NEWS & COMMENT

Britain's Big Science in a Bind 898
Walker Sets Off Alarm Bells With Efforts to Rein In EOS 900
NCI Cuts Contracts to Fund More Grants 901
Calculus Reform Sparks a Backlash 901
Linacs Offer Straight Line To Future 902
Heavy Hitters Anchor the AAAS Lineup at Annual Meeting 903

NEWS

Small Clusters Hit the Big Time 920
Ordering Nanoclusters Around 921
Clusters Whip Light Atomic Nuclei Into Shape 922

ARTICLES

Structure, Dynamics, and Thermodynamics of Clusters: Tales from Topographic Potential Surfaces 925
D. J. Wales

CLUSTERS

NEWS

RESEARCH ARTICLE

A Lower Limit on the Age of the Universe 957
B. Chaboyer, P. Demarque, P. J. Kernan, L. M. Krauss

Making gels by adding water

Board of Reviewing Editors

Frederick W. Alt
Don L. Anderson
Michael Ashburner
Stephen J. Benkovic
Alain Bernstein
David E. Bloom
Peter Borst
Henry R. Bourne
Michael S. Brown
James J. Bull
Kathryn Calame
Dennis W. Choi
David Clapham
Adrienne E. Clarke
John M. Coffin
F. Fleming Crim
Paul J. Crutzen
James E. Dahlberg
Robert Desmonde
Paul T. Englund
G. Ertl
Richard G. Fairbanks
Douglas T. Fearon
Harry A. Fozzard
Klaus Friedrich
Roger I. M. Glass
Stephen P. Golf
Peter N. Goodfellow
Corey S. Goodman
Peter Gruss
Philip C. Hanawalt
Nobutaka Hirokawa
Tomas Høkfelt
Tatsuki Horio
Susan D. Iverson
Eric F. Johnson
Stephen M. Kosslyn
Michael LaBarbera
Nicole Le Douarin
Charles S. Levinson III
Harvey F. Lodish
Richard Losick
Rennard Lührmann
Ruth Lyden-Bell
Seth Marder
Diane Mathis
Anthony R. Means
Shigetada Nakashima
Kim Nasmyth
Roger A. Nicoll
Stefan Normark
Stuart L. Pinn
Yeshayau Pocker
Richard B. Quinlan
Martin Raft
V. Ramanathan
Douglas C. Rees
T. M. Rice
David C. Rubie
Erikki Ruoslahti
Gottfried Schatz
Jozef Schell
Ronald H. Schwartz
Teresno J. Sejnowski
Thomas A. Steitz
Michael P. Styrer
Tomoyuki Takahashi
Masatoshi Takeichi
Keiji Tanaka
Robert T. N. Tian
Yoshinori Tokura
Emil R. Unanue
Gerard J. Verrijn
Bert Vogelstein
Arthur Weiss
Zora Werb
George M. Whitesides
Owen N. Witte
William A. Wulf

DEPARTMENTS

THIS WEEK IN SCIENCE 885
EDITORIAL 889
LETTERS 891

SCIENCESCOPE 897
RANDOM SAMPLES 915
BOOK REVIEWS 948

The DNA Provisor, reviewed by G. S. Martin * Supramolecular Chemistry, J. S. Siegel * Vignettes * Books Received

PRODUCTS & MATERIALS 1003

This week in science

Fusion Prospects: T. H. Stix; E. Mazuccato; W. E. Perkins * Comparing Student Test Scores: A. Ahlgren; I. C. Rotberg * HHMI Awards: I. L. O. Buxton

Perspectives

Do Big and Little Earthquakes Start Differently J. E. Vidale

Bio-Molecular Dynamics Comes of Age 954
H. J. C. Berendsen

When Proteins Receive Deadly Messages at Birth S. Jentsch

Research article

A Lower Limit on the Age of the Universe 957
B. Chaboyer, P. Demarque, P. J. Kernan, L. M. Krauss
The isolated water pentamer adopts a ring structure, with each molecule acting as a single donor and single acceptor of a hydrogen bond. The average separation between oxygen atoms (red spheres) is 2.76 angstroms. Similar water pentagons are prominent structures in the dynamic hydrogen-bonding network revealed in computer simulations of liquid water, like that depicted in the background. See page 929 in the Special Section on clusters beginning on page 920, and a related Report (page 963). [Image: Tim Robinson, Chemistry Graphics Facility, University of California, Berkeley]

