

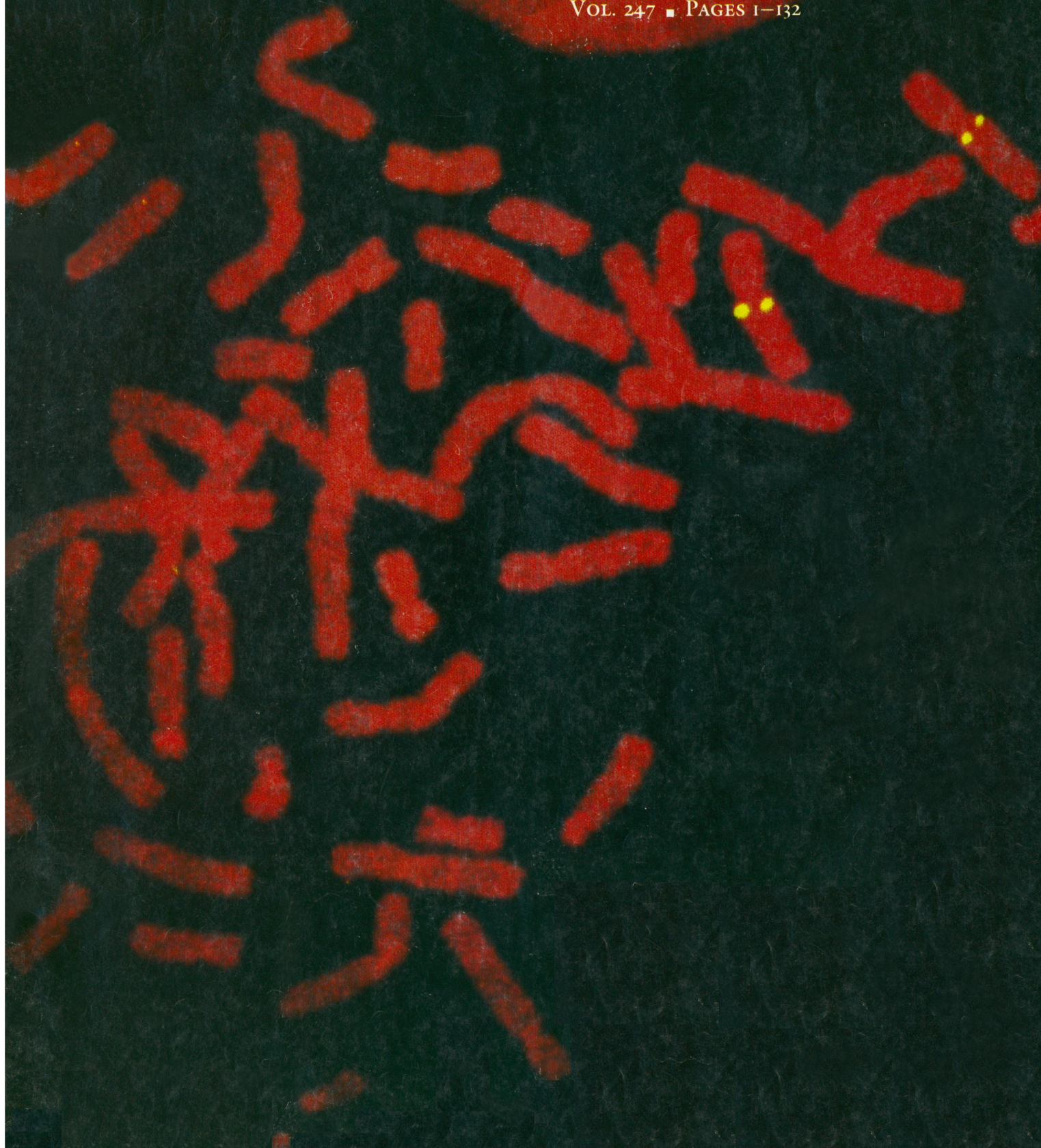
AMERICAN
ASSOCIATION FOR THE
ADVANCEMENT OF
SCIENCE

SCIENCE

5 JANUARY 1990

\$3.50

VOL. 247 ■ PAGES 1-132



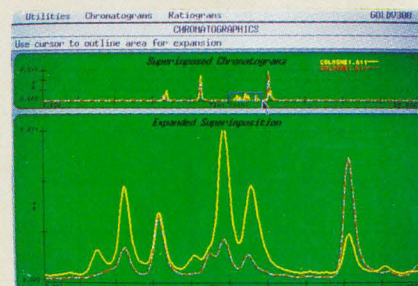
There's nothing hard about our software.

System Gold™, the Personal™ Chromatograph, teams an advanced HPLC system with a powerful personal computer* to make balancing many LC functions a lot easier.

The software is what makes it so easy. A mouse, drop down menus, truly helpful help screens and enhanced graphics give you the easiest control of your data ever.

All System Gold LC modules are fully programmable, and linked on a bi-directional digital network. So you control and monitor the entire system from a single point.

Superior integration algorithms always give you accurate, reproducible results. Stunning post-run graphics make data comparison and spectral analysis especially easy. Because of multi-tasking, you can even review data while the system is doing another run.



And it's easy to configure System Gold for any application — methods development, QC, analysis of amino acids, proteins, peptides and more.

