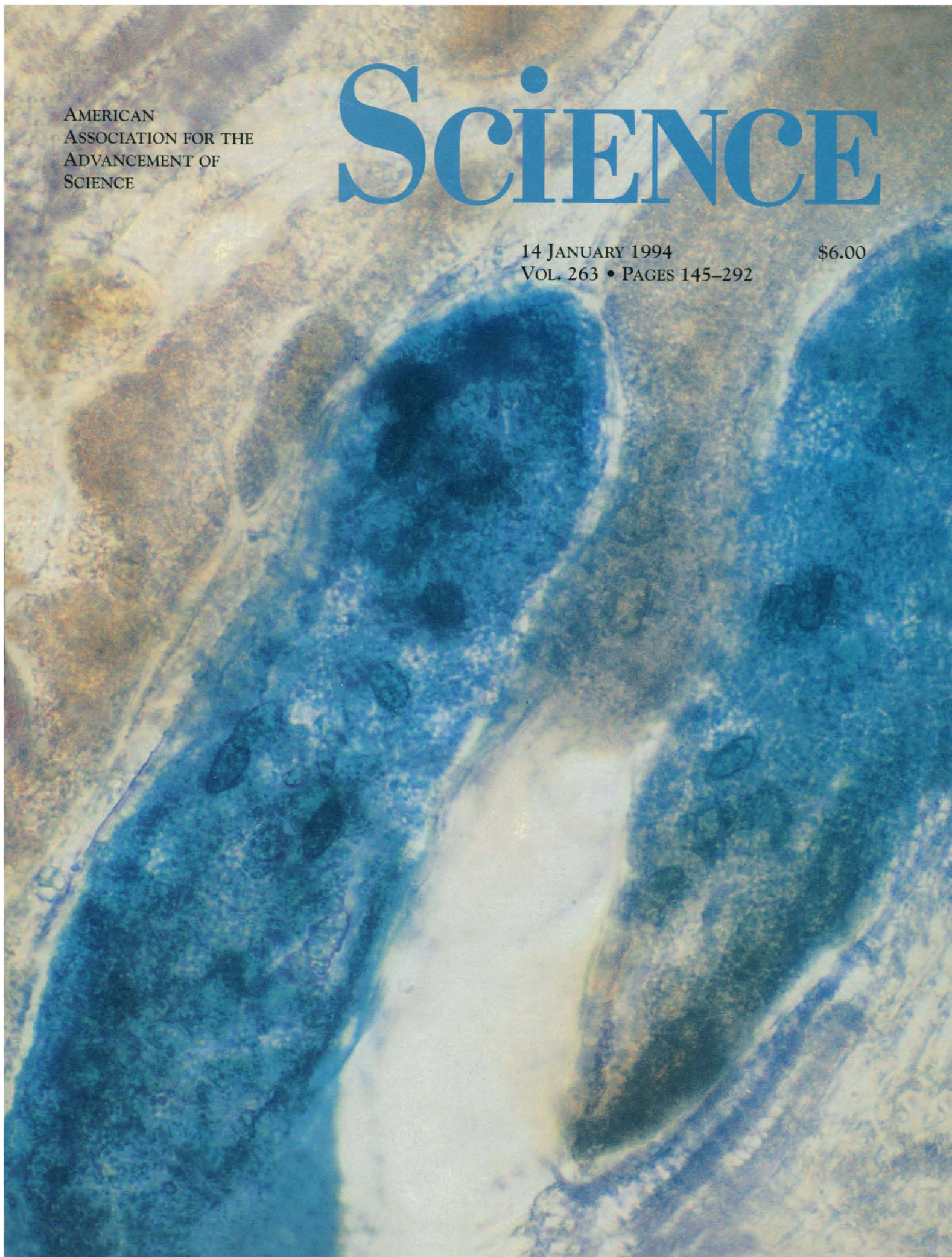


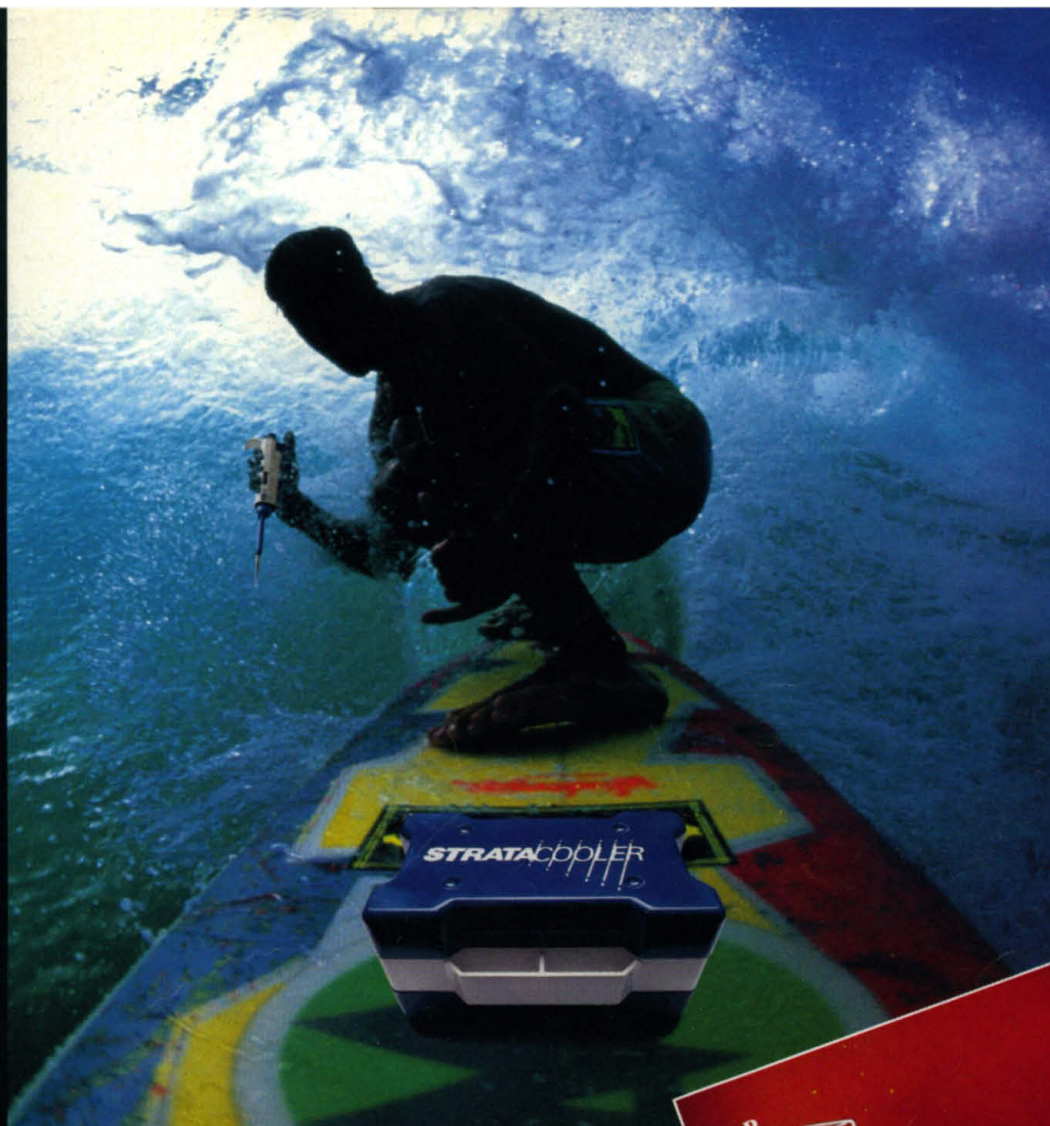
AMERICAN
ASSOCIATION FOR THE
ADVANCEMENT OF
SCIENCE

SCIENCE

14 JANUARY 1994
VOL. 263 • PAGES 145-292

\$6.00





Cool Tube

"Often Imitated, Never Equaled"

The StrataCooler® Portable Benchtop Coolers

Wherever your research may lead you, the StrataCooler® Benchtop Coolers are designed to maintain subzero temperatures. Within your -20°C freezer, the StrataCooler line of benchtop coolers insulates your enzymes from periodic temperature increases due to open freezer doors, frost-free cycles, or power loss. The StrataCooler line is the most reliable, maintaining subzero temperatures for up to two hours at your benchtop or wherever you prefer to work.

NEW: Stratagene now offers the StrataCooler® Cryo Cell Freezer and the StrataCooler® Cryo Lite Cell Freezer. Both units are designed for the controlled freezing of mammalian cells. The StrataCooler Cryo units provide researchers with a convenient, controlled and inexpensive means to freeze mammalian and insect cells, with overall survival rates of 80-90%.



- A. StrataCooler® II Benchtop Cooler
 - B. StrataCooler® II Racks (2 Racks)
 - C. StrataCooler® Lite Benchtop Cooler
 - D. StrataCooler® Lite Racks (1 Rack)
 - E. StrataCooler® Cryo Cell Freezer
 - F. StrataCooler® Cryo Lite Cell Freezer
- Cryovials • 500 (not pictured)

Catalog #400002
Catalog #400007
Catalog #400012
Catalog #400017
Catalog #400005
Catalog #400006
Catalog #410500

When looking for the "Coolest" technologies, call Stratagene or the Stratagene distributor nearest you.



STRATAGENE®

USA:
Corporate Headquarters
Telephone: 800-424-5444
Fax: 619-535-0034

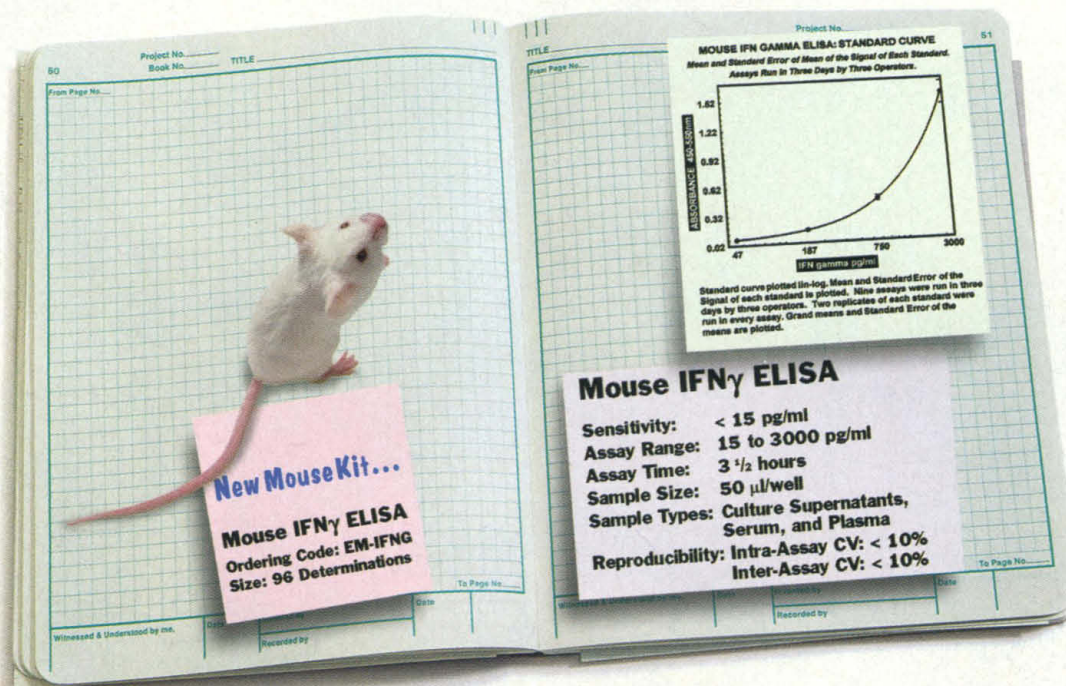
Germany:
Stratagene GmbH
Telephone: (06221) 40 06 34
Telefax: (06221) 40 06 39

United Kingdom:
Stratagene Ltd.
Telephone: (0223) 42 09 55
Telefax: (0223) 42 02 34

France:
Stratagene France
Telephone: (0590) 72 36
Telefax: (1) 44 28 19 00

Switzerland:
Stratagene GmbH
Telephone: 01-3641106
Telefax: 01-3657707

The new mouse IFN γ ELISA. For the data you need today.



