

279 This Week in *Science*

Editorial

281 Planetary Fluids

Perspective

283 Sodium-Calcium Exchange in Excitable Cells: Fuzzy Space: W. J. LEDERER, E. NIGGLI, R. W. HADLEY

Letters

288 Greenland Ice Sheet: Is It Growing or Shrinking?: B. C. DOUGLAS, R. E. CHENEY, L. MILLER, R. W. AGREEN, W. E. CARTER, D. S. ROBERTSON; H. J. ZWALLY, A. C. BRENNER, J. A. MAJOR, R. A. BINDSCHADLER, J. G. MARSH ■ Fish, Money, and Science in Puget Sound: C. J. GAGEN; J. L. PITTS

News & Comment

292 Stanford Erupts Over Indirect Costs
295 East Germany Struggles to Clean Its Air and Water
296 NIH: The Endless Search
297 Scientific Misconduct Cases Revealed
Bromley Promises Small Science Focus
298 Gordon & Breach Impanels a Journal Jury
299 How the United States Stacks Up in Key Technologies

Research News

300 A Generational Rift in Geophysics ■ Not So Irreconcilable Differences?
303 Is AIDS Dementia Due to Increases in Calcium?
304 Polymer Chemists Are Having a ROMP
305 "Hairy Enzymes" Stay in the Blood
306 *Briefings*: Update: RU 486 ■ Math Students Needed ■ Ordinary Is Beautiful ■ AIDS Meeting: Visas ■ The Dimmest "Star" ■ Social Science: NSF's Poor Relation ■ Changing U.S. Demography ■ Truth in Labeling

Articles

Planetary Fluids

308 Atmospheric Dynamics of the Outer Planets: A. P. INGERSOLL
316 The Dynamics of the Oceanic Subtropical Gyres: J. PEDLOSKY
323 Scales and Effects of Fluid Flow in the Upper Crust: L. M. CATHLES III
329 Fluid Processes in Subduction Zones: S. M. PEACOCK
337 Mantle Oxidation State and Its Relationship to Tectonic Environment and Fluid Speciation: B. J. WOOD, L. T. BRYNDZIA, K. E. JOHNSON
345 Paleomagnetism and the Nature of the Geodynamo: R. T. MERRILL AND P. L. MCFADDEN

- **SCIENCE** is published weekly on Friday, except the last week in December, and with a supplement in March by the American Association for the Advancement of Science, 1333 H Street, NW, Washington, DC 20005. Second-class Non-profit 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, \$20 (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 1723, 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 objectives 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, to advance education in science, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.



COVER The Champagne Pool, named for its CO₂ bubbles, provides an interesting window into fluid processes beneath Waitotapu, the largest area of surface thermal activity in New Zealand. The pool occupies a 900-year-old hydrothermal explosion crater. Evaporation cools the surface waters from 100°C to about 75°C, producing the steam. Amorphous silica, blown by the wind to the sides, settles as an orange coating that contains 80 parts per million of gold and 175 parts per million of silver. See page 323. [Photograph by L. M. Cathles]

Reports

- 351 Seismic-Wave Attenuation Associated with Crustal Faults in the New Madrid Seismic Zone: R. M. HAMILTON AND W. D. MOONEY
- 354 Theory of Spontaneous Vesicle Formation in Surfactant Mixtures: S. A. SAFRAN, P. PINCUS, D. ANDELMAN
- 356 Developmental Arrest During Larval Life and Life-Span Extension in a Marine Mollusc: S. E. MILLER AND M. G. HADFIELD
- 358 Rational Design of Peptide-Based HIV Proteinase Inhibitors: N. A. ROBERTS, J. A. MARTIN, D. KINCHINGTON, A. V. BROADHURST, J. C. CRAIG, I. B. DUNCAN, S. A. GALPIN, B. K. HANDA, J. KAY *et al.*
- 361 Immunobiology and Pathogenesis of Hepatocellular Injury in Hepatitis B Virus Transgenic Mice: T. MORIYAMA, S. GUILHOT, K. KLOPCHIN, B. MOSS, C. A. PINKERT, R. D. PALMITER, R. L. BRINSTER, O. KANAGAWA, F. V. CHISARI
- 364 HIV-1 Coat Protein Neurotoxicity Prevented by Calcium Channel Antagonists: E. B. DREYER, P. K. KAISER, J. T. OFFERMANN, S. A. LIPTON
- 367 Defective Presentation of Endogenous Antigen by a Cell Line Expressing Class I Molecules: N. A. HOSKEN AND M. J. BEVAN
- 370 Shared Actions of Endotoxin and Taxol on TNF Receptors and TNF Release: A. H. DING, F. PORTEU, E. SANCHEZ, C. F. NATHAN
- 372 Sodium Current-Induced Release of Calcium from Cardiac Sarcoplasmic Reticulum: N. LEBLANC AND J. R. HUME
- 376 The Relationship Between Charge Movements Associated with I_{Ca} and I_{Na-Ca} in Cardiac Myocytes: J. H. B. BRIDGE, J. R. SMOLLEY, K. W. SPITZER
- 378 Erythropoietin Retards DNA Breakdown and Prevents Programmed Death in Erythroid Progenitor Cells: M. J. KOURY AND M. C. BONDURANT

Book Reviews

- 388 American Teachers, reviewed by S. SCHWAGER ■ Science Between the Superpowers AND Techno-Diplomacy, P. R. JOSEPHSON ■ Some Other Books of Interest ■ Books Received

Products & Materials

- 391 Database of 3-D Molecular Structures ■ Fluids Spectrometer ■ Monoclonal Antibodies ■ Image Analysis Workstation ■ Affinity Medium for Biomolecule Analysis ■ Oligonucleotide Labeling Kits ■ Hot Plate Magnetic Stirrer ■ Data Acquisition Program for Electrophysiology ■ Literature

Board of Directors

Richard C. Atkinson
Retiring President, Chairman

Donald N. Langenberg
President

Leon M. Lederman
President-elect

Mary Ellen Avery
Francisco J. Ayala
Eugene H. Cota-Robles
Robert A. Frosch
Joseph G. Gavin, Jr.
John H. Gibbons
Beatrice A. Hamburg
Florence P. Haseltine

William T. Golden
Treasurer

Richard S. Nicholson
Executive Officer

Editorial Board

Elizabeth E. Bailey
David Baltimore
William F. Brinkman
E. Margaret Burbidge
Pierre-Gilles de Gennes
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
Don L. Anderson
Stephen J. Benkovic
Gunter K-J Blobel
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
Harry A. Fozzard

Theodore H. Geballe
Roger I. M. Glass
Stephen P. Goff
Corey S. Goodman
Stephen J. Gould
Eric F. Johnson
Stephen M. Kosslyn
Konrad B. Krauskopf
Charles S. Levings III
Richard Losick
Joseph B. Martin
John C. McGiff
Anthony R. Means
Mortimer Mishkin
Roger A. Nicoll
Carl O. Pabo
Yeshayau Pocker

Dennis A. Powers
Erkki Ruoslahti
Thomas W. Schoener
Ronald H. Schwartz
Terrance J. Sejnowski
Robert T. N. Tjian
Virginia Trimble
Emil R. Unanue
Geerat J. Vermeij
Bert Vogelstein
Harold Weintraub
Irving L. Weissman
Zena Werb
George M. Whitesides
Owen N. Witte
William B. Wood

Science

248 (4953)

Science **248** (4953), 279-391.

ARTICLE TOOLS

<http://science.sciencemag.org/content/248/4953>

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. 2017 © The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works. The title *Science* is a registered trademark of AAAS.