

1347 This Week in *Science*

## Editorial

1349 Ballooning Around Venus

## Perspective

1351 Science: The Best and Worst of Times

## Letters

1355 Shakespeare and Statistics: O. DRIVER; G. KOLATA ■ Mexican Seed Bank: D. C. JEWELL; M. SUN ■ The Dot: Alternative Notation: M. PEARL ■ Black Holes—"Ingestars"?: W. A. SHURCLIFF

## News & Comment

1357 DOE's Way-Out Reactors ■ Shooting Plutonium into Space  
1360 Engineering Crops to Resist Weed Killers ■ Calgene Breaks New Ground  
1362 Long-Range Forecasting: Truth or Consequences  
1363 McLean-AMI Agree on Joint Venture  
1364 *Briefing*: NIH Gets a Friendly Hearing on Capitol Hill ■ Congress Likely to Halt Shrinkage in AIDS Funds ■ Fletcher Nominated as New NASA Chief ■ Formaldehyde Poses Little Risk, Study Says

## Research News

1366 VEGA's 1 and 2 Visit Halley  
1367 How Killer Cells Kill Their Targets  
1369 Weather Balloons at Venus  
1370 Testing Superposition in Quantum Mechanics ■ Delayed Choice Supports Quantum Theory

## Articles

1387 Cost of Space-Based Laser Ballistic Missile Defense: G. FIELD and D. SPERGEL  
1393 Rates of DNA Sequence Evolution Differ Between Taxonomic Groups: R. J. BRITTEN  
1399 The 1985 Nobel Prize in Economics: P. A. SAMUELSON

## Research Articles

1401 Structure of Tobacco Mosaic Virus at 3.6 Å Resolution: Implications for Assembly: K. NAMBA and G. STUBBS

## Reports

### *VEGA Venus Balloon Experiment*

1407 The VEGA Venus Balloon Experiment: R. Z. SAGDEEV, V. M. LINKIN, J. E. BLAMONT, R. A. PRESTON  
1408 VEGA Balloon System and Instrumentation: R. S. KREMNEV, V. M. LINKIN, A. N. LIPATOV, K. M. PICHKADZE, A. A. SHURUPOV, A. V. TERTERASHVILI, R. V. BAKITKO, J. E. BLAMONT, C. MALIQUE, B. RAGENT, R. A. PRESTON, L. S. ELSON, D. CRISP

- SCIENCE 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 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): \$60. 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 rates 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. 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** Test flight in Earth's atmosphere of balloon and gondola system similar to two placed in the atmosphere of Venus in June 1985 by the VEGA spacecraft. These were the first balloons to float in the atmosphere of another planet. Gondola instruments measured in situ meteorological parameters; a world-wide network of 20 ground-based antennas monitored the Venus winds by means of radio signals transmitted by the balloons. See pages 1407-1425. [Photo: V. M. Linkin, Space Research Institute, Moscow, U.S.S.R.; emblem: R. A. Preston, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA 91125]