Accuracy. Performance. Precision. Endogen for Mouse ELISAs.

The Endogen mouse IFN γ ELISA is the newest addition to our extensive line of quality mouse reagents and ELISA kits.

The ELISA format makes acquiring reliable data fast and easy. The mouse IFN γ ELISA allows you to quantitate less than 15 pg/ml of natural and recombinant mouse IFN γ in serum, plasma and culture supernatants in only 3 1/2 hours.

All Endogen mouse

ELISAs are designed for accuracy and precision. Our kits undergo thorough quality control testing and are required to meet stringent product specifications. A battery of validation and optimization experiments are conducted in order to assure that our products are of the highest quality.

All Endogen mouse ELISA kits are simple and convenient. Kit reagents are pre-mixed and ready to use. The

stripwell plates are pre-coated and can be run in their entirety, or strips may be used individually. Each assay can be completed in 3 1/2 hours.

Put your mouse IFN γ samples to the test. We guarantee your satisfaction.

Our technical service representatives are available to answer your questions or fax data sheets for any Endogen human or mouse ELISA kit or research reagent.

Call today for our new 1994 catalog with over 150 assays, reagents, and methodologies for the study of immunology.

Endogen Mouse ELISAs

- ◆ IL-2
- ◆ IL-3
- ◆ IL-4
- ◆ IL-5
- ◆ IL-6
- ◆ IL-10
- ◆ GM-CSF
- ◆ IFN γ
- ◆ sICAM-1
- ◆ TNF α

68 Fargo Street, Boston, MA 02110 USA (617) 439-3250 Fax (617) 439-0355

For research use only. Not for use in diagnostic or therapeutic procedures.

Head Office for Europe Biozol Diagnostica

TEL 49+(89) 3192053
FAX 49+(89) 3193611

In Japan: Funakoshi Co., Ltd.

TEL 81+(3) 56841622
FAX 81+(3) 56841633

ENDOGEN
800-487-4885

Circle No. 15 on Readers' Service Card



DNA DIPSTICK *From Invitrogen*



Funny, It Doesn't look like A Revolution *in* NUCLEIC ACID QUANTITATION.

Don't be fooled by the modest appearance of the new DNA DipStick™ Kit from Invitrogen. It's nothing short of a revolution in the quantitation of DNA, RNA and oligonucleotides.

The DNA DipStick™ is the economical solution for quantifying amplification products, mRNA, total RNA, cDNA or plasmid DNA.

WE'RE SENSITIVE *to* YOUR NEEDS.

The easy-to-use DNA DipStick™ is so sensitive, it quantitates nucleic acid at concentrations as low as 0.1 ng/μl. That's a big advantage over conventional techniques like ethidium bromide staining or spectrophotometry, which are less sensitive and require ~~substantially more sample.~~ *≥0.1 ng/μl*



HOW FAST *is* FAST?

With the DNA DipStick™, you'll get results in less than 10 minutes. It's as easy as spotting 1 μl of sample on the DipStick and placing it in three solutions.

The DNA DipStick™ makes quantification of single- or double-stranded DNA, RNA or oligonucleotides fast, accurate and economical. Plus, it provides a permanent record of results.

JOIN *the* REVOLUTION. CALL NOW.

Customer Service Representatives are standing by! To order the DNA DipStick™ Kit, call and ask for catalog no. K5632-01.

1-800-955-6288 or Fax 1-619-597-6201

Invitrogen®

3985 B Sorrento Valley Boulevard, San Diego, California 92121

European Headquarters:
Invitrogen BV
De Schelp 26, 9351 NV Leek
The Netherlands
Tel (0) 5945-15175
Fax (0) 5945-15312

Toll free Telephone Numbers
The Netherlands 06-02208848
Belgium 078-111173
Germany 0130 8100 43
Switzerland 155-1966
Austria 0660-8127

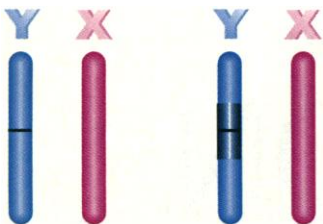
UK Tel +44 (0)235 531074 FAX +44 (0)235 533420
France 05 90 72 49
Sweden 020 793149
Norway 800 11033
Denmark 80 01 85 92

**RD
SYSTEMS**

CELBO Italy
Tel 39-238103171
Fax 39-238101465

Japan
Tel 81-356841622
Fax 81-356841633

Austria 43-1-8891819 Australia 61-38089077 Finland 35-804208077 India 33-594127 Israel 972-8472563 Spain 34-14091251 or 34-3-4560607 Singapore 65-779-1919



171 & 230

The wherefore of Y

NEWS & COMMENT

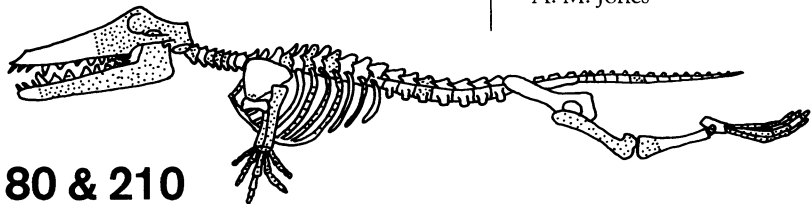
R&D Budget: More Wins Than Losses	164
OSTP Plans a Blueprint for Research	165
Russian Science: Battle Expands Over Shrinking Budget	166
Astronomy: A Scheme for a High-Flying Scope	167
Mars Observer: Management Faulted in Postmortem	167
U.S.-Japan Collaboration: Academic Biotech Deals Offer More Promise Than Product	168
National Laboratories: DOE Finds Physics Archives May Be Too Hot to Handle	170

RESEARCH NEWS

Rise and Fall of the Y Chromosome	171
Unveiling a Tuberculosis Drug Target	172
Ancient Tropical Climates Warm San Francisco Gathering	173
A Family Tree of European Bears	175

PERSPECTIVES

What Is a Whale? A. Berta	180
What Are We? Where Did We Come From? Where Are We Going? L. O'Neill, M. Murphy, R. B. Gallagher	181
Surprising Signals in Plant Cells A. M. Jones	183



180 & 210

Steps in whale evolution

DEPARTMENTS

THIS WEEK IN SCIENCE	153
EDITORIAL	155
The Perversity of Inanimate Objects	
LETTERS	157
Health Care Costs: A. R. Martin; R. D. Klugman and V. A. Fulginiti; M. E. DeBaakey; G. H. Deckert	
SCIENCESCOPE	163
RANDOM SAMPLES	176
Is There an Addiction Gene? • Namibia's Ancient Big Bird • Chilean Telescope Expansion Delayed	

• Bringing More Reality to Fiction • Alaskan Illnesses Remain a Mystery, etc.	
AAAS MEETING	241
1994 Annual Meeting Final Program	
BOOK REVIEWS	252
Science and Anti-Science, reviewed by D. A. Hollinger • Visions of Caliban, M. Cartmill • Alfred Nobel, A. S. Travis • The Quantum Theory of Motion, S. Goldstein • Human Gene Mutation, H. H. Kazazian Jr. • Vignettes • Books Received	
PRODUCTS & MATERIALS	258

Board of Reviewing Editors

John Abelson
Frederick W. Alt
Don L. Anderson
Michael Ashburner
Stephen J. Benkovic
David E. Bloom
Floyd E. Bloom
Piet Borst
Michael S. Brown
Henry R. Bourne
James J. Bull

Kathryn Calame
C. Thomas Caskey
Dennis W. Choi
John M. Coffin
Paul J. Crutzen
Robert Desimone
Nicole Le Douarin
Bruce F. Eldridge
Paul T. Englund
Richard G. Fairbanks
Douglas T. Fearon

Harry A. Fozzard
K. Friedrich
Theodore H. Geballe
Margaret J. Geller
John C. Gerhart
Roger I. M. Glass
Stephen P. Goff
Peter N. Goodfellow
Corey S. Goodman
Stephen J. Gould
Ira Herskowitz

Eric F. Johnson
Stephen M. Kosslyn
Michael LaBarbera
Charles S. Levings III
Alexander Levitzki
Harvey F. Lodish
Richard Losick
Diane Mathis
Anthony R. Means
Shigetada Nakanishi
Roger A. Nicoll

William H. Orme-Johnson III
Stuart L. Pimm
Yeshayau Pocker
Dennis A. Powers
Ralph S. Quatrano
V. Ramanathan
Douglas C. Rees
T. M. Rice
Erkki Ruoslahti
David C. Rubie

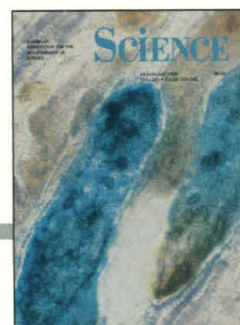
Gottfried Schatz
Jozef Schell
Ronald H. Schwartz
Terrence J. Sejnowski
Ellen Solomon
Thomas A. Steitz
Michael P. Stryker
Richard F. Thompson
Robert T. N. Tjian
Emil R. Unanue
Gerard J. Vermeij

Bert Vogelstein
Harold Weintraub
Zena Werb
George M. Whitesides
Owen N. Witte
William A. Wulf
Keith Yamamoto

COVER

Root-knot nematodes infect a wide range of plants and establish permanent feeding sites (giant cells) in the root by inducing expression of many plant genes. The promoter sequences required by the nematode to direct expression of one such gene have been un-

coupled from those necessary for expression in uninfected roots. This nematode-responsive region provides gene expression in giant cells, revealed here by the activity of a reporter gene product (blue). See page 221. [Photo: Mark A. Conkling]



ARTICLES

Carbon Pools and Flux of Global Forest Ecosystems 185

R. K. Dixon, S. Brown, R. A. Houghton, A. M. Solomon, M. C. Trexler, J. Wisniewski

The Transfer RNA Identity Problem: A Search for Rules 191

M. E. Saks, J. R. Sampson, J. N. Abelson

REPORTS

Observed Impact of Snow Cover on the Heat Balance and the Rise of Continental Spring Temperatures 198

P. Ya. Groisman, T. R. Karl, R. W. Knight

Nanometer Spatial Resolution Achieved in Hard X-ray Imaging and Laue Diffraction Experiments 201

D. H. Bilderback, S. A. Hoffman, D. J. Thiel

Free-Radical Side-Chain Bromination of Alkylaromatics in Supercritical Carbon Dioxide 203

J. M. Tanko and J. F. Blackert

Quantum Yield for Production of CH_3NC in the Photolysis of CH_3NCS 205

R. A. Alvarez and C. B. Moore

Structure of Solidified Colloidal Array Laser Filters Studied by Cryogenic Transmission Electron Microscopy 207

E. A. Kamenetzky, L. G. Magliocco, H. P. Panzer

Fossil Evidence for the Origin of Aquatic Locomotion in Archaeocete Whales 210

J. G. M. Thewissen, S. T. Hussain, M. Arif

An Inverted Double Seismic Zone in Chile: Evidence of Phase Transformation in the Subducted Slab 212

D. Comte and G. Suárez

Modes of Tilting During Extensional Core Complex Development 215

D. S. Coleman and J. D. Walker

Turbulent Mixing Under Drifting Pack Ice in the Weddell Sea 218

M. G. McPhee and D. G. Martinson

Root-Knot Nematode-Directed Expression of a Plant Root-Specific Gene 221

C. H. Opperman, C. G. Taylor, M. A. Conkling

Crystal Structure of the DNA Binding Domain of the Heat Shock Transcription Factor 224

C. J. Harrison, A. A. Bohm, H. C. M. Nelson

inhA, a Gene Encoding a Target for Isoniazid and Ethionamide in *Mycobacterium tuberculosis* 227

A. Banerjee, E. Dubnau, A. Quemard, V. Balasubramanian, K. S. Um, T. Wilson, D. Collins, G. de Lisle, W. R. Jacobs Jr.

Degeneration of a Nonrecombining Chromosome 230

W. R. Rice

Innervation of the Heart and Its Central Medullary Origin Defined by Viral Tracing 232

A. Standish, L. W. Enquist, J. S. Schwaber

The Adjuvant Effect of Interleukin-12 in a Vaccine Against *Leishmania major* 235

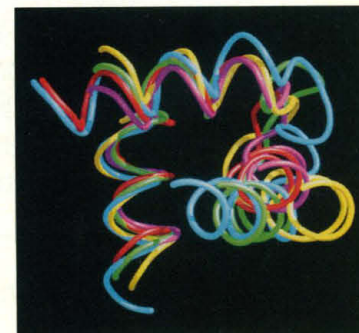
L. C. C. Afonso, T. M. Schariton, L. Q. Vieira, M. Wysocka, G. Trinchieri, P. Scott

Phase Shifting of the Circadian Clock by Induction of the *Drosophila period* Protein 237

I. Edery, J. E. Rutilla, M. Rosbash

224

A crowd of threes



AAAS Board of Directors

F. Sherwood Rowland
Retiring President,
Chairman
Eloise E. Clark
President
Francisco J. Ayala
President-elect

Robert A. Frosch
Florence P. Haseltine
William A. Lester, Jr.

