

1179 This Week in *Science*

Editorial

1181 Global Manufacturing Competition

Letters

1183 "Disloyalty" and DOD Funding: S. D. DRELL; P. SIEKEVITZ; D. A. HICKS ■
"Tradition" Questioned: E. THELEN ■ The SSC and a Balanced Budget:
R. ROY

News & Comment

1185 McTague Quits White House Post

1186 Midgetman Missile Plans Generate Political Debate

1187 A Worrisome Shift in Nuclear Strategy

1189 White House to Release Biotechnology Guidelines

1190 *Briefing*: Wisconsin Synchrotron Ring Back in Business ■ GAO Hits Accounting
on DOE Accelerators ■ Space Science Board Endorses Conventional Rockets for
Science Missions ■ MIT's Relationship with DOD Lab Criticized

Research News

1192 Pressures Measured in Live Hip Joint

1193 Atoms in Strong Laser Fields Obey the Rules

1196 Brain Function Decline in Children with AIDS

1197 *Biomedical Briefing*: Where Is the AIDS Virus Harbored? ■ A Perspective on
Degenerative Brain Disease ■ Depression, Anorexia, Cushing's Link Revealed ■
Limiting Heart Attack Injury

Association Affairs

1199 Sheila E. Widnall: President-Elect of AAAS: W. R. SEARS

Articles

1219 Pattern Recognition Used to Investigate Multivariate Data in Analytical
Chemistry: P. C. JURIS

1225 Accretion Rate of Extraterrestrial Matter: Iridium Deposited 33 to 67 Million
Years Ago: F. T. KYTE and J. T. WASSON

Research Articles

1230 Deletion in Cysteine-Rich Region of LDL Receptor Impedes Transport to Cell
Surface in WHHL Rabbit: T. YAMAMOTO, R. W. BISHOP, M. S. BROWN,
J. L. GOLDSTEIN, D. W. RUSSELL

Reports

1240 Structure of Pressinoic Acid: The Cyclic Moiety of Vasopressin: D. A. LANGS,
G. D. SMITH, J. J. STEZOWSKI, R. E. HUGHES

1242 Plant Glutamine Synthetase Complements a *glnA* Mutation in *Escherichia coli*:
S. DASARMA, E. TISCHER, H. M. GOODMAN

■ SCIENCE is published weekly on Friday, except the last week in December, and with a plus issue in May 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 © 1986 by the American Association for the Advancement of Science. Domestic individual membership and subscription (51 issues): \$65. Domestic institutional subscription (51 issues): \$98. Foreign postage extra: Canada \$24, other (surface mail) \$27, air-surface via Amsterdam \$65. First class, airmail, school-year, and student rate on request. Single copies \$2.50 (\$3 by mail); back issues \$4 (\$4.50 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 Skeleton drawing of the bis-intercalator drug triostin A (blue) binding to the DNA duplex d(GCGTACGC) (magenta). Two molecules of the drug bind to each duplex. See page 1255. [Picture by Gary L. Quigley and Christin A. Frederick (Biology Department, Massachusetts Institute of Technology, Cambridge, MA 02139) with assistance of Rob Campbell (Chemistry Department, MIT) using the program FRODO by Alwynn Jones on an Evens and Sutherland PS300 graphics system]

- 1245 Distribution of and Feeding by the Copepod *Pseudocalanus* Under Fast Ice During the Arctic Spring: R. J. CONOVER, A. W. HERMAN, S. J. PRINSENBERG, L. R. HARRIS
- 1247 Shape Analysis of the Histone Octamer in Solution: E. C. UBERBACHER, J. M. HARP, E. WILKINSON-SINGLEY, G. J. BUNICK
- 1250 Transforming Growth Factor- α : A More Potent Angiogenic Mediator Than Epidermal Growth Factor: A. B. SCHREIBER, M. E. WINKLER, R. DERYNCK
- 1253 Cultivation of the *Drosophila* Sex-Ratio Spiroplasma: K. J. HACKETT, D. E. LYNN, D. L. WILLIAMSON, A. S. GINSBERG, R. F. WHITCOMB
- 1255 Non-Watson-Crick G · C and A · T Base Pairs in a DNA-Antibiotic Complex: G. J. QUIGLEY, G. UGHETTO, G. A. VAN DER MAREL, J. H. VAN BOOM, A. H.-J. WANG, A. RICH
- 1258 Pertussis Toxin Gene: Nucleotide Sequence and Genetic Organization: C. LOCHT and J. M. KEITH
- 1264 Caffeine-Induced Uncoupling of Mitosis from the Completion of DNA Replication in Mammalian Cells: R. SCHLEGEL and A. B. PARDEE
- 1266 Visual Pigment Homologies Revealed by DNA Hybridization: R. L. MARTIN, C. WOOD, W. BAEHR, M. L. APPELBURY

