

EDITORIAL

- 1019 The Flame Challenge
Alan Alda

NEWS OF THE WEEK

- 1024 A roundup of the week's top stories

NEWS & ANALYSIS

- 1027 Loose Cable May Unravel
Faster-Than-Light Result
- 1028 Scientists Rush to Find Clues
on New Animal Virus
- 1029 Potential Egg Stem Cells Reignite Debate
- 1030 Is Motherhood the Biggest Reason
for Academia's Gender Imbalance?
Half-Time Jobs, Full-Time Scientists
- 1032 Overhaul of U.S. Child Health Study
Concerns Investigators

NEWS FOCUS

- 1033 Sound and Fury in the Microbiology Lab
Giant Viruses Revive Old Questions
About Viral Origins
- 1036 'Killjoys' Challenge Claims of Clever
Animals
- 1038 Is the World Tottering on the Precipice
of Peak Gold?
>> *Science Podcast*

LETTERS

- 1040 Editors' Note
C. Norman and J. Sills
- Saudi University Policy:
King Saud Response
A. A. Al-Khedhairi
- Saudi University Policy:
King Abdulaziz Response
A. Zahed
- Saudi University Policy:
Meaningful Cooperation
U. Becker
- Saudi University Policy:
Overvalued Rankings
G. Miley

- 1042 TECHNICAL COMMENT ABSTRACTS
- 1042 CORRECTIONS AND CLARIFICATIONS

BOOKS ET AL.

- 1043 The Major Transitions in Evolution
Revisited
*B. Calcott and K. Sterelny, Eds.,
reviewed by D. H. Erwin*
- 1044 Dispersed Radiance
A. Sur, reviewed by A. Gopinathan

POLICY FORUMS

- 1045 Reconsidering the Consequences
of Selective Fisheries
S. M. Garcia et al.
- 1047 The Limits of Government Regulation
and Science
J. D. Kraemer and L. O. Gostin
>> *See all H5N1 coverage online at
<http://scim.ag/h5n1>*

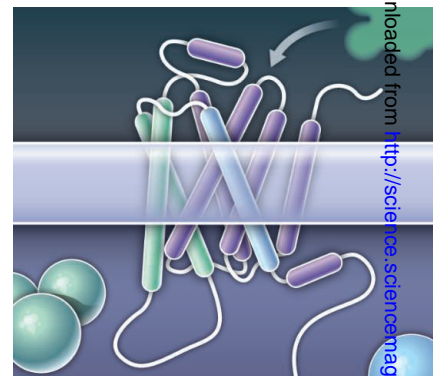
PERSPECTIVES

- 1050 Reconfiguring Regulation
G. Chalancon et al.
>> *Reports pp. 1099 and 1103*
- 1051 Probing the Mantle Past
V. C. Bennett
>> *Research Article p. 1065*
- 1052 Facing Extinction in Real Time
D. B. Wake
- 1054 Roaming Reaction Pathways
Along Excited States
M. J. T. Jordan and S. H. Kable
>> *Report p. 1075*
- 1055 Structural Origins of Receptor Bias
S. R. Sprang and J. Chief Elk
>> *Report p. 1106*
- 1056 Origins of Cumulative Culture
R. Kurzban and H. C. Barrett
>> *Report p. 1114*

CONTENTS continued >>



page 1038



pages 1055 & 1106



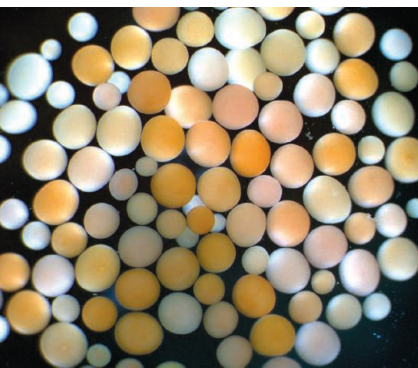
COVER

An adult male brown anole, *Anolis sagrei* (length ~150 millimeters from snout to tail), perches atop a branch. The diameter of the vegetation used by brown anoles is a strong selective force on limb length. Lizards inhabiting previously unoccupied islands in the Bahamas show genetic and morphological differences due to random and selective processes. See page 1086.

