1-609-825-1368

©T.M. DuPont

Circle No. 148 on Readers' Service Card

This Week in SCIENCE

Species conservation

As species extinction rates continue to increase, some see a parallel decline in the overall diversity of animal populations. Hunting has thinned out populations that used to be large and healthy and natural habitats are disappearing. Attempting to prevent or delay extinction, wildlife groups may move certain species to more favorable environments, intentionally releasing populations of animals in numbers and areas where they might not naturally occur. In a survey principally focused on the thousands of North American releases from 1973 (the year the Endangered Species Act became law) to 1986, Griffith *et al.* find information that could help define elements necessary to make future translocations successful in establishing, reestablishing, or augmenting species populations (page 477). In their survey, herbivores fared better than carnivores or omnivores, and early breeders with large numbers of offspring were slightly more likely to be successfully moved than were species that bred late and had small broods. Native game (nonthreatened) species, constituting 90% of the translocations, were nearly twice as likely to establish themselves as were species that were classified as threatened, endangered, or sensitive.

The evolution of Triton

NEPTUNE sports satellite and ring systems that stand in contrast to those of Jupiter, Saturn, and Uranus. Instead of complete rings, Neptune has a collection of between 10 and 100 ring arcs; a large moon, Triton, moving in a retrograde sense and two other known moons replace the rich and regular satellite systems of the other giant planets. Goldreich *et al.* seek to explain Neptune's peculiarities by proposing a scenario for the evolution of Triton—this unusual satellite may have had an unusual origin (page 500). Triton, moving in its proposed original orbit around the sun, may have collided with some primordial satellite system of Neptune. Such a collision would have

dissipated enough orbital energy to allow the capture of Triton by Neptune; the large moon (roughly the size of Earth's moon) then would have cannibalized any smaller satellites it crashed into, accounting for the absence of a regular satellite system around Neptune. In its highly eccentric (elongated) orbit, Triton would have forced profound perturbations in surviving satellites before evolving into its present circular, inclined path. Though the orbits of the two other known moons fall (just) within calculated boundaries for the perturbations, more information from Voyager 2 will be needed before the scenario can be corroborated or modified.

Fish antifreeze

FISH living in sea water near its freezing point can produce a novel kind of antifreeze: water-soluble peptides or glycopeptides that prevent the growth of ice crystals without lowering the equilibrium freezing point of the solution in which they are dissolved. The antifreeze might do this in one of two ways. First, the antifreeze molecules could lie flat on the interface between ice and water, adhering to the ice surface structure and preventing further growth. Second, the antifreeze molecules could project partway into the ice crystals. Knight and DeVries use antifreeze material refined from the blood of the Antarctic fish *Dissostichus mawsoni* to observe a melting inhibition effect whose strength may approach that of the known freezing inhibition effect (page 505). They describe superheated ice and argue that this shows that the second process described above does not take place.

Disorder to order

TINY spheres suspended in cyclohexane settle under gravity's pull to form layers with distinct boundaries between more ordered and less ordered regions. To probe the dynamics of crystal formation, Davis *et al.* monitor the order-disorder transi-

tions that appear during the sedimentation of organophilic silica spheres (page 507). The low dielectric constant and the refractive index of the cyclohexane inhibit electrical charges and van der Waals forces; the resulting sedimentation process couples gravity settling, diffusion, and crystallization. As the sediment accumulates, ordered packing of the spheres diffracts white light in such a way as to cause bands of iridescence to appear in the liquid-sphere mixture. A sharp interface between the iridescent sediment and the opaque disordered liquid above them indicates a true phase transition. Scanning electron microscopy of the sediment reveals planes of hexagonally packed spheres, arranged in either a cubic structure or randomly stacked layers.

Contradictions in atmospheric models

MANY of the warnings of an impending rise of a few degrees in the earth's atmospheric temperature—and the catastrophes that would accompany such a rise—are based on computer models that include rough simulations of how climate depends on atmospheric, glacial, and oceanic processes and interactions. To evaluate the accuracy of these general circulation models (GCMs), the quality of the components describing the complicated feedback processes of clouds must be assessed. In an intercomparison of 14 GCMs of the earth's atmosphere, Cess *et al.* examine the effects of how cloud-climate feedback is simulated in the various models as part of a larger study directed toward improving GCMs and climatic projections (page 513). When changes in snow and ice coverage were suppressed, the 14 GCMs showed excellent agreement among clear-sky projections but a nearly threefold variation when cloud feedback was taken into account. These vastly different cloud feedback effects emphasize the need for improvements in the treatment of clouds in these models if they are ultimately to be used as climatic predictors.

■ PAT JANOWSKI

Gilson fraction collectors have always been reliable. Our newest offers 98% problem-free performance.

Whether you need simple or sophisticated collection techniques, the one thing you need is a collector that performs day-in and day-out. Without jamming. Without breaking down. That's the kind of reliability built into every Gilson fraction collector... from the very first in 1957 to the very latest introduced in 1986.

Stationary rack system is one of our secrets to problem-free performance.

Many collectors have rotating carousel racks. Some of our earliest models did, too. But we soon recognized the advantages of a stationary rack. With fewer moving parts, the chance of mechanical problems is greatly reduced. The FC 203, since its introduction three years ago, has achieved a problem-free performance record of 98%. The stationary rack system is just one of the reasons why.

Built for long-term use... inside and out.

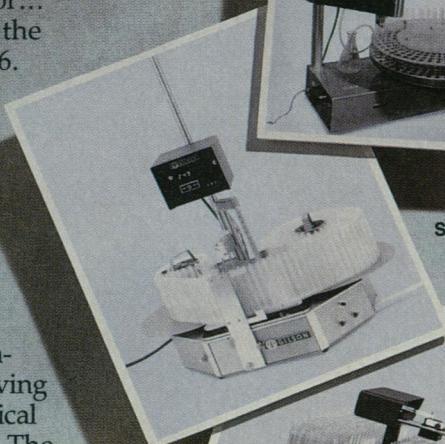
To assure optimal performance over time, internal drive components are designed for long-term use—even in the cold room. Critical components are metal, rather than plastic, for long-lasting operation.

And, the exteriors of Gilson fraction collectors are durable, too. For example, the FC 203 features a chemically-resistant molded case and keypad to protect the unit inside and out from spills.

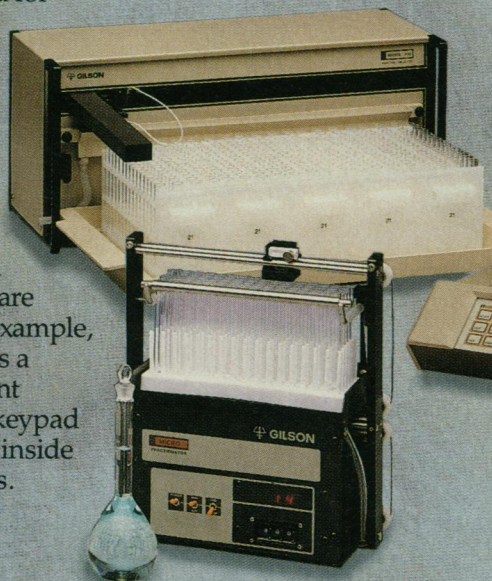
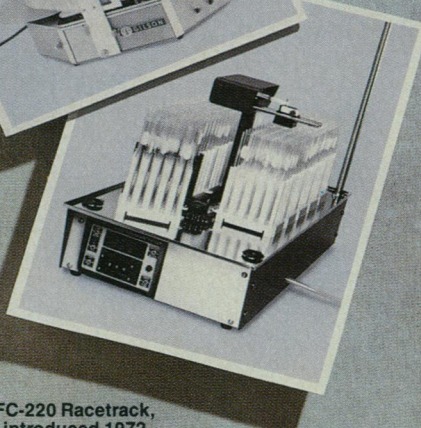
SB-1,
introduced
1958



SC-Escargot,
introduced
1967



FC-220 Racetrack,
introduced 1972



Day-in and day-out convenience, too.

We also build Gilson fraction collectors for easy installation and use. It starts with compact design. The 202 has the largest capacity of any collector—540 tubes. Yet, it measures only 20 inches wide by 17 inches deep. And the FC 203 takes up only about a square foot of bench space.

Gilson fraction collectors can be used with any HPLC or LC system—ours or other manufacturers'. And three of the collectors can control peripherals such as pumps and chart recorders.