Contact your Beckman HPLC Representative at 800/742-2345. Or Beckman Instruments, Inc., Altex Division, 2350 Camino Ramon, P.O. Box 5101, San Ramon, CA 94583. Offices in major cities worldwide.

There's nothing hard about it.

*IBM Personal System/2, PC-AT, PC-XT or NEC portable.

IBM® Personal System/2™, PC-AT™ and PC-XT™ are trademarks of International Business Machines Corporation.
NEC™ is a trademark of NEC Corporation.
© 1988, Beckman Instruments, Inc. AX67-1051B

BECKMAN

Send Representative and Literature circle No. 58
Send Literature only circle no. 59

We Take Great Ideas... & Make Them Even Better™

500 Series



From \$975

IEEE-488 Interfaces



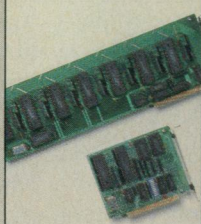
\$395

**Circular Thermal Print
Recorders**



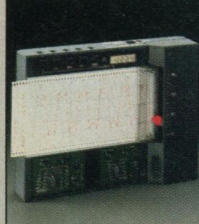
\$940

**High Capacity
Digital I/O**



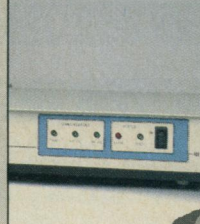
\$495

Portable Recorders



\$1,050

**Stand-Alone
Interfaces**



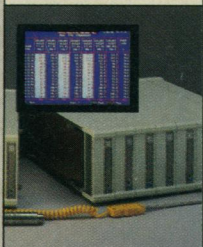
\$1,995

Event Recorders



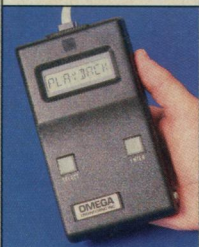
\$444

**Data Acquisition
Software**



\$1,495

**Handheld
Dataloggers**



\$559

**Voice Synthesis
Alarm Units**



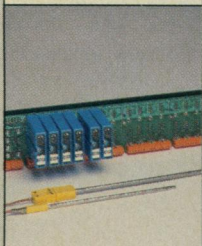
\$345

Plotters



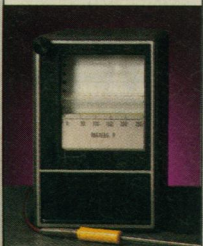
\$1,400

Digital Transmitters



\$245

**Economical
Mv Recorders**



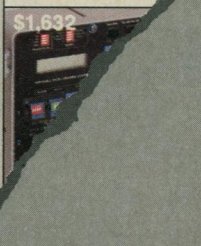
\$285

**Plug-In Cards for
IBM PS/2**



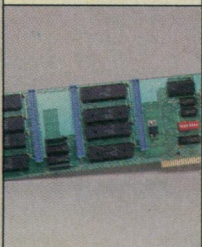
\$300

**Remote Logging
Systems**



\$1,632

**Plug-In Cards for
Apple Macintosh**



\$295

**Compact Circular
Recorders**



**NEW!
FREE!
NOW
HARDBOUND!**

Over 600 Full Color Pages

The 1990/91 OMEGA
Complete Data Acquisition
and Computer Interface
Handbook and Encyclopedia®
Circle No. 79 on Readers' Service Card

Ask For Your
FREE Handbook
Qualification Form!

Dial (203) 359-RUSH
(203) 359-7874



An OMEGA Technologies Company
One Omega Drive, Box 4047, Stamford, CT 06907
Telex 996404 Cable OMEGA FAX (203) 359-7700
For Orders and Technical Information Call

1-800-826-6342
1-800-T-C OMEGA

IN CT. (203) 359-1660

©COPYRIGHT 1990, OMEGA ENGINEERING INC., ALL RIGHTS RESERVED

Also Available FREE: Temperature, Pressure, Flow, pH and Electric Heaters.



7 This Week in *Science*

Editorial

- 9 To See Ourselves As Others See Us

Perspective

- 12 Identifying Tumor Suppressor Genes in Human Colorectal Cancer:
E. J. STANBRIDGE

Letters

- 14 Global Warming Report: R. S. LINDZEN; W. A. NIERENBERG; R. JASTROW;
S. BALIUNAS; M. STUIVER; L. ROBERTS

News & Comment

- 17 To Test or Not to Test?
18 One Worked; The Other Didn't
19 Article on Gallo Prompts Inquiry
20 Amino Acids: How Much Excitement Is Too Much?
21 MSG: A 20-Year Debate Continues
22 Academy Panel Raises Radiation Risk Estimate
24 *Briefings*: Deforestation: Brazil's Surprise Role ■ New Science-Minded Leadership
in Romania ■ Lobbying for an Environmental NIH ■ Rogue AIDS Disk Alarms
Researchers ■ NSF to Spell Out Priorities ■ Tireless Promoter ■ Shockley Shocker
■ The Big Sleep ■ Will John Deutch or Dr. X Lead MIT? ■ Americans Capture
More Math Degrees

