EDITORS' PICKS
1375 Time to Play Ball
Keith Yamamoto

NEWS OF THE WEEK
1384 A roundup of the week’s top stories

NEWS & ANALYSIS
1387 Supreme Court Rules Out Patents on ‘Natural’ Genes
1388 Agency Nixes deCODE’s New Data-Mining Plan
1390 Does Cloning Produce Better Embryonic Stem Cells?
1391 Science Standards Begin Long, Hard Road to Classroom
1392 Iranian ‘Medical’ Reactor Stokes Search for Alternatives
1393 Global Gamma Observatory Looks for (Two) Homes

NEWS FOCUS
1394 How Long Can the U.S. Stay on Top? Grateful Patients Can Lead to Gracious Gifts
1400 Monsoon Melee

LETTERS
1403 Risks of Neonicotinoid Pesticides
G. Zeng et al.
Integrity Training: Conflicting Practices
S. Godecharle et al.
Integrity Training: Misconduct’s Source
D. S. Kornfeld
1404 The Buzz: Impact Factor Concerns
1404 CORRECTIONS AND CLARIFICATIONS

BOOKS ET AL.
1406 The Book of Woe
G. Greenberg, reviewed by J. Licinio
1407 The Philadelphia Chromosome
J. Wapner, reviewed by A. Nadkarni
>> Perspective p. 1412
1408 Browsings

POLICY FORUM
1410 Targeting Transparency
D. Weil et al.

PERSPECTIVES
1412 A Story of Swapped Ends
J. D. Rowley
>> Book Review p. 1407; Policy Podcast
1413 Critical Mass in Graphene
M. S. Fuhrer
>> Report p. 1427
1414 Controlling the Polarity of Silicon Nanowire Transistors
T. Ernst
1416 Herit-Ability
J. Flint and M. Munafò
>> Report p. 1467
1417 Seeing the Reaction
F. J. Giessibl
>> Report p. 1434
1418 A Theory of City Size
M. Batty
>> Report p. 1438

REVIEW
1420 Liquid Exfoliation of Layered Materials
V. Nicolosi et al.
Review Summary; for full text:
http://dx.doi.org/10.1126/science.1226419

CONTENTS continued >>

ON THE WEB THIS WEEK
>> Science Podcast
Listen to stories on a new brain database, the 100th anniversary of Bohr’s atomic theory, the fate of U.S. research powerhouses, and more.

>> Find More Online
Check out Science Express, our podcast, videos, daily news, our research journals, and