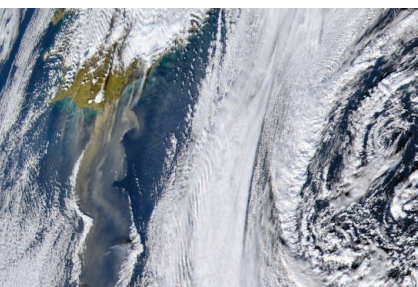
*Photo: Neil Losin, University of California, Los Angeles,
www.neillosin.com*

DEPARTMENTS

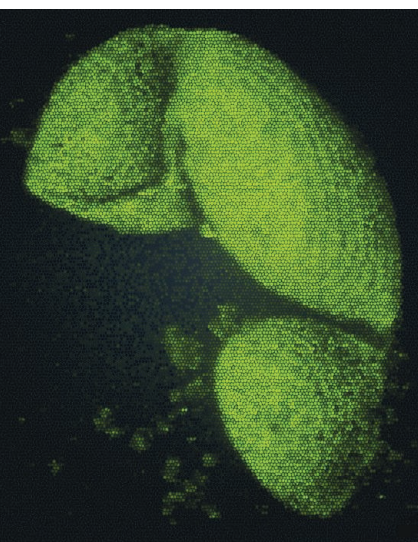
- 1017 This Week in *Science*
- 1020 Editors' Choice
- 1022 *Science* Staff
- 1126 New Products
- 1127 *Science* Careers



page 1064



page 1078



page 1083

REVIEW

- 1058 The Geological Record of Ocean Acidification
B. Hönisch et al.

BREVIA

- 1064 Turbulence, Cleavage, and the Naked Embryo: A Case for Coral Clones
A. J. Heyward and A. P. Negri
The embryos of pelagic corals break up in waves yet survive to form smaller colonies.

RESEARCH ARTICLE

- 1065 ^{182}W Evidence for Long-Term Preservation of Early Mantle Differentiation Products
M. Touboul et al.
Tungsten isotopes in ancient volcanic rocks suggest sluggish mixing processes in the primitive mantle.
>> *Perspective p. 1051*

REPORTS

- 1070 Observation of Quantum Criticality with Ultracold Atoms in Optical Lattices
X. Zhang et al.
Trapped low-temperature atoms model the transition between insulating and superfluid states in a more complex material.
- 1072 Reactions of Solvated Electrons Initiated by Sodium Atom Ionization at the Vacuum-Liquid Interface
W. A. Alexander et al.
Electrons at a deuterated glycerol surface can liberate deuterium atoms that escape into the gas phase before reacting further.
- 1075 No Straight Path: Roaming in Both Ground- and Excited-State Photolytic Channels of $\text{NO}_3 \rightarrow \text{NO} + \text{O}_2$
M. P. Grubb et al.
A chemical reaction proceeds exclusively by mechanisms that do not pass through a conventional transition state.
>> *Perspective p. 1054*
- 1078 High-Latitude Dust Over the North Atlantic: Inputs from Icelandic Proglacial Dust Storms
J. M. Prospero et al.
Cold, higher-latitude regions—not just low-latitude arid regions—can be substantial sources of dust.
- 1083 Glacial Survival of Boreal Trees in Northern Scandinavia
L. Parducci et al.
DNA from modern and ancient spruce and pine indicate that both survived in ice-free areas during the last glaciations.