Research News

- 26 A Small Revolution Gets Under Way
28 The Reign of Trial and Error Draws to a Close
30 Making Deep Earthquakes in the Laboratory
31 Quick Fix for Freeways
32 Feathers Fly in Grouse Population Dispute

Articles

- 33 U.S. Trade Policy at a Crossroad: R. E. LITAN AND P. O. SUCHMAN
39 Stellar Activity and Brightness Variations: A Glimpse at the Sun's History:
R. R. RADICK, G. W. LOCKWOOD, S. L. BALIUNAS
44 Mental Models in Narrative Comprehension: G. H. BOWER AND D. MORROW

Research Article

- 49 Identification of a Chromosome 18q Gene That Is Altered in Colorectal Cancers:
E. R. FEARON, K. R. CHO, J. M. NIGRO, S. E. KERN, J. W. SIMONS,
J. M. RUPPERT, S. R. HAMILTON, A. C. PREISINGER, G. THOMAS *et al.*

- **SCIENCE** is published weekly on Friday, except the last week in December, and with an extra issue in March 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. Copyright © 1990 by the American Association for the Advancement of Science. The title **SCIENCE** is a registered trademark of the AAAS. Domestic individual membership and subscription (51 issues): \$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 Mapping the muscle glycogen phosphorylase gene on human chromosome 11 by chromosomal in situ suppression (CISS) hybridization. Fluorescent signals from the dinitrophenol-labeled cosmid probe are visualized as yellow dots on the propidium iodide (red) counterstained chromosome spread. See p. 64. [Photograph by Peter Lichter and David C. Ward]

Reports

- 57 Direct Observation of Structural Defects in Laser-Deposited Superconducting Y-Ba-Cu-O Thin Films: R. RAMESH, D. M. HWANG, T. VENKATESAN, T. S. RAVI, L. NAZAR, A. INAM, X. D. WU, B. DUTTA, G. THOMAS, A. F. MARSHALL *et al.*
- 59 A Light Source Smaller Than the Optical Wavelength: K. LIEBERMAN, S. HARUSH, A. LEWIS, R. KOPELMAN
- 61 Evidence for a Novel Thioredoxin-Like Catalytic Property of Gonadotropic Hormones: J. J. BONIFACE AND L. E. REICHERT, JR.
- 64 High-Resolution Mapping of Human Chromosome 11 by in Situ Hybridization with Cosmid Clones: P. LICHTER, C.-J. C. TANG, K. CALL, G. HERMANSON, G. A. EVANS, D. HOUSMAN, D. C. WARD
- 69 U1-Specific Protein C Needed for Efficient Complex Formation of U1 snRNP with a 5' Splice Site: V. HEINRICHS, M. BACH, G. WINKELMANN, R. LÜHRMANN
- 72 Mechanism of Insect Resistance to the Microbial Insecticide *Bacillus thuringiensis*: J. VAN RIE, W. H. MCGAUGHEY, D. E. JOHNSON, B. D. BARNETT, H. VAN MELLAERT
- 74 Derepression of Ferritin Messenger RNA Translation by Hemin in Vitro: J.-J. LIN, S. DANIELS-MCQUEEN, M. M. PATINO, L. GAFFIELD, W. E. WALDEN, R. E. THACH
- 77 Inhibition of Angiogenesis by Recombinant Human Platelet Factor-4 and Related Peptides: T. E. MAIONE, G. S. GRAY, J. PETRO, A. J. HUNT, A. L. DONNER, S. I. BAUER, H. F. CARSON, R. J. SHARPE
- 79 A Peptide Sequence Confers Retention and Rapid Degradation in the Endoplasmic Reticulum: J. S. BONIFACINO, C. K. SUZUKI, R. D. KLAUSNER
- 83 Posttranslational Glutamylation of α -Tubulin: B. EDDÉ, J. ROSSIER, J.-P. LE CAER, E. DESBRUYÈRES, F. GROS, P. DENOULET
- 85 An Identified Neuron (CPR) Evokes Neuronal Responses Reflecting Food Arousal in *Aplysia*: T. TEYKE, K. R. WEISS, I. KUPFERMANN

AAAS Meetings

- 88 Science and All That Jazz ■ Advance Registration Form ■ AAAS Hotel Registration Form

Book Reviews

- 90 And Sadly Teach, reviewed by D. WARREN ■ Doing Comparable Worth, T. L. PARCEL ■ Particle Physics and Cosmology, L. M. KRAUSS ■ Books Received

Products & Materials

- 94 pH Measurements of Microsamples ■ Fluorescent Labels ■ Thermoelectric Transducer for Geothermal Exploration ■ Nonformalin Tissue Fixative ■ Data Collection Software ■ Incubators with Carbon Dioxide Sensing Systems ■ Tiny Titrator ■ 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