Choose from five different models:

FC 80 and FC100 micro-fractionators: Proven performers for simple time and drop collection. Many of these units have been in use for more than 15 years. Racks hold 80 or 100 tubes.

FC 203: Collects fractions by time or drop for simple analyses; peak and time windows enable more sophisticated applications. An affordable multi-mode unit capable of collecting up to 128 fractions.

201 and 202: With 15 operating modes, 15 rack options and capacities up to 540 tubes, no other fraction collector does more or handles more.

Contact us for free literature today.

To learn more about Gilson fraction collectors and how they outperform others, simply mark the reader service number below. Or call us toll-free in the U.S. at 800-445-7667.

(In Wisconsin, call 608-836-1551.)

 **GILSON**

Gilson Medical Electronics, Inc., Box 27, 3000 W. Beltline Hwy., Middleton, WI 53562 USA, Tel: 608-836-1551, TLX: 26-5478, FAX: 608-831-4451
Gilson Medical Electronics (France) S.A., 72 rue Gambetta, B.P. No. 45, 95400, Villiers-le-bel, France, Tel: (1)34.29.50.00, TLX: 606682, FAX (1) 39.94.51.83

Circle No. 143 on Readers' Service Card

American Association for the Advancement of Science
Science serves its readers as a forum for the presentation and discussion of important issues related to the advancement of science, including the presentation of minority or conflicting points of view, rather than by publishing only material on which a consensus has been reached. Accordingly, all articles published in *Science*—including editorials, news and comment, and book reviews—are signed and reflect the individual views of the authors and not official points of view adopted by the AAAS or the institutions with which the authors are affiliated.

Publisher: Richard S. Nicholson

Editor: Daniel E. Koshland, Jr.

News Editor: Ellis Rubinstein

Managing Editor: Patricia A. Morgan

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

EDITORIAL STAFF

Senior Editor: Eleanor Butz

Associate Editors: Keith W. Brocklehurst, Martha Coleman, R. Brooks Hanson, Barbara Jasny, Katrina L. Kelner, Edith Meyers, Linda J. Miller, Phillip D. Szuroni, David F. Voss
Letters Editor: Christine Gilbert

Book Reviews: Katherine Livingston, *editor*; Susan Milius

This Week in Science: Ruth Levy Guyer

Contributing Editor: Lawrence I. Grossman

Chief Production Editor: Ellen E. Murphy

Editing Department: Lois Schmitt, *head*; Mary McDaniel, Patricia L. Moe, Barbara P. Ordway

Copy Desk: Joi S. Granger, Jane Hurd, MaryBeth Shartle, Beverly Shields

Production Manager: James Landry

Assistant Production Manager: Kathleen C. Fishback

Art Director: Yolanda M. Rook

Graphics and Production: Holly Bishop, Julie Cherry, Catherine S. Siskos

Covers Editor: Grayce Finger

Systems Analyst: William Carter

NEWS STAFF

Correspondent-at-Large: Barbara J. Culliton

Deputy News Editors: Roger Lewin, Colin Norman

News and Comment/Research News: Mark H. Crawford, Constance Holden, Richard A. Kerr, Eliot Marshall, Jean L. Marx, Joseph Palca, Robert Pool, Leslie Roberts, Marjorie Sun, M. Mitchell Waldrop

European Correspondent: David Dickson

West Coast Correspondent: Marcia Barinaga

BUSINESS STAFF

Circulation Director: John G. Colson

Fulfillment Manager: Ann Ragland

Business Staff Manager: Deborah Rivera-Wienhold

Classified Advertising Supervisor: Karen Morgenstern

ADVERTISING REPRESENTATIVES

Director: Earl J. Scherago

Traffic Manager: Donna Rivera

Traffic Manager (Recruitment): Gwen Canter

Advertising Sales Manager: Richard L. Charles

Marketing Manager: Herbert L. Burkland

Employment Sales Manager: Edward C. Keller

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 60914: Jack Ryan, 525 W. Higgins Rd. (312-885-8675); San Jose, CA 95112: Bob Brindley, 310 S. 16th St. (408-998-4690); Dorset, VT 05251: Fred W. Dieffenbach, Kent Hill Rd. (802-867-5581); Damascus, MD 20872: Rick Sommer, 11318 Kings Valley Dr. (301-972-9270); U.K., Europe: Nick Jones, +44(0647)52918; Telex 42513; FAX (0647) 52053.

Information for contributors appears on page XI of the 31 March 1989 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, New York, NY 10036. Telephone 212-730-1050 or WU Telex 968082 SCHERAGO, or FAX 212-382-3725.

Global Change

For more than 150 years a major activity of geologists has been to elucidate the great episodes of global change that have been wrought by natural processes. Today the challenge has expanded, for humans have become agents for environmental degradation with effects comparable to, and in some instances more profound than, those of nature. In assessing what is happening and in formulating remedial measures, earth scientists will have at their disposal a great array of instrumentation, data storage, and computational capabilities. In addition, geologists are accustomed to engage in cooperative international efforts.

The vitality, broad capabilities, and enthusiasm for tasks ahead was showcased at the International Geological Congress held 9 to 19 July in Washington, D.C. About 5900 registrants from more than 80 countries attended the meeting. Presentations were made by scientists from more than 73 countries. Among them were geologists from Vietnam, Cuba, Iran, Iraq, Israel, Yemen, and South Africa. All the Eastern Bloc countries sent representatives, including 207 from the Soviet Union. This was one of the few instances in which the Russians arrived as promised, and in which passport problems were largely nonexistent. The People's Republic of China sent 127. In the three decades previous to the 1980 and 1984 International Geological Congresses, the PRC was conspicuous by its absence.

A large number of activities were conducted in connection with the Congress, including field trips, committee meetings, short courses, and workshops. A major transfer of information occurred in 13 sessions involving 20 to 25 simultaneous 15-minute talks plus a total of about 650 posters. A feature worthy of copying by other scientific groups was a set of extended abstracts for each presentation: no abstract, no place on the program. There were about 3500 abstracts, and these occupied 1858 pages. The average length was more than 800 words. From these it is possible to gain an impression of the status of earth science in the respective countries. As might be expected, geologists of the Third World were preoccupied with applied studies, for example, those relating to fossil fuels and minerals. Presentations from the developed world touched on a wide variety of additional topics, including radioactive wastes, ground-water contamination, soil erosion, seismic tomography, continental deep drilling, high-pressure studies, isotope geochemistry, and comparative planetology. At one time, the typical geologist strolled to rock outcrops and with pick and hammer obtained a hand specimen. Examination with a hand lens followed. Today, the most advanced equipment of the physical sciences is employed as well as supercomputers. Storage of information in databases and extracting information from them are now effective aids to progress in earth science. Cooperation between biochemists and paleontologists using DNA techniques is producing new understanding of phylogenetic relationships between living and extinct taxa.

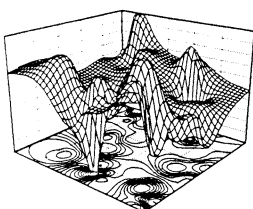
This was the 28th International Geological Congress. The first was held in Paris in 1878. The President of the current Congress was Charles Drake of Dartmouth, with Bruce Hanshaw of the U.S. Geological Survey as Secretary General. They were excellent organizers. The next Congress will be held in Japan in 1992 with the Japanese in charge. Collaborating closely with the successive congresses is the International Union of Geological Sciences. It serves to foster international cooperation in the years between and during the congresses. The current President of the IUGS is Umberto Cordani of the University of São Paulo, Brazil. In a speech to the Congress he surveyed the many current successful research activities of earth scientists. He also pointed to an expanded role for geoscience in cooperation with other sciences in a worldwide effort to achieve sustainable development. He further noted:

Damage to the environment and the many problems related to it are now a major worldwide concern. The challenges cut across the divides of national jurisdiction, and political decisions on the management of resources and land-use planning are crucial. Sustainable development will give rise to an unprecedented demand for information, advice, and technologies that only an integrated approach can satisfy. In many countries, the focus of the challenge ahead is shifting from protection and restoration to planning and prevention. Possible solutions to environmental issues are becoming more and more complex and dependent on the cooperation of a multitude of sectors—but first and foremost, that of science.

