INTRODUCTION
Theoretical Possibilities

NEWS
Problem Solved* (*Sort Of)

PERSPECTIVES
Intermolecular Potentials
A. J. Stone
Quantum Dynamics of Chemical Reactions
D. C. Clary
Insights into Current Limitations of Density Functional Theory
A. J. Cohen et al.
Frontiers in Surface Scattering Simulations
G.-J. Kroes
Large-Scale Molecular Dynamics Simulations of Self-Assembling Systems
M. L. Klein and W. Shinoda
Challenges in Modeling Materials Properties Without Experimental Input
E. A. Carter

NEWS OF THE WEEK
Scientists Seek Answers, Ponder Future After Anthrax Case Suicide
Scientists Targeted in California Firebombings
Court Ruling Scrambles Clean Air Plans, Leaving a Vacuum
Ethics Questions Add to Concerns About NIH Lines

SCIENCESCOPE
Phoenix’s Water May Be Gumming Up the Works Successes, Past and Future
Researchers Flock to View Fleeting Display of Solar Corona

NEWS FOCUS
Deciphering the Genetics of Evolution
Industrial-Style Screening Meets Academic Biology
Universities Join the Screening Bandwagon
Can the Vaquita Be Saved?
ATMOSPHERIC SCIENCE
Atmospheric Warming and the Amplification of Precipitation Extremes
R. P. Allan and B. J. Soden
Satellite data show that in the tropics, heavy rain events have increased in warmer months and decreased in colder months, more than predicted by climate models.
10.1126/science.1160787

BIOCHEMISTRY
Helical Structures of ESCRT-III Are Disassembled by VPS4
S. Lata et al.
A protein responsible for the final separation of daughter cells or budding viruses forms heteromeric complexes on the inside of the membrane to regulate the abscission step.
10.1126/science.1161070

RESEARCH ARTICLES
PSYCHOLOGY
The Rupture and Repair of Cooperation in Borderline Personality Disorder
B. King-Casas et al.
In a game, patients with personality disorder cannot build trust with normal partners, possibly because they cannot distinguish between trusting and distrusting acts in others.
10.1126/science.1159466

BIOCHEMISTRY
The Crystal Structure of a Sodium Galactose Transporter Reveals Mechanistic Insights into Na+/Sugar Symport
S. Faham et al.
The structure of a sugar transporter suggests how these proteins may rearrange to permit the sugar to enter and leave the binding site on opposite sides of the membrane.
10.1126/science.1159466

ASTRONOMY
Gas Disks to Gas Giants: Simulating the Birth of Planetary Systems
E. W. Thommes, S. Matsumura, F. A. Rasio
A model of the evolution of planets from a gas-rich disk shows that the disk’s density and viscosity affect the final distribution of planets and that our solar system is unusual.
10.1126/science.1159466

CHEMISTRY
Latent Fingerprint Chemical Imaging by Mass Spectrometry
Imaging of fingerprints in the field with a portable mass spectrometer can reveal the presence of drugs, explosives, or other materials and help resolve overlapping prints.
REPORTS CONTINUED...

PHYSICS

Suppressing Spin Qubit Dephasing by Nuclear State Preparation
D. J. Reilly et al.
A series of voltage pulses can mitigate the detrimental influence of background spins in gallium arsenide, allowing the spin of quantum dots to remain coherent for microseconds.

CHEMISTRY

Large Electocaloric Effect in Ferroelectric Polymers
Near Room Temperature
B. Neese et al.
A polymer undergoes a large change in ordering on application of an electric field at near-room temperatures, causing a temperature drop potentially useful for refrigeration.

CHEMISTRY

Programming DNA Tube Circumferences
P. Yin et al.
Synthetic molecular tubes with monodisperse, programmable circumferences are self-assembled using a single-stranded DNA motif.

CHEMISTRY

The Role of Excited-State Topology in Three-Body Dissociation of sym-Triazine
J. D. Savee et al.
Molecular imaging, along with theoretical analysis, shows that two distinct mechanisms interact to simultaneously break apart a molecule into three equivalent fragments.

PLANETARY SCIENCE

Phyllosilicate Diversity and Past Aqueous Activity Revealed at Mawrth Vallis, Mars
J. L. Bishop et al.
One of the oldest water channel deposits on Mars shows a layered sequence of different clay minerals produced by a history of aqueous alteration.

ATMOSPHERIC SCIENCE

Brown Carbon Spheres in East Asian Outflow and Their Optical Properties
D. T. L. Alexander, P. A. Crozier, J. R. Anderson
Pollution blown from East Asia over the Pacific contains abundant brown spheres, not simply black or organic carbon particles, complicating modeling of its climatic effects.

EVOLUTION

A Conserved Mutation in an Ethylene Biosynthesis Enzyme Leads to Andromonoecy in Melons
A. Boualem et al.
Melon plants have both hermaphroditic and male flowers, a mating system that results from a mutation involved in ethylene synthesis that is still under positive selection.

MEDICINE

Human CHN1 Mutations Hyperactivate α2-Chimaerin and Cause Duane’s Retraction Syndrome
N. Miyake et al.
A signaling protein that helps nerve fibers find their correct target muscles is required for innervation of the eye muscles and, if defective, causes an eye movement disorder.

IMMUNOLOGY

Deletional Tolerance Mediated by Extrathymic Aire-Expressing Cells
J. M. Gardner et al.
Cells in the spleen and lymph nodes express self-antigens to detect and remove circulating self-reactive immune cells that have escaped deletion by the thymus.

NEUROSCIENCE

Histologically Defined Components of a Neuronal Circuit underpinning the Cerebral Cortex
W. Shen et al.
Contrary to previous assumptions, dopamine helps both strengthen and weaken synapses made by cortical cells onto cells of the subcortical striatum.

NEUROSCIENCE

Dynamic Shifts of Limited Working Memory Resources in Human Vision
P. M. Bays and M. Husain
Working memory is a flexibly allocated, but finite, resource; more attention given to an object means it is remembered more precisely, whereas other objects are remembered less well.

SPECIAL FEATURE

Geoscience Careers

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In the Geosciences, Business Is Booming
Geoscientists in High Demand in the Oil Industry
Hydrogeologists Tap Into Demand for an Irreplaceable Resource

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CONTENTS continued >>
In contrast to its stolid image, the Z band of the mature myofibril is a beehive of activity.

Oppunities for geoscientists.

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www.sciencemag.org/multimedia/podcast
FREE WEEKLY SHOW
Download the 8 August Science Podcast to hear about science in Muslim countries, the brain signature of borderline personality disorder, geoscience careers, and more.

FUNDING SOURCES
Browse a list of grants and funding opportunities for cell signaling research and training; in the Resources section.

Separate individual or institutional subscriptions to these products may be required for full-text access.
Science 321 (5890), 741-859.

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