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### COVER

Single cobalt atoms (cones) on a stepped platinum substrate (blue), with attached stripes of one atomic layer of cobalt, magnetized up (yellow) or down (red), as imaged by spin-polarized scanning tunneling microscopy. Recording such images at successive magnetic fields enables measurement of the magnetic properties of individual atoms. See page 82.

*Image: F. Meier et al.*

*Illustration: F. Marczinowski*
ANTHROPOLOGY
DNA from Pre-Clovis Human Coprolites in Oregon, North America
M. T. P. Gilbert et al.
Fossil human feces from an Oregon cave predate the Clovis culture by about 1000 years, and DNA from the feces marks the presence of Native Americans in North America.
>> News story p. 37
10.1126/science.1154116

PHYSICS
BREVIA: Fine Structure Constant Defines Visual Transparency of Graphene
R. R. Nair et al.
The transparency of sheets of graphene is quantized in a way that allows a simple determination of the fine structure constant, which relates light and relativistic electrons.
10.1126/science.1156965

RESEARCH ARTICLES
ARCHAEOLOGY
Aztec Arithmetic Revisited: Land-Area Algorithms and Acolhua Congruence Arithmetic
B. J. Williams and M. del Carmen Jorge y Jorge
Analysis of ancient property records shows that the Aztecs used common algorithms and a distance standard for calculating land area and specific symbols to represent fractions.

BIOCHEMISTRY
Crystal Structure of a Self-Spliced Group II Intron
N. Toor, K. S. Keating, S. D. Taylor, A. M. Pyle
The autocatalytic group II intron contains a network of unusual tertiary RNA interactions that form a metalloribozyme active site with parallels to eukaryotic spliceosomes. >> Perspective p. 56

REPORTS
APPLIED PHYSICS
Revealing Magnetic Interactions from Single-Atom Magnetization Curves
F. Meier, L. Zhou, J. Wiebe, R. Wiesendanger
A scanning tunneling microscope with a spin-polarized tip can characterize the magnetic properties of single atoms on a nonmagnetic surface.

CHEMISTRY
The Roles of Subsurface Carbon and Hydrogen in Palladium-Catalyzed Alkyne Hydrogenation
D. Teschner et al.
The population of hydrogen and carbon within a palladium catalyst governs the hydrogenation of alkenes on its surface.
GEOCHEMISTRY
The Electrical Conductivity of Post-Perovskite in Earth’s D” Layer
K. Ohta et al.
A major silicate mineral deep in Earth’s mantle has a high electrical conductivity, causing a sufficiently strong coupling with the core to explain variations in Earth’s rotation.

ASTRONOMY
Graphite Whiskers in CV3 Meteorites
M. Fries and A. Steele
Graphite whiskers, a naturally occurring allotrope of carbon, have been found in primitive grains in several meteorites and may explain spectral features of supernovae.

CLIMATE CHANGE
Covariant Glacial-Interglacial Dust Fluxes in the Equatorial Pacific and Antarctica
G. Winckler et al.
A 500,000-year record shows that more dust, which provides iron and other nutrients, was blown into the equatorial Pacific during glacial periods than during warm periods.

MOLECULAR BIOLOGY
Selective Blockade of MicroRNA Processing by Lin-28
S. R. Viswanathan, G. O. Daley, R. I. Gregory
A protein necessary for reprogramming skin fibroblasts to pluripotent stem cells is an RNA-binding protein that normally inhibits microRNA processing in embryonic cells.

MICROBIOLOGY
Bacteria Subsisting on Antibiotics
G. Dantas et al.
A wide range of bacteria in the environment, many related to human pathogens, are both resistant to antibiotics and consume them as their only source of carbon for growth.

CELL BIOLOGY
Reversible Compartmentalization of de Novo Purine Biosynthetic Complexes in Living Cells
S. An, R. Kumar, E. D. Sheets, S. J. Benkovic
The enzymes needed for purine biosynthesis cluster in the cytoplasm when cells are depleted of purine but dissociate when the demand for purine is low.

BIOCHEMISTRY
Single-Molecule DNA Sequencing of a Viral Genome
T. D. Harris et al.
The M13 viral genome has been resequenced by a single-molecule method that allows simultaneous sequencing of 280,000 DNA strands of 25 bases with 100 percent coverage.

NEUROSCIENCE
Entrainment of Neuronal Oscillations as a Mechanism of Attentional Selection
P. Lakatos et al.
In monkeys that are paying attention to a rhythmic stimulus, brain oscillations become tuned to the stimulus so that the response in the visual cortex is enhanced.

NEUROSCIENCE
Episodic-Like Memory in Rats: Is It Based on When or How Long Ago?
W. A. Roberts et al.
Unlike humans, who can place past events within a temporal framework, rats can only remember when an event happened by tracking the time elapsed since its occurrence.
**SCIENCE SIGNALING**

**REVIEW:** Calpain in the CNS—From Synaptic Function to Neurotoxicity

J. Liu, M. Cheng Liu, K. K. W. Wang

Physiological activation of calpains may play a role in memory, whereas pathological activation leads to cell death.

**PODCAST**

E. M. Adler and J. F. Foley

Mutations in the IGF-1 receptor are associated with longer life span in humans.

**SCIENCE NOW**

**DAILY NEWS COVERAGE**

**Peacock Feathers: That’s So Last Year**
Some female birds have lost interest in flashy males.

**Traffic Jams Happen, Get Used to It**
Physics helps explain bunch-ups on the highway.

**Organics in the Mist**
Astronomers find an amino acid precursor lurking in an interstellar cloud.

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**SCIENCE CAREERS**

**CAREER RESOURCES FOR SCIENTISTS**

**Taken for Granted: Help Is on the Way (for Some)**
B. Benderly

A flurry of activity on workforce issues in early March did little to ease the problems of young scientists.

**A Competitive Fellowship**
J. Mervis

Next year, NSF officials hope to launch a novel training program connected to the president’s American Competitiveness Initiative.

**Networking Group Seeks to Bridge the Poles**
C. Reed

A fledgling organization connects polar scientists.

**April 2008 Funding News**
J. Fernández

Learn about the latest in research funding opportunities, scholarships, fellowships, and internships.

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**SCIENCE PODCAST**

Download the 4 April Science Podcast to hear about DNA evidence of pre-Clovis people in the Americas, bacteria subsisting on antibiotics, Aztec arithmetic, and more.

www.sciencemag.org/about/podcast.dtl

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