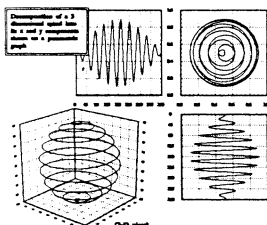
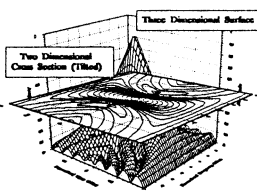
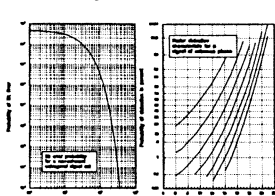
—PHILIP H. ABELSON

CAN YOUR GRAPHICS SOFTWARE DO ALL THIS?

Shadow Contour of a Random 3-D Surface

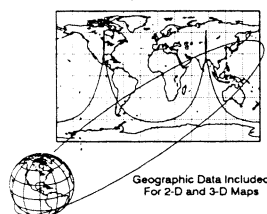
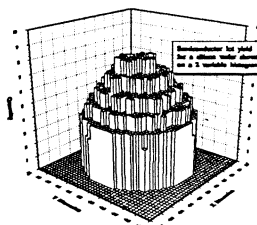


Linear, Logarithmic, and Probabilistic Axes

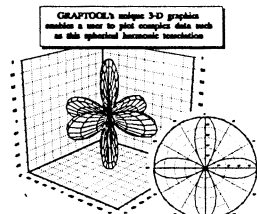


"Graftool has the potential to be the ultimate graphics package, fulfilling everybody's needs."

- Ehud Kaplan
PC Magazine



Integrated 2D&3D graphics
Menu-driven user interface
Scientific spreadsheet
Presentation-quality fonts
Import from 1-2-3, Excel
Export to desktop publishers
Full zooming and panning



GRAFTOOL \$495 • Demo Kit Available

Academic Discounts • Call (800) SAY-GRAF • FAX (213) 540-3492

3-D VISIONS

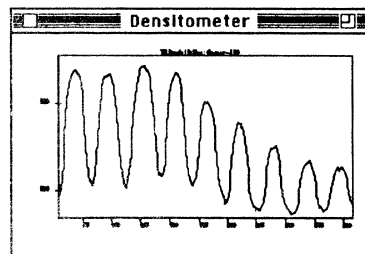
412 S. Pacific Coast Highway, Suite 201, Redondo Beach, CA 90277

* Reprinted with permission from PC Magazine, March 14th, Copyright ©1989 Ziff Communications Co.

Circle No. 158 on Readers' Service Card

S O F T W A R E

Scan Analysis



Densitometry for the Apple Macintosh

Scan Analysis uses data obtained from ThunderScan scanners or TIFF files from 16(4 bit) and 256(8 bit) grayscale scanners such as QuickCapture, Apple Scanner, Macvision 2.0 etc etc. It will integrate user-selected regions on polyacrylamide and agarose gels, autoradiograms, TLC plates or any other material which can be scanned.

Scan Analysis has both automatic peak-sensing and manual integration modes. Multiple background subtraction modes include tangent skim and group-interpolated. There is full control over the way the selection is integrated including data smoothing, integration of white on black densities and peak rejection.

Scan Analysis data files can be exported directly to word processing and spreadsheet programs. There is full control over the axes of the densitometer plot. Plots are standard PICT files which can be read by most graphics programs. **Scan Analysis** is fully Multifinder compatible. Two versions are supplied on the disk, one of which functions on the entire Mac family with 128K ROMs or greater and the other of which supports 68020/68030 CPU and 68881/68882 floating point coprocessor.

Disk plus manual for Apple Macintosh (512KE, Plus, SE, II, IIx; System release 6.0 or later) **\$399**
AMEX/VISA/MasterCard or Check in US funds drawn on US bank. Credit on approved accounts

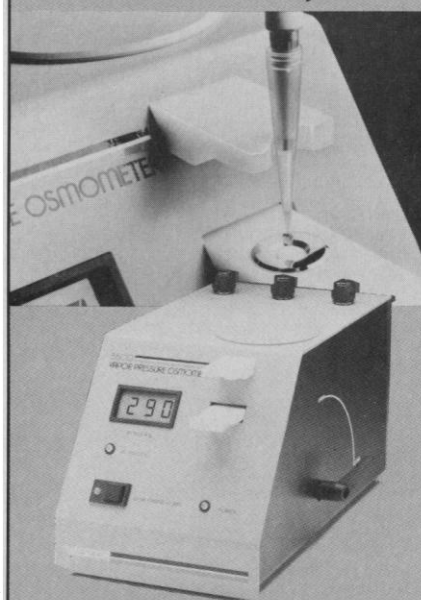
BIO SOFT

P.O. Box 580, Milltown, New Jersey 08850. Telephone (201) 613 9013.

Circle No. 2 on Readers' Service Card

The ideal way to measure osmolality.

The biotechnology explosion has expanded the need for measuring the osmolality of solutions. Such measurements are critical in many areas of research. The most current and accurate means of measuring osmolality is the Wescor Vapor Pressure Osmometer. More than 5,500 laboratories now use the Wescor VPO routinely.



Here's why it's so popular:

- Accepts any biological sample, including viscous liquids, tissue specimens and cell suspensions with no need to alter the physical state of the specimen.
- Accepts sample volumes as small as 2 microliters.
- Avoids measurement artifacts that often accompany freezing point measurements.
- Electronic accuracy and reliability without mechanical complexity.

If you are working with living cells or have other applications for accurate concentration measurements, investigate the Wescor VPO. It's the ideal osmometer.

Contact Wescor, Inc. 459 South Main Street, Logan, UT 84321 USA. (801) 752-6011 or (800) 453-2725. Telex 4930393 WESC UI. FAX (801) 752-4127.

WESCOR®

Innovative instrumentation since 1970.

Circle No. 145 on Readers' Service Card

Taq DNA polymerase

The old faithful



Thermostable DNA polymerase available now from Amersham

New pre-dispensed mega-pack sizes

Quantity	Ordering code
50 units	T0303Y
250 units	T0303Z
10 x 50 units	RPN0303Y
5 x 250 units	RPN0303Z

Amersham International plc
Amersham UK

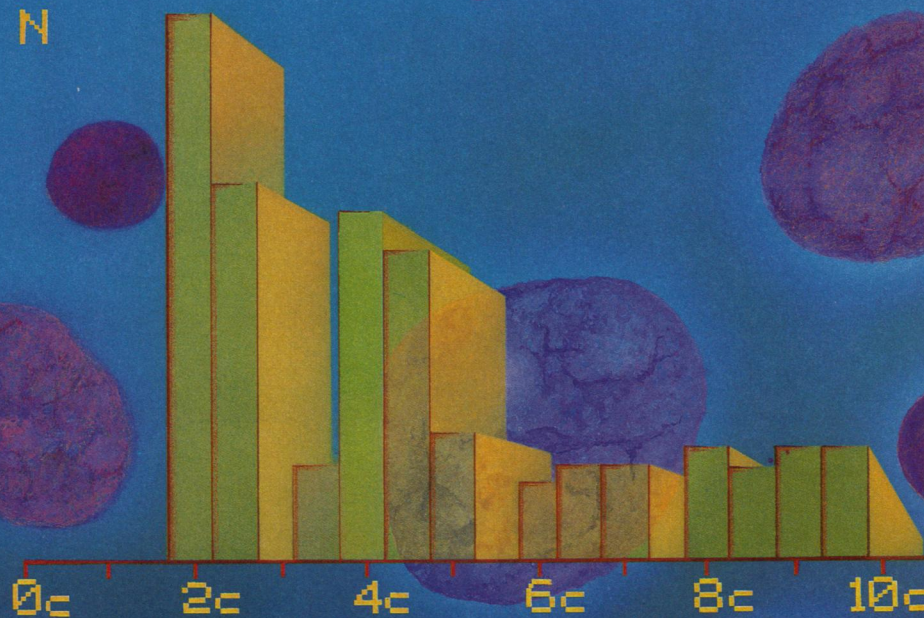
Amersham

UK Sales Aylesbury (0296) 395222 **Amersham Australia Pty Ltd** Sydney (02) 888-2288 **Amersham Belgium SA/NV** Brussels (02) 770 0075
Amersham Buchler GmbH & Co KG Braunschweig West Germany (05307) 8080 **Amersham Canada Ltd** Oakville, ONT (416) 847-1166
Amersham Corporation Arlington Heights, IL USA (800) 323-9750 **Amersham Denmark ApS** Birkerød 02-82 02 22 **Amersham France SA** Paris (1) 69.28.83.00
Amersham Japan Tokyo (03) 816 6161 **Amersham Nederland BV** Houten 03403 76660 **Amersham - Norway branch** Sandvika 02-54 63 18
Amersham Sweden AB Solna 08-734 08 00

Circle No. 147 on Readers' Service Card

BENIGN OR MALIGNANT?