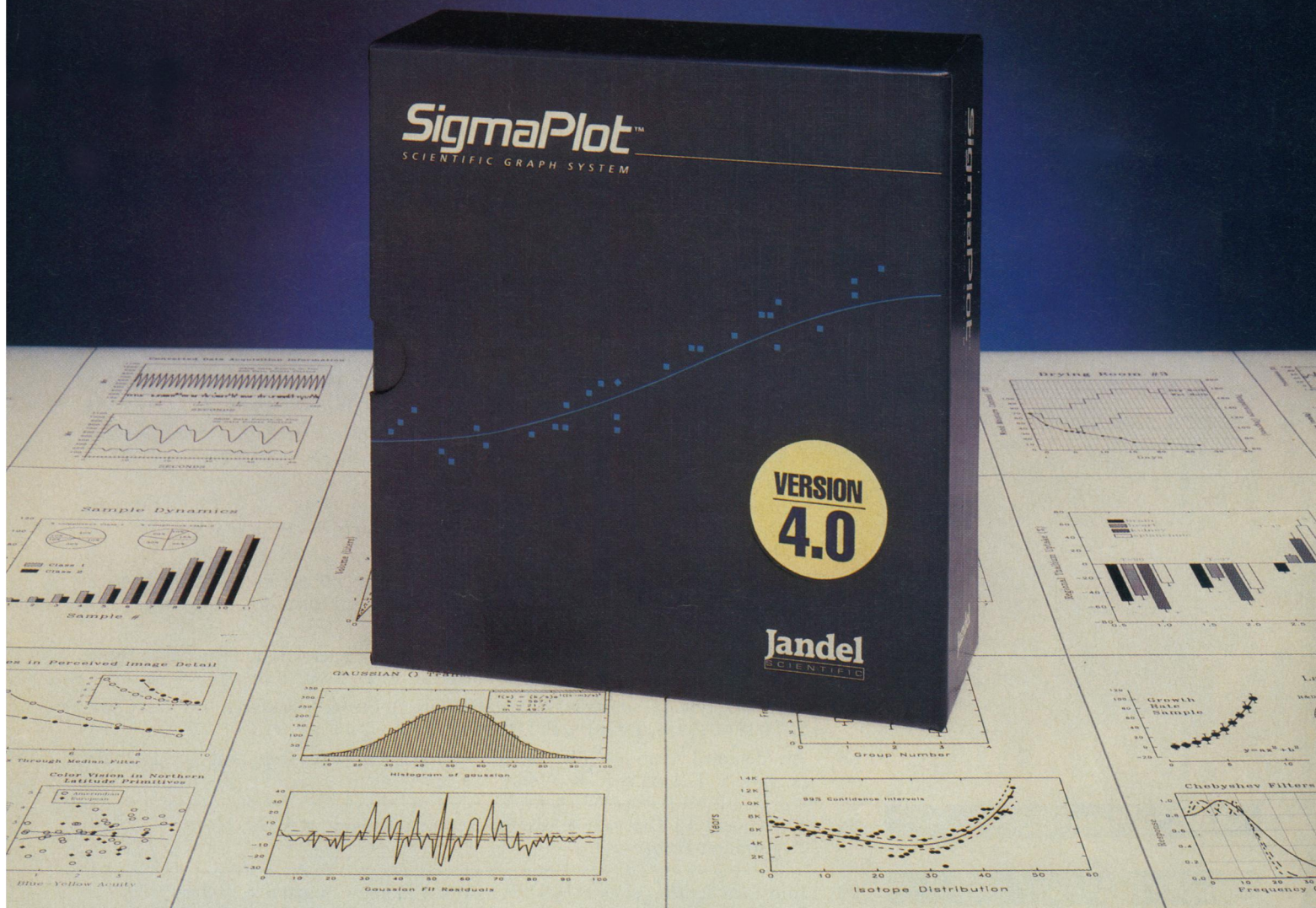
Board of Reviewing Editors

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. Cicerone
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

IT'S HERE.



Introducing SigmaPlot™ 4.0.

The powerful new version of the world's finest PC software for the production of publication-quality scientific charts and graphs...on your own IBM® or compatible personal computer.

Used by over 15,000 scientists.

SigmaPlot, Version 3.1, is the software of choice worldwide for creating graphics for scientific papers and poster sessions. It was selected "Editor's Choice" by *PC Magazine* for its outstanding output. Now, Jandel's new SigmaPlot Version 4.0 gives you all of the advantages of 3.1...and much, much more.

Designed with the scientist in mind.

SigmaPlot 4.0 is elegant and easy to use...with its pull-down menu interface, mouse and keyboard support, novice prompting, and full context-

sensitive interactive help. Input data directly from the keyboard, or from Lotus 123®, or ASCII files, into SigmaPlot's *huge* worksheet - 16,000 columns by 65,000 rows. Version 4.0's full mathematical transform language lets you plot mathematical functions or transform data. SigmaPlot 4.0 also gives you highly sophisticated non-linear curve fitting...and error bars that are complemented by confidence intervals and quality control lines.

Outstanding plot output.

Extremely high-quality output is given, a result of extraordinary control over the appearance of your graphs. With SigmaPlot 4.0 you have outstanding page layout control, as well as control over individual width, color and position of independent graphic elements. You also have more fonts, more scales, and more graph types to

work with. Not to mention multiple axes, Greek, mathematical and European characters, descriptive statistics, and much more. You can easily export graphs into WordPerfect® 5.0, Pagemaker®, Ventura Publisher® and many other programs. And SigmaPlot outputs to plotters, slide makers, dot matrix printers, Postscript™ and HP Laserjet™ printers.

Affordable and fully supported.