Alan Schriesheim
Jean'ne M. Shreeve
Chang-Lin Tien
Warren M. Washington
Nancy S. Wexler

William T. Golden
Treasurer
Richard S. Nicholson
Executive Officer

■ **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 © 1994 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): \$92 (\$50 allocated to subscription). Domestic institutional subscription (51 issues): \$215. Foreign postage extra: Mexico, Caribbean (surface mail) \$50; other countries (air assist delivery) \$95. First class, airmail, student and emeritus rates on request. Canadian rates with GST available upon request, GST #1254 88122. **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 2033, Marion, OH 43305-2033. **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, MA 01970. The identification code for *Science* is 0036-8075/93 \$1 + .10. *Science* is indexed in the *Reader's Guide to Periodical Literature* and in several specialized indexes.



NOMINATIONS FOR THE 1995 LOUIS JEANTET PRIZE FOR MEDICINE

Nominations are being sought for the 1995 Louis Jeantet Prize for Medicine. One to three prizes will be awarded. They will amount to a maximum of 2 million Swiss Francs (approximately 1.4 million US Dollars) in 1995. These prizes will provide substantial funds for the support of biomedical research projects (fundamental or clinical) of the highest quality. Candidacies in clinical research are strongly encouraged.

Candidates (either individuals or research groups) must be nominated by scientists, physicians or institutions having detailed knowledge of the candidates' research. The Louis Jeantet Prize for Medicine is not intended to honour past accomplishments but to help and encourage the winners' continued research activity. Candidates shortlisted for the final selection will therefore be asked to provide a research project to which the financial support of the Prize could give decisive impetus.

The previous winners of the Louis Jeantet Prize for Medicine have been **Luc Montagnier, Michael Berridge and Désiré Collen** in 1986, **Sidney Brenner, Walter Gehring and Dominique Stehelin** in 1987, **Bert Sakmann, John Skehel and Rolf Zinkernagel** in 1988, **Roberto Poljak, Walter Schaffner and Greg Winter** in 1989, **Nicole Le Douarin, Harald Von Boehmer and Gottfried Schatz** in 1990, **Pierre Chambon, Frank Grosveld and Hugh Pelham** in 1991, **Paul Nurse, Christiane Nüsslein-Volhard and Alain Townsend** in 1992, **Jean-Pierre Changeux, Richard Henderson and Kurt Wüthrich** in 1993, **Thierry Boon, Jan Holmgren and Philippe Sansonetti** in 1994.

The following general points should be noted:

1. The Prize is intended for researchers working in European countries, members of the Council of Europe. The candidates need not, however, be themselves nationals of any of these countries.
2. Applications must be submitted, confidentially, on the official forms only. These are obtainable from:

**The Secretary of the Science Committee
The Louis Jeantet Foundation for Medicine
P.O. Box 277
CH—1211 GENEVA 17
Switzerland**

Further information will be sent with the nomination form.

3. The deadline for applications is February 15, 1994.

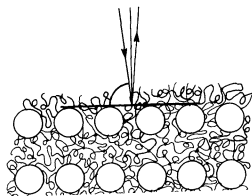
The name(s) of the winner(s) of the 1995 Louis Jeantet Prize for Medicine will be announced in January 1995. The Prize Ceremony will take place in Geneva (Switzerland) in April 1995.

Forest carbon flux

Forest ecosystems provide a large and dynamic reservoir for carbon. They are often mentioned both as a missing sink for balancing the carbon budget and as a means for managing atmospheric carbon dioxide levels. Dixon *et al.* (p. 185) overview the global carbon content of forests, including carbon in soils and estimates of current gains and losses and impacts of management policies. High-latitude forests may contain nearly half of the global forest carbon and are continuing to sequester carbon, whereas deforestation at low latitudes is a major source of carbon into the atmosphere. Most of the forest carbon is stored in soils.

Laser light lost

Laser filters block transmittance over a narrow bandwidth (about 20 nanometers) while allowing other wavelengths to pass. Such filters can allow doctors to observe patients more easily during laser surgery and can be used to protect sensitive



detectors in spectroscopic methods that use intense laser excitation, such as Raman spectroscopy. Colloidal particle crystals are useful filters but can be unstable. Kamenetzky *et al.* (p. 207) developed a polymeric gel matrix for stabilizing such suspensions. Transmission electron microscopy shows that the polystyrene particles stack above one another in close-packed planes whose layer spacing agrees well with that predicted for the observed rejection wavelength.

Snow cover and climate change

Average spring snow cover has declined significantly in the Northern Hemisphere during the past 20 years. Because more snow increases Earth's albedo, more incoming solar energy is reflected and surface temperature should decrease. Groisman *et al.* (p. 198) investigated the effects of this feedback using records of surface temperature in the Northern Hemisphere and measurements of Earth's energy balance from satellites. The analysis implies that the retreat of snow cover, which resulted from some warming, in turn enhanced the warming, most noticeably in the spring by modifying the radiative balance over northern land areas.

Doubled up

Several subduction zones are characterized by a zone of compressional earthquakes overlying a zone of extensional earthquakes within the subducting slab at depths of 50 to 200 kilometers. Such "double seismic zones" have been proposed to result from slab unbending or sagging of the subducting plate in the mantle or from complex distribution of stresses produced by volume changes during phase transitions. Comte and Suárez (p. 212) describe a double seismic zone beneath Chile that shows the opposite polarity to the above pattern: a zone of compression below a zone of extension. This pattern is unlikely to reflect unbending but is consistent with the gradual transition of basalt to denser eclogite in the top of the slab.

Making itself at home

Root-knot nematodes, which cause tremendous losses in food and fiber crops, induce a feeding site in the infected plant specialized for the maintenance of the nematode. Opperman *et al.* (p. 221; cover) analyzed some of the molecular interactions between the plant and the parasitic nematode. The plant gene *TobRB7*, which may function as a water channel, is normally expressed in the root meristem

and immature vascular cylinder regions of the elongating root, but not in mature differentiated vascular tissue. The nematode induces abnormal expression of the gene in the feeding site cells. This expression is sustained even after differentiation. Only 0.3 kilobase of the promoter sequence was required for the nematode to redirect expression of the plant *TobRB7* gene to its own purposes.

Whale walking

How did whales undergo a transition from land to water locomotion nearly 50 million years ago? Thewissen *et al.* (p. 210; see the Perspective by Berta, p. 180) describe a fossil whale from Pakistan that appears to have been caught in the act. It could walk on land as well as swim by undulating its vertebral column.

Like clockwork

Underlying the circadian rhythms of an organism is a molecular clock or pacemaker that sets a 24-hour cycle. The protein product PER of the *period* (*per*) gene of *Drosophila* may be a component of the pacemaker, as both PER and *per* mRNA undergo circadian oscillations, and mutations in *per* can increase or decrease the free-run-

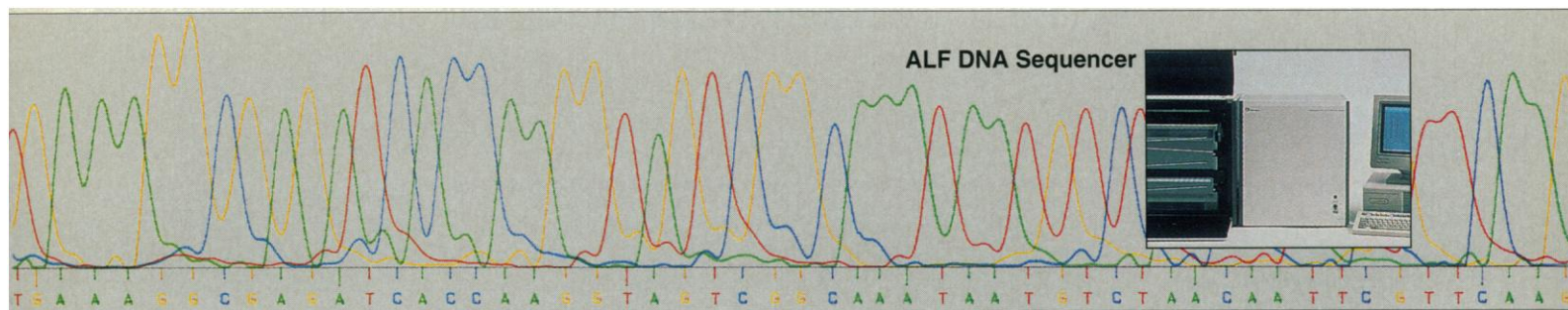
ning period. Edery *et al.* (p. 237) show that changes in PER expression can shift the phase of the circadian rhythm, thus providing additional evidence that PER is a clock component.

Tuberculosis target

Although isoniazid has been widely used as an antituberculosis drug since the 1950s, its mode of action has remained elusive. Banerjee *et al.* (p. 227; see news story by Travis, p. 172) have used genetic methods to identify a protein in the pathogen, *Mycobacterium tuberculosis*, that may well be isoniazid's primary target. This protein, called InhA, appears to be involved in mycolic acid biosynthesis. The identification of InhA may provide clues to the mechanism by which mycobacteria acquire resistance to isoniazid, a problem of increasing importance clinically, and may facilitate the development of new drugs.

Cytokine adjuvant

In order for a vaccination to produce a protective response, it is almost always necessary to administer an adjuvant along with the antigen. The adjuvant activates the helper T cells, which can direct the immune response to either produce mostly antibodies or to concentrate on a cellular response. Afonso *et al.* (p. 235) show that an effective cellular T helper response against *Leishmania major* could be elicited in mice with soluble leishmanial antigen by using interleukin-12 as an adjuvant instead of the usual bacterium. Such an approach could avoid the toxic side effects associated with bacterial adjuvants and allow more control over the type of response elicited.



Avoid redundancy. Buy ALF™ - the DNA sequencer with the highest accuracy.

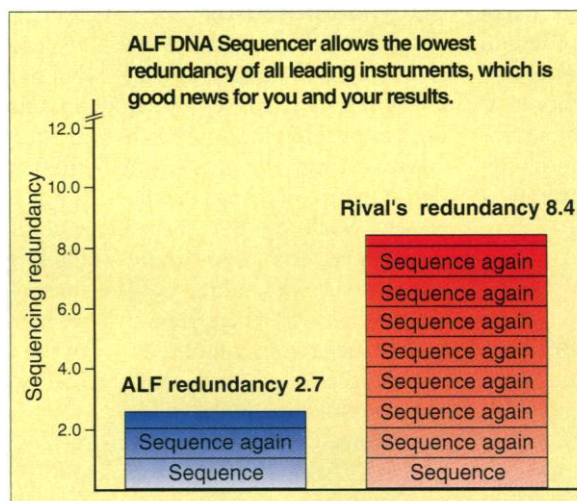
Redundancy in any form is something to avoid. When you are sequencing DNA, redundancy increases when you are forced to sequence the same template over and over again before you can determine the true final sequence.

