

343 This Week in *Science*

## Editorial

345 Results and Discussion in an Election Year

## Letters

347 Crystallographic Citations: W. A. HENDRICKSON; G. D. ROSE; F. M. RICHARDS  
■ Energy Consumption: D. BODANSKY ■ Knot Really: D. N. BAKER ■ Relman on  
Maddox: A. S. RELMAN

## News & Comment

363 Savannah River Blues  
365 Security at Weapons Labs  
366 EPA Sets New Policy on Pesticide Cancer Risks  
367 Congress Passes First AIDS Bill  
Supercomputer Centers Enter New Phase  
368 USDA Fights to Repel African Bees' Invasion  
370 Family Planning: A Growing Gap  
Candidates' Heroes  
371 Let 100 Million Trees Bloom  
NSF Pauses to Assess Engineering Centers

## Research News

372 HTLV-I: To Test or Not to Test  
374 Mathematicians Reach Factoring Milestone  
375 Discovery Gets a Clean Bill of Health  
376 New Clues About Kaposi's Sarcoma  
377 Does Earth Fill Its Own Magnetosphere with Ions?  
378 Shroud of Turin Is Medieval  
379 Microscopic Motor Is a First Step

## Articles

385 Significance of "Tethyan" Fossils in the American Cordillera: C. R. NEWTON  
391 Energy Loss Mechanisms of Superconductors Used in Alternating-Current Power  
Transmission Systems: E. B. FORSYTH  
399 Phenotypic Diversity Mediated by the Maize Transposable Elements *Ac* and *Spm*:  
S. R. WESSLER

## Research Articles

405 MyoD1: A Nuclear Phosphoprotein Requiring a Myc Homology Region to  
Convert Fibroblasts to Myoblasts: S. J. TAPSCOTT, R. L. DAVIS, M. J. THAYER,  
P.-F. CHENG, H. WEINTRAUB, A. B. LASSAR

■ SCIENCE is published weekly on Friday, except the last week in December, and with an extra issue in February by the American Association for the Advancement of Science, 1333 H Street, NW, Washington, DC 20005. Second-class postage (publication No. 484460) paid at Washington, DC, and at an additional entry. Now combined with *The Scientific Monthly*® Copyright © 1988 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): \$70. Domestic institutional subscription (51 issues): \$110. Foreign postage extra: Canada \$32, other (surface mail) \$32, air-surface via Amsterdam \$85. First class, airmail, school-year, and student rates on request. Single copies \$3.00; back issues \$5.00; Biotechnology issue, \$5.50 (\$6 by mail); classroom rates on request; Guide to Biotechnology Products and Instruments \$16 (\$17 by mail). Change of address: allow 6 weeks, giving old and new addresses and seven-digit account number. Authorization to photocopy material for internal or personal use under circumstances not falling within the fair use provisions of the Copyright Act is granted by AAAS to libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that the base fee of \$1 per copy plus \$0.10 per page is paid directly to CCC, 21 Congress Street, Salem, Massachusetts 01970. The identification code for *Science* is 0036-8075/83 \$1 + .10. Postmaster: Send Form 3579 to *Science*, 1333 H Street, NW, Washington, DC 20005. *Science* is indexed in the *Reader's Guide to Periodical Literature* and in several specialized indexes.

■ The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to foster scientific freedom and responsibility, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.



**COVER** Camera image overlaid with discontinuities in texture (yellow), motion (orange), and stereo depth (green). The discontinuities are computed from the output of early vision modules coupled with brightness gradient data using Markov random fields. The union of the discontinuities produces a "cartoon" which is used by a parallel recognition algorithm. See page 436. [T. Poggio *et al.*, Artificial Intelligence Laboratory, Massachusetts Institute of Technology, Cambridge, MA 02139]

## Reports

- 412 Constraint of the Translational Diffusion of a Membrane Glycoprotein by Its External Domains: M. WIER AND M. EDIDIN
- 414 A Graph-Dynamic Model of the Power Law of Practice and the Problem-Solving Fan-Effect: J. SHRAGER, T. HOGG, B. A. HUBERMAN
- 417 Rapid Growth of Magnesium-Carbonate Weathering Products in a Stony Meteorite from Antarctica: A. J. T. JULL, S. CHENG J. L. GOODING, M. A. VELBEL
- 419 Herbicide Resistance in Transgenic Plants Expressing a Bacterial Detoxification Gene: D. M. STALKER, K. E. McBRIDE, L. D. MALYJ
- 423 Single-Chain Antigen-Binding Proteins: R. E. BIRD, K. D. HARDMAN, J. W. JACOBSON, S. JOHNSON, B. M. KAUFMAN, S.-M. LEE, T. LEE, S. H. POPE, G. S. RIORDAN, M. WHITLOW
- 426 Kaposi's Sarcoma Cells: Long-Term Culture with Growth Factor from Retrovirus-Infected CD4<sup>+</sup> T Cells: S. NAKAMURA, S. Z. SALAHUDDIN, P. BIBERFELD, B. ENSOLI, P. D. MARKHAM, F. WONG-STAAI, R. C. GALLO
- 430 Angiogenic Properties of Kaposi's Sarcoma-Derived Cells After Long-Term Culture in Vitro: S. Z. SALAHUDDIN, S. NAKAMURA, P. BIBERFELD, M. H. KAPLAN, P. D. MARKHAM, L. LARSSON, R. C. GALLO
- 433 Heat Shock Is Lethal to Fibroblasts Microinjected with Antibodies Against hsp70: K. T. RIABOWOL, L. A. MIZZEN, W. J. WELCH
- 436 Parallel Integration of Vision Modules: T. POGGIO, E. B. GAMBLE, J. J. LITTLE
- 440 Earthquake-Caused Coastal Uplift and Its Effects on Rocky Intertidal Kelp Communities: J. C. CASTILLA
- 443 Activation of Muscarinic Potassium Currents by ATP $\gamma$ S in Atrial Cells: A. S. OTERO, G. E. BREITWIESER, G. SZABO