- 1086 Founder Effects Persist Despite Adaptive Differentiation: A Field Experiment with Lizards
J. J. Kolbe et al.
Introduced populations of anoles retain characteristics of their founders and acquire adaptations to their new environment.
- 1090 Pollinator-Mediated Selection on Flower Color Allele Drives Reinforcement
R. Hopkins and M. D. Rausher
Butterfly behavior reduces hybridization and reinforces speciation among *Phlox* plants.
- 1092 Generation of Leaf Shape Through Early Patterns of Growth and Tissue Polarity
E. E. Kuchen et al.
A model for the development of leaf shape describes how it arises through oriented growth and tissue deformation.
- 1096 Elastic Domains Regulate Growth and Organogenesis in the Plant Shoot Apical Meristem
D. Kierzkowski et al.
New leaves emerge where they are allowed.
- 1099 Global Network Reorganization During Dynamic Adaptations of *Bacillus subtilis* Metabolism
J. M. Buescher et al.
A vertical analysis reveals that a simple switch of one food for another evokes changes at many levels.
- 1103 Condition-Dependent Transcriptome Reveals High-Level Regulatory Architecture in *Bacillus subtilis*
P. Nicolas et al.
A horizontal analysis reveals the breadth of genes turned on and off as nutrients change.
>> *Perspective p. 1050*
- 1106 Biased Signaling Pathways in β_2 -Adrenergic Receptor Characterized by ^{19}F -NMR
J. J. Liu et al.
Selective effects of different ligands provide insights into the structural plasticity of receptor signaling.
>> *Perspective p. 1055*
- 1110 Catalysis and Sulfa Drug Resistance in Dihydropteroate Synthase
M.-K. Yun et al.
Structures of a target enzyme in the bacteria that cause anthrax and bubonic plague may lead to effective drugs.
- 1114 Identification of the Social and Cognitive Processes Underlying Human Cumulative Culture
L. G. Dean et al.
Humans not only watch and imitate each other but also learn from each other in multiple ways.
>> *Perspective p. 1056; Science Podcast*
- 1118 The Effects of Experience and Attrition for Novice High-School Science and Mathematics Teachers
G. T. Henry et al.
New teachers face a steep learning curve, and those who fall off tend to leave teaching.

SCIENCEONLINE

SCIENCEEXPRESS

www.sciencexpress.org

Energy Capture from Thermolytic Solutions in Microbial Reverse-Electrodialysis Cells

R. D. Cusick et al.

Thermally induced salt gradients could augment the electricity generated by microbial fuel cells from wastewater.

10.1126/science.1219330

>> [Science Podcast](#)

Silicon Isotope Evidence Against an Enstatite Chondrite Earth

C. Fitoussi and B. Bourdon

Earth accreted from materials with a heterogeneous mix of chondritic meteorite compositions.

10.1126/science.1219509

Niche and Neutral Effects of Acquired Immunity Permit Coexistence of Pneumococcal Serotypes

S. Cobey and M. Lipsitch

The human immune response preserves antigenic variation in a bacterial pathogen.

10.1126/science.1215947

Interleukin-22 Drives Endogenous Thymic Regeneration in Mice

J. A. Dudakov et al.

Damage to the thymus caused by infection or radiation is reversed by a cytokine.

10.1126/science.1218004

Crystal Structure of Human Enterovirus 71

P. Plevka et al.

The structure of a virus linked to neurological disease reveals how drugs targeting viruses in this family can be modified.

10.1126/science.1218713

TECHNICALCOMMENTS

Comment on "Phonemic Diversity Supports a Serial Founder Effect Model of Language Expansion from Africa"

T. F. Jaeger et al.

Full text at www.sciencemag.org/cgi/content/ful/335/6072/1042-a

Response to Comment on "Phonemic Diversity Supports a Serial Founder Effect Model of Language Expansion from Africa"

Q. D. Atkinson

Full text at www.sciencemag.org/cgi/content/ful/335/6072/1042-b

SCIENCENOW

www.sciencenow.org

Highlights From Our Daily News Coverage

Shame on the Rich

Unethical behavior more common in upper classes.

http://scim.ag/Shame_Rich

The Red-Dress Effect

Men see women wearing red as more open to romantic advances.

<http://scim.ag/Red-Dress>

Bacteria-Killing Viruses Wield an Iron Spike

Researchers figure out how bacteriophages gain entry into cells.

http://scim.ag/Viral_Attack

SCIENCE SIGNALING

www.sciencesignaling.org

The Signal Transduction Knowledge Environment

28 February issue: <http://scim.ag/ss022812>

EDITORIAL GUIDE: Focus Issue—A Cell's Sense of Direction

W. Wong

Research reveals new mechanisms for cell migration and chemotaxis.

RESEARCH ARTICLE: Diverse Sensitivity Thresholds in Dynamic Signaling Responses by Social Amoebae

C. J. Wang et al.

PERSPECTIVE: Chemoattractant Signaling in *Dictyostelium*—Adaptation and Amplification

P. A. Iglesias

Dictyostelium cells sense and interpret gradients by combining an incoherent feedforward loop and an amplification step.

RESEARCH ARTICLE: PTEN Protein Phosphatase Activity Correlates with Control of Gene Expression and Invasion, a Tumor-Suppressing Phenotype, But Not with AKT Activity

P. Tibarewal et al.

The lipid and protein phosphatase activities of PTEN are both required for glioma cell invasion and many of its effects on gene expression.