All this redundant work is needed to compensate for shortcomings in the raw data and base calling accuracy of the sequencer. The more inaccurate the base calling, the higher the redundancy, and the more you have to sequence and sequence again. And again. And again.

Fortunately, there's ALF™.

ALF is the Automated Laser Fluorescent DNA Sequencer with base calling technology so precise that it reduces redundancy to a new low.

Already confirmed as the most accurate sequencer available today⁽¹⁾, ALF has now demonstrated a redundancy as low as 2.7 on both strands in the *Saccharomyces cerevisiae* genome sequencing project⁽²⁾.



Not only is ALF™ the most accurate DNA sequencer available today, it also allows by far the lowest redundancy.

Its leading competitor usually operates at a redundancy level over three times as high.

ALF makes better use of your time and your employer's investment.

References

1. Comparison of three non-isotopic automated DNA sequence analysis systems. *Clinical Chemistry*, 38 (1992) 465, Van Ranst, M., Fiten, P., Voet, M., Volckaert, G., Opendakker, G.
2. Automated low-redundancy large-scale DNA sequencing by primer walking. *BioTechniques* 15 (1993) 714-721, Voss, H., Wiemann, S., Grotheus, D., Sensen, C., Zimmermann, J., Schwager, C., Stegemann, J., Erfle, H., Rupp, T., Ansorge, W.
3. Sequence length and error analysis of Sequenase and automated Taq cycle sequencing methods. *BioTechniques* 14 (1993) 442-447, Koop, B.F., Rowan, L., Chen, W.-Q., Deshpande, P., Lee, H., Hood, L.

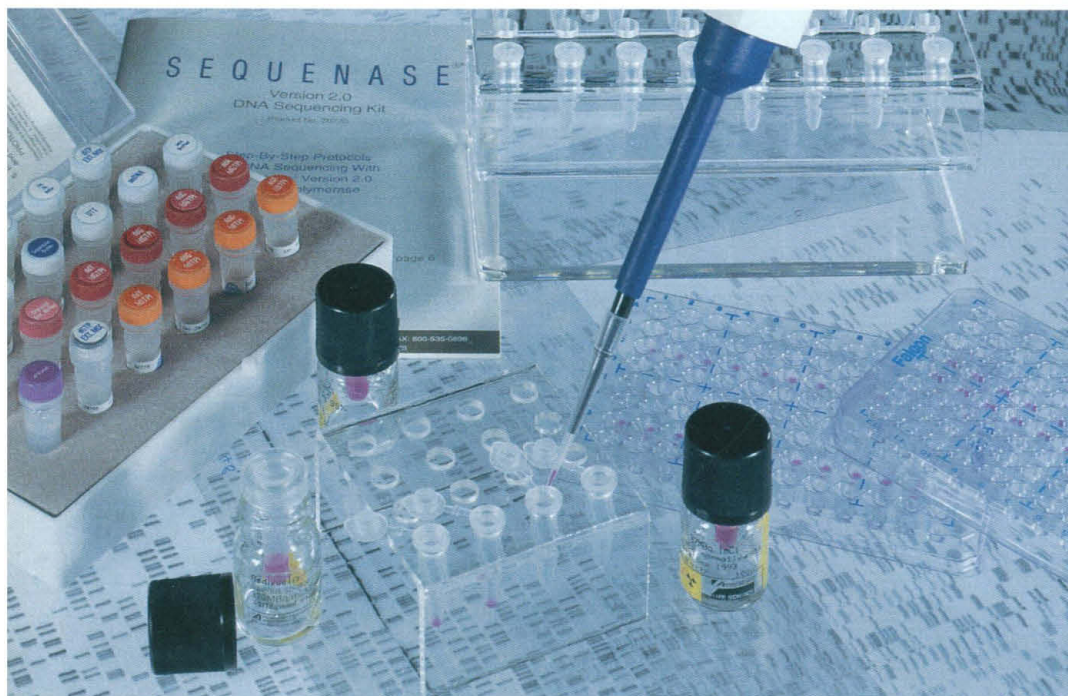
In contrast, the leading competitor to ALF has a redundancy level as high as 8.4⁽³⁾ - more than three times that of ALF. So you have to sequence at least three times as much data to get the same result. That's a lot of waste. That's why it's called redundancy.

So if you want to feel really secure about your results - and your job - just buy the DNA sequencer with the lowest redundancy.

*Just ask for ALF.
Request more information today.*



redivue™ ³⁵S-nucleotides Colored nucleotides you store in the fridge!



Amersham's range of Redivue nucleotides has been extended to include the important sequencing nucleotide [³⁵S]dATPαS. Containing a novel red dye and stabilizer formulation, Redivue ³⁵S-nucleotides provide unique advantages in convenient handling and storage.

Extensive testing in independent laboratories worldwide has shown the performance of Redivue ³⁵S-nucleotides to be equivalent to Amersham's standard nucleotides in a range of DNA sequencing systems and other applications.

The red dye makes handling sub-microliter quantities easier:

- Easier to pipette
- Easy to see in the vial

In addition, the stabilized formulation offers:

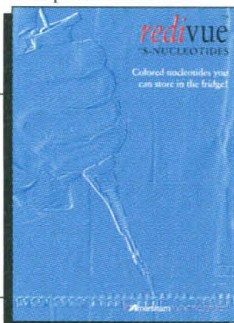
- Storage at +4°C
- Time saving - no thawing necessary
- Consistent performance - freeze-thaw cycles eliminated

Every batch of Redivue is tested with Sequenase Version 2.0 DNA Sequencing kit.

Following the acquisition of USB™, Amersham™ is now the leading supplier of reagents for DNA sequencing. The combination of Sequenase™ kits with Amersham's labelling and detection products provides fully compatible sequencing systems from template preparation to sequence assignment. Amersham - for quality sequencing from start to finish.



Free product brochure



Amersham Corporation
 2636 South Clearbrook Drive
 Arlington Heights
 Illinois 60005
 Tel: (800) 323-9750
 Fax: (708) 437-1640

Amersham Canada Ltd
 1166 South Service Road West
 Oakville
 Ontario L6L5T7
 Tel: (416) 847-1166
 Fax: (416) 847-7790

Amersham International plc
 Little Chalfont England HP7 9NA
 Tel: 0494 544000
 Fax: 0494 542929

For further information contact
 your local office.

Redivue and Amersham are trademarks of Amersham International plc. Sequenase and USB are trademarks of United States Biochemical Corporation. Sequenase T7 DNA polymerase (kit) is covered by or suitable for use under one or more US Patent Nos: 4,795,699; 4,946,786; 4,942,130; 4,962,020; 4,994,372; 5,145,776 and 5,173,411. Patents pending in US and other countries.

Circle No. 29 on Readers' Service Card

 **Amersham LIFE SCIENCE**



Big Bill and Bigger Bill
Orbital Shakers from
Thermolyne.

Brains and brawn.



Pound for pound, our Big and Bigger Bill give you more mixing capability than any other shakers in their class...up to 177 10ml flasks. Thermolyne shakers continue to bring heavy-duty reliability, and trouble-free operation to your lab.

With six models offering a mixing range of 25 to 450 rpms, you're certain to find one that fits your application, budget and space requirements. Digital displays on some models mean added speed control, while all shakers feature gentle ramping to set speed.

Oscillating models can be pre-programmed for self-reversing orbital action. Thermolyne shakers are perfect for emulsifying solutes, homogeneous mixing of viscous solutions, and suspending bacterial cultures.

For more information about shakers for all your mixing needs, call us at 1-800-553-0039.



Thermolyne

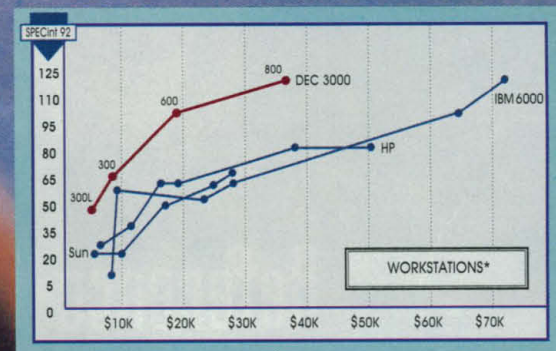
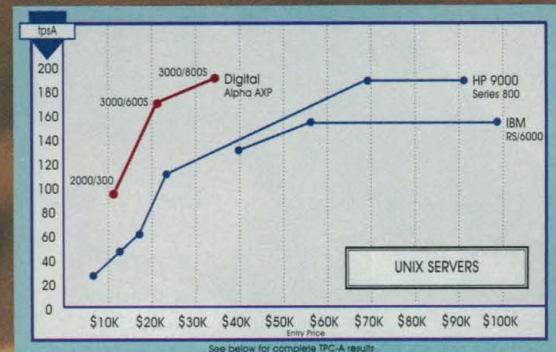
Barnstead | Thermolyne a subsidiary of SYBRON

2555 Kerper Blvd. • P.O. Box 797
Dubuque, Iowa 52004-0797

The Barnstead/Thermolyne Lab...
a family of innovative products for
scientific research.

Digital's new Alpha AXP systems put the competition in its place.

You asked for UNIX® servers and workstations that would help you win in today's increasingly competitive environment. The people of Digital announce their response—three



new servers and two new workstations that bring the power of Alpha AXP™ technology to your open client/server environment. Each of these new UNIX systems offers the best price/performance in its class. And although they're new, nearly 2,000 UNIX applications are available for them today, with more to come. For more information about Digital's UNIX solutions, call 1-800-DIGITAL. Or call Digital's Alpha AXP Fast Fax 1-800-842-7027 in the U.S. and Canada. Or contact your local Digital Representative.

PUTTING IMAGINATION TO WORK

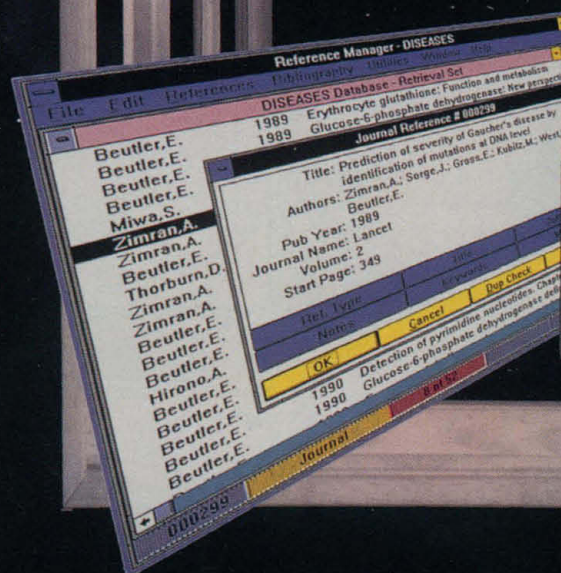
i imagine UNIX servers and workstations with the speed to keep you out in front.

digital

BFN. © Digital Equipment Corporation 1993. The DIGITAL logo and Alpha AXP and AXP are trademarks of Digital Equipment Corporation. UNIX is a registered trademark of UNIX Systems Laboratories, Inc., in the USA and other countries. TPC and TPC-A are trademarks of the Transaction Processing Performance Council. * Performance comparison based on vendor's reported UNIX benchmarks. TPC Benchmark™ A Results as of October 12, 1993: tpsA/\$/tpsA Digital: 2000/300-94.4/@\$7,466, 3000/600S-172.1/@\$6,390, 3000/800S-186.0/@\$6,810. HP: F10-30.4/@\$10,117, F20-51.2/@\$8,095, F30-60.0/@\$7,716, G40-110.5/@\$7,364, H50-184.5/@\$9,137. IBM: 570-128.5/@\$8,928, 580-157.2/@\$9,437, 980B-160.3/@\$10,054.

Circle No. 22 on Readers' Service Card

Competitive Upgrade - save \$300
Only \$199
 Users of EndNote, Pro-Cite and Papyrus
 Call Now - Limited Time Offer



Reference Manager® Opens New W I N D O W S

The leading bibliographic software is now available for Microsoft® Windows™ !

