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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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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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TECHNICAL COMMENT ABSTRACTS

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C. Hillaire-Marcel and A. de Vernal
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H. Rashid and E. A. Boyle

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ECOLOGY
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.

RESEARCH ARTICLES

PLANETARY SCIENCE
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
10.1126/science.1156675

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.

Published by AAAS
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.

PLANT PHYSIOLOGY
Estimates of Leaf Area in an Inland Amazonian Rain Forest
C. A. Williams, L. S. Schubart, J. W. Seidl, W. J. Scurlock, P. K. Roy
The sunlit portion of the forest floor is comparable to the surface area of the United States.

CLIMATE CHANGE
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

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.

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EVOLUTION
Massive horizontal gene transfer in bdelloid rotifers
E. A. Gladyshev, M. Meselson, I. R. Arkhipova
Bdelloid rotifiers carry a large number of foreign genes—unusual for a metazoan—perhaps explaining how they have escaped extinction despite an asexual lifestyle.
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The Neurochemistry of Forgiving and Forgetting
Hormone may spur feelings of trust by suppressing brain region that signals fear.

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REVIEW: Pharmacological PKA Inhibition—All May Not Be What It Seems
A. J. Murray
 Widely used inhibitors of cAMP-dependent protein kinase (PKA) have nonspecific side effects.

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E. C. Rericha and C. A. Parent
 Multiple pathways act in concert to direct a cell’s migration.

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E. Pain
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Science 320 (5880), 1129-1230.