PERSPECTIVE: How Actin Gets the PIP

S. E. Moss

The relative concentrations of different phosphoinositide species may dictate whether actin comets or membrane ruffles are formed.

SCIENCE TRANSLATIONAL MEDICINE

www.sciencetranslationalmedicine.org

Integrating Medicine and Science

29 February issue: <http://scim.ag/stm022912>

RESEARCH ARTICLE: A Biophysical Indicator of Vaso-occlusive Risk in Sickle Cell Disease

D. K. Wood et al.

PODCAST

J. M. Higgins and M. L. Frisk

An ex vivo microfluidic device can stratify sickle-cell patients on the basis of dynamic blood properties.

RESEARCH ARTICLE: Productive Replication of Ebola Virus Is Regulated by the c-Abl1 Tyrosine Kinase

M. García et al.

Ebola virus growth is regulated by a c-Abl tyrosine kinase, which modulates the viral protein VP40, and can be blocked by c-Abl antagonists.

RESEARCH ARTICLE: HIV-Specific Cytolytic CD4 T Cell Responses During Acute HIV Infection Predict Disease Outcome

D. Z. Soghoian et al.

PERSPECTIVE: CD4⁺ T cells and HIV—A Paradoxical Pas de Deux

N. R. Klatt and G. Silvestri

A robust CD4⁺ T cell response during early HIV infection predicts a slower progression to overt disease.

PERSPECTIVE: Toward a Meningitis-Free World

S. Black et al.

New vaccines against serotypes A, C, W, Y, and B of meningococcal meningitis may allow elimination of the disease.

SCIENCE CAREERS

www.sciencereers.org/career_magazine

Free Career Resources for Scientists

Taken for Granted: Foreign Invasion

B. L. Benderly

What happens when an influx of established talent invades a small research field?

http://scim.ag/TFG_Invasion

Young Spanish Scientists in Limbo

E. Pain

Tighter research budgets and bureaucratic delays threaten to derail the careers of many young scientists in Spain.

<http://scim.ag/SpanishLimbo>

Perspective: Preparing for a PUI Career

R. N. Austin

A chemistry professor at a top liberal arts college offers advice on preparing for jobs at colleges like hers.

http://scim.ag/PUI_Prep

SCIENCEPODCAST

www.sciencemag.org/multimedia/podcast

Free Weekly Show

On the 2 March *Science* Podcast: the roots of human cumulative culture, microbes that transform waste into energy, peak gold, and more.

SCIENCEINSIDER

news.sciencemag.org/scienceinsider

Science Policy News and Analysis

SCIENCE (ISSN 0036-8075) is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1200 New York Avenue, NW, Washington, DC 20005. Periodicals Mail postage (publication No. 484460) paid at Washington, DC, and additional mailing offices. Copyright © 2012 by the American Association for the Advancement of Science. The title SCIENCE is a registered trademark of the AAAS. Domestic individual membership and subscription (51 issues): \$149 (\$74 allocated to subscription). Domestic institutional subscription (51 issues): \$990; Foreign postage extra: Mexico, Caribbean (surface mail) \$55; other countries (air assist delivery) \$85. First class, airmail, student, and emeritus rates on request. Canadian rates with GST available upon request, GST #1254 88122. Publications Mail Agreement Number 1069624. Printed in the U.S.A.

Change of address: Allow 4 weeks, giving old and new addresses and 8-digit account number. Postmaster: Send change of address to AAAS, P.O. Box 96178, Washington, DC 20090-6178. Single-copy sales: \$10.00 current issue, \$15.00 back issue prepaid includes surface postage; bulk rates on request. Authorization to photocopy material for internal or personal use under circumstances not falling within the fair use provisions of the Copyright Act is granted by AAAS to libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that \$30.00 per article is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923. The identification code for Science is 0036-8075. Science is indexed in the Reader's Guide to Periodical Literature and in several specialized indexes.



ADVANCING SCIENCE. SERVING SOCIETY

Science

335 (6072)

Science **335** (6072), 1017-1126.

ARTICLE TOOLS

<http://science.sciencemag.org/content/335/6072>

PERMISSIONS

<http://www.sciencemag.org/help/reprints-and-permissions>

Use of this article is subject to the [Terms of Service](#)

Science (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. 2017 © The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works. The title *Science* is a registered trademark of AAAS.