Since 1984, Reference Manager has been the leading bibliographic management software package for scientists, information professionals, and other scholars. Now Reference Manager is available for the Microsoft Windows operating system as well as for MS-DOS, Macintosh, and the NEC 9801.

In addition to the features found in its DOS and Macintosh counterparts, Reference Manager for Windows contains a number of enhancements, including greatly increased flexibility in bibliographic formatting and the ability to "cut and paste" entire references or their components using the standard clipboard function of Windows.

Reference Manager for Windows - The Best Bibliographic Management Software is now the only product of its kind for Microsoft Windows!



Research Information Systems

2355 Camino Vida Roble, Carlsbad, CA 92009-1572
 (800) 722-1227 • (619) 438-5526 • Fax: (619) 438-5573

Circle No. 17 on Readers' Service Card

FLUORESCENCE POLARIZATION AT LOW COST



FPM-1™/FPM-1™ SYSTEM

- HIGHLY PRECISE—LESS THAN 1MP STANDARD DEVIATION
- HIGHLY SENSITIVE—ACCURATE AT 10^{-11} M FLUORESCIN IN THE POLARIZATION MODE DOWN TO 10^{-13} M FLUORESCIN IN THE INTENSITY MODE
- VARIABLE READ TIME FOR ULTRA HIGH PRECISION
- USES DISPOSABLE 12X75 MM GLASS TEST TUBES
- 4 STATIC MODES OF MEASUREMENT
- 4 KINETIC MODES OF MEASUREMENT
- AUTO BLANK SUBTRACT
- 99 USER PROGRAMMABLE PROTOCOLS
- RS232 AND/OR HARD COPY OUTPUT
- FPM-1 SYSTEM INCLUDES: COMPUTER, SUPER VGA MONITOR, KEYBOARD, PRINTER AND CABLES. MSDOS AND JOLLEY DATA REDUCTION SOFTWARE INSTALLED. (A COMPLETE TURN-KEY SYSTEM)

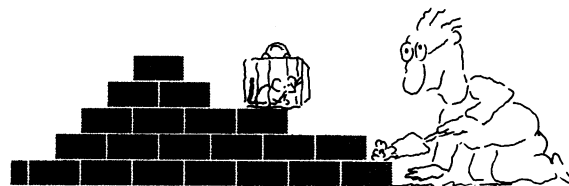


FOR FURTHER DETAILS CALL, FAX OR WRITE TO
JOLLEY CONSULTING AND RESEARCH, INC.

34469 N. CIRCLE DR., ROUND LAKE, IL 60073
(708) 548-2026 • U.S. & CANADA 1-800-685-0401 • FAX (708) 548-2025

Circle No. 5 on Readers' Service Card

We'll Help You Build A New Lab



Let the free Science product information service put you in touch with the vendors whose products you will need.

Simply write us a letter stating the specifics about your proposed lab and the instruments and supplies you need. We will do the rest. Write to:

SCIENCE Magazine
New Lab Service Department, Rm. 830,
1333 H Street, N.W.,
Washington, DC 20005

The Global Weekly of Research
SCIENCE

DEFINING THE ART OF MICROPIPETTE TECHNOLOGY

P-2000
LASER BASED
MICROPIPETTE
PULLER



No other micropipette puller offers you the combined functionality, versatility and reproducibility of the P-2000.

The only micropipette puller that utilizes a laser as the heat source

The only micropipette puller that allows you to pull quartz tubing or quartz optical fibers, as well as conventional glasses

The only micropipette puller that offers programmable heating filaments

Call us for details.



Sutter Instrument Company

40 Leveroni Court, Novato, CA 94949 Ph: (415) 883-0128 Fax: (415) 883-0572

Circle No. 9 on Readers' Service Card

ACT ON HUMAN RIGHTS CONCERNS!

ASSIST PERSECUTED SCIENTISTS AROUND THE WORLD!

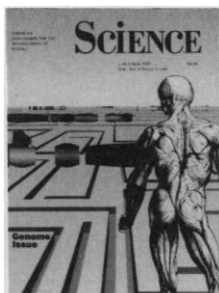
Become a free subscriber to the American Association for the Advancement of Science Human Rights Action Network (AAASHRAN) and receive (about once a week), via E-Mail, information on current cases of human rights concern of special interest to the scientific community so that you can become part of letter writing and public awareness campaigns on behalf of persecuted scientists. Examples of recent cases include:

- Mass dismissals of science professors and researchers in Cuba, Ethiopia and Mexico for political activities, or the pursuit of their scientific work; and
- Denial of adequate medical care to dissident scientists who are political prisoners of conscience in China.

You can join the network and receive more detailed information on how it works by sending the message:

"SUBSCRIBE AAASHRAN **FIRSTNAME LASTNAME**"
to the E-Mail
address "LISTSERV@GWUVM.GWU.EDU"

Additional information also can be obtained from Morton Sklar at the AAAS Science and Human Rights Program, 1333 H Street, N.W., Washington, D.C. 20005; tele: (202) 326-6799; E-Mail: MSKLAR@AAAS.ORG on Internet; or fax: (202) 289-4950.



Order your 1993 Human Genome Map Issue today !

This special issue of **SCIENCE** Magazine includes the very popular Genome Wall Chart. The 1993 version of the chart focuses on homologies between the mouse and human genomes, many of which are valuable in understanding human disease. The chart presents a synthesis of two mouse genome maps - one based on simple sequence polymorphisms and the other on genes. In addition to the map itself, this issue also contains an article, reports, perspectives and a policy forum that reflect the progress that has been made in the genome project and the goals for the next five years.

To order your copy please send \$6.00 to: Helen Williams
1333 H St., NW, Rm 1167-D
Washington, DC 20005

Name _____
Address _____
City _____ State _____ Zip _____

Method of Payment: Visa _____ MC _____ Check Enclosed _____

_____ Total # ordered @ \$6.00
\$ _____ Subtotal
\$ _____ For shipment to CA, add sales tax

Visa & MC orders accepted by fax (202) 842-1065

WOMEN IN SCIENCE "Gender and the Culture of Science" SCIENCE 16 April 1993 Reprint

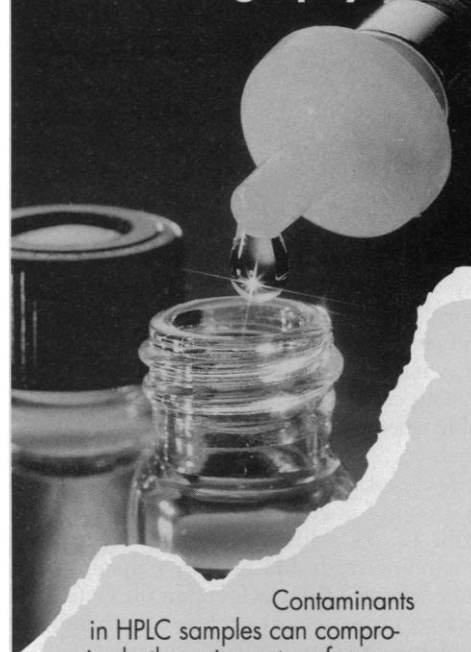
This 2nd annual cover story explores the many issues vital to female scientists and the companies and universities where they work. Are females unique in their approach to science? Are the issues facing American women global or are the barriers and frustrations different in Europe and Japan? Is there a female model for success in science? These questions and more will be raised in this important cover story.

To order your copy send \$2.95 per copy (includes postage) to:

SCIENCE
Attn: Corrine Harris
1333 H Street, NW
Washington, DC 20005

\$1.95 per copy on bulk orders of 10 or more copies
\$25.00 minimum on Visa and MasterCard orders

Don't Inject Variables Into Your Chromatography.



Contaminants in HPLC samples can compromise both equipment performance and chromatographic results. A sound sample prep program includes filtration with Millex® Filter Units just prior to column injection to protect your research from unwanted variables.

Get the Millipore HPLC Protection Policy.

Millex units incorporate low-extractable membranes in natural white, contaminant-free, solvent-resistant housings without glues, binders, or adhesives to compromise your solution. They are tested for membrane and housing integrity. Why use a filter unit that *contributes* contamination instead of one that *eliminates* it?

An HPLC-Certified Device.

The HPLC-certified Millex-LCR unit provides universal filtration for all commonly-used aqueous and organic solvents, and each box includes a certification stating that each lot is tested with water and acetonitrile to ensure consistent performance time after time.

Call For Our New Brochure.

Call **1-800-MILLIPORE** (1-800-645-5476) for a copy of our new Small-Volume Filtration Guide. And don't forget to request a copy of the 1994-95 Millipore Catalogue.

MILLIPORE

Copyright © 1993 Millipore Corporation.

Circle No. 14 on Readers' Service Card

*You are cordially invited to the premier event
for scientific and technical professionals*

AAAS 1994 Annual Meeting

The AAAS Annual Meeting

San Francisco Hilton and Towers

18-23 February 1994

SCIENCE AND A
CHANGING WORLD

Deadline for Advanced Registration: ~~January 24, 1994~~

- Over 125 sessions
- More than 700 speakers
- 100 exhibiting companies and publishers
- Network with 5000 of your peers
- Explore new career opportunities at the Employment Exchange

FINAL PROGRAM

Table of Contents

Plenary Lectures	2
Topical Lectures	3
Meeting-At-A-Glance	4
Meeting Time Table	6
General Meeting Information	
Meeting Location	7
On-site Registration Information	7
Important Deadline	7
For More Information Contact	7
Airline Information	7
San Francisco Transportation	7
Barrier-Free Information	7
Field Trip Information	8
Hotel Descriptions	8
Exhibit Hours	9
Invitation to Exhibit	9
Employment Exchange Hours	9
Special Events	9
Hotel Reservation Form	10
Advance Registration Form	11

**Gain insight into the latest scientific advances and
enhance your professional development at the 1994 AAAS Annual Meeting**

American Association for the Advancement of Science

SCIENCE AND A
CHANGING WORLD

Lectures

Plenary Lectures:

Plenary lectures will be held each day in the Hilton from 6:30 PM until 7:30 PM with the exception of Eloise E. Clark who will speak from 6:00 PM until 7:00 PM.

Fri, Feb 18:

John H. Gibbons,
Assistant to the President of
the U.S. for Science and
Technology

In these capacities, Dr. Gibbons is charged with providing access to authoritative information and expert scientific, engineering and technological advice for the President, Federal Officials, and Congress, and with coordinating science and technology policy throughout the Federal Government. Prior to his appointment by President Clinton, Dr. Gibbons directed the congressional Office of Technology Assessment (OTA).



Sun, Feb 20:

Eloise E. Clark,
Vice President for Academic
Affairs and Professor of
Biological Sciences, Bowling
Green State University

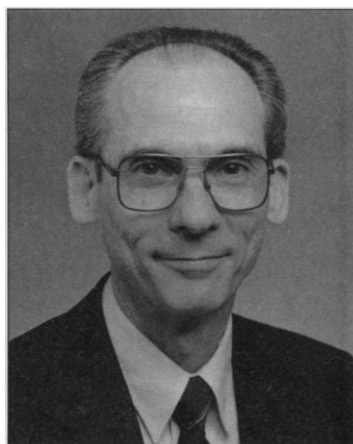
Dr. Clark is the first to hold this newly created position at BGSU that incorporates the academic functions of the previous Provosts' responsibilities. As principal academic officer at the University, she has responsibilities for the Graduate College, Research Services, Continuing Education, and the Libraries and Learning Resources. Prior to this appointment, Dr. Clark was Assistant Director of the National Science Foundation.



Sat, Feb 19:

Edward C. Stone,
Director, Jet Propulsion Lab
Vice President and Professor of
Physics,
California Institute of
Technology

Dr. Stone has served as the project scientist for the Voyager Mission since 1972 and coordinated the efforts of 11 teams of scientists in their studies of Jupiter, Saturn, Uranus and Neptune.