N

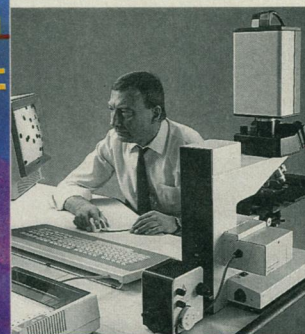


More accurate information with the Leitz MIAMED DNA®.

Sometimes, morphological criteria of a cell viewed under the microscope are not sufficient for a clear-cut decision on whether the cell is normal or abnormal.

In such cases, the Leitz MIAMED DNA supplies extra information with DNA analysis, widening your scope for decision-making.

You get reliable and reproducible results at an early stage.



Wild Leitz USA, Inc. 24 Link Drive, Rockleigh, NJ 07647
Telephone 1-201-767-1100
Telefax 1-201-767-4196

Wild Leitz GmbH · D-6330 Wetzlar
Telefon (0 64 41) 29-0
Telefax (0 64 41) 29 33 99



WILD LEITZ

take each step with confidence

The effective and economical extension of a DNA template consists of a series of operationally critical steps. Why complicate the issue further with variables resulting from the wrong choice of Taq Polymerase?

A new Taq Polymerase preparation, developed and produced by Bio-Excellence in association with the Dutch State University of Leiden will give you the confidence you need.

The enzyme is extremely accurate, primer - specific and stable up to 95°C making it very economical to use. Availability of the enzyme at either 1U/ul or 5U/ul, with its own reaction buffer also makes the product simple to use.

Take your first step towards improved results by contacting your local Bio-Excellence distributor. You will receive further information and a FREE sample for your evaluation.

We know you won't look back.

bioexcellencetm

Anglian Biotec Ltd (UK)
Whitehall House
Whitehall Road
Colchester.
Essex CO2 8HA
England
Tel: +206 866007
Fax: +206 860518
Tlx: 987181 BIOTEC G

Biores bv (Rest of the World)
Daggeldersweg 10
3449 JD Woerden
PO Box 260
3440 AG Woerden
The Netherlands
Tel: +31 3480 22384
Fax: +31 3480 19804
Tlx: 73454 VTL NL

25 Distributors Worldwide
Including

West Germany : Biozym
Diagnostik GmbH
Tel: +5151 7311

France: Prolabo s.a.
Tel: +1 4807 3800

Sweden: Gentross AB
Tel: +8 145690

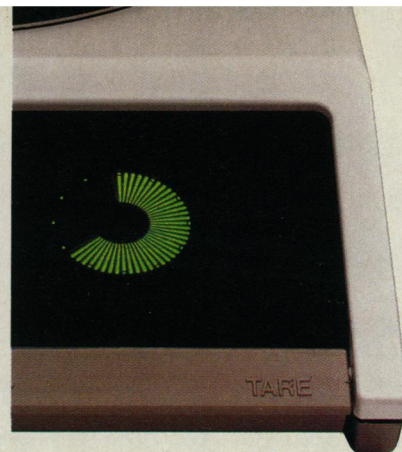
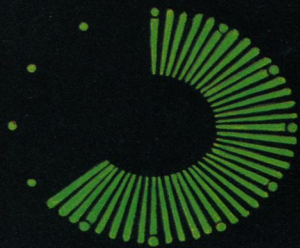
Holland: Sanbio bv
Tel: +04132 51115

Belgium: Devos Francois
s.a./n.v.

Tel: +71 364047

USA: Brisco Ltd
Tel: +617 846 4474

Circle No. 157 on Readers' Service Card



**Think of it as an intelligent sign of life
in your universe.**

There's nothing like a new dimension to expand your view of the future. METTLER DeltaTrac® shows exactly what we mean.

It adds a unique visual dimension that makes the METTLER PM balance seem light-years ahead of all the rest.

That's because the DeltaTrac display is the fastest way to transmit information from the weighing instrument to the human brain. An automatic tracking device pinpoints precisely where you are in the weighing range—and does it with the speed of sight. No calculations needed.

No other lab balance is so simple to use, yet so advanced it's ready for the labs of tomorrow.

METTLER balances are available only from Fisher Scientific or VWR Scientific.

All products are backed by METTLER Service Plus®. Call 1-800-METTLER for information and put DeltaTrac in your future.

Mettler Instrument Corporation
Box 71
Hightstown, NJ 08520
1-800-METTLER
(NJ 1-609-448-3000)

METTLER

We understand.
Precisely.

Circle No. 140 on Readers' Service Card

NEW ENGLAND BIOLABS

writing the book on restriction enzymes.

NEW SPECIFICITIES

Bsa AI	#531	5' PYAC*GTPV 3' 3' PGTG*CAPV 5'	250 UNITS 1250 UNITS
Bsr I	#527	5' AOTGGN* 3' 3' TGAC*CN 5'	100 UNITS 500 UNITS
Drd I	#530	5' GACNNNN*NNGTC 3' 3' CTGNN*NNNNCAG 5'	300 UNITS 1500 UNITS
Eae I	#528	5' GTCTTCN*NNN 3' 3' GAGAAGNNNN 5'	100 UNITS 500 UNITS
Msc I (Ba/I)	#534	5' TGG*CCA 3' 3' ACC*GGT 5'	50 UNITS 250 UNITS
Pml I (PmaCI)	#532	5' CAC*GTG 3' 3' GTG*CAC 5'	2000 UNITS 10000 UNITS
Xcm I	#533	5' CCAN*NTGG 3' 3' GGTN*NAACC 5'	250 UNITS 1250 UNITS

Substantial Price Reductions

Our in-house cloning success has resulted in substantial reductions in prices. Please inquire.

At NEW ENGLAND BIOLABS, Inc. we know restriction enzymes. For more than 14 years we have been the source of the highest quality restriction endonucleases available. And our selection is the best by far, over 130 restriction endonucleases with different specificities.

Our commitment keeps us at the forefront of the scientific community. We guarantee our products. We back them up with technical assistance from people who really know the product. All NEB enzymes are purified in-house using procedures developed by us. In-house screening and cloning efforts enable us to regularly, and substantially, reduce the price of our enzymes.

At NEW ENGLAND BIOLABS, Inc. we're still writing the book on restriction enzymes.



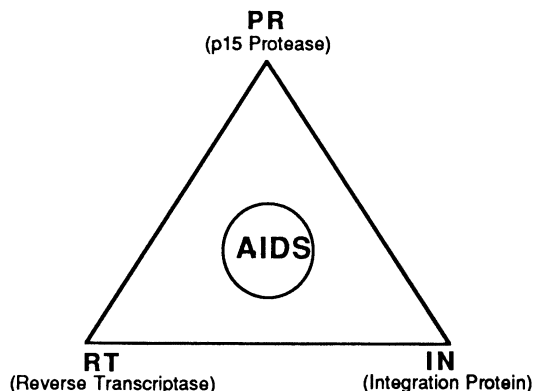
New England Biolabs, Inc.
32 Tozer Road
Beverly, MA 01915-5510 USA

800-NEB-LABS
In MA and International: (508)927-5054
FAX (508)921-1350

Circle No. 129 on Readers' Service Card

DISTRIBUTORS: Australia GENESEARCH PTY LTD Tel. (075) 37 5499 / **Federal Republic of Germany, West Berlin, Austria and Switzerland** NEW ENGLAND BIOLABS GmbH (Federal Republic of Germany) Tel. (06196) 3031 / **Finland, Sweden, Denmark, USSR** FINNZYMES OY (Finland) Tel. (0) 437-5312 / **France** OZYME S.A.R.L. Tel. (1) 30 57 0025 / **Italy** GRUPPO FLOW S.p.A. Tel. (02) 5241041 / **Israel** GAMIDOR LTD. Tel. (03) 342 202 / **Japan** DAIICHI PURE CHEMICALS CO. LTD. Tel. (03) 272-0671 / **The Netherlands** WESTBURG B.V. Tel. (033) 95 00 94 / **People's Republic of China** CHINA UNITED BIOTECHNOLOGY CORP. Tel. (1) 894233 / **Spain** LANDERDIAGNOSTICO S.A. Tel. (01) 759 73 12 / **United Kingdom** CP LABORATORIES Tel. (0279) 758200

AIDS Drug Research Tools from MGR



Critical reagents for the design and screening of drugs for AIDS therapy are available from MGR. Currently the best source for these reagents is avian myeloblastosis virus (AMV) and MGR has years of experience working with AMV.