Priced under \$500, SigmaPlot 4.0 is well within reach of any research facility. And, like all Jandel products, SigmaPlot 4.0 comes with a money-back guarantee and the full technical support of Jandel's experts. It's what you'd expect from the leader in software for scientists. Find out how much you can do with SigmaPlot 4.0.

Call today for a FREE brochure:

1-800-874-1888 (inside CA 415-924-8640).

65 Koch Road • Corte Madera, CA 94925
1-800-874-1888 (inside CA or Canada 415-924-8640)
FAX: 415-924-2850 • TELEX: 4931977

Jandel
SCIENTIFIC
"Microcomputer Tools for the Scientist"

In Europe: RJA Handels GmbH
Grosser Mühlenweg 14A, 4044 Kaarst 2, FRG
Phone: 2101/666268 • FAX: 2101/64321

Circle No. 62 on Readers' Service Card

This Week in SCIENCE

Future science

THE News Department of *Science* will be looking at "Science in the 1990s" in a ten-part series that begins in this issue (pages 26 and 28).

Mental models

WHETHER people are listening to a story or reading one, they construct the same kinds of mental models of the action of the narrative and of the characters involved. The mental model serves as a mental stage on which the narrative is played out and comprehended. How this model is constructed, how it is updated as the narration proceeds, what features of the narrative attract attention, and what aspects of the model promote comprehension are discussed by Bower and Morrow (page 44). Readers tend to take the perspective of characters in the story and follow actions much as the protagonist does; later they remember their own mental model of the situation rather than the details in the text from which the model was constructed. Causal events are more readily remembered than incidental ones, and the attention of the reader is most closely fixed on actions and events that directly carry the protagonist toward goals of the story or prevent characters from achieving important goals. Although the study focuses on story comprehension, the same types of mental models are constructed as individuals try to comprehend features of their real physical and social world.

Suppressor candidate

A gene on human chromosome 18 appears to be one of the suppressor genes that normally prevents the development of colorectal cancer (page 49). It is thought that when tumor suppressor genes are inactivated, either through alteration, mutation, or loss, tumor development can proceed; activation of oncogenes is also part of this process. The DCC gene, which stands for deleted in colorectal cancer,

was studied by Fearon *et al.* with a variety of molecular techniques, including chromosome walking and a novel application (exon-connection) of the polymerase chain reaction. Several observations supported the gene's association with colorectal cancer: DCC alleles were deleted in 71% of samples from colorectal cancer patients, expression of DCC was reduced (compared with levels of expression in normal tissues) or absent in 88% of colorectal cancer cells, and somatic mutations were detected in DCC in a number of tumor samples. The predicted protein encoded by this gene is similar to surface glycoproteins that are responsible for cell-cell interactions; thus, DCC may affect such interactions, which in turn affect cell growth and proliferation. Stanbridge expands on the significance of this work (page 12).

Catalytic hormones

Two pituitary hormones that are important in the normal development and functioning of gonads—LH (lutropin) and FSH (folliotropin)—have catalytic activities that may contribute to the activation of cellular receptors to which they bind (page 61). Like the ubiquitous enzyme thioredoxin, FSH and LH catalyzed refolding and reactivation of reduced and denatured ribonuclease; these chemical changes probably involve disulfide interchange reactions. Similar disulfide exchanges or redox reactions may occur after the hormones bind to their receptors, changing the structures of the receptors and thereby triggering the cascade of events that cause signals to be transduced within cells. Boniface and Reichert describe a common and conserved tetrapeptide in LH, FSH, and thioredoxin that is associated with this catalytic activity.

Insecticide resistance

THE insecticide ICP, which is made by *Bacillus thuringiensis*, has been used successfully for more than 30 years. So far, few insects in the

field have developed ICP resistance, but in the laboratory ICP-resistant organisms can be selected and have been used for characterizing molecular changes associated with the resistant state. Two forms of ICP—CryIA(b) and CryIC—were studied by Van Rie *et al.* (page 72). In sensitive insects, these toxins are activated from protoxins, bind to brush borders in the midgut of the larval insect, and induce toxic effects. In ICP-resistant Indian meal moths, the toxin binding step is altered, and the binding affinity of CryIA(b) is greatly reduced. In contrast, "resistant" organisms show increased sensitivity to CryIC and an increase in the concentration of receptors for CryIC. Because agriculture specialists are evaluating the feasibility of inserting ICP genes into plants so that plants can produce their own insecticides, it is important to understand what factors cause resistance and whether transgenic plants will need to express more than one type of ICP gene in order to effectively counter attacks by insect pests.

Angiostatic factor

A key feature of pathogenesis in a number of diseases—malignant tumors, diabetic retinopathy, Kaposi's sarcoma, neovascular glaucoma, and others—is the inappropriate formation of new blood vessels. One approach to halting or slowing the progression of these diseases might therefore be to treat patients with substances that suppress vessel growth. Maione *et al.* describe the preparation of human platelet factor-4 (PF4), an angiostatic agent made from a synthetic gene expressed by bacteria (page 77). The 70-amino acid molecule prevented growth of endothelial cells and proliferation of blood vessels in a test system. Because the recombinant PF4 molecule is identical to natural human PF4, it may have low or no toxicity for humans and could be clinically useful as an angiostatic agent; this is not true of the related angiostatic molecule protamine, which is extremely toxic and thus cannot be used clinically.