Topical Lectures: (*invited, not confirmed)

Topical Lectures will be held each day in the Hilton from 1:15 PM until 2:15 PM with the exception of Christopher McKay, who will speak in the Parc Fifty Five from 1:00 PM until 2:00 PM.

- Sat, Feb 19:** **Leonard A. Cole**, Rutgers Univ: *Radon: Hazard or Hype?*
Valli McDougale, Univ of California-San Francisco: *Scientific Education of the Public: Winding Your Way Through DNA*
Larry Squire, VA Med Ctr: *Memory and Brain Systems*
Alexander Tomasz*, Rockefeller Univ: *TBA*
Neal Lane, National Science Fdn: *Excellence and the future of NSF*
- Sun, Feb 20:** **Geory Delocote***, San Francisco Exploratorium: *TBA*
Steven L. Garrett, Naval Postgraduate School: *Thermoacoustic Refrigeration: A CFC Alternative*
Roy Porter, Wellcome Inst for the History of Medicine: *TBA*
David Stoddart, Univ of California-Berkeley: *The co-evolution of island landforms and biotas*
Paul Switzer, Stanford Univ: *Climate Change and Spatial Statistics*
- Mon, Feb 21:** **Rumen Bojkov**, World Meteorological Org: *Changes in Atmospheric Ozone*
Don C. Des Jarlais, Beth Israel Med Ctr: *Targeted and General AIDS Prevention Programming*
Katherine Milton, Univ California-Berkeley: *Brains, Guts, Diet, and Human Evolution*
Karl Rubin, Ohio State Univ: *The Solving of Fermat's Last Theorem*
Roger Shepard, Stanford Univ: *Visualization in Science: Thought Experiments, Physics and the Mind*
- Tue, Feb 22:** **Raymond Jeanloz**, Univ California-Berkeley: *Deep-earth Chemistry*
Jerold Lowenstein, Univ California-Berkeley: *Molecular Studies of Human Evolution*
Christopher McKay, NASA/Ames Rsch Ctr: *Life On Mars: Past, Present, and Future*
Rubin Puentes, Rockefeller Fdn: *Balancing Conservation and Societal Needs in Tropical Rainforests*
- Wed, Feb 23:** **Perry R. Cook**, Stanford Univ: *Real-time Voice Synthesis by Vocal Tract Model*
Garniss H. Curtis, Inst of Human Organs: *Calibration of Hominoid and Hominid Evolution*



Larry Squire
Va Med Ctr



Neal Lane
NSF



Don C. Des Jarlais
Beth Israel Med Ctr



Katherine Milton
Univ California-Berkeley



Roger Shepard
Stanford Univ



Jerold Lowenstein
Univ California-Berkeley



Christopher McKay
NASA/Ames Rsch Ctr



Garniss H. Curtis
Inst of Human Organs

Meeting-At-A-Glance

Time Schedule

All A.M. Sessions: 8:30 A.M. - 11:30 A.M. (Hilton)
All P.M. Sessions: 2:30 P.M. - 5:30 P.M. (Hilton) and
2:00 P.M. - 5:00 P.M. (Park Fifty Five)

San Francisco Hilton & Towers

(1) Continental Ballroom 4 (5) Continental Parlor 2
(2) Continental Ballroom 5 (6) Continental Parlor 3
(3) Continental Ballroom 6 (7) Continental Parlor 7
(4) Continental Parlor 1 (8) Continental Parlor 8-9

Session Locator Chart

Saturday, 19 February

Sunday, 20 February

Health Care Reform & Advances in Medicine (Hilton)	A.M. Increasing the Healthy Life Span: Advances in Health and Aging (1) P.M. Discovery of AIDS Therapies in an Era of Health Care Reform (1)	A.M. Ethical Issues in the Testing of Preventative HIV Vaccines (1) P.M. AIDS: Information Technology Supporting Research, Healthcare, and the Affected Community (1)
The Changing Environment (Hilton)	A.M. Valuing the Environment: Where Do We Stand? (4-5) A.M. Trade, Environment, and Food Security: Issues for Japanese and American Farmers (9) P.M. Monterey Bay Marine Sanctuary: A Natural Laboratory for Scientific Research (4) P.M. Whose Responsibility, for What, When? Responsibility Judgments for Disaster Consequences (5) P.M. Could We/Should We Engineer the Earth's Climate? (6)	A.M. Environmental Justice: Local, National and Global Perspectives (4-5) A.M./P.M. Critical Current Issues in Marine Biodiversity (15) P.M. Pacific Marine Science at Century's Close: Achievements and Prospects (4) P.M. Predicting, Mitigating, and Recovering from Disasters: The Role of the Information Infrastructure (5) P.M. Could We/Should We Engineer the Earth's Climate? (6)
Evolution Revolution (Park Fifty Five)	P.M. Origins (20)	A.M. Current State of Origins of Life Research (20) P.M. Anti-science/Anti-evolution (20)
Industry, Policy, and the Changing Infrastructure of Science (Hilton)	A.M. The X Program: A Model for Government-Industry Collaboration (18) A.M. Building a US Technology Policy (12) P.M. New Directions in the Organization of Japanese Corporate R&D (12) P.M. Science after the SSC: Where Do We Go From Here? (8)	A.M. Managing the Globalization of Industrial R&D (12) P.M. Research Assessment: Best Friend or Junkyard Dog? (12)
Science, Ethics & Law (Hilton)	A.M. Ethics in the Science Curriculum (8)	A.M./P.M. The Application of Forensic Sciences to Human Rights Investigation (8)
Regional and International Security & Defense Conversion (Hilton)	A.M. Defense Conversion and Technology Transfer (7) P.M. Defense Conversion in California (7)	A.M. Effective Approaches to the Arms Trade (7) P.M. Nuclear Arms Reduction and Russian Laboratory Conversion Through Joint US/Russian Cooperation (7)
Frontiers in Engineering & Physical Science Technology (Hilton)	A.M./P.M. Frontiers of the Physical Sciences: 1994 (11)	A.M. Phase Transitions (11) P.M. Recent Advances in Lasers (11)
Frontiers in Psychology & Linguistics (Hilton)	A.M. Face Recognition by Computers and People (19) P.M. New Findings on the Origins and Behavioral Consequences of Temperament (19)	A.M. Animal Behavior: Using Behavior-Genetic Analysis to Study Heredity and Behavior (19) P.M. Brain and Behavior: Biology Meets Public Health (19)
Frontiers in Astronomy (Park Fifty Five)		
Communicating Science (Hilton)	A.M./P.M. Measuring the Impact of Public Understanding of Science Programs (17)	A.M. Designing Science Shows for Kids (17) A.M./P.M. The Science of Star Trek: Bringing Science to a Different Public (3) P.M. Rethinking Public Understanding of Science: Putting the Audience First (17)
Science Education Reform (Hilton)	A.M. Benchmarks for Science Literacy and the Project 2061 Vision (2) P.M. The Essential Role of the Science Community in K-12 Education Reform (2)	A.M. Using Benchmarks and Other Project 2061 Reforms Tools for Curriculum Planning (2) P.M. Changing the System: Getting Policymakers, Academics, and Community Leaders Behind Project 2061 Reform (2)
Science for Everyone (Hilton)	A.M. Science is Fun! (21) A.M. Youth Meets the Masters (10) P.M. Pseudo Opinion Pools: SLOP or Useful Data? (18)	A.M. Science, Nutrition, and California Cuisine (18) P.M. Acoustics: Sound of Science and Science of Sound (22)
Societal Change: Population Trends and Urban Challenges (Hilton)	A.M. The Changing Work-face: Women, Men, and the Dynamics of Inclusion (13) P.M. Dual-Career Marriages (13)	A.M. The Many Faces of Women Scientists: Resolving the Woman/Scientist Dilemma (13) P.M. Glass-Cutter Programs: Eliminating Barriers to Career Advancement (13)

Seminars

Friday, 18 February	Saturday, 19 February	Sunday, 20 February
A.M./P.M. Mapping and Modeling the Brain (Hilton) (11)	A.M./P.M. Mapping and Modeling the Brain (Hilton) (3) A.M./P.M. Half the Secret of Life Is Outside the Cell (Park Fifty Five) (23)	P.M. Eating and Health (Park Fifty Five) (21)

AT-A-GLANCE ROOM ASSIGNMENTS
Parc Fifty Five

(9) Franciscan A-B	(13) Monterey	(17) Yosemite A	(20) Barcelona 1
(10) Franciscan C-D	(14) Teakwood A-B	(18) Yosemite B	(21) Barcelona 2
(11) Imperial Ballroom A	(15) Toyon A-B	(19) Yosemite C	(22) daVinci 1-2-3
(12) Imperial Ballroom B	(16) Walnut A-B		(23) Parc Ballroom 1-2-3

Monday, 21 February
Tuesday, 22 February
Wednesday, 23 February

A.M. Minding the Human Brain via Functional Magnetic Resonance Imaging (1) P.M. Imaging Systems for Health Education and Health Care Delivery (1) P.M. Social, Ethical, and Scientific Perspectives of Biological Research on Sexual Orientation (14)	A.M. Universal Design: Including People with Disabilities (1) P.M. Breast Cancer: the Environmental Connection (1) P.M. Current Perspectives on Pain Medicated by the Trigeminal Nerve (18)	A.M. Getting Under Your Skin: New Advances in Transdermal Drug Delivery (1) P.M. Potentials of Nanofabrication Science & Technology in the Biological Sciences (1)
A.M. Public Perceptions and Scientific Reality in Environmental Risks (4-5) A.M. Population, Agriculture, and the Environment in California (6) A.M. Biomedicine, Biotechnology, and Biodiversity: The Western Hemisphere Experience. (15) P.M. How Effective Are International Environmental Accords? (4) P.M. Resolving Africa's Environmental and Socioeconomic Problems (16) P.M. Recent Advances in Earthquake Disaster Mitigation (5) P.M. Global Change Update 1994: What Do We Know About Ozone? (6)	A.M. The Floods of 1993: Causes, Losses, and Responses (5) A.M. Climate Change, Cultural Complexity, and the Collapse of Civilizations (6) A.M./P.M. Sustainability From the Ground Up: Land and Soil Resources (15) A.M./P.M. Energy Research in Africa: Power and Development Beyond 2000 (4) P.M. Estimating the Impact of the California Drought (5) P.M. Charting the Biosphere: The Systematic Science Agenda (6)	A.M./P.M. Africa's Fragile Lakes: An Assessment of Social and Environmental Changes (4) A.M./P.M. Development and Use of Crop and Livestock Intellectual Property (5)
A.M./P.M. Diversity in Engineering: Oxymoron or Opportunity? (12) P.M. Is Science Becoming Just Another Interest Group? (12)	P.M. Research Universities in a Changing Funding Environment (12)	A.M. Benchmarking Technology from a Global Perspective (12)
A.M. Who's an Expert? Science and the Supreme Court (8) P.M. Linking Independent S&T Expertise to Courts: A Demonstration Project (8)	A.M. Scientists and Human Rights: Activists, Victims, and Advocates (8) P.M. Statistics and Information Management for Human Rights (8)	A.M. Coping with Crises: Sexual Harassment (8) P.M. Inner City Crime and Future Violence Initiatives (8)
A.M./P.M. Nuclear Weapons Dismantlement and Its Aftermath (7)	A.M. Arms Control and International Security: New Players, New Approaches (7) P.M. The Future of the Nuclear Nonproliferation Treaty and Regime (7)	
A.M. New Physics in the Bay Area (11) P.M. Highways and Toll Roads: Electronic Access in the 21st Century (11)	P.M. The Unreasonable Effectiveness of Number Theory (14)	A.M. Trace Substances: Impact of Recent Instrumental Advances on Regulatory Affairs (11) P.M. Calibrating Human History: The Impact of New Methods of Dating (11)
P.M. Comparative Linguistics and Historical Relationships (19)	P.M. Application of Behavior Science to Real-World Problems: The USS Vincennes (19)	A.M. Brain, Mind, and Language: Evidence from Aphasia (19) P.M. Inherited Speech and Language Disorders: In Search of a Phenotype (19)
A.M./P.M. Cosmology After COBE (20)	A.M. Changing Perspectives on the Planets (20) P.M. How California Astronomers Changed Our View of the Universe (20)	A.M. Cosmic Rain: The Bombardment of Earth (20) P.M. Gravitational Biology and Space Medicine (20)
A.M. Science, Lies, and Videotape (17) P.M. Is Visualization REALLY Necessary for Science, Engineering, and Medicine? (17)	P.M. Multimedia Information Systems Education: Harnessing Technologies (17)	
A.M. National Science Education Standards (2) P.M. The Third International Math and Science Study (TIMSS) (2)	A.M. Public Understanding of Basic Biomedical Concepts (2) P.M. Facing the Challenge: Building Scientific Literacy in a Multicultural and Multilingual Society (2)	A.M. National and International Tests: How Good Is the Science? (2) P.M. Women in Science and Engineering: to Be (or Not to Be) a Postdoc (2)
	A.M./P.M. Science for the Naked Eye, XXI (22)	A.M. Art and Mathematics (7) P.M. Science and the Sense of the Sacred (7)
A.M. Why Adaptation Becomes Maladaptive: The Dynamics of Population and Resource (13) P.M. Global Population, Food, Environment, and Ethics (13)	A.M. Immigrants in the United States: Impacts and Assimilation (13) P.M. Beyond the Boundaries of Nation-State: New Perspectives on Transnational Migration (13)	A.M. Changing America: Population Trends and Outlooks (13) P.M. Changes in American Families: Causes and Consequences (13)

