

7 This Week in *Science*

Editorial

9 A New Threat to World Health: B. R. BLOOM

Letters

10 "My Mom, the Professor": C. DJERASSI ■ Arctic Dinosaurs and Terminal Cretaceous Extinctions: G. J. GALBREATH; J. A. WOLFE; E. M. BROUWERS, R. A. SPICER, W. A. CLEMENS

News & Comment

12 Growth in R&D Spending Slows
13 Down to the Wire on U.S.-Japan Agreement
14 IBM, Chen in Supercomputer Partnership
15 Nevada Wins the Nuclear Waste Lottery
16 Britain to Remain in CERN for Now
17 Debate Rages Over Breast Cancer Study
19 NASA's Space Station Approved by Congress
20 NIH May Have to Move ASAP on AIDS Grants

Research News

21 Zeroing in on the Sex Switch
23 Has a Brown Dwarf Been Found at Last?
25 Orphan Interferon Finds a New Home
26 Gamma Rays for Christmas

Articles

27 Pliocene and Pleistocene Hominid-Bearing Sites from West of Lake Turkana, Kenya: J. M. HARRIS, F. H. BROWN, M. G. LEAKEY, A. C. WALKER, R. E. LEAKEY
33 Heavy-Electron Metals: New Highly Correlated States of Matter: Z. FISK, D. W. HESS, C. J. PETHICK, D. PINES, J. L. SMITH, J. D. THOMPSON, J. O. WILLIS
42 Tropical Forests and the Global Carbon Cycle: R. P. DETWILER AND C. A. S. HALL

Reports

48 Global Trends in Total Ozone: K. P. BOWMAN
50 Atomic Force Microscopy of an Organic Monolayer: O. MARTI, H. O. RIBI, B. DRAKE, T. R. ALBRECHT, C. F. QUATE, P. K. HANSMAN

■ 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): \$65. Domestic institutional subscription (51 issues): \$98. Foreign postage extra: Canada \$32, other (surface mail) \$27, air-surface via Amsterdam \$65. First class, airmail, school-year, and student rates on request. Single copies \$3.00 (\$3.50 by mail); back issues \$4.50 (\$5.00 by mail); 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 Molecular crowding on the living cell surface is revealed by the redistributions of fluorescence-labeled surface proteins in electrical potential gradients. This pseudocolor digital image shows induced asymmetric concentration profiles of fluorescein-labeled immunoglobulin E receptors on rat basophilic leukemia cell surfaces. Strongly enhanced thermodynamic activities of cell surface proteins even at normal concentrations were found by quantitative analysis of these images. See page 61. [T. A. Ryan, J. Meyers, B. Baird, and W. W. Webb, Cornell University, Ithaca, NY 14853]

- 52 GEOSAT Altimeter Observations of Kelvin Waves and the 1986–87 El Niño: L. MILLER, R. E. CHENEY, B. C. DOUGLAS
- 55 Implantation of *Bacteroides gingivalis* in Nonhuman Primates Initiates Progression of Periodontitis: S. C. HOLT, J. EBERSOLE, J. FELTON, M. BRUNSVOLD, K. S. KORNMANN
- 57 Dominant Role of N-Type Ca²⁺ Channels in Evoked Release of Norepinephrine from Sympathetic Neurons: L. D. HIRNING, A. P. FOX, E. W. MCCLESKEY, B. M. OLIVERA, S. A. THAYER, R. J. MILLER, R. W. TSIEN
- 61 Molecular Crowding on the Cell Surface: T. A. RYAN, J. MEYERS, D. HOLOWKA, B. BAIRD, W. W. WEBB
- 64 Human Ribosomal RNA Genes: Orientation of the Tandem Array and Conservation of the 5' End: R. G. WORTON, J. SUTHERLAND, J. E. SYLVESTER, H. F. WILLARD, S. BODRUG, I. DUBÉ, C. DUFF, V. KEAN, P. N. RAY *et al.*
- 68 Risk of Human Immunodeficiency Virus (HIV-1) Infection Among Laboratory Workers: S. H. WEISS, J. J. GOEDERT, S. GARTNER, M. POPOVIC, D. WATERS, P. MARKHAM, F. DI MARZO VERONESE, M. H. GAIL, W. E. BARKLEY *et al.*
- 72 Naturally Occurring Antihormones: Secretion of FSH Antagonists by Women Treated with a GnRH Analog: K. D. DAHL, T. A. BICSAK, A. J. W. HSUEH

