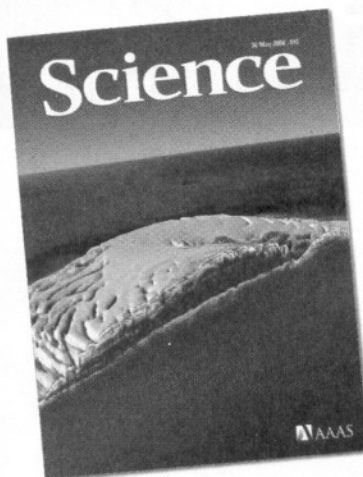




COVER

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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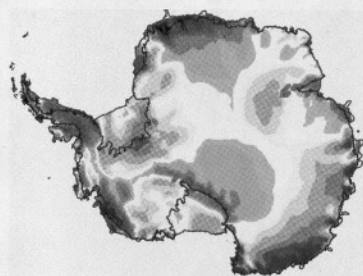
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SCIENCE EXPRESS

www.sciencexpress.org

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

PERSPECTIVE: A Matter of Firn

K. M. Cuffey

10.1126/science.1158683

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

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Comment on "Mixed-Layer Deepening During Heinrich Events: A Multi-Planktonic Foraminiferal $\delta^{18}\text{O}$ Approach" 1161

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 $\delta^{18}\text{O}$ Approach"

H. Rashid and E. A. Boyle

full text at www.sciencemag.org/cgi/content/full/320/5880/1161b

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E. Pronin

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Ecosystem Feedbacks and Nitrogen Fixation in Boreal Forests 1181

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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 1182

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*

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Widespread Translational Inhibition by Plant miRNAs and siRNAs 1185

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.

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Predicting Human Brain Activity Associated with the Meanings of Nouns 1191

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.



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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*

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- Interfacial Polygonal Nanopatterning of Stable Microbubbles** 1198

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.

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- The Sensitivity of Polar Ozone Depletion to Proposed Geoengineering Schemes** 1201

S. Tilmes, 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*

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- Water Activity and the Challenge for Life on Early Mars** 1204

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.

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- A Cytosolic Iron Chaperone That Delivers Iron to Ferritin** 1207

H. Shi, K. Z. Bencze, 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.

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- Massive Horizontal Gene Transfer in Bdelloid Rotifers** 1210

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** 1213

W. O. H. Hughes et al.

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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.

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- Coordination of Early Protective Immunity to Viral Infection by Regulatory T Cells** 1220

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*

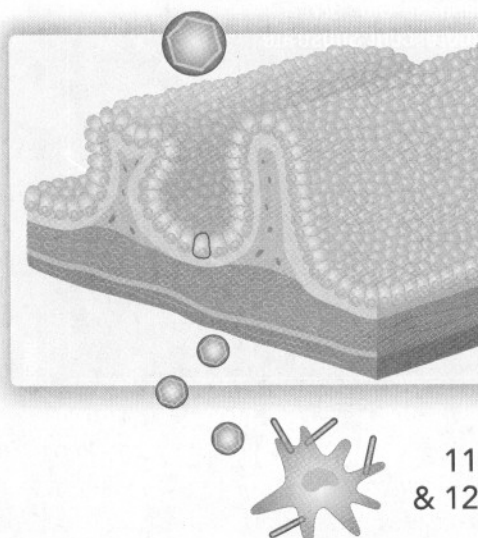
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M. Chahrour et al.

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