Monday, 21 February
Tuesday, 22 February
Wednesday, 23 February

A.M./P.M. Evolution and Extinction (Hilton) (3)
A.M./P.M. Eating and Health (Parc Fifty Five) (21)

A.M./P.M. Evolution and Extinction (Hilton) (3)

A.M./P.M. Evolution and Extinction (Hilton) (3)

AAAS 1994 Annual Meeting Time Table

February 18-23, 1994, San Francisco Hilton and Towers

Friday, 18 February	Saturday, 19 February	Sunday, 20 February	Monday, 21 February	Tuesday, 22 February	Wednesday, 23 February
Registration "Brain" Seminar <u>Only</u> 7:30 AM Hilton East Lounge	Registration 7:30 AM- 5:00 PM Hilton East Lounge	Registration 7:30 AM- 5:00 PM Hilton East Lounge	Registration 7:30 AM- 3:00 PM Hilton East Lounge	Registration 7:30 AM- 3:00 PM Hilton East Lounge	Registration 7:00 AM- Noon Hilton East Lounge
Public Science Day Youth Symposium 9:00 AM - 2:00 PM Hilton Continental Ballroom	Concurrent Sessions 8:30 AM - 11:30 AM See program book for details	Concurrent Sessions 8:30 AM - 11:30 AM See program book for details	Concurrent Sessions 8:30 AM - 11:30 AM See program book for details	Concurrent Sessions 8:30 AM - 11:30 AM See program book for details	Concurrent Sessions 8:30 AM - 11:30 AM See program book for details
		Exhibitions 10:00 AM - 4:00 PM Hilton Grand Ballroom	Exhibitions 10:00 AM - 4:00 PM Hilton Grand Ballroom	Exhibitions 10:00 AM - 2:00 PM Hilton Grand Ballroom	
		Student Award Poster Competition 11:30 AM - 1:30 PM Hilton Grand Ballroom	Poster Sessions 11:30 AM - 1:30 PM Hilton Grand Ballroom	Poster Sessions 11:30 AM - 1:30 PM Hilton Grand Ballroom	
Registration 2:00 PM - 8:00 PM Hilton East Lounge	Topical Lectures 1:15 PM - 2:15 PM Hilton See program book for details	Topical Lectures 1:15 PM - 2:15 PM Hilton See program book for details	Topical Lectures 1:15 PM - 2:15 PM Hilton See program book for details	Topical Lectures 1:15 PM - 2:15 PM Hilton 1:00 PM - 2:00 PM Parc Fifty Five See program book for details	Topical Lectures 1:15 PM - 2:15 PM Hilton See program book for details
AJAS Oral Presentations 2:00 PM - 5:30 PM Hilton Toyon A-B Walnut A-B Monterey	Concurrent Sessions 2:30 PM - 5:30 PM Hilton 2:00 PM - 5:00 PM Parc Fifty Five See program book for details	Concurrent Sessions 2:30 PM - 5:30 PM Hilton 2:00 PM - 5:00 PM Parc Fifty Five See program book for details	Concurrent Sessions 2:30 PM - 5:30 PM Hilton 2:00 PM - 5:00 PM Parc Fifty Five See program book for details	Concurrent Sessions 2:30 PM - 5:30 PM Hilton 2:00 PM - 5:00 PM Parc Fifty Five See program book for details	Concurrent Sessions 2:30 PM - 5:30 PM Hilton 2:00 PM - 5:00 PM Parc Fifty Five See program book for details
Social Hour 5:30 PM - 6:30 PM Hilton Yosemite Foyer	Grand Opening Reception, Exhibitions, and AJAS Poster Session 5:00 PM - 6:30 PM Hilton Grand Ballroom		Social Hour 5:30 PM - 6:30 PM Hilton Yosemite Foyer	Social Hour 5:30 PM - 6:30 PM Hilton Yosemite Foyer	
Keynote Speaker <i>John H. Gibbons</i> 6:30 PM - 7:30 PM Hilton Continental Ballroom (4 and 5)	Plenary Lecture <i>Edward C. Stone</i> 6:30 PM - 7:30 PM Hilton Continental Ballroom (4 and 5)	President's Lecture <i>Eloise E. Clark</i> 6:00 PM - 7:00 PM Hilton Continental Ballroom (4 and 5)	Awards Ceremony 7:00 PM - 8:00 PM Hilton Imperial Ballroom	Plenary Lecture <i>TBA</i> 6:30 PM - 7:30 PM Hilton Continental Ballroom (4 and 5)	
		President's Social 7:00 PM - 8:00 PM Hilton Continental Ballroom (4 and 5)			

General Meeting Information

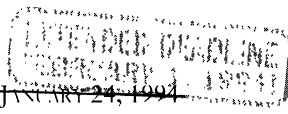
Location

The San Francisco Hilton and Towers
One Hilton Square
San Francisco, California 94102

On-site Registration Hours

Friday February 18, 1994: 2:00 PM – 8:00 PM
Saturday February 19, 1994: 7:30AM – 5:00 PM
Sunday February 20, 1994: 7:30AM – 5:00 PM
Monday February 21, 1994: 7:30AM – 3:00 PM
Tuesday February 22, 1994: 7:30AM – 3:00 PM
Wednesday February 23, 1994: 7:30AM – NOON

Important Deadline

Advance Registration: 

For General Meeting Information

ADDRESS: AAAS
Meetings Department
1333 H Street, NW
Washington, DC 20005

PHONE: (202) 326-6450
FAX: (202) 289-4021

For Registration Information Only

SEE PAGE 11, OR
PHONE: (301) 855-8811

Discount Air Fares

Special air fare discounts to San Francisco are available through the AAAS Meetings Desk at World Travel Partners. Discounts apply to standard coach fares as well as to the lowest published air fares. Make your reservation early to insure that you get the best possible air fare.

Airlines include United, the official carrier, as well as all other major carriers including American, Continental, Delta, Northwest, USAir and others.

Remember to tell the convention specialist that you are attending the AAAS Annual Meeting in San Francisco.

Book your flight now, with the AAAS Meetings Desk and you will automatically receive: \$150,000 flight insurance, arrival information on taxi fares, rental cars, headset coupon on United Airlines (an \$8.00 value), and more.

Barrier-Free Environment

Accommodations for people with disabilities are provided upon request at all general lectures and other sessions. Services include interpreters for the deaf or hearing impaired, audiotaped highlights for the blind or visually impaired, and mobility assistance within and outside the Hilton as needed. In addition, a resource room for people with disabilities will be available in the San Francisco Hilton and Towers-Saratoga Room. Please make sure to include any accommodation requests on your registration form on page 10.

Local Transportation

Bay Area Rapid Transit (BART) provides convenient transportation around the city; a modern subway and bus system links many areas within and around San Francisco. SFO Airporter provides bus service from the airport to area hotels every 20 minutes between 5:00 AM and 11:30 PM. Buses depart from the lower level baggage claim area. Bus fares are \$8 one-way, \$12 roundtrip. Taxis are also located on the airport lower level. Taxi fares from the airport to downtown are approximately \$25-\$30. Allow 30-45 minutes between the airport and hotels.

To reserve your flight, contact:

AAAS MEETINGS DESK
Provided by World Travel Partners

Hours: 9:00 AM - 5:30 PM Eastern Time
Monday through Friday

Toll Free 800-336-0227
Washington, DC Metro Area 703-684-2774
TDD, for hearing impaired 703-684-6091

UNITED AIRLINES
CONVENTION DESK

Hours: 7:00 AM - 1:30 AM
Seven days a week

REFER TO ID #540MW
Toll Free 800-521-4041
TDD, for hearing impaired 800-323-0170

Field Trips

The expeditions described below will take participants to places in the Bay Area that enrich the scientific content of the Meeting. The trips will be kept small (as few as twenty people) so that everyone can talk with the leaders and learn from the sites. Early enrollment is advised because of space limitations.

ENROLLMENT DEADLINE: January 24, 1994

FOR ENROLLMENT FORMS CONTACT:

Michele Aldrich, (202) 326-6485 or Alan Leviton (415) 752-1554.

Muir Woods -

Friday, February 18, 1994

Leave the Hilton at 12:30 PM, return by 5:00 PM

Leaders: Richard Beidleman, Colorado College and
Linda Beidleman, botanist/author

Cost: \$20 per person

The leaders will guide participants along the two kilometer paved level trail through the major redwood stands. The drive to the park goes through successive botanical assemblages reflecting the influence of rainfall and geology formations on California vegetation.

Stanford Linear Accelerator -

Friday, February 18, 1994

Leave the Hilton at Noon, return by 5:00 PM

Leader: SLAC Personnel

Cost: \$20 per person

Tour includes two-mile linear accelerator, SPEAR storage ring, Synchrotron Radiation Laboratory and Positron-Electron Project storage ring (slated to be converted to an Asymmetric B Factory)

Earthquake Walk at Point Reyes - Saturday, February 19, 1994

Leave the Hilton at 9:00 AM, return by 5:00 PM

Leader: Peter U. Rodda, California Academy of Sciences
and San Francisco State University

Cost: \$50 per person (includes box lunch)

Tour includes hands-on examination of the dramatic and subtle earthquake topography sculpted by the San Andreas Fault. Cherts, basalts, shales, schists, diorites, conglomerates, and serpentines are among the rocks outcropping at stops on this trip. Walking will be mostly on level trails and gentle slopes.

Marine Headlands Geology and Botany- Wednesday, February 23, 1994

Leave the Hilton at 8:30, return by 5:00 PM

Leaders: Clyde Wahrhaftig, Univ of California-Berkeley and
Bonnie Murchey, US Geological Survey -Menlo Park, and
Jonathan Hagstrom, US Geological Survey-Menlo Park, Terri
Thomas, National Park Service

Cost: \$50 per person (includes box lunch)

Trip requires considerable walking to examine outcrops at close hand; trail to the beach is steep, and scuffable clothes and hiking footwear is required. Tour includes the south shore of the headlands; terrane offers superb examples of geological influence on vegetation.

Exploratorium -

Wednesday, February 23, 1994

Leave the Hilton at 1:00 PM, return by 5:00 PM

Leader: Sally Duensing, The Exploratorium

Cost: \$20 per person (includes admission)

Includes an overview of the museum, a behind-the-scenes visit to the shops, labs and research centers where exhibits will be under development on immunology, genetics, and feedback (mechanical and biological), and a questions and answer session at the end.