Focus your AIDS research with dependable products from MGR. For more information, call or write:

Molecular Genetic Resources, Inc.
6201 Johns Road #8
Tampa, FL 33634

800-255-8142 813-886-5338 (Florida Residents call collect)

Circle No. 46 on Readers' Service Card

3RD INTERNATIONAL SYMPOSIUM ON TISSUE REPAIR CLINICAL AND EXPERIMENTAL APPROACHES TO DERMAL AND EPIDERMAL REPAIR: NORMAL & CHRONIC WOUNDS

Hotel Inter-Continental, Miami, Florida

JANUARY 10-14, 1990

The 3rd International Symposium on Tissue Repair will provide an inter-disciplinary forum for the presentation and discussion of new therapeutic approaches, both clinical and experimental, to tissue repair in normal and chronic wounds.

The program is being sponsored by a grant from Johnson & Johnson Patient Care, Inc. and organized/conducted by Symposia Medicus with co-sponsorship from the University of Miami Wound Care Institute.

A world renowned faculty has been assembled to cover topics including:

- Anatomy, Pathophysiology & Clinical Spectrum of Venous, Diabetic and Decubitus Ulcers
- Circulation and Oxygen Delivery in Chronic Wounds
- Biological Tissue Coverage
- Combination Therapy with Growth Factors
- Matrix Components and their Role in Wound Healing
- Characteristics of Wound Fluid
- Dressings: new Developments
- Clinical Experience with Growth Factors
- Pharmacological Approaches to Wound Repair.

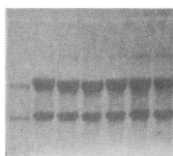
POSTERS ARE CURRENTLY BEING SOUGHT —
mail 150-300 word abstracts to: **Dr. Adrian Barbul,**
Sinai Hospital & Johns Hopkins University, Dept. of Surgery
Belvedere at Greenspring, Baltimore, MD 21215.

For further information regarding symposium registration/brochure, contact:

Symposia Medicus, 2815 Mitchell Drive #128
Walnut Creek, CA 94598-1622 • Phone (415) 935-7889

NEW HETS™ High Efficiency Transfer Solution

A concentrated solution of inorganic and organic salts designed for the highest efficiency of RNA transfer from agarose gel to hybridization membranes. In addition, HETS has a remarkable new property of visualization of RNA on the membranes without ethidium bromide staining.



- ☒ Northern blotting
- ☒ Southern blotting
- ☒ In any hybridization protocol with nylon or other plastic-based hybridization membranes.
- ☒ Replaces 20XSSC and 20XSSPE for the nucleic acid transfer.

Cat. No. CS-103
Size: 500 ml

Also available:
RNAzol™ for rapid isolation of pure undegraded total RNA from tissues and cells without the use of ultracentrifugation.

CINNA/BIOTECX INTERNATIONAL INC.
P.O. BOX 1421, FRIENDSWOOD, TEXAS 77546, U.S.A.
(713) 482-2672 • TOLL FREE (800) 631-0600
TELEX (ITT) 4998324 ITDI UI • FAX: (713) 482-1070



Circle No. 155 on Readers' Service Card

At Synthecell, We Foresaw the Need... and Responded

Introducing
S-OLIGOS
Anti-Sense DNA
for Experimentation in Living Cells

S-OLIGOS ARE SULFUR DERIVATIZED OLIGONUCLEOTIDES.

- | | |
|--------------------------|--|
| CHARACTERISTICS - | <ul style="list-style-type: none"> • MORE CELL PERMEABLE • RESISTANT TO NUCLEASES |
| RESULT - | <ul style="list-style-type: none"> • REPLICATION, TRANSCRIPTION AND TRANSLATION SIGNIFICANTLY BLOCKED |

FOR A BIBLIOGRAPHY ON S-OLIGOS, OR INFORMATION ON OUR OTHER OLIGONUCLEOTIDE PRODUCTS, PLEASE CALL

1-800-336-7455

SYNTHECCELL
SYNTHECCELL
SYNTHECCELL
SYNTHECCELL
SYNTHECCELL
SYNTHECCELL
CORP

2096 Gaither Road, Rockville, MD 20850 USA

Circle No. 60 on Readers' Service Card

HUMAN GENOME I

An International Conference On The Human Genome
1st Annual Meeting – October 2-4, 1989
Town & Country Hotel
San Diego, CA

Co-Chairman:
Daniel E. Koshland, Jr., Ph.D.
Editor of Science

Co-Chairman:
Charles R. Cantor, Ph.D.
Director of Human Genome Center
Lawrence Berkeley Laboratory

PROGRAM

KEYNOTE ADDRESSES

Opening Welcome:

Richard Atkinson, President, American Association for the Advancement of Science.

Role of the Meeting:

Charles Cantor, Director, Human Genome Center, Lawrence Berkeley Laboratory.

CURRENT STATUS OF THE GENOME PROJECT

THE GENETIC MAP: Raymond White, Howard Hughes Medical Institute, University of Utah.

RESTRICTION MAPS: Cassandra Smith, University of California, Berkeley.

CLONING: Ronald Davis, Stanford University School of Medicine.

ORDERED LIBRARIES: Sydney Brenner, MRC Molecular Genetics Unit, Cambridge, England.

APPLICATIONS: Thomas Caskey, Howard Hughes Medical Institute, Baylor College of Medicine.

SOCIETAL IMPLICATIONS: Daniel Koshland, University of California, Berkeley.

TECHNIQUE INNOVATIONS

PCR OF SINGLE SPERM: Norman Arnheim, Ahmanson Center for Biological Research, University of Southern California.

SEQUENCING METHODS: George Church, Harvard Medical School.

DNA CLEAVAGE: Peter Dervan, California Institute of Technology.

RADIATION HYBRIDS: David Cox, University of California, San Francisco.

IN SITU HIBRIDIZATION: Jeanne Lawrence, University of Massachusetts Medical Center.

RAPID MAPPING: Glen Evans, Salk Institute.

INTERESTING REGIONS

CYSTIC FIBROSIS: Francis Collins, Howard Hughes Medical Institute, University of Michigan Medical Center.

TELOMERES: Robert Moyzis, Los Alamos National Laboratory.

IMMUNOGLOBULINS: Tasuku Honjo, Kyoto University Faculty of Medicine.

IMMUNOGLOBULINS: Hans Zachau, Institute for Physiological Chemistry, University of Munich.

T-CELL RECEPTORS: Leroy Hood, NSF Science and Technology Center for Biotechnology, California Institute of Technology.

FRAGILE X: Jean-Louis Mandel, Institut de Chimie Biologique, Strasbourg.

APPLICATIONS

HUMAN EVOLUTION: Allen Wilson, University of California, Berkeley.

MULTIGENE DISEASES: Eric Lander, Whitehead Institute for Biomedical Research, Cambridge, Massachusetts.

HUMAN DIVERSITY: Jean Dausset, Human Polymorphism Study Center (CEPH).

SEX DETERMINATION: David Page, Whitehead Institute for Biomedical Research.

UNSTABLE SEQUENCES: Michio Oishi, University of Tokyo.

INTERPRETING SEQUENCE: Russell Doolittle, University of California, San Diego.

ORGANIZATION – DIFFERENT VIEWS OF CURRENT AND FUTURE SCIENCE AND PROCEDURES

HUGO: Victor McKusick, Johns Hopkins University School of Medicine; President, The Human Genome Organisation (HUGO).

NIH: James Watson, Cold Spring Harbor Laboratory; NIH Human Genome Project.

DOE: Charles Cantor, Human Genome Center, Lawrence Berkeley Laboratory.

EEC: Peter Pearson, Johns Hopkins University School of Medicine.

JAPAN: Nobuyoshi Shimizu, Keio University School of Medicine.

INFOMATICS: David Lipman, National Library of Medicine.

OVERVIEW: Renato Dulbecco, Salk Institute.

POSTER SESSIONS AND EXHIBITS

Registrants of the meeting may submit abstracts for poster sessions by requesting abstract forms on the registration tear off below. Exhibits will be open to all attendees and interested researchers Monday, Tuesday and Wednesday.