■ RUTH LEVY GUYER

MICROPHOT-FXA

TOUCH THE FUTURE

Nikon's Microphot-FXA...
the first research
microscope to display
real intelligence...



SIMPLIFIES complex microscopy and photo protocols with user defined software management.

RESOLVES images called "the best in microscopy today" with a choice of over 130 CF lenses including new 1.4 N.A. 60x and 100x oil plan apochromats.

PRODUCES the brightest low light image in the shortest exposure time.

CONCENTRATES essential controls in a single "ergo-control center" so your eyes never leave the specimen.

SWITCHES effortlessly between transmitted or reflected light techniques including: brightfield, darkfield, DIC, pol, fluorescence, rectified, phase contrast, interferometry, Hoffman Modulation Contrast® and VRM illuminator.

DISPLAYS key camera and microscope data on a clear, bright LCD screen.

IMPRINTS exposure time, film speed, frame number, bracket exposure adjust, lux intensity, auto-scale, photo magnification or user defined ID file name/number on the film.

CALCULATES total magnification and prints it on the film.

DETECTS the DX code from the film cassette and automatically sets the film speed.

AUTOMATES control of brightness, motorized nose-piece, focus, stage movement, photo light path selection and condensor aperture.

DOCUMENTS hard copy of all functions via desk-top printer.

STORES data and automated functions for up to 3 attached cameras independently for a total of 18 separate data print files.

COMMUNICATES with a host computer for remote control and quantitative applications.

RESPONDS to computer commands via RS 232 protocols.

You've just begun to touch on the total system advantages of the Nikon Microphot-FXA. Discover more. Contact Nikon Inc., Instrument Group, 623 Stewart Avenue, Garden City, NY 11530. 516-222-0200.

Nikon
Extending Man's Vision

® Registered trademark of Modulation Optics Inc.

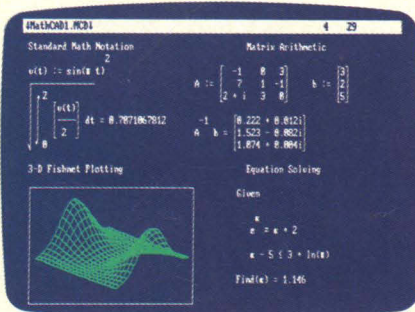
Circle No. 43 on Readers' Service Card

After centuries of practice, mankind perfects scientific calculations: MathCAD.

Announcing MathCAD 2.5: The Dawn of a New Age.

What the historians will call it, only time will tell.

Perhaps the Century of Speed, or the Era of Ease. But whatever the name, this is the age of MathCAD 2.5, the only math package that looks and works the way you think.

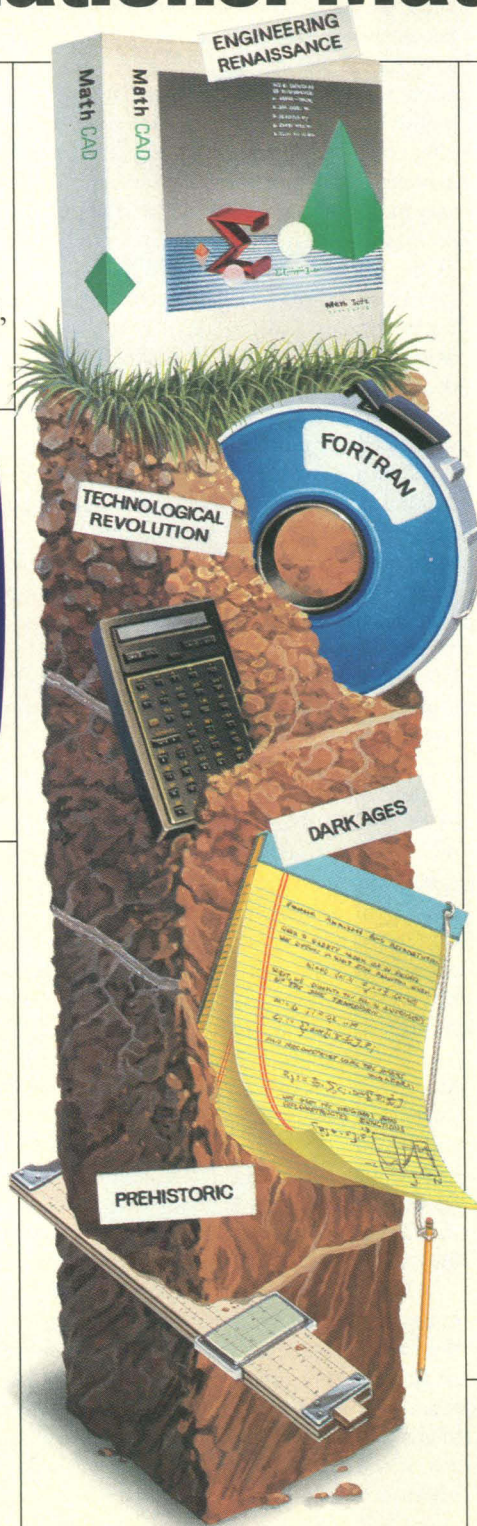


MathCAD 2.5 includes 3-D plotting, HPGL sketch import, and PostScript output.