Technical Comments

- 1269 Human Brain Receptor Distribution: K. A. FREY, B. W. AGRANOFF, A. B. YOUNG, R. D. HICHTWA, R. L. E. EHRENKAUFER; D. F. WONG, H. N. WAGNER, JR., R. F. DANNALS, J. M. LINKS, M. J. KUJAR, A. GJEDDE
- 1271 Effects of Growth Hormone-Releasing Factor in the Brain: W. B. WEHREBERG and C. L. EHLERS; G. S. TANNENBAUM

AAAS News

- 1274 AAAS Annual Elections: Preliminary Announcement ■ New "Expedition" Benefit Announced for AAAS Members ■ Denise Weiner Memorial Fund Established ■ Pacific/Arctic Divisions Reminder ■ Problems with Promotional Mailings

Book Reviews

- 1278 Geologists and Ideas, reviewed by R. E. WALLACE ■ Genetic Differentiation and Dispersal in Plants, S. C. H. BARRETT ■ Late Cainozoic Paleoclimates of the Southern Hemisphere, D. A. LIVINGSTONE ■ Prehistory of the Indo-Malaysian Archipelago, W. S. AYRES ■ Some Other Books of Interest ■ Books Received

Products & Materials

- 1283 Molecular Biology Teaching ■ Dilutor-Dispenser ■ Chromatography Fraction Collector ■ Blood Flow Measurement ■ Sorbent Extraction Technology ■ Literature

Board of Directors

Gerard Piel
*Retiring President,
Chairman*

Lawrence Bogorad
President

Sheila E. Widnall
President-elect

Robert McC. Adams
Robert W. Berliner
Floyd E. Bloom
Mary E. Clutter
Mildred S. Dresselhaus
Donald N. Langenberg
Dorothy Nelkin
Linda S. Wilson

William T. Golden
Treasurer

William D. Carey
Executive Officer

Editorial Board

David Baltimore
William F. Brinkman
Ansley J. Coale
Joseph L. Goldstein
James D. Idol, Jr.
Leon Knopoff
Seymour Lipset
Walter Massey
Oliver E. Nelson
Allen Newell
Ruth Patrick
David V. Ragone
Vera C. Rubin
Howard E. Simmons
Solomon H. Snyder
Robert M. Solow

Board of Reviewing Editors

Qais Al-Awqati
James P. Allison
Luis W. Alvarez
Don L. Anderson
C. Paul Bianchi
Elizabeth H. Blackburn
Floyd E. Bloom
Charles R. Cantor
James H. Clark
Bruce F. Eldridge
Stanley Falkow
Theodore H. Geballe
Roger I. M. Glass

Stephen P. Goff
Robert B. Goldberg
Patricia S. Goldman-Rakic
Richard M. Held
Gloria Heppner
Eric F. Johnson
Konrad B. Krauskopf
Joseph B. Martin
John C. McGiff
Alton Meister
Mortimer Mishkin
Gordon H. Orians
John S. Pearce
Yeshayau Pocker
Frederic M. Richards
James E. Rothman

Ronald H. Schwartz
Stephen M. Schwartz
Otto T. Solbrig
Robert T. N. Tjian
Virginia Trimble
Geerat J. Vermeij
Martin G. Weigert
George M. Whitesides
William B. Wood
Harriet Zuckerman

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: William D. Carey

Editor: Daniel E. Koshland, Jr.

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

EDITORIAL STAFF

Managing Editor: Patricia A. Morgan

Assistant Managing Editors: Nancy J. Hartnagel, John E. Ringle

Senior Editors: Eleanore Butz, Lawrence I. Grossman, Ruth Kulstad

Associate Editors: Martha Collins, Sylvia Eberhart, William Greaves, Barbara Jasny, Katrina L. Keiner, Edith Meyers

Letters Editor: Christine Gilbert

Book Reviews: Katherine Livingston, *editor*; Linda Heiserman

This Week in Science: Ruth Levy Guyer

Chief Production Editor: Ellen E. Murphy

Editing Department: Lois Schmitt, *head*; Caitilin Gordon, Mary McDaniel, Barbara E. Patterson