REGISTRATION FEES: Make checks payable to: **Scherago Assoc., Inc./Human Genome**

\$250 ON-SITE REGISTRATION – Includes Abstract Booklet.

\$200 ADVANCED REGISTRATION – (Received by Sept. 1, 1989) Includes Abstract Booklet.

\$ 75 STUDENT REGISTRATION – Student status must be confirmed in writing by department chairman.

☐ Please forward abstract forms.

Please Print

Name _____ Street _____

Dept. _____ City _____ State _____ Zip _____

Affiliation _____ Telephone: () _____

Return to: Human Genome I/Scherago Associates, Inc., 1515 Broadway, New York, NY 10036, Tel: (212) 730-1050

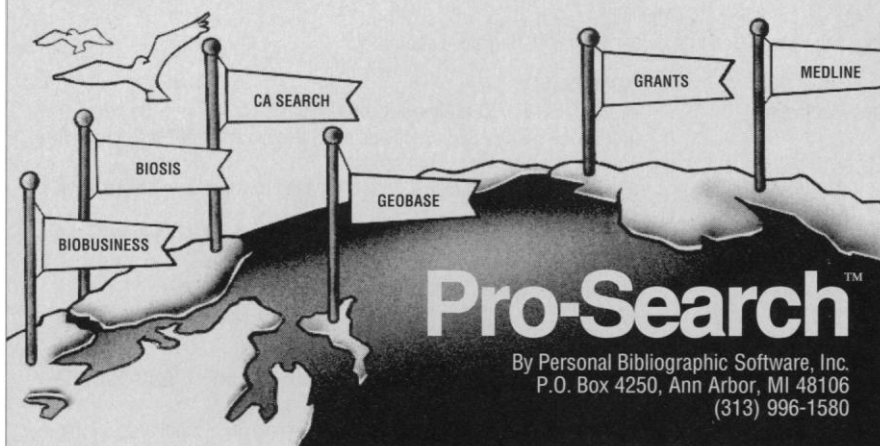
Fax: (212) 382-3725

Bring the World To Your Desktop...



It's easy! Turn on your computer and start up Pro-Search. Pro-Search provides an intelligent interface for BRS and DIALOG Information Services. Just choose from over 350 databases covering Business, Law, Science, and the Humanities. Enter the keywords for your search and hit a key to go online. Then, sit back and let Pro-Search bring the world of online information to your desktop.

Pro-Search is available for the IBM personal computers and compatibles and requires 320k memory and a modem. A Macintosh version will be available this fall.



Circle No. 161 on Readers' Service Card

Crush Vials and Recover Liquids

Glass and Plastic research, scintillation and sample vials up to 4" long, 40 ml. capacity.

Vyleater



Worker dumps vials from tray into machine's basket. No hand contact. Vyleater processes up to 10,000 vials per hour. Handles various sizes. Vibratory screen separates liquid and solids. Internal fan for fume exhaust. Quiet, compact, efficient, economical to buy and use. **Ideal for labs.**



Crush drums and compact waste in drums with RAMFLAT compactors.

ENTERPRISES, INC.

5637 N. 91st St., Milwaukee,

WI 53225 800-233-3721

Write or call for descriptive literature.

Circle No. 154 on Readers' Service Card



A FIDIA RESEARCH FOUNDATION SYMPOSIUM NEUROTOXICITY OF EXCITATORY AMINO ACIDS

A Satellite Symposium of the 19th Annual Meeting of the *SOCIETY FOR NEUROSCIENCE*

OCTOBER 26-28, 1989 • SCOTTSDALE, ARIZONA

SESSION TITLES

- Ca and Ca Channels
- Ca-Dependent Enzymes
- Cellular Mechanisms Underlying LTP and Excitotoxicity
- Excitatory Amino Acids and Ischaemic Damage

SPEAKERS

P. Andersen (*Oslo, Norway*), K. Beam (*Fort Collins, CO*), D.W. Choi (*Standord, CA*), T. Curran (*Nutley, NJ*), B.A. Engelsen (*Bergen, Norway*), M. Favaron (*Washington, DC*), C. Fieschi (*Rome, Italy*), D.R. Grayson (*Washington, DC*), I. Hanbauer (*Bethesda, MD*), K.P. Huang (*Bethesda, MD*), C.B. Klee (*Bethesda, MD*), A. Leon (*Abano Terme, Italy*), R.R. Llinas (*New York, NY*), G. Lynch (*Irvine, CA*), H. Manev (*Washington, DC*), C. Manni (*Rome, Italy*), M. Morad (*Philadelphia, PA*), F. Moroni (*Florence, Italy*), T. Pozzan (*Padua, Italy*), R. Siman (*Wilmington, DE*), R. Simon (*San Francisco, CA*), K. Suzuki (*Tokyo, Japan*), R.K.S. Wong (*New York, NY*), P.L. Wood (*St. Louis, MO*), G.N. Woodruff (*Harlow, UK*)

REGISTRATION

The registration fee is US \$175 (\$75 for students and postdoctoral fellows). There will be no charge for press. Fee entitles participants to the printed materials of the symposium, working lunches on October 27 and 28, a wine and cheese reception on October 26, and a dinner party on October 28.

DEADLINE FOR REGISTRATION

September 22, 1989

FOR FURTHER INFORMATION, CONTACT

Fidia Research Foundation
1640 Wisconsin Ave., NW
Suite 2
Washington, DC 20007
Telephone: 202-337-7185
Telefax: 202-337-7188

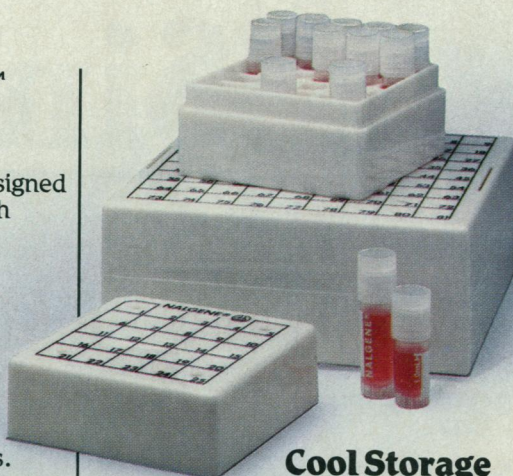
Cold Feat!

New Nalgene® Cryoware™ beats the others cold.

The advanced labware system for improved cryogenic storage. All designed by Nalge, the first name in high-tech plastic labware.

Cool Control with Nalgene Cryovials.

We designed them *right* from the start. We put screw threads outside the vial where they belong. We gave the closure a longer skirt, for uncontaminated aseptic procedures. Our closure seals—without a gasket. And we gave the vial a conical bottom for easier sample extraction—and a flat base to stand on its own. Plus, an opaque marking area for your ID codes and an easy-to-read fill line. In 1.2- and 2-mL sizes.



Cool Storage with Nalgene Cryoboxes™

Isn't it time you had all-plastic cryogenic storage boxes? Replace your flimsy cardboard or expensive stainless steel boxes with durable and economical Nalgene Cryoboxes. Grid and numbers on box top and inside keep track of inventory—one-way fit keeps grids lined up. In standard 9x9 array (81 vials) and a new 5x5 array (25 vials). Stackable. Autoclavable. Tough. Strong. Never brittle—even at -196°C!

Cool Handling with Nalgene Cryovial Holders.

Your lab deserves our new, all-plastic cryovial holders, too. Holder interlocks with up to 50 Nalgene Cryovials to allow single-handed operation. Molded-in alpha-numeric identification system. Autoclavable.

Cool Fit with Nalgene Cryobox Racks.

We didn't forget to design new stainless steel racks, either. Our racks fit your existing mechanical or liquid-nitrogen

freezers and Dewars. Retainers hold new Nalgene Cryoboxes securely and separately—release quickly. Racks hold your existing cardboard or stainless steel boxes, too.

Order Nalgene Cryoware from your Authorized Nalgene Labware Dealer worldwide.

Cool Thinking from Nalge.

Call (716)586-8800 now for more information and free trial samples of sterile Nalgene Cryovials. Or send us the coupon today.

Nalge Company

Nalgene® Brand Products

**The ability to listen.
The technology to respond.**

Send for free samples.

Prove it to me that Nalgene Cryoware beats the others cold. Send *free* trial samples of Nalgene Cryovials and more information about advanced Nalgene Cryoware.