AAAS News

- 75 1987 Election Results ■ Reports Investigate Torture and Role of Health Professionals ■ SWARM Plans Spring Meeting ■ U.S.–China Water Management Collaboration ■ 1988 Calendar of Scientific Meetings Available ■ Dues Increase Announced ■ Reminder for Members

AAAS Meetings

- 78 AAAS 1989 Annual Meeting: Call for Symposium Proposals

Book Reviews

- 79 Guide to China's Science and Technology Policy, 1986, *reviewed by* N. LARDY ■ The Care of Strangers, D. ROSNER ■ Quantum Concepts in Space and Time, K. KUCHAR ■ Free Radical, W. D. MCELROY ■ Books Received

Products & Materials

- 85 Gel Electrophoresis System ■ Lab Information-Management System ■ Finned Test Tube ■ Microwave Tissue Preparation ■ Powdered Tissue Culture Medium ■ Scientific Graphing Software ■ Vial Crusher ■ Literature

Board of Directors

Lawrence Bogorad
*Retiring President,
Chairman*

Sheila E. Widnall
President

Walter E. Massey
President-elect

Robert McC. Adams
Floyd E. Bloom
Mary E. Clutter
Mildred S. Dresselhaus
Beatrix A. Hamburg
Donald N. Langenberg
Frank von Hippel
Linda S. Wilson

William T. Golden
Treasurer

Alvin W. Trivelpiece
Executive Officer

Editorial Board

Elizabeth E. Bailey
David Baltimore
William F. Brinkman
Philip E. Converse
Joseph L. Goldstein
F. Clark Howell
James D. Idol, Jr.
Leon Knopoff
Oliver E. Nelson
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
James J. Bull
Charles R. Cantor
Ralph J. Cicerone
John M. Coffin
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
Richard Losick
Karl L. Magleby
Philippa Marrack
Joseph B. Martin
John C. McGiff
Mortimer Mishkin
Jiri Novotny
Gordon H. Orians

Carl O. Pabo
John S. Pearce
Yeshayau Pocker
Jean Paul Revel
James E. Rothman
Daniel V. Santi
Thomas C. Schelling
Ronald H. Schwartz
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 Collins, R. Brooks Hanson, Barbara Jasny, Katrina L. Kelner, Edith Meyers, Phillip D. Szuroni, David F. Voss

Letters Editor: Christine Gilbert

Book Reviews: Katherine Livingston, *editor*; Deborah F. 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, Barbara E. Patterson

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

Production Manager: Karen Schools

Assistant Production Manager: James Landry

Graphics and Production: Holly Bishop, James J. Olivari, Eleanor Warner

Covers Editor: Grayce Finger

Manuscript Systems Analyst: William Carter

NEWS STAFF

News Editor: Barbara J. Culliton

News and Comment: Colin Norman, *deputy editor*; William Booth, Mark H. Crawford, Constance Holden, Eliot Marshall, Marjorie Sun, John Walsh

Research News: Roger Lewin, *deputy editor*; Deborah M. Barnes, Richard A. Kerr, Jean L. Marx, Leslie Roberts, M. Mitchell Waldrop

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

Marketing Manager: Herbert L. Burklund

Sales: New York, NY 10036: J. Kevin Henebry, 1515 Broadway (212-730-1050); Scotch Plains, NJ 07076: C. Richard Callis, 12 Unami Lane (201-889-4873); Chicago, IL 60611: Jack Ryan, Room 2107, 919 N. Michigan Ave. (312-337-4973); 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 (0392) 31645.

