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Image: NASA/JPL-Caltech/Agenzia Spaziale Italiana/Università di Roma/Southwest Research Institute; additional data credits: Mars Orbiter Laser Altimeter Science Team, Mars Orbiter Camera (NASA/JPL/Malin Space Science Systems); digital graphics: JPL/Eric De Jong/Mike Stetson/Jason Craig

Cover

Synthetic image of the north polar cap of Mars, about 1000 kilometers across, with cutaway revealing interior structure as imaged by the Shallow Radar (SHARAD) on the Mars Reconnaissance Orbiter mission. Vertical exaggeration is about 60:1. In this false-color rendition, bright lines in the cross section are reflections from internal layer boundaries within the icy cap; their depth distribution provides clues to recent climate history. See page 1182.

Image: NASA/JPL-Caltech/Agenzia Spaziale Italiana/Università di Roma/Southwest Research Institute; additional data credits: Mars Orbiter Laser Altimeter Science Team, Mars Orbiter Camera (NASA/JPL/Malin Space Science Systems); digital graphics: JPL/Eric De Jong/Mike Stetson/Jason Craig

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C. Hillaire-Marcel and A. de Vernal
full text at www.sciencemag.org/cgi/content/full/320/5880/1161a
Response to Comment on “Mixed-Layer Deepening During Heinrich Events: A Multi-Planktonic Foraminiferal $\delta^{18}O$ Approach”
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How We See Ourselves and How We See Others
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Ecosystem Feedbacks and Nitrogen Fixation in Boreal Forests
T. H. DeLuca et al.
As burned areas in boreal forests recover, cyanobacteria in moss carpets fix nitrogen as it is lost from dead leaves and litter, ensuring a constant nitrogen supply.

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Mars North Polar Deposits: Stratigraphy, Age, and Geodynamical Response
R. J. Phillips et al.
Radar mapping shows that Mars’ thick north polar ice cap contains four dust-rich layers recording variation in the planet’s orbit and only slightly depresses the underlying crust. >> Perspective p. 1171

MOLECULAR BIOLOGY
Widespread Translational Inhibition by Plant miRNAs and siRNAs
P. Brodersen et al.
Plant microRNAs and small interfering RNAs, thought to inhibit gene expression by cleavage of their RNA targets, also interfere with the translation of these RNAs into protein.

PSYCHOLOGY
Predicting Human Brain Activity Associated with the Meanings of Nouns
T. M. Mitchell et al.
A model trained to associate specific nouns with resultant images of brain activity can predict what activity pattern will occur when a participant is shown a picture of a new noun.

BIOCHEMISTRY
Structural Basis of Trans-Inhibition in a Molybdate/Tungstate ABC Transporter
S. Gerber, M. Comellas-Bigler, B. A. Goetz, K. P. Locher
A class of membrane transporters is subject to product inhibition: The imported substrate binds to a regulatory domain that sterically inhibits further adenosine triphosphate hydrolysis.
10.1126/science.1156213

GENETICS
Paleo-Eskimo mtDNA Genome Reveals Matrilineal Discontinuity in Greenland
M. T. P. Gilbert et al.
Ancient human DNA sequences from Greenland suggest that the earliest inhabitants of the far north were from a lineage distinct from extant Native Americans and Eskimos. >> News story p. 1146
10.1126/science.1159750

PHYSICS
Probing Cold Dense Nuclear Matter
R. Subedi et al.
Electron-beam experiments reveal that some neutrons within $^{12}$C nuclei tend to form close, dynamical pairs with protons but that pairs of the same particle type are rare.
10.1126/science.1156675

CLIMATE CHANGE
Elevation Changes in Antarctica Mainly Determined by Accumulation Variability
M. M. Helsen et al.
Satellite data since 1995, corrected for the conversion of snow to denser ice, imply that ice sheets grew slowly in the East Antarctic but decreased around the Amundson Sea.
10.1126/science.1153894

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ASTRONOMY
The Cassiopeia A Supernova Was of Type Ib
O. Krause et al.
A supernova seen 300 years ago is now seen again as infrared echoes scattered by interstellar dust, showing that it formed from the helium core of a red supergiant star.
>> Perspective p. 1167; Science Podcast

APPLIED PHYSICS
Interfacial Polygonal Nanopatterning of Stable Microbubbles
E. Dressaire, R. Bee, D. C. Bell, A. Lips, H. A. Stone
Hexagonally packed surfactant molecules at the gas/liquid interface of micrometer-sized gas bubbles retard dispersion enough to stabilize them for more than a year.

CLIMATE CHANGE
The Sensitivity of Polar Ozone Depletion to Proposed Geoengineering Schemes
S. Tímes, R. Müller, R. Salawitch
Calculations imply that injection of sulfur into the atmosphere to counteract global warming would threaten the ozone layer, as occurred after the Mount Pinatubo eruption.
>> Perspective p. 1166

PLANETARY SCIENCE
Water Activity and the Challenge for Life on Early Mars
N. J. Tosca, A. H. Knoll, S. M. McLennan
Calculations imply that the high salinity required to form widespread sulfates found on Mars reduces the effective concentration of water below the limits for life on Earth.

CELL BIOLOGY
A Cytosolic Iron Chaperone That Delivers Iron to Ferritin
H. Shi, K. Z. Bence, T. L. Stemmler, C. C. Philpott
A cytosolic iron-binding protein, PCBP1, carries the reactive but essential element iron to ferritin, its major storage depot in the cell.

EVOLUTION
Massive Horizontal Gene Transfer in Bdelloid Rotifers
E. A. Gladyshev, M. Meselson, I. R. Arkhipova
Bdelloid rotifers carry a large number of foreign genes—unusual for a metazoan—perhaps explaining how they have escaped extinction despite an asexual life-style.

EVOLUTION
Ancestral Monogamy Shows Kin Selection Is Key to the Evolution of Eusociality
W. O. H. Hughes et al.
Monogamy prevailed in the ancestral lineages of bees and wasps, suggesting that high relatedness was critical to the evolution of their complex, cooperative social systems. >> Science Podcast

PSYCHOLOGY
Log or Linear?: Distinct Intuitions of the Number Scale in Western and Amazonian Indigene Cultures
S. Dehaene, V. Izard, E. Spelke, P. Pica
Adults from an Amazonian tribe view numbers as a logarithmic progression (e.g., 10 is halfway to 100), suggesting that our linear view of numbers is culturally learned.

IMMUNOLOGY
Coordination of Early Protective Immunity to Viral Infection by Regulatory T Cells
J. M. Lund, L. Hsing, T. T. Pham, A. Y. Rudensky
In mice infected with herpes virus, a usually immunosuppressive T cell is necessary for rapid arrival of immune cells and elevated cytokine levels at the site of infection.
>> Perspective p. 1168

MEDICINE
MeCP2, a Key Contributor to Neurological Disease, Activates and Represses Transcription
M. Chahrour et al.
A transcription factor implicated in autism and learning disorders is unexpectedly found to activate a large number of genes in the hypothalamus, not just a few.
>> Perspective p. 1172
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A. J. Murray
Widely used inhibitors of cAMP-dependent protein kinase (PKA) have nonspecific side effects.

**PERSPECTIVE: Steering in Quadruplet—The Complex Signaling Pathways Directing Chemotaxis**
E. C. Rericha and C. A. Parent
Multiple pathways act in concert to direct a cell’s migration.

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