CONTENTS

EDITORIAL
709 Science Advances
Marcia McNutt and Alan I. Leshner

NEWS OF THE WEEK
714 A roundup of the week’s top stories

NEWS & ANALYSIS
716 Ancient Infant Was Ancestor of Today’s Native Americans
717 India Poised to Join Hunt for Gravitational Waves
718 New NSF Report Shows Where U.S. Leads and Lags
719 Science Behind Plan to Ease Wolf Protection Is Flawed, Panel Says
720 After More Than 50 Years, a Dispute Over Down Syndrome Discovery
721 Laser Fusion Shots Take Step Toward Ignition

NEWS FOCUS
722 The Coming Copper Peak
725 Strength in Numbers?
>> Science Podcast

LETTERS
729 Global Warming and Winter Weather
J. M. Wallace et al.
The Big Picture for Big Data: Visualization
B. Shneiderman
Innovation Goes Global
C. S. Wagner

730 CORRECTIONS AND CLARIFICATIONS

BOOKS ET AL.
731 Sex Itself
S. S. Richardson, reviewed by A. M’charek
732 Nature’s Trust
M. C. Wood, reviewed by R. Steinzor

POLICY FORUM
733 Methane Leaks from North American Natural Gas Systems
A. R. Brandt et al.

PERSPECTIVES
736 Self-Organizing Somites
S. Kondo
>> Report p. 791
737 A Drier Future?
S. Sherwood and Q. Fu
739 Capturing Surface Processes
C. Nicklin
>> Report p. 758
740 Graphene Oxide Membranes for Ionic and Molecular Sieving
B. Mi
>> Report p. 752
742 Robots Acting Locally and Building Globally
J. Korb
>> Report p. 754; Science Podcast
743 Protein Folding, Interrupted
K. A. Sharp
>> Report p. 795
744 Genetic Resolutions of Brain Convolutions
B. G. Rash and P. Rakic
>> Report p. 764

CONTENTS continued >>

ON THE WEB THIS WEEK
>> Science Podcast
Listen to stories on termite-inspired robots, cells with many, many genomes, and a roundup of stories from our daily news site.

>> Find More Online
Check out the latest in a series of Perspectives on Challenges in Climate Science at www.sciencemag.org/extra/climate.

COVER
A multirobot construction system inspired by mound-building termites. Independent climbing robots with onboard sensors automatically build user-specified structures out of specialized brick-sized building material. The robots are limited to local sensing and coordinate their activity indirectly by manipulating their shared environment and reacting to what they encounter. See pages 742 and 754, as well as supplementary movies online at www.sciencemag.org/content/343/6172/754/suppl/DC1.

Photo: Eliza Grinnell, Harvard School of Engineering and Applied Sciences

DEPARTMENTS
707 This Week in Science
710 Editors’ Choice
712 Science Staff
799 New Products
800 Science Careers

www.sciencemag.org SCIENCE VOL 343 14 FEBRUARY 2014
RESEARCH ARTICLES

746 Toddler: An Embryonic Signal That Promotes Cell Movement via Apelin Receptors
A. Pauli et al.
A conserved signal is identified that activates G protein–coupled receptors to promote zebrafish gastrulation.
Research Article Summary; for full text: http://dx.doi.org/10.1126/science.1248636

747 A Genetic Atlas of Human Admixture History
G. Hellenthal et al.
Evidence of human migrations over the past 4000 years is identified in existing genomes.

772 Crude Oil Impairs Cardiac Excitation-Contraction Coupling in Fish
F. Brette et al.
Crude oil from the Deepwater Horizon spill is cardiotoxic to tuna species that spawn in the Gulf of Mexico.

776 Massively Parallel Single-Cell RNA-Seq for Marker-Free Decomposition of Tissues into Cell Types
D. A. Jatin et al.
Sequencing of RNA from thousands of individual immune cells allows unbiased identification of cellular subtypes.

780 Leaf Shape Evolution Through Duplication, Regulatory Diversification, and Loss of a Homeobox Gene
D. Vlad et al.
The evolutionary trajectory leading to crucifer leaf shape in Cardamine hirsuta plants is elucidated.

783 A Viral RNA Structural Element Alters Host Recognition of Nonself RNA
J. L. Hyde et al.
Alphaviruses use secondary structural elements in their genomic RNA to avoid host detection.

788 A Common Cellular Basis for Muscle Regeneration in Arthropods and Vertebrates
N. Konstantinides and M. Averof
Crustacean limb regeneration relies on committed progenitor cells including satellite-like muscle precursors.

791 Somites Without a Clock
A. S. Dias et al.
The formation of body segments in vertebrate embryos involves local cell interactions independent of cyclic gene expression.

795 An Antifreeze Protein Folds with an Interior Network of More Than 400 Semi-Clathrate Waters
T. Sun et al.
The crystal structure of an antifreeze protein shows a polyhedral network of water in the protein core.

REPORTS

752 Precise and Ultrafast Molecular Sieving Through Graphene Oxide Membranes
R. K. Joshi et al.
Graphene oxide membranes allow only very small hydrated molecules and ions to pass with an accelerated transport rate.
>> Perspective p. 740

754 Designing Collective Behavior in a Termite-Inspired Robot Construction Team
J. Werfel et al.
Robots programmed with simple construction rules can work independently but collectively to build a complex structure.
>> Perspective p. 742; Science Podcast

758 High-Energy Surface X-ray Diffraction for Fast Surface Structure Determination
J. Gustafson et al.
High-energy x-rays incident at grazing angles allow for rapid collection of surface diffraction beams.
>> Perspective p. 739

762 The New Madrid Seismic Zone: Not Dead Yet
M. T. Page and S. E. Hough
Statistical modeling of aftershock occurrences shows that the central United States is still active, despite low active deformation rates.

764 Evolutionarily Dynamic Alternative Splicing of GPR56 Regulates Regional Cerebral Cortical Patterning
B. Bae et al.
Development of surface folds of the human brain is controlled in sections.
>> Perspective p. 744

769 Origin and Spread of de Novo Genes in Drosophila melanogaster Populations
L. Zhao et al.
Novel genes derived from ancestral noncoding sequences are polymorphic among fruit fly strains.

776 Massively Parallel Single-Cell RNA-Seq for Marker-Free Decomposition of Tissues into Cell Types
D. A. Jatin et al.
Sequencing of RNA from thousands of individual immune cells allows unbiased identification of cellular subtypes.
Science 343 (6172), 707-799.