Information for contributors appears on page XI of the 18 December 1987 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, NY 10036. Telephone 212-730-1050 or WU Telex 968082 SCHERAGO.

A New Threat to World Health

The Third World is the place in which 75% of the world's population resides, where 86% of all babies are born, and where 98% of all infant and childhood deaths occur. For 1.1 billion people in the 40 poorest countries, it is shocking to realize that life expectancy at birth is but 46 years, mortality under 5 years is 22%, access to clean water in rural areas is 15%, and 31% of the children suffer from malnutrition. Per capita income averages \$310 per year. As of 1982, 0.5% of the children became lame from polio, 1% died from neonatal tetanus, 2% succumbed to whopping cough, 3% died from measles, and ten kids died of vaccine preventable illness every minute.

The agency that has the greatest impact on the health and quality of life of the people in the developing countries is, in most cases, the World Health Organization. WHO established the Expanded Program for Immunization which has increased the number of children vaccinated against the six major killing and disabling childhood diseases from 5% to almost 50% in the past decade and is committed to making it accessible to all children in the world by 1990. It set up a Program on Diarrhoeal Disease Control to prevent the needless death of 4.5 million children a year worldwide. It is the center of information on maternal and child health. And at the Venice Summit, our President and the leaders of the major industrialized nations asked WHO to serve as the major coordinating and promoting agency for research on AIDS. WHO has formulated a Global Strategy for Health for All by the Year 2000, based on the principle that health is a powerful lever for socioeconomic development (and political stability as well). And precisely 10 years ago, WHO brought about the eradication of smallpox, saving innumerable lives (and the United States \$110 million per year in vaccination costs alone). Today and in the future, international travel will help speed the spread of disease among all countries. We will serve both ourselves and others if we provide our share of support to WHO.

WHO is suffering the worst crisis in its history, and ironically we are the cause. Without reason or notice the U.S. government has unilaterally and arbitrarily refused to pay its assessment. We are \$118 million in arrears for 1986-87. That represents a cut of almost 25% in an annual budget that has had zero real growth for 6 years. No organization can function with an unplanned reduction in budget of that magnitude, and drastic cuts in its programs and skilled personnel are now being made.

WHO was caught by the Kassebaum amendment directed at punishing the United Nations' system because "the U.N. and its specialized agencies, which are financed through assessed contributions of member states, have not paid sufficient attention in the development of their budgets to the views of the member governments who are major financial contributors to those budgets." For WHO this is tragic because the objection simply does not pertain. WHO has its own budget process independent of the U.N.'s, and U.S. government representatives have repeatedly acknowledged that its views have invariably been fully taken into account in the budgetary process. Curiously, the United States since 1981 has praised WHO's efficiency and voted in support of the WHO budget. Yet we do not pay our assessment. Now, WHO is caught in the Gramm-Rudman budget constraints and is unlikely to receive its past or future U.S. assessments.

WHO was created in 1948 by an international treaty that was ratified by the U.S. Senate. Thus the failure of the United States to pay its assessment constitutes a violation of a treaty obligation. The response of the American people to the past African famine indicates that we are among the most generous of people and committed to trying to improve the lives of the poorest of the earth. And my experience in Ethiopia and elsewhere indicates that, independent of their form of government, people everywhere know and appreciate that. They will be tragically disillusioned when explanations are forthcoming for cutbacks in WHO programs in health that directly affect their lives. WHO is a unique institution whose work improves the lives of all of us, but particularly those in the Third World. On grounds of quality and importance it deserves the full funding of the U.S. assessment.—BARRY R. BLOOM, *Chairman of the Department of Microbiology and Immunology, Albert Einstein College of Medicine, Bronx, New York 10461, and Chairman of the Committee on the Immunology of Tuberculosis, Special Programme for Vaccine Development, World Health Organization*