Copy Desk: Isabella Bouldin, *chief*; Sharon Ryan, Beverly Shields

Production Manager: Karen Schools

Graphics and Production: John Baker, *assistant manager*; Holly Bishop, Kathleen Cosimano, 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*; Mark H. Crawford, Constance Holden, Eliot Marshall, R. Jeffrey Smith, Marjorie Sun, John Walsh

Research News: Roger Lewin, *deputy editor*; Deborah M. Barnes, Richard A. Kerr, Gina Kolata, Jean L. Marx, Arthur L. Robinson, M. Mitchell Waldrop

European Correspondent: David Dickson

BUSINESS STAFF

Associate Publisher: William M. Miller, III

Business Staff Supervisor: Deborah Rivera-Wienhold

Associate Business Supervisor: Leo Lewis

Membership Recruitment: Gwendolyn Huddle

Member and Subscription Records: Ann Ragland

Guide to Biotechnology Products and Instruments Editor: Richard G. Sommer

ADVERTISING REPRESENTATIVES

Director: Earl J. Scherago

Production Manager: Donna Rivera

Advertising Sales Manager: Richard L. Charles

Marketing Manager: Herbert L. Burkland

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); Beverly Hills, CA 90211: Winn Nance, 111 N. La Cienega Blvd. (213-657-2772); 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).

Instructions for contributors appears on page xi of the 28 March 1986 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.

Global Manufacturing Competition

The United States has been experiencing enormous trade deficits, largely due to inability to compete in the production of high-quality, low-cost durable goods. The situation will not be quickly remedied, but emerging new technology and better management practices hold the promise of better days. A crucial determinant in the outcome of global competition will be activities occurring in Michigan, the leading manufacturing state.

Until the late 1970's, a smug arrogance was the dominant mood in the automobile industry. To a major degree, the research laboratories of the big three automobile manufacturers were merely window dressing. In 1979, when a Japanese engineer described at a symposium his painstaking analysis of stresses in the shell of a Honda, he was an object of derision. The industry had little contact with universities except to hire some of the graduates. The state government's principal actions were to pile taxes and regulations on the industry while cutting back support for engineering at the universities.

The oil crisis, demand for high-quality small cars, and a recession that brought Michigan unemployment in 1981 to 17 percent had the effect of that of a two-by-four on a mule. The state government, industry, universities, and citizens in general recognized the need for change as well as to learn some lessons from the Japanese.

On a recent visit to Ann Arbor and Detroit, I noted evidence of changes that have occurred in the intervening years. The state government has provided \$70 million for construction at the University of Michigan of new buildings for engineering. It has substantially increased its support for the engineering faculty and their research. The state is assisting in the financing of start-up companies such as those in robotics and machine vision.

The automobile industry is in the midst of change in the use of electronics, robots, machine vision, and new materials, as well as in supplier and employee relations. A new Buick-Oldsmobile-Cadillac plant at Hamtramck has 260 robots and many new computer-controlled features. To meet the needs for robots of various kinds and for machine vision, a large number of new small companies have become active in southeast Michigan. They bring an excitement reminiscent of that of an early Silicon Valley.

Two nonprofit institutes in Ann Arbor have impressive leadership and roles of increasing importance. The Environmental Research Institute of Michigan has some of the world's best experts in remote sensing. They have produced robots with good shape discrimination, devices for very accurate measurements of features of automobiles, and a device for inspecting the complete exterior of an automobile for proper trim, taillights, and other features. The machine vision is fast, cheap, and capable. They have also developed a computer with parallel processing especially suitable for processing the complex data related to machine vision.

The Industrial Technology Institute has activities that include a flexible machining group looking at machine tools, sensors, materials handling, and automated design for manufacturability. It is a robotic evaluation center. The institute is helping to write the specifications for a manufacturing automation protocol. This will provide a common computer and control language that will allow robots and other equipment to communicate no matter who makes them.

The University of Michigan has been positioning itself to interact with these institutes and with companies large and small. In turn, auto companies now welcome professors and their students and permit them to use assembly plants as laboratories. One of the aims at the university is to achieve interaction of experts in robotics, machine cognition, machine vision, and machine action with experts in computer-aided design of systems involving those technologies and new and superior materials. A goal is to develop highly adaptable robots with large-scale computing capability and expanded artificial intelligence.

One can encounter a great deal of enthusiasm and a climate of can-do in Ann Arbor. A new culture seems to be evolving there. If the rate of evolution continues, something will be created that will have impact beyond Michigan.—PHILIP H. ABELSON