NAME _____

TITLE _____

COMPANY (ORGANIZATION) _____ PHONE _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Nalge Company, A Subsidiary of Sybron Corp.
Box 20365, Rochester, NY 14602-0365

SCI-8

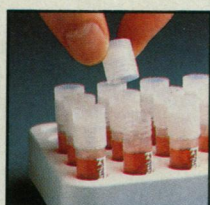
© 1987 Sybron Corporation
Nalgene, Cryoware and Cryobox are trademarks of Nalge Company



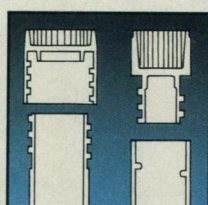
Reusable all-plastic Nalgene Cryoboxes have printed grid and numbers on box top and molded-in grid numbers inside to keep track of inventory.



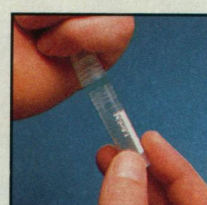
Nalgene Cryovials are non-cytotoxic, non-pyrogenic, radiation sterilized. Available in 1.2- and 2-mL sizes. Recessed bases interlock firmly with Nalgene Cryovial Holder.



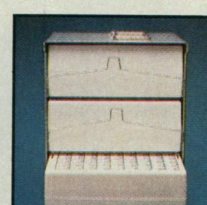
All-plastic Nalgene Cryovial Holder locks Nalgene Cryovials firmly in place for single-handed opening of closures.



Outside thread design on Nalgene Cryovial (left) reduces possible sample contamination. Inside thread of conventional vial (right) increases contamination risk and sample hang-up.



Longer skirt length of closure on Nalgene Cryovials minimizes risk of contamination in aseptic procedures. Conical bottoms allow complete sample extraction.



New stainless steel Nalgene Cryobox Racks hold Nalgene Cryoboxes securely and separately with retainer clamps. Hold standard cardboard and stainless steel boxes, too.

Advanced Nalgene® Cryoware™

BURN YOUR REFERENCE CARDS!

REF-11™

Computerizes your REFERENCES
and prepares your BIBLIOGRAPHIES

- ☐ Maintains a data base of references
- ☐ Searches for any combination of authors, years of publication, reference title, publication title, keywords or abstract
- ☐ Formats bibliographies exactly as you want them
- ☐ Reads your paper, inserts citations into the paper, and prepares a bibliography of the references cited (optional)
- ☐ Downloads references from MedLine data bases such as NLM, BRS and DIALOG (optional)

IBM PC/XT/AT, MS-DOS, CP/M 80 . . . **\$195⁰⁰**

RT-11, TSX-Plus, RSX-11, P/OS **\$250⁰⁰**

VAX/VMS (native mode) **\$350⁰⁰**



ANY
MANUAL **\$15⁰⁰**

ANY
MANUAL
& DEMO **\$20⁰⁰**

322 Prospect Ave., Hartford, CT 06106
(203) 247-8500

Connecticut residents add 7½% sales tax.

Circle No. 20 on Readers' Service Card

Develop a New Attachment

Now create your own custom affinity support, just by passing your protein or peptide ligand through a HiPAC™ Aldehyde Activated Luer Tip Quick (LTQ™) Column.

To immobilize your ligand to silica, inject a solution of the ligand and NaCNBH₃ into the LTQ column. Allow to react (20 to 60 minutes), then wash the column. All you need is an LTQ and a syringe.

Once the ligand is immobilized to silica, it only takes about 5 minutes to purify a sample.

And when it's time to scale up, transfer the immobilization protocol directly to a HiPAC analytical or prep-scale HPLC column.

With LTQ Aldehyde Activated Columns, you're bound to succeed. For complete information, call toll-free.



ChromatoChem, Inc.
2837 Fort Missoula Road
Missoula, MT 59801
Call toll-free: 800/426-7227

Circle No. 153 on Readers' Service Card

Pure & Simple

They say that variety is the spice of life. But the variety of life insurance products in the marketplace today poses a bewildering prospect—even for the most educated customer. Which is why it's refreshing to know that there's still a kind of life insurance whose appeal lays in its simplicity.

Not only is AAAS Term Life the purest kind of life insurance available, it is also the least expensive. And now that Group Rates have been cut another 15% effective 4/1/88 (they were also cut 10% last October), AAAS Term Life is an even better bargain.

If you're interested in applying for coverage from \$15,000 up to \$240,000, and wish to request generous protection for your family, too, the next step is simple.

Contact the Administrator, AAAS Group Insurance Program, 1255 23rd Street, N.W., Suite 300, Washington, D.C. 20037, or call toll-free (800) 424-9883 (in Washington, D.C. call 296-8030). They will be pleased to answer any questions you may have about this valuable member benefit.

5th Annual AAAS Forum for School Science

6-7 October 1989 ♦ Arlington, Va.

SCIENTIFIC LITERACY

Everybody's talking about it. It's scarce. Students aren't attaining it. What is it? Who needs it? How is it best attained? How is it adequately assessed?

FIND OUT AT THE 5TH ANNUAL AAAS FORUM FOR SCHOOL SCIENCE:

■ Join with nationally recognized leaders in education, government, business and the sciences to help develop a consensus definition of scientific literacy ■ Consider the implications of the meaning of scientific literacy for classroom practice and national policy ■ Learn about national projects — sponsored by AAAS, NAEP, NCISE, NSF, NSTA — aimed at achieving scientific literacy

SPEAKERS INCLUDE:

Bill Aldridge, Executive Director, National Science Teachers Association

Erwin Hiebert, Professor Emeritus, History of Science, Harvard University

Paul DeHart Hurd, Professor Emeritus, Science Education, Stanford University

Jon Miller, Director, Social Science Research Institute, Northern Illinois University

C.K.N. Patel, Executive Director, Research on Materials Science and Academic Affairs Division, AT&T Bell Labs

F. James Rutherford, Education Officer, American Association for the Advancement of Science

Bassam Shakhshiri, Assistant Director, Directorate for Science and Engineering Education, National Science Foundation

Thomas Spiro, Chemist, Princeton University

Iris Weiss, President, Horizon Research, Inc.

REGISTER NOW!

For program and registration information: Call (202) 326-6620 or write: Forum '89, Office of Science & Technology Education, AAAS, 1333 H Street, NW, Washington, DC 20005

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

The Superspeeds from SORVALL®— designed to fit your workload.



The advanced features of the SORVALL® RC-5C give you utmost flexibility. When you enter your run, both “set” and “run” conditions are simultaneously displayed. You can instantly check g-force at any speed by touching the RCF Mode. Duplication of any run is easy and convenient, thanks to a built-in $\omega^2 dt$ integrator that calculates the total centrifugal effect.

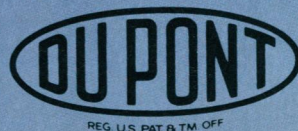
Are your procedures more routine? Then choose the practical RC-5B. This workhorse offers straightforward selection of run conditions in any sequence and allows you to change run parameters anytime during the run. No vacuum is required to achieve rotor speeds or maintain operating temperatures. You will find this time-tested instrument performing in laboratories worldwide.

Either way, whether you choose digital electronics to save you effort or opt for a simpler analog model and save money, SORVALL® Superspeeds give your research an edge. It's the edge that comes from the “working knowledge” built into all Du Pont Biotechnology products.

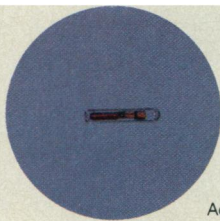
Call us...we speak your language—1-800-551-2121.
In Canada, call 1-800-387-2179.

Or write Du Pont Company, Biotechnology Systems,
P16-2130, Wilmington, DE 19880-0016.

**Working Knowledge
in Biotechnology**

REG. U.S. PAT. & TM. OFF.

Circle No. 127 on Readers' Service Card



Actual Size

THIS IMPLANTABLE MICROCHIP HAS JUST TOTALLY REVOLUTIONIZED LABORATORY ANIMAL IDENTIFICATION.

The end of ear punching or tagging, toe clipping,
tail tattooing ... and their problems.

Conventional animal identification techniques have three familiar problems:

Cost—it's expensive to mark the animals initially and to read them subsequently

Accuracy—misidentification can occur as a result of the marking process

Health—occasional infection can jeopardize animal health or even the research effort itself

Bio Medic Data Systems has now developed a practical state-of-the-art electronic system that revolutionizes animal identification and that deals effectively with these three problems.

An Implantable Micro-Identification Device (IMI™)—actually a microchip transponder—transmits its unique identifying number when energized by a low power radio-frequency source. This IMI (shown actual size above) is hermetically sealed in an inert glass capsule.