MathCAD is far and away the best-selling math package in the world. Because it lets you perform engineering and scientific calculations in a way that's faster, more natural and less error-prone than the way you're doing them now—whether you're using a scratchpad, calculator, spreadsheet or program that you wrote yourself.

And now we've made the best even better. MathCAD 2.5 is a dramatically improved version that includes three-dimensional plotting, enhanced numerical analysis, and the ability to import HPGL files from most popular CAD programs, including AutoCAD.® And now you can print on PostScript® compatible printers.

And like before, MathCAD's live document interface™ lets you enter



equations anywhere on the screen, add text to support your work, and graph the results. Then print your analysis in presentation-quality documents.

It has over 120 commonly used functions built right in, for handling equations and formulas, as well as exponentials, differentials, cubic splines, FFTs and matrices.

No matter what kind of math you do, MathCAD 2.5 has a solution for you. In fact, it's used by over 60,000 engineers and scientists, including electrical, industrial, and mechanical engineers, physicists, biologists, and economists.

But don't take our word for it; just ask the experts. PC Magazine recently described MathCAD as "everything you have ever dreamed of in a mathematical toolbox."

And for Macintosh® users, we present MathCAD 2.0, rewritten to take full advantage of the Macintosh interface. Entering operators and Greek letters into equations is pure simplicity!

Look for MathCAD 2.5 at your local software dealer, or give us a call. For more information, a free demo disk, or upgrade information, dial 1-800-MATHCAD (in MA, 617-577-1017).

Available for IBM® compatibles and Macintosh computers.

TM and ® signify manufacturer's trademark or manufacturer's registered trademark respectively.



March 14,
1989 issue.
Best of '88
Best of '87

MathCAD®

MathSoft, Inc. One Kendall Square, Cambridge, MA 02139

#8

U.K.: Adept Scientific 0462-480055; France: ISE CEGOS 1-46092768; Germany: Softline 07802-4036; Japan: CRC 03-665-9768.

PS

Circle No. 92 on Readers' Service Card

PUMPOLOGY

pump·ol·o·gy | pəmp-'äl-ə-jē | *n* : the science of fluid transfer systems

Masterflex | 'mas-ter-fleks | *n*



1 : a fermentation pump 2 : a H₂SO₄, HCl, or NaOH transfer pump 3 : a tissue perfusion pump 4 : an agar dispensing pump 5 : a multichannel sampling pump 6 : an automatic dispensing pump 7 : a liquid chromatography pump 8 : a chemical additive pump 9 : an electrophoresis gel, gradient forming pump 10 : a general-purpose laboratory pump <**MASTERFLEX** pumps deliver precise, reproducible flow rates>

A Masterflex® pump is more than just a fluid transfer system. It's the answer to your many pumping needs. Call 1-800-323-4340 today for your pumping solution.

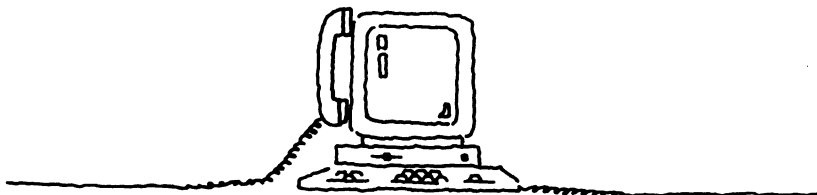
MASTERFLEX®

COLE-PARMER INSTRUMENT COMPANY

7425 NORTH OAK PARK AVENUE

CHICAGO, ILLINOIS 60648

Circle No. 55 on Readers' Service Card



Your life line.

BIOSIS Connection®

Keeping your finger on the pulse of biological and biomedical research information is as easy as pressing a button. The **BIOSIS Connection** is your low-cost direct line to the world's largest abstracting and indexing service for the life sciences, and you can be part of it!

This exciting and invaluable computerized information service connects you to all research and professional information needs, with current awareness databases covering journal literature, pat-

ents, books, meetings, theses, upcoming events and employment openings.

All it takes to extend your life line is a modern-equipped personal computer or terminal and a phone line. And what's more, you need no special search skills to use the **BIOSIS Connection!**

Put your fingers on the life line. . . Subscribe now to the **BIOSIS Connection!**

BIOSIS Connection is a registered trademark of BIOSIS.



For more information, a Sign-Up Kit, or a free demonstration disk, contact BIOSIS, 2100 Arch Street, Dept. IT190LL, Philadelphia, PA 19103-1399 USA. Telephone (215) 587-4800 worldwide; toll free 1-800-523-4806 (USA except PA); Telex 831739; Fax (215) 587-2016.

Circle No. 6 on Readers' Service Card

Science and All That Jazz

AAAS ANNUAL MEETING

15-20 February 1990

New Orleans

Have it all — science and all that jazz — when the world's largest and most comprehensive science conference meets in the city of legendary jazz, Cajun cuisine, and Mississippi river boats.

