

EDITORIAL

- 157 Peruvian Highlands, Fume-Free
Pilar Nores Bodereau
>> *Policy Forum p. 180*

NEWS OF THE WEEK

- 160 A roundup of the week's top stories

NEWS & ANALYSIS

- 163 Panel Draws Ambitious Road Map for Gulf Restoration
- 164 Teasing Out Cause and Effect in Macroeconomics
- 165 Once-Ridiculed Discovery Redefined the Term Crystal
- 166 HIV Study Renews Scrutiny of Hormonal Contraception
- 167 African Data Bolster New View of Modern Human Origins
- 168 Gut Bacteria Lend a Molecular Hand to Viruses
>> *Reports pp. 245 and 249*

NEWS FOCUS

- 169 Beyond the Data
The Community Weighs In on Broader Impacts
>> *Science Podcast*
- 173 Vital Details of Global Warming Are Eluding Forecasters

LETTERS

- 176 Partial Retraction
R. H. Silverman et al.
Chemical Elements: What's in a Name?
J. P. Leal
Biosecurity and the Politics of Fear
P. E. Hulme

177 TECHNICAL COMMENT ABSTRACTS

BOOKS ET AL.

- 178 Redirect
T. D. Wilson, reviewed by G. L. Cohen
- 179 Browsers

POLICY FORUM

- 180 A Major Environmental Cause of Death
W. J. Martin II et al.
>> *Editorial p. 157*

PERSPECTIVES

- 182 Keeping Bacteria at a Distance
M. E. V. Johansson and G. C. Hansson
>> *Report p. 255*
- 183 Self-Assembly Enters the Design Era
A. Travesset
>> *Report p. 204*
- 184 The Costs of Breathing
N. Lane
- 186 SeVERing Mitochondria
A. S. Rambold and J. Lippincott-Schwartz
- 187 Shining Light on Diabolic Points
B. J. Whitaker
>> *Report p. 208*
- 188 Grass Trumps Trees with Fire
A. L. Mayer and A. H. Khalyani
>> *Reports pp. 230 and 232*

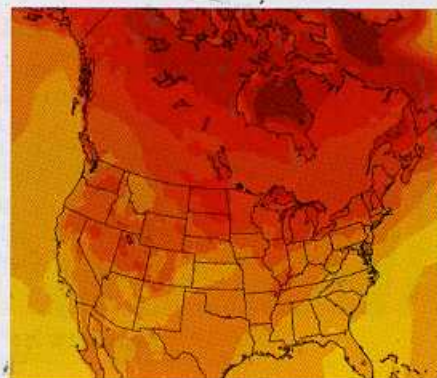
REVIEW

- 190 The Diets of Early Hominins
P. S. Ungar and M. Sponheimer

BREVIA

- 194 Replication-Dependent Loss of 5-Hydroxymethylcytosine in Mouse Preimplantation Embryos
A. Inoue and Y. Zhang
The oxidation product of methylated cytosine is passively lost from DNA in the zygote as cell division progresses.

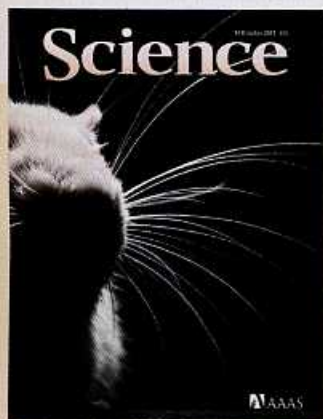
CONTENTS continued >>



page 173



page 178



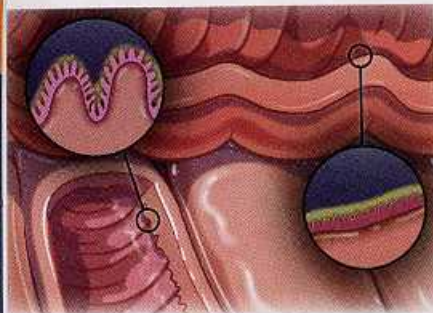
COVER

Whiskers at the snout are instrumental for the rat to explore the external world. During development, sensory information provided by the whiskers is critical for the formation of their representation in the brain. *Minlebaev et al.* show how this process is controlled by gamma oscillations in developing neuronal networks. See page 226.