The animal is identified as it passes near the stationary reader.

Circle No. 162 on Readers' Service Card

Patents pending, U.S. and International. Copyright © Bio Medic Corporation, 1988.

Implantation of the IMI in the animal does not lead to its migration, physiological or biochemical disturbances, or to infection (given, of course, appropriate implantation practices).

This entire system—that is, everything required to make it function—called the Electronic Laboratory Animal Monitoring System (ELAMS™) is now working well in several major laboratories. To learn a great deal more about this exciting development, complete the coupon below requesting a detailed brochure, or drop us a line, or call us at 201/587-8300. Fax: 201/843-8816.

BioMedic
DATA SYSTEMS

a **bioMedic** company

Bio Medic Data Systems, Inc.
255 West Spring Valley Avenue
Maywood, New Jersey 07607
201/587-8300
Telex: 62985471
Fax: 201/843-8816

European Distributor: UNO bv

P.O. Box 15, 6900 AA Zevenaar—Holland
Marconistraat 31, 6942 PX Zevenaar—Holland
Phone: 08360-24451* Telex: 45518 unozv nl.

Bio Medic Data Systems, Inc.
255 West Spring Valley Avenue
Maywood, NJ 07607

☐ Please send me your ELAMS™ brochure describing your new animal identification system.

☐ I'd welcome a call from a technical representative.

Area code

No.

Ext.

Name

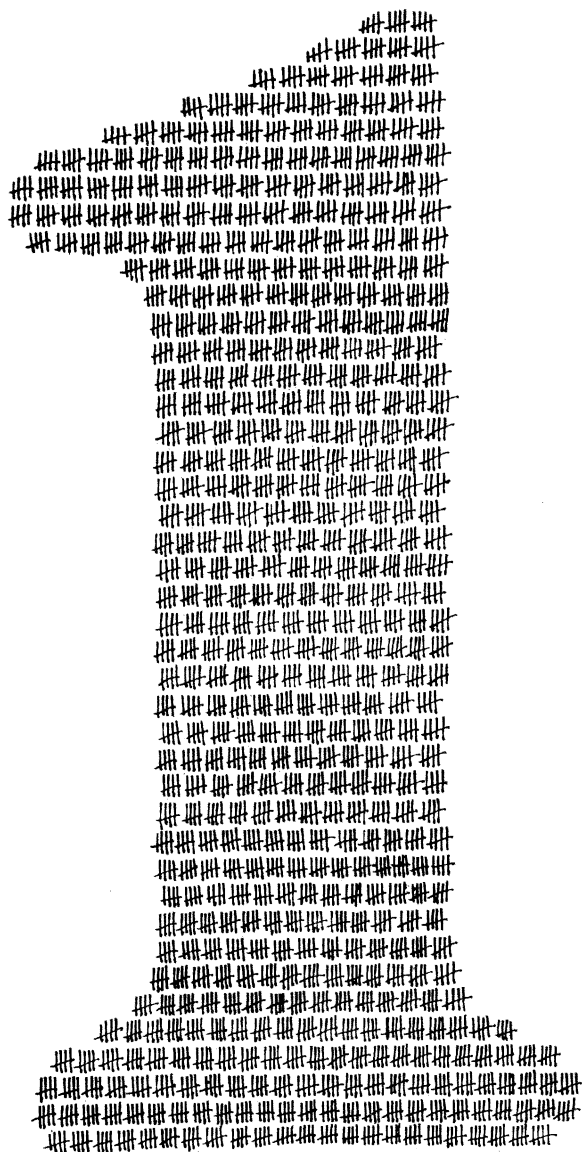
Title

Dept.

Organization

Address

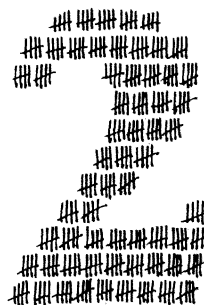
Zip Code



SCIENCE has 153,192*
good reasons for being
number one.

The pre-eminence of SCIENCE as the definitive life science journal starts with our circulation, a full 435% greater than our nearest rival! But that's only one reason for our supremacy. SCIENCE reaches more doctoral scientists, more NIH/Hughes Institute grant recipients, more U.S. science policy leaders than any other publication. For working scientists who must keep in touch with the life sciences universe, there is no choice but to read SCIENCE. For businesses with products or services to sell them, there is no choice but to advertise in SCIENCE.

*ABC Audit, 6/88 †BPA Audit, 12/87



Number 2 has 35,192†
reasons for coming
in second.

• THE GLOBAL WEEKLY OF RESEARCH
SCIENCE

ADVERTISING REPRESENTATIVES
SCHERAGO ASSOCIATES, INC.
1515 Broadway, New York, N.Y. 10036 • (212) 730-1050

Some Other Books of Interest

Insect Pheromones in Plant Protection. A. R. JUSTUM and R. F. S. GORDON, Eds. Wiley-Interscience, New York, 1989. xvi, 369 pp. \$95.

Advertised as a "technocommercial review," this book, John Kennedy writes in the foreword, "chronicles—and in effect celebrates" the fact that "we have now passed the point where the practical, commercial feasibility of using pheromones to control insect pests could still be doubted." Although predicting that pheromones will never "sweep the board as did the insecticides," Kennedy notes that they provide an "object lesson" showing how "the development of new pest management techniques . . . is going to need a much larger *scientific content* than in the past." An introduction by the editors and a background chapter on pheromones and insect behavior open the book. There follow chapters on the monitoring of pest insects and the timing of treatment and on mass trapping of pests and disruption of mating, especially in the pink bollworm, *Pectinophora gossypiella*, through the use of pheromones. Another group of

chapters is concerned with methods of commercial production and application, the latter including plastic laminate dispensers, hollow-fiber controlled release systems, and microcapsules. A final section, headed Commercialization and the Future, includes a discussion of the development and marketing of pheromones based on the experience of ICI Agrochemicals with *Pectinophora gossypiella* in Egypt, an outline of procedures involved in registration of pheromones with regulatory agencies, and a consideration of factors involved in their practical adoption. An "epilogue" by the editors, followed by species and subject indexes, closes the book.—K.L.

Crop Safeners for Herbicides. Development, Uses, and Mechanisms of Action. KRITON K. HATZIOS and ROBERT E. HOAGLAND, Eds. Academic Press, San Diego, CA, 1988. xiv, 400 pp., illus. \$69.95.

Crop safeners, also known as herbicide safeners, herbicide antidotes, or crop protectants, are chemical agents used to manipulate the tolerance of crop plants to herbicides

used for weed control. This volume, according to the editors, is the first overview of the subject in book form since 1978. Twenty-four authors from North America, Japan, Hungary, Switzerland, and Israel have contributed. In part 1 Hatzios discusses the development of safeners from the 1940s to the present and Matsunaka and Wakabayashi report on their use in Japan. Part 2 is devoted to their mechanisms of action, beginning with a general discussion by Hatzios and including consideration of herbicide effects on metabolism, enzyme activity, and terpenoid biosynthesis, the action of dichloroacetamide and thiazole safeners, and protection of grasses against acetanilide, sulfonylurea, and imidazolinone herbicides. Part 3 discusses "alternative approaches," including the use of activated carbon and other adsorbents, controlled release agents, growth regulators and fungicides, microbial agents, and potentially more selective safeners ("prosafeners"). A summary ("progress and prospects") by the editors, an appendix listing common or code names of agrochemicals mentioned in the text, and a 21-page subject index conclude the volume.—K.L.

no substitute

This is an actual customer order for Tekmar high quality Microcentrifuge Tubes...

(please note)

ITEM NO. (39-40)	QUANTITY (41-47)	UNIT MEAS. (48-51)	DESCRIPTION	UNIT PRICE (52-60)	AMOUNT
1.	5	bags	#170237000 Centrifuge tubes 1.5 ml - no substitutes	.42	\$2.10.00

Once our customers get used to the Treff Microcentrifuge quality, they'll accept NO SUBSTITUTES. Call, write, or check RS # below and ask for free samples for your evaluation. Maybe then you too will be a "NO SUBSTITUTE" believer!

CALL TOLL FREE 800-543-4461
IN OHIO 800-344-8569
TEKMAR COMPANY
P.O. BOX 371856
CINCINNATI, OH 45222-1856

Circle No. 149 on Readers' Service Card

Tekmar®