- 1411 Overview of VEGA Venus Balloon in Situ Meteorological Measurements: R. Z. SAGDEEV, V. M. LINKIN, V. V. KERZHANOVICH, A. N. LIPATOV, A. A. SHURUPOV, J. E. BLAMONT, D. CRISP, A. P. INGERSOLL, L. S. ELSON, R. A. PRESTON, C. E. HILDEBRAND *et al.*
- 1414 Determination of Venus Winds by Ground-Based Radio Tracking of the VEGA Balloons: R. A. PRESTON, C. E. HILDEBRAND, G. H. PURCELL, JR., J. ELLIS, C. T. STELZRIED, S. G. FINLEY, R. Z. SAGDEEV, V. M. LINKIN, V. V. KERZHANOVICH, V. I. ALTUNIN *et al.*
- 1417 VEGA Balloon Dynamics and Vertical Winds in the Venus Middle Cloud Region: V. M. LINKIN, V. V. KERZHANOVICH, A. N. LIPATOV, K. M. PICHKADZE, A. A. SHURUPOV, A. V. TERTERASHVILI, A. P. INGERSOLL, D. CRISP, A. W. GROSSMAN, R. E. YOUNG *et al.*
- 1420 Thermal Structure of the Venus Atmosphere in the Middle Cloud Layer: V. M. LINKIN, V. V. KERZHANOVICH, A. N. LIPATOV, A. A. SHURUPOV, A. SEIFF, B. RAGENT, R. E. YOUNG, A. P. INGERSOLL, D. CRISP, L. S. ELSON, R. A. PRESTON, J. E. BLAMONT
- 1422 Implications of the VEGA Balloon Results for Venus Atmospheric Dynamics: J. E. BLAMONT, R. E. YOUNG, A. SEIFF, B. RAGENT, R. SAGDEEV, V. M. LINKIN, V. V. KERZHANOVICH, A. P. INGERSOLL, D. CRISP, L. S. ELSON, R. A. PRESTON, G. S. GOLITSYN, V. N. IVANOV
- 
- 1425 Southern Hemisphere Origin of the Cretaceous Laytonville Limestone of California: J. A. TARDUNO, M. MCWILLIAMS, W. V. SLITER, H. E. COOK, M. C. BLAKE, JR., I. PREMOLI-SILVA
- 1429 On the Origin of Bacterial Resistance to Penicillin: Comparison of a  $\beta$ -Lactamase and a Penicillin Target: J. A. KELLY, O. DIDEBERG, P. CHARLIER, J. P. WERY, M. LIBERT, P. C. MOEWS, J. R. KNOX, C. DUEZ, CL. FRAIPONT, B. JORIS *et al.*
- 1431 Tyr<sup>527</sup> Is Phosphorylated in pp60<sup>c-src</sup>: Implications for Regulation: J. A. COOPER, K. L. GOULD, C. A. CARTWRIGHT, T. HUNTER
- 1434 Specific DNA Probe for the Diagnosis of *Plasmodium falciparum* Malaria: R. H. BARKER, JR., L. SUEBSAENG, W. ROONEY, G. C. ALECRIM, H. V. DOURADO, D. F. WIRTH
- 1437 Two Elements in the Bovine Leukemia Virus Long Terminal Repeat That Regulate Gene Expression: D. DERSE and J. W. CASEY

## Book Reviews

- 1451 Community Ecology, reviewed by R. M. MAY ■ Cognitive Learning and Memory in Children and Basic Processes in Memory Development, S. J. CECI ■ Phanerozoic Earth History of Australia, J. K. WEISSEL ■ Books Received

## Products & Materials

- 1455 Mass Spectrometer ■ Pocket Calculator with Display ■ Mantles ■ Chromatography System ■ Scanning Electron Microscope ■ Personal Computer ■ Literature

### Board of Directors

David A. Hamburg  
*Retiring President,  
Chairman*

Gerard Piel  
*President*

Lawrence Bogorad  
*President-elect*

Robert McC. Adams  
Robert W. Berliner  
Mildred Dresselhaus  
Donald N. Langenberg  
Dorothy Nelkin  
John E. Sawyer  
Sheila E. Widnall  
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  
Kenneth J. Arrow  
C. Paul Bianchi  
Elizabeth H. Blackburn  
Floyd E. Bloom  
Charles R. Cantor  
James H. Clark  
Bruce F. Eldridge  
Stanley Falkow  
Douglas J. Futuyma

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  
John S. Pearce  
Yeshayau Pocker  
Frederic M. Richards  
James E. Rothman

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

# Science

**231 (4744)**

*Science* **231** (4744), 1347-1455.

**ARTICLE TOOLS**

<http://science.sciencemag.org/content/231/4744.citation>

**PERMISSIONS**

<http://www.sciencemag.org/help/reprints-and-permissions>

Use of this article is subject to the [Terms of Service](#)

---

*Science* (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. The title *Science* is a registered trademark of AAAS.

Copyright © 1986 The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works.