### Water Clusters
K. Liu, J. D. Cruzan, R. J. Saykally
929

### Semiconductor Clusters, Nanocrystals, and Quantum Dots
A. P. Alivisatos
933

### Magnetic Clusters in Molecular Beams, Metals, and Semiconductors
J. Shi, S. Gider, K. Babcock, D. A. Awhsalom
937

### Ab Initio Calculations of Fullerenes
G. E. Scuseria
942

### REPORTS

**Dust: A Diagnostic of the Hydrologic Cycle During the Last Glacial Maximum**
Y. L. Yung, T. Lee, C.-H. Wang, Y.-T. Shieh
962

**From Topographies to Dynamics on Multidimensional Potential Energy Surfaces of Atomic Clusters**
K. D. Ball, R. S. Berry, R. E. Kunz, F.-Y. Li, A. Proykova, D. J. Wales
963

**Catalytic Cleavage of the C–H and C–C Bonds of Alkanes by Surface Organometallic Chemistry: An EXAFS and IR Characterization of a Zr-H Catalyst**
J. Corker, F. Lefebvre, C. Lécuver, V. Dufaud, F. Quignard, A. Choplin, J. Evans, J.-M. Basset
966

**Catalytic Cleavage of the C–H and C–C Bonds of Alkanes by Surface Organometallic Chemistry: An EXAFS and IR Characterization of a Zr-H Catalyst**
J. Corker, F. Lefebvre, C. Lécuver, V. Dufaud, F. Quignard, A. Choplin, J. Evans, J.-M. Basset
966

**Catalytic Cleavage of the C–H and C–C Bonds of Alkanes by Surface Organometallic Chemistry: An EXAFS and IR Characterization of a Zr-H Catalyst**
J. Corker, F. Lefebvre, C. Lécuver, V. Dufaud, F. Quignard, A. Choplin, J. Evans, J.-M. Basset
966

**Catalytic Cleavage of the C–H and C–C Bonds of Alkanes by Surface Organometallic Chemistry: An EXAFS and IR Characterization of a Zr-H Catalyst**
J. Corker, F. Lefebvre, C. Lécuver, V. Dufaud, F. Quignard, A. Choplin, J. Evans, J.-M. Basset
966

**Hydrogen-bonding of a Peptide Tagging System in the Degradation of Proteins Synthesized from Damaged Messenger RNA**
K. C. Keiler, P. R. H. Waller, R. T. Sauer
990

**Phenotypes of Mouse diabetes and Rat fatty Due to Mutations in the OB (Leptin) Receptor**
994

**Ligand Binding: Molecular Mechanics and Rupture Force**
H. Grubmüller, B. Heymann, P. Tavan
997

**Direct Visualization of A-, P-, and E-Site Transfer RNAs in the Escherichia coli Ribosome**
R. A. Agrawal, P. Penczek, R. A. Grassucci, Y. Li, A. Leith, K. H. Nierhaus, J. Frank
1000

**Neurons traveling in chains**
978

### AAS A Board of Directors

Rita R. Colwell
Retiring President
Jane Lubchenco
Chairman
Mildred S. Dresselhaus
President-elect
Sheila Jasanoff
William A. Lester Jr.
Simon A. Levin
Marcia C. Linn
Michael J. Novacek
Anna C. Roosevelt
Jean E. Taylor
Nancy S. Wexler
William T. Golden
Treasurer
Richard S. Nicholson
Executive Officer

**SCIENCE** (ISSN 0036-8075) 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. 484160) paid at Washington, DC, and additional mailing offices. Copyright © 1996 by the American Association for the Advancement of Science. The title SCIENCE is a registered trademark of the AAAS. Domestic individual membership and subscription (1 issue): $110; $102 ( indispensable to subscription). Domestic institutional subscription (1 issue): $420. Foreign postaje extra. Mexico, Caribbean (surface mail) $55, other countries (air assisted delivery) $90. First class, airmail, student, and emeritus rates on request. Canadian rates with GST available upon request, GST #125481122. Printed in the U.S.A.

Change of address: allow 4 weeks, giving old and new addresses and 9-digit account number. Postmaster: Send change of address to Science, P.O. Box 1811, Danbury, CT 06813–1811. Single copy sales: $7.00 per issue prepaid includes surface postage; bulk rates on request. Authorization to photocopy material for internal or personal use under circumstances not falling with 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 $4.00 per article is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923. The identification code for Science is 0036-8075/83 $4.00. Science is indexed in the Reader’s Guide to Periodical Literature and in several specialized indexes.