Come to New Orleans for the AAAS Annual Meeting, and learn about the latest developments in science and technology. You can take your pick from more than 250 symposia, technical sessions, and workshops on virtually every field of scientific inquiry; attend intensive seminars on protein folding or parasitism; gain new skills in short courses on chaos or computer simulation; present your own research in one of a series of poster sessions; hear major public lectures by eminent scholars; meet colleagues from every corner of the scientific community; and enjoy the food, the music, and the charm of this unique southern city.

Reserve your place now! Use the registration form on the facing page. (For a full program, see the 8 December issue of *Science*, or write AAAS Marketing, 1333 H Street, NW, Washington, DC 20005.)

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Advance Registration Form

1990 AAAS Annual Meeting ♦ New Orleans

15 - 20 February

Please print

Name of registrant _____
(last name first)

Institution/Company _____

Mailing address _____
(number / street)

(city / state / zip / country)

Daytime telephone number _____

Name of spouse registrant _____
(if attending meeting)

Convention address _____
(hotel or phone number)

Circle days you will attend Meeting: Thu Fri Sat Sun Mon Tue

☐ Check here if you need special services due to a handicap.

[1] **12 January deadline:** Advance registrations received after this date cannot be processed. On-site registration begins 15 February at the New Orleans Hilton. On-site rates: regular member, \$120; regular nonmember, \$160; all others, same as advance rates.

[2] **Refund requests** must be made in writing to the address below by **6 February** and will be honored after the meeting. **No refunds will be made for cancellations received after this date.**

[3] Fees for seminars, short courses, and spouse registration are **in addition to** (not in lieu of) the meeting registration fee.

[4] Nonmember 6-day (not 1-day) registration fee includes a 6-month membership with 25 issues of *Science*.

Advance Registration Deadline: 12 JANUARY 1990

Mail top portion (registration form) to:

AAAS Annual Meeting Registration
P.O. Box 23320
Alexandria, VA 22304-9330

OFFICE USE ONLY	
AMT PD	_____
CHECK #	_____
DEP. DATE	_____
SOURCE: S4	_____

I. Advance Registration Fees ¹

Category	Six-day	One-day	Amount
Regular member.....	[] \$95	[] \$45	\$ _____
Regular nonmember.....	[] \$135 ⁴	[] \$55	\$ _____
Student member.....	[] \$30	[] \$15	\$ _____
Student nonmember.....	[] \$50 ⁴	[] \$20	\$ _____
Postdoctoral member.....	[] \$35	[] \$15	\$ _____
Postdoctoral nonmember....	[] \$60 ⁴	[] \$20	\$ _____
HS teacher or Retired.....	[] \$45	[] \$20	\$ _____

One-day registrants circle one: Thu Fri Sat Sun Mon Tue

II. Additional Fees ³

	Six-day	One-day	
Spouse Registration	[] \$35	[] \$20	\$ _____

SEMINARS (3-day) & SHORT COURSES (1-day)

Category	Seminar	Short Course	
Regular.....	[] \$100	[] \$40	\$ _____
Grad. student or postdoc....	[] \$35	[] \$20	\$ _____

Seminar registrants check one only:

☐ Protein Folding ☐ Biology of Parasitism

Short course registrants check one only:

☐ Computer Simulation for Biomedical Scientists
☐ Chaotic Dynamic Systems

III. Payment ² TOTAL AMOUNT: \$ _____

☐ check enclosed ☐ VISA ☐ MasterCard
☐ original institutional purchase order attached

Card No. _____ Expires _____

Signature _____

AAAS Hotel Reservation Form

AAAS Annual Meeting ♦ New Orleans ♦ 15-20 February 1990

Send confirmation to:

Name _____
(last name first)

Mailing address _____
(number / street)

(city / state / zip) (phone number)

Other occupants(s) of room _____
(names)

Indicate special needs due to a handicap: ☐ Wheelchair-accessible room

Other _____

Charge my major credit card. Card name _____

Card number _____ Expires _____

Signature _____

- Reservations must be received at either hotel by 13 January 1990. Reservation requests received after this cut-off date are conditional on room availability.
- All reservation forms must be accompanied by a deposit of one night's room rate plus tax; check or major credit card accepted.
- If the room rate requested is no longer available, the next available higher rate will be confirmed.
- Reservation changes and cancellations must be sent directly to the hotel.
- Rollaway beds or additional adult in room: Hilton, \$22; Holiday Inn, \$15.
- Children under age 18 stay free of charge in same room with parents if no extra bed is required.

Hotel Rates: Check boxes for your choice of hotel and room. Add 11% sales tax and \$2.00 occupancy tax to the rates shown. **Mail this hotel reservation form to the hotel of your choice (addresses below),** together with a deposit equal to the room rate plus taxes for one night.

☐ **New Orleans Hilton Reservations,**
2 Poydras Street, New Orleans, LA 70140

	single	double	suites
Main Bldg.	[] \$ 90	[] \$115	[] \$390 & up
Riverside	[] \$100	[] \$125	[] \$950 & up
Towers	[] \$115	[] \$145	[] \$575 & up

☐ **Holiday Inn Crowne Plaza Reservations,**
333 Poydras Street, New Orleans, LA 70130

	single	double	suites
	[] \$89	[] \$104	[] \$283 & up

Please list definite arrival and departure dates and times:

Arrival date _____ Time _____

Departure date _____ Time _____