Hotel Information

SAN FRANCISCO HILTON AND TOWERS

The San Francisco Hilton and Towers is the largest hotel on the west coast with 1,900 guest rooms. It is conveniently located in the heart of San Francisco near cable cars, the financial district, Union Square, theaters and night-life entertainment. A premier business, meetings and luxury hotel, accommodations include the exclusive Towers with private registration area. The Hilton also offers beautiful rooms with breathtaking views and balconies. Other features include an Executive Business Center, Health and Fitness Center and Cityscape, a panoramic view restaurant atop the 46th floor. Lectures, seminars, the Employment Exchange, and Exhibits of the AAAS Annual Meeting will take place at the Hilton. Special early bird rates available if you reserve your room now. For room rates see the Hotel Registration Form.

PARC FIFTY FIVE

The Parc Fifty Five is a four-diamond luxury hotel located immediately across the street from the Hilton. This beautiful hotel offers spacious rooms, fabulous views of San Francisco and award-winning service. In addition to two restaurants and three lounges, the Parc Fifty Five offers a complimentary health club and a full service business center. The San Francisco Shopping Center is adjacent to the hotel, and Union Square and the cable cars are just a block away. Special early bird rates available. For room rates see the Hotel Registration Form.

Exhibit Hours

Saturday February 19, 1994	5:00 PM - 7:00 PM
<i>(Opening Reception from 5:00 PM until 6:30 PM)</i>	
Sunday, February 20, 1994	10:00 AM - 4:00 PM
Monday, February 21, 1994	10:00 AM - 4:00 PM
Tuesday, February 22, 1994	10:00 AM - 2:00 PM

For more information or to reserve your booth space contact:

CENTEX
475 GATE FIVE ROAD
SUITE 221
SAUSALITO, CA 94965
PHONE: 415-331-2466
FAX: 415-331-2006

Employment Exchange Hours

Sunday, February 20, 1994	Noon - 6:00 PM
Monday, February 21, 1994	9:00 AM - 5:00 PM
Tuesday, February 22, 1994	9:00 AM - 5:00 PM
Wednesday, February 23, 1994	9:00 AM - 2:00 PM

Invitation to Exhibit

The American Association for the Advancement of Science (AAAS) invites you to exhibit at its 160th Annual Meeting. This annual, multidisciplinary conference attracts over 5,000 scientists, educators, and researchers working in the life sciences, physical sciences and the social sciences. The AAAS Annual Meeting provides a unique audience of potential customers. Exhibitors include: publishers of scientific books or journals, computer software and hardware companies, scientific associations and societies, government agencies, education and information services, corporations with scientific interest, and scientific equipment companies.

Discussion Groups and Special Events**AAAS Fellowships for Scientists and Engineers**

A panel discussion will explore opportunities for scientists and engineers to participate in the interaction of science and public policy in Washington, DC, through the AAAS Congressional, Diplomacy, Technology Policy, and Environmental Fellowship Programs. The programs place Fellows in congressional offices, at the State Department and the Agency for International Development, in the White House Office of Science and Technology Policy, and the Environmental Protection Agency. For more information, contact the AAAS Directorate for Science and Policy Programs at (202) 326-6600.

"Is Science Becoming Just Another Interest Group?"

In recent years, scientists have repeatedly been exhorted by policymakers to become more active in the political process. At the same time, it has appeared to scientists that it is in their interests to do so, particularly

during times of tight budgets for R&D. A panel discussion will explore this topic. For more information, contact the AAAS Directorate for Science and Policy Programs at (202) 326-6600.

Science Policy Reception

Meeting attendees can meet the members of the AAAS Committee on Science, Engineering, and Public Policy in an informal setting. Scientists and engineers who have participated in the AAAS science policy fellowship programs will also be present. For more information, contact the AAAS Directorate for Science and Policy Programs at (202) 326-6600.

American Junior Academy of Science (AJAS)

Friday, February 18: Oral Presentations—Hilton/Toyon A-B, Walnut A-B, Monterey

(2:00 - 5:30 PM)

Saturday, February 19: Poster Session—Hilton/Grand Ballroom

(5:00 - 6:30 PM)

AJAS will convene in conjunction with the AAAS Annual Meeting. Sixty to seventy of the nation's premier Pre-College Science Research Students will meet in San Francisco to share their research, both in poster and oral presentation. For more information contact: Gloria J. Takahashi at (213) 744-3384

Science Encounters Youth Symposium (Public Science Day)

Friday, February 18: Hilton/Continental Ballroom

9:00 AM - 2:00 PM

Selected Bay Area high school students will have the opportunity to explore the most exciting advances in physics, biology, computer and space science, and medicine. For more information contact: Judy Kass at (202) 326-6667

Hotel Reservation Form

AAAS Annual Meeting 18-23 February 1994 • San Francisco

Send Confirmation to:

(Please print clearly)

Name _____
(last name) (first name)

Institution/Company _____
(if part of address)

Address _____

City/State/Zip/Country _____

Phone _____ FAX _____

Other occupant(s) of room _____
(name)

(name) / _____
(name)

Special housing needs: ☐ Wheelchair accessible room ☐ Nonsmoking room
☐ Other _____

Reservations must be guaranteed with a credit card or check for first night's deposit.

☐ VISA ☐ Mastercard ☐ Discover ☐ American Express ☐ Check Enclosed

Credit Card #

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Expiration Date _____ Signature _____

Room Rates:

Check appropriate box for your choice of hotel and room. Add 12% occupancy tax to rates shown.

San Francisco Hilton and Towers

Attn: Reservations, 333 O'Farrell Street, San Francisco, CA 94102

(Specify Standard, Superior, Deluxe, or Towers)

	Standard	Superior	Deluxe	Towers
<input type="checkbox"/> Single	\$120 <input type="checkbox"/>	\$130 <input type="checkbox"/>	\$140 <input type="checkbox"/>	\$195 <input type="checkbox"/>
<input type="checkbox"/> Double/Twin	\$140 <input type="checkbox"/>	\$150 <input type="checkbox"/>	\$160 <input type="checkbox"/>	\$215 <input type="checkbox"/>

\$25 per additional person

Parc Fifty Five Hotel

Attn: Reservations, 55 Cyril Magnin, San Francisco, CA 94102

(Specify Superior, Deluxe, Concierge Club, or Suites)

	Standard	Deluxe	Concierge Club	Suites
<input type="checkbox"/> Single	\$117 <input type="checkbox"/>	\$125 <input type="checkbox"/>	\$145 <input type="checkbox"/>	\$270-960 (S/D) <input type="checkbox"/>
<input type="checkbox"/> Double/Twin	\$127 <input type="checkbox"/>	\$135 <input type="checkbox"/>	\$155 <input type="checkbox"/>	

Arrival & Departure:

Reservations must be guaranteed with a credit card or check for the first night's deposit (room rate plus 12% occupancy tax). Please note hotel check-in and check-out times listed below.

Arrival date _____

Arrival Time AM ☐ PM ☐

Departure date _____

Departure Time AM ☐ PM ☐

- Reservations must be received at the appropriate hotel by 21 January 1993. (Housing requests received after this date are conditional on room availability.)

- Reservation changes and cancellations must be made directly with the hotel. Cancellations must be received at the appropriate hotel no later than 72 hours prior to scheduled arrival.

- Children under 18 stay free in same room as parents and using existing bedding.

- Check-in time for Hilton is 2 pm; check-out time is 12 noon.

- Check-in time for Parc Fifty Five is 3 pm; check-out time is 12 noon.

Mailing Instructions

Mail this form to the hotel of your choice, with any necessary deposit.

Advance Registration Form

The AAAS Annual Meeting 18-23 February 1994 • San Francisco

Registrant Information

(Please type or print clearly)

First/given name (as you would like it to appear on your badge)

Last/family name (as you would like it to appear on your badge)

Institution/company (will appear on badge, subject to abbreviation)

Mailing Address

City State Zip code

Country

Daytime phone number Fax number

☐ Check here if you need special services due to a disability.
(We'll call you before the meeting.)

AAAS member number (if member)

If registering at student rate, check here ☐ and attach a copy of your student ID card.

If registering at postdoctoral or K-12 teacher rate, indicate the name and number of your chairperson or principal:

Chairperson/principal's name

Chairperson/principal's phone number

DEADLINE: RECEIVED BY JANUARY 24, 1994

Meeting Fees¹ (No seminars/workshops)

	PRE-REGISTRATION DISCOUNT	AFTER JAN. 24	ONE DAY
Regular			
<input type="checkbox"/> Member	\$145	\$195	\$98
<input type="checkbox"/> Nonmember	\$195	\$250	\$125
If only one day, please check day:			
<input type="checkbox"/> Fri <input type="checkbox"/> Sat <input type="checkbox"/> Sun <input type="checkbox"/> Mon <input type="checkbox"/> Tues <input type="checkbox"/> Wed			
Special			
<input type="checkbox"/> Retired	\$50	\$70	n/a
<input type="checkbox"/> Postdoc ²	\$50	\$70	n/a
<input type="checkbox"/> K-12 Teacher ²	\$50	\$70	n/a
<input type="checkbox"/> Speaker	\$50	\$50	n/a
<input type="checkbox"/> Section Officer	\$50	\$50	n/a
Student ²			
<input type="checkbox"/> Member	\$25	\$30	n/a
<input type="checkbox"/> Nonmember	\$45	\$50	n/a

Seminar Fees (Seminar fees listed below INCLUDE discount meeting fees unless otherwise indicated.)

	REGULAR		STUDENT		SPECIAL
	MEMBER	NONMEMBER	MEMBER	NONMEMBER	
<input type="checkbox"/> Mapping and Modeling the Brain	\$295	\$345	\$125	\$145	\$150
<input type="checkbox"/> Evolution and Extinction	\$295	\$345	\$125	\$145	\$150
<input type="checkbox"/> Eating and Health	\$195	\$245	\$75	\$95	\$100
<input type="checkbox"/> Half the Secret of Life Is Outside the Cell (co-sponsored by ASCB)	\$155	\$205	\$5 ⁶	\$10 ⁶	\$20 ⁶

Membership Dues³

(Optional)

If you are not an AAAS member, you can join now by checking the appropriate box below — and take advantage of the discounted member registration fees below. You'll also get a year's subscription (51 issues) to the journal *Science* at the lower 1993 rate.

	USA	Canada	International
<input type="checkbox"/> Regular	\$87	\$146.59	\$182
<input type="checkbox"/> Student	\$47	\$103.79	\$142
<input type="checkbox"/> Postdoc	\$62	\$119.84	\$157
<input type="checkbox"/> Retired	\$47	\$103.79	\$142

Payment⁴

Meeting or Seminar fee.....\$

Membership dues\$
(if joining now)

Total amount\$

- ☐ Check enclosed⁵
☐ Original institutional purchase order attached
☐ VISA ☐ Mastercard
(no other cards accepted)

Credit card number

Signature

Exp. date

Mailing Instructions

(24 January deadline¹)

Mail to: The AAAS Annual Meeting
P.O. Box 630285
Baltimore, MD 21263

Or fax (credit card payments only) to
202-289-4021

IMPORTANT FOOTNOTES

- [1] 24 January deadline: AAAS will make every effort to process registrations received after this deadline but to ensure proper processing, please mail or fax your registration form before this deadline. You may register on site beginning 18 February.
- [2] Special rates: To qualify for the student rate, you must attach a copy of your student ID card. To qualify for the postdoctoral or K-12 teacher rate, you must provide the name and phone number of your department chairperson or principal in the space provided above. Registrations received without appropriate verification will be charged at the Regular rates.
- [3] Membership dues indicated herein are at the 1993 rates. Although dues are increasing on January 1, 1994, the 1993 rates are guaranteed through 23 February 1994 for registrants of the annual meeting; \$47 of dues plus international postage are allocated to *SCIENCE*. Please allow 4-6 weeks for receipt of your first issue of *SCIENCE*. Canadian rate includes GST #125488122.
- [4] Cancellations must be received in writing by 24 January 1994. No refunds will be made for cancellations received after this date. Refunds are subject to a \$25 cancellation charge and will be processed after the meeting.
- [5] Checks must be in United States currency and must be payable on a U.S. bank.
- [6] Does not include meeting registration fee. Students and Specials only can register for this seminar without registering for the entire meeting.