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D. V. M. Bishop
Review Summary; for full text: http://dx.doi.org/10.1126/science.1230531

ON THE WEB THIS WEEK
>> Science Express
Read about medieval versus modern leprosy, fossilized muscles for primitive jaws, ice shelf melting around Antarctica, and more.

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COVER
Polished thin section (70 micrometers) of volcanic glass, sample catalog number NMNH115296-3, in transmitted light (14 by 18 millimeters). Molten lava erupted onto the sea floor freezes to glass and minerals that contain clues to the lava’s ancient past and origin in Earth’s deep interior. Volcanic glasses such as this one may reveal a link between Earth’s oxidation state and the deep carbon cycle. See page 1314.

Image: G. Macpherson, T. Gooding, and E. Cottrell

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RESEARCH ARTICLE

1303 Evolution of Mammalian Diving Capacity Traced by Myoglobin Net Surface Charge
S. Mirceta et al.
Increasing the number of charged amino acids allows for higher myoglobin concentrations in the muscles of diving mammals.
Research Article Summary; for full text: http://dx.doi.org/10.1126/science.1234192

1307 Short-Range Quantum Magnetism of Ultracold Fermions in an Optical Lattice
D. Greif et al.
A redistribution of entropy in an optical lattice loaded with atoms leads to magnetic correlations.

1311 Strong Light-Matter Interactions in Heterostructures of Atomically Thin Films
L. Britnell et al.
Transition metal dichalcogenides sandwiched between two layers of graphene produce an enhanced photoresponse.

1314 Redox Heterogeneity in Mid-Ocean Ridge Basalts as a Function of Mantle Source
E. Cottrell and K. A. Kelley
Subducted carbon from ancient oceanic crust results in a more reduced mantle.

1317 Hydrogen Isotopes in Lunar Volcanic Glasses and Melt Inclusions Reveal a Carbonaceous Chondrite Heritage
A. E. Saal et al.
Hydrogen isotope ratios in lunar samples imply a common origin for Earth’s and the Moon’s water.

1320 Clarifying the Dominant Sources and Mechanisms of Cirrus Cloud Formation
D. J. Cziczo et al.
Mineral dust and metallic particles initiate most ice nucleus condensation during cirrus cloud formation.

1324 Epistasis Among Adaptive Mutations in Deer Mouse Hemoglobin
C. Natarajan et al.
Deer mice have discovered that mutations distant from the oxygen-binding site help them live at high altitude.

1327 Root Effect Hemoglobin May Have Evolved to Enhance General Tissue Oxygen Deliveries
J. L. Rumber et al.
The evolutionary origin of the unloading of oxygen at low pH is traced back to teleosts.

1330 Targeting Isoprenylcysteine Methylation Ameliorates Disease in a Mouse Model of Progeria
M. X. Ibrahim et al.
Reduced protein methyltransferase activity improves progeria-like disease phenotypes.

1334 The Molecular Basis for Attractive Salt-Taste Coding in Drosophila
Y. V. Zhang et al.
Low or high concentrations of sodium chloride activate distinct receptor pathways and, hence, elicit attractive or aversive responses.

1338 Parallel Neural Pathways Mediate CO2 Avoidance Responses in Drosophila
H.-H. Lin et al.
Different concentrations of carbon dioxide activate distinct projection neurons and, hence, elicit different responses.

1342 Multisensory Control of Hippocampal Spatiotemporal Selectivity
P. Ravassard et al.
Virtual reality reveals how sensory cues differentially influence brain activity involved in sensing place in rats.

1346 Subangstrom Resolution X-Ray Structure Details Aquaporin-Water Interactions
U. Kosinska Eriksson et al.
A really, really close-up view of an aquaporin hints at how water passes through but protons do not.

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1304 Terahertz Metamaterials for Linear Polarization Conversion and Anomalous Refraction
N. K. Grady et al.
A metasurface-based design is used for polarization conversion in the terahertz regime.

1334 Transition metal dichalcogenides sandwiched between two layers of graphene produce an enhanced photoresponse.

1338 Different concentrations of carbon dioxide activate distinct projection neurons and, hence, elicit different responses.

1342 Virtual reality reveals how sensory cues differentially influence brain activity involved in sensing place in rats.

1346 A really, really close-up view of an aquaporin hints at how water passes through but protons do not.