COVER
Laser-surveyed topography of the elevation in a Pennsylvania landscape, showing evidence of sediment-filled early American millponds along a stream valley. Terraces around the stream channel descend stepwise from upstream to downstream (dark purple, light purple, pink), each associated with a dam. The deeper stream incision into the two downstream terraces is due to more complete dam breaching. See page 299.
Image: U.S. Geological Survey (LIDAR data and preliminary processing); Michael Rahnis (image analysis and generation)

NEWS OF THE WEEK
Uncle Sam’s Biomedical Archive Wants Your Papers
Satellite Company Offers Earth-Observing Researchers a Ride
Mirror Neurons May Help Songbirds Stay in Tune
SCIENCESCOPE
New Dark-Matter Map Reveals Where Galaxies Gambol
Polynesians Took the Express Train Through Melanesia to the Pacific
Most-Massive Black Hole Confirms Relativity Rules the Universe
Isolated Tribe Gives Clues to the Origins of Syphilis
Calculating Iraq’s Death Toll: WHO Study Backs Lower Estimate

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Hoping for a Glimpse of What’s Ahead
Seeking the Roots of Ritual
Just Don’t Call It the Garden of Eden

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Scientific Meetings: Call In Instead R. Roy
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Fair Game for Chimpanzees E. Visalberghi and J. Anderson
Response K. Jensen, J. Call, M. Tomasello

BOOKS ET AL.
Cool It The Skeptical Environmentalist’s Guide to Global Warming
B. Lomborg, reviewed by W. F. Ruddiman (U.S. and U.K. editions)

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Aging Infrastructure and Ecosystem Restoration M. W. Doyle et al.

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A Shared Docking Motif in TRF1 and TRF2 Used for Differential Recruitment of Telomeric Proteins
Y. Chen et al.
Two similar members of the protein complex that protects the free ends of chromosomes have distinct binding sites for other complex members and accessory proteins.

10.1126/science.1151804

Cell Biology

Differential Regulation of Dynein and Kinesin Motor Proteins by Tau
R. Dixit, J. L. Ross, Y. E. Goldman, E. L. F. Holzbaur
The motor proteins dynein and kinesin both encounter the protein tau as they move along the microtubules; the former reverses direction, whereas the latter detaches.

10.1126/science.1152993

Medicine

Clonal Integration of a Polyomavirus in Human Merkel Cell Carcinoma
H. Feng, M. Shuda, Y. Chang, P. S. Moore
A rare, but highly aggressive, form of human skin cancer may be caused by a previously uncharacterized human polyomavirus.

10.1126/science.1152586

Geophysics

Rogue Mantle Helium and Neon
F. Albarède
Anomalously high ratios of $^3$He to $^4$He in the recycled basalts under ocean islands may result from helium diffusing in from more pristine, primitive mantle.

10.1126/science.1150060

Brevia

Plant Science

Arabidopsis CLV3 Peptide Directly Binds CLV1 Ectodomain
M. Ogawa, H. Shinohara, Y. Sakagami, Y. Matsubayashi
Peptides that maintain the stem cells in the shoot apical meristem of Arabidopsis act by binding to the extracellular portion of a receptor-like kinase.

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Time-Resolved Observation and Control of Superrexchange Interactions with Ultracold Atoms in Optical Lattices
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Ultracold atoms trapped at sites of optical lattices are used to investigate the superexchange interaction between neighboring spins. >> Perspective p. 292

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Natural Streams and the Legacy of Water-Powered Mills
R. C. Walter and D. J. Merritts
Floodplains and streams in the eastern United States were altered extensively by milldams in the 1700s and 1800s, challenging recent hydrologic interpretations and restoration approaches.

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Neuroscience

Lhx2 Selector Activity Specifies Cortical Identity and Suppresses Hippocampal Organizer Fate
V. S. Mangale et al.
The brain’s cortex begins as a one-cell-thick sheet of stem cells, whose ultimate identity is specified by a gene that suppresses noncortical cell fates.

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Million-Degree Plasma Pervading the Extended Orion Nebula
M. Güdel et al.
Million-degree gas fills the Orion Nebula, implying that shock-heated gas from stellar outflows is common in our Galaxy.

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Elementary Structural Motifs in a Random Network of Cytosine Adsorbed on a Gold(111) Surface
R. Otero et al.
Upon cooling, cytosine molecules on a gold surface form a disordered network based on the assembly of three elementary structural units, which may have analogies with glasses.

GEOPHYSICS
The Subduction Zone Flow Field from Seismic Anisotropy: A Global View
M. D. Long and P. G. Silver
Identification of the fastest seismic-wave propagation speed in subduction zones reveals that trench migration induces flow in the mantle above and beneath the subducting slab.

EVOLUTION
A Localized Negative Genetic Correlation Constrains Microevolution of Coat Color in Wild Sheep
J. Gratten et al.
Although the fitness of wild sheep increases with size, large, dark sheep are becoming rarer because color is genetically linked to genes that decrease fitness.

ECOLOGY
Coastal Ecosystem–Based Management with Nonlinear Ecological Functions and Values
E. B. Barbier et al.
Taking into account the nonlinear relation between preserved habitat area and wave attenuation facilitates integrated management of coastal conservation and development.

DEVELOPMENTAL BIOLOGY
β-Catenin Defines Head Versus Tail Identity During Planarian Regeneration and Homeostasis
K. A. Gurley, J. C. Rink, A. S. Alvarado
Smed-βcatenin-1 Is Required for Anteroposterior Blastaema Polarity in Planarian Regeneration
C. P. Petersen and P. W. Reddien
After the head or tail of a planarian is severed, the signal intensity of a prominent developmental signaling pathway controls whether a new head or tail regenerates.

GENETICS
Natural Genetic Variation in Lycopene Epsilon Cyclase Tapped for Maize Biofortification
C. E. Harjes et al.
Identification of the gene that controls vitamin A levels in maize will allow production of varieties that can improve global health without using transgenic methods.

CELL BIOLOGY
Dual Positive and Negative Regulation of Wingless Signaling by Adenomatous Polyposis Coli
C. M. Takacs et al.
An important developmental signaling molecule known to be a tumor suppressor can also activate growth, possibly explaining the responses of some cancers.

MEDICINE
Initiating and Cancer-Propagating Cells in TEL-AML1–Associated Childhood Leukemia
D. Hong et al.
Identical twins each carry preleukemic cells containing the characteristic chromosomal translocation, but only one undergoes further genetic changes and develops leukemia.

BIOCHEMISTRY
Effects of Molecular Memory and Bursting on Fluctuations in Gene Expression
J. M. Pedraza and J. Paulsson
A theory of stochastic gene expression suggests that noise can be modulated without feedback loops, complicating interpretation of single-cell experiments.
Perspective: The Endoplasmic Reticulum Takes Center Stage in Cell Cycle Regulation
P. Fearon and O. Cohen-Fix
The ER appears to play a key role in controlling the spatial localization of proteins involved in the cell cycle.

ST NETWATCH: UCSC Genome Bioinformatics
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