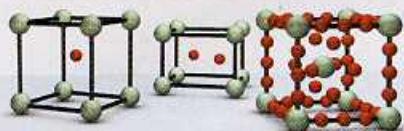
Photo: Henrik Sorensen/Getty Images

DEPARTMENTS

- 153 This Week in *Science*
- 158 Editors' Choice
- 159 *Science* Staff
- 259 New Products
- 260 *Science* Careers



pages 182 & 255



pages 183 & 204



page 219

RESEARCH ARTICLE

- 195 **Synthesized Light Transients**
A. Wirth et al.
Light spanning the near infrared to the ultraviolet has been confined in pulses shorter than a single optical cycle.

REPORTS

- 200 **Observation of Correlated Particle-Hole Pairs and String Order in Low-Dimensional Mott Insulators**
M. Endres et al.
Parity correlations in a one-dimensional Bose gas in an optical lattice reveal a hidden "string order."
>> *Perspective p. 183*
- 204 **Nanoparticle Superlattice Engineering with DNA**
R. J. Macfarlane et al.
Design rules allow the synthesis of nanoparticle-DNA superlattices in nine different lattices.
>> *Perspective p. 183*
- 208 **Conical Intersection Dynamics in NO₂ Probed by Homodyne High-Harmonic Spectroscopy**
H. J. Würner et al.
Coincident vibrational and electronic rearrangements in a photoexcited molecule are tracked in fine detail.
>> *Perspective p. 187*
- 213 **Linear Alkane Polymerization on a Gold Surface**
D. Zhong et al.
The confining channel geometry of a gold surface induces selective end-to-end linking of hydrocarbon chains.
- 216 **Flash Heating Leads to Low Frictional Strength of Crustal Rocks at Earthquake Slip Rates**
D. L. Goldsby and T. E. Tullis
Extreme temperatures generated over short distances may weaken faults during earthquakes.
- 219 **A 100,000-Year-Old Ochre-Processing Workshop at Blombos Cave, South Africa**
C. S. Henshilwood et al.
Early humans mixed and stored ochre pigments in shells 100,000 years ago, an indication of the emergence of higher planning.
>> *Science Podcast*
- 222 **The Dynamic Architecture of Hox Gene Clusters**
D. Noordermeer et al.
Sequential activation of *Hox* genes correlates with a transition of negative to positive three-dimensional chromosome structure.
- 226 **Early Gamma Oscillations Synchronize Developing Thalamus and Cortex**
M. Minlebaev et al.
Thalamic gamma rhythms help develop highly spatially and laminar-specific ascending cortical projections.
- 230 **The Global Extent and Determinants of Savanna and Forest as Alternative Biome States**
A. C. Staver et al.
Savanna and forest are alternative states governed by fire at intermediate rainfall levels.
- 232 **Global Resilience of Tropical Forest and Savanna to Critical Transitions**
M. Hirota et al.
Tree distributions across continents indicate three distinct stable states in tree cover—forest, savanna, and treeless.
>> *Perspective p. 188*
- 235 **The *Escherichia coli* Replisome Is Inherently DNA Damage Tolerant**
J. T. P. Yeeles and K. J. Marians
The core DNA replication machinery of *Escherichia coli* has an inherent ability to squeeze past DNA damage on the leading strand.
- 238 **Sequential Establishment of Stripe Patterns in an Expanding Cell Population**
C. Liu et al.
A synthetic circuit implementing density-controlled bacterial motility autonomously produces a tunable stripe pattern.
- 242 **NMR Detection of Structures in the HIV-1 5'-Leader RNA That Regulate Genome Packaging**
K. Lu et al.
An RNA structural switch regulates whether the HIV genome is translated or dimerized and packaged.
- 245 **Successful Transmission of a Retrovirus Depends on the Commensal Microbiota**
M. Kane et al.
- 249 **Intestinal Microbiota Promote Enteric Virus Replication and Systemic Pathogenesis**
S. K. Kuss et al.
Commensal microflora promote the pathogens of mucosally acquired viruses.
>> *News story p. 168*
- 252 **MED12, the Mediator Complex Subunit 12 Gene, Is Mutated at High Frequency in Uterine Leiomyomas**
N. Mäkinen et al.
Uterine fibroids frequently harbor mutations in a specific gene that has been implicated in transcriptional regulation.
- 255 **The Antibacterial Lectin RegIII γ Promotes the Spatial Segregation of Microbiota and Host in the Intestine**
S. Vaishnava et al.
Innate immune signaling and antimicrobial peptide activity maintain separation of the microbiota and intestinal epithelium.
>> *Perspective p. 182*