## Book Reviews

- 448 Uneasy Careers and Intimate Lives, *reviewed by* J. CONWAY ■ The American Census, R. V. WELLS ■ The Child's Construction of Economics, H. G. FURTH ■ Some Other Books of Interest ■ Books Received

## Products & Materials

- 453 Theorem-Proving Software ■ Membrane Filtration by Rotary Separation ■ Scanning Electron Microscope ■ Protein G ■ DNA Gel Documentation System ■ Warming Stages ■ Automated HPLC System ■ Literature

### Board of Directors

Sheila E. Widhall  
*Retiring President,  
Chairman*

Walter E. Massey  
*President*

Richard C. Atkinson  
*President-elect*

Floyd E. Bloom  
Mary E. Clutter  
Eugene H. Cota-Robles  
Mildred S. Dresselhaus  
Joseph G. Gavin, Jr.  
John H. Gibbons  
Beatrix A. Hamburg  
Donald N. Langenberg  
William T. Golden  
*Treasurer*  
Alvin W. Trivelpiece  
*Executive Officer*

### Editorial Board

Elizabeth E. Bailey  
David Baltimore  
William F. Brinkman  
E. Margaret Burbidge  
Philip E. Converse  
Joseph L. Goldstein  
F. Clark Howell  
James D. Idol, Jr.  
Leon Knopoff  
Oliver E. Nelson  
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  
Charles R. Cantor  
Ralph J. Cicerone  
John M. Coffin  
Robert Dorfman  
Bruce F. Eldridge  
Paul T. Englund  
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  
Jiri Novotny  
Gordon H. Orians

Carl O. Pabo  
Yeshayau Pocker  
Michael I. Posner  
Dennis A. Powers  
Jean Paul Revel  
Russell Ross  
James E. Rothman  
Daniel V. Santi  
Ronald H. Schwartz  
Vernon L. Smith  
Otto T. Solbrig  
Robert T. N. Tjian  
Virginia Trimble  
Geerat J. Vermeij  
Harold Weintraub  
Irving L. Weissman  
George M. Whitesides  
Owen N. Witte  
William B. Wood

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

**Publisher:** Alvin W. Trivelpiece

**Editor:** Daniel E. Koshland, Jr.

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

## EDITORIAL STAFF

**Managing Editor:** Patricia A. Morgan

**Assistant Managing Editor:** Nancy J. Hartnagel

**Senior Editors:** Eleanore Butz, Ruth Kulstad

**Associate Editors:** Martha Coleman, R. Brooks Hanson,

Barbara Jasny, Katrina L. Kelner, Edith Meyers, Linda J.

Miller, Phillip D. Szuroni, David F. Voss

**Letters Editor:** Christine Gilbert

**Book Reviews:** Katherine Livingston, *editor*; Deborah Field Washburn

**This Week in Science:** Ruth Levy Guyer

**Contributing Editor:** Lawrence I. Grossman

**Chief Production Editor:** Ellen E. Murphy

**Editing Department:** Lois Schmitt, *head*; Mary McDaniel,

Patricia L. Moe, Barbara E. Patterson

**Copy Desk:** Joi S. Granger, Beverly Shields, Anna Victoreen,

Barbara Wittig

**Production Manager:** Karen Schools Colson

**Assistant Production Manager:** James Landry

**Graphics and Production:** Holly Bishop, James J. Olivarri,

Yolanda M. Rook

**Covers Editor:** Grayce Finger

**Manuscript Systems Analyst:** William Carter

## NEWS STAFF

**News Editor:** Barbara J. Culliton

**Deputy News Editors:** Roger Lewin, Colin Norman

**News and Comment/Research News:** Deborah M. Barnes,

William Booth, Gregory Byrne, Mark H. Crawford, Constance

Holden, Richard A. Kerr, Eliot Marshall, Jean L. Marx, Robert

Pool, Leslie Roberts, Marjorie Sun, M. Mitchell Waldrop, John

Walsh

**European Correspondent:** David Dickson

## BUSINESS STAFF

**Business Staff Manager:** Deborah Rivera-Wienhold

**Classified Advertising Supervisor:** Karen Morgenstern

**Membership Recruitment:** Gwendolyn Huddle

**Member and Subscription Records:** Ann Ragland

**Guide to Biotechnology Products and Instruments:**

Shauna S. Roberts

## ADVERTISING REPRESENTATIVES

**Director:** Earl J. Scherago

**Traffic Manager:** Donna Rivera

**Traffic Manager (Recruitment):** Gwen Canter

**Advertising Sales Manager:** Richard L. Charles

**Employment Sales Manager:** Edward C. Keller

**Marketing Manager:** Herbert L. Burklund

**Sales:** New York, NY 10036: J. Kevin Henebry, 1515 Broad-

way (212-730-1050); Scotch Plains, NJ 07076: C. Richard

Callis, 12 Unami Lane (201-889-4873); Chicago, IL 60194:

Jack Ryan, 525 W. Higgins Rd. (312-885-8675); San Jose, CA

95112: Bob Brindley, 310 S. 16 St. (408-998-4690); Dorset,

VT 05251: Fred W. Dieffenbach, Kent Hill Rd. (802-867-5581);

Damascus, MD 20872: Rick Sommer, 24808 Shrubbery Hill

Ct. (301-972-9270); U.K., Europe: Nick Jones,

+44(0647)52918; Telex 42513; FAX (0647) 52053.

**Information for contributors** appears on page XI of the 30 September 1988 issue. Editorial correspondence, including requests for permission to reprint and reprint orders, should be sent to 1333 H Street, NW, Washington, DC 20005. Telephone: 202-326-6500.

Advertising correspondence should be sent to Tenth Floor, 1515 Broadway, New York, NY 10036. Telephone 212-730-1050 or WU Telex 968082 SCHERAGO, or FAX 212-382-3725.

## Results and Discussion in an Election Year

The accusation of “negative campaigning” has been leveled by the press at the 1988 presidential candidates. That is like the boy who shot his parents and then pleaded for mercy on the grounds of being an orphan. The greater publicity given to the clever insult, the meretricious photo opportunity, and the public relations gimmick encourages candidates to use these devices instead of the dull delineation of position.

Policy statements are frequently boring, largely because everyone comes out for motherhood and virtue, and no sensible candidate dares mention the gruesome inevitabilities of taxes and budget choices. Nevertheless, policy statements have value as a glimpse at a candidate’s enthusiasms and priorities, even in the absence of desired specifics. Thus the willingness of Vice President George Bush and Governor Michael S. Dukakis to send answers to a series of questions presented by *Science* is, in itself, an extremely positive sign (*Science*, 14 October 1988, p. 173).

As expected, many of the answers were vague, but others were surprisingly specific. The candidates agreed on most matters of science policy, such as maintaining the tax credit for research and development, the need to double the National Science Foundation budget, and the need to increase scientific research and development in general. When they disagreed, it was mainly in emphasis, but there is considerable variation in the detail and commitment in the various area. Bush advocated increasing the importance of the science adviser but did not specify how much the currently weakened office would be changed. Dukakis was more specific in detailing how he would enhance the importance and prestige of that office and added that the science adviser would have direct access to him. Bush is against subsidy for commercial space ventures and Dukakis is against the “Orient Express.” Both are in favor of “big science” and “little science” and an increased space effort. Both ducked the question of how big the National Institutes of Health budget should be, but both indicated understanding of the role of biotechnology in health care and competitiveness.

Overall, one can only conclude that both candidates will be strong supporters of science, and that they and their advisers recognize the intricacies of modern science policy. Increased funding for science does not cost as much as increased defense or Social Security funding, but science as a whole has become a sizable budget factor, and the candidates’ commitments have major significance.

The candidates and this journal are also supporting a larger principle: the need to see in print the actual positions of the major candidates. The standards of science publishing require presentation of the data as well as the conclusions. Too often in this campaign we have seen the “analysis” of candidates’ positions on the front page as a substitute for news. These analyses are all too often the opinions of the writer, appropriate for the editorial page, just as authors’ opinions are appropriate in the Discussion section of a scientific paper. But the front page of a newspaper or the lead story on the television news program should be analogous to the Results section of a scientific paper.

The reader deserves to see the raw data, not just speculation on the impression that a candidate made, or whether a statement was negative campaigning or positive campaigning. Clarification of previous positions of one’s opponents should be construed as positive if it is accurate and negative only if it is inaccurate. A clear discussion of the past record is more edifying than pompous promises of future utopias. Reproducing the candidate’s actual words allows the reader to decide whether the candidate was vague or specific, evasive or responsive, appealing or repulsive. A second reason for publishing actual statements is the tendency of observers to use colorful wording that obscures the data. The favored candidate is “aggressive”; the unfavored, “negative.” The favored is “well prepared”; the opposition is “packaged.” The favored is “relaxed”; the unfavored, “bumbling.” Democracy cannot flourish any more than science if the Results sections are turned into Discussion sections.

Policy statements, budget proposals, and responses to questions are primary data. We could hope that future candidates will be more specific in these areas, but we need to build a tradition in which the candidates will prepare and the public will have access to unfiltered policy statements. Once that is done, as in a scientific paper, we can have a Discussion of the Results; then our individual Conclusions will be based on accurate evidence.—DANIEL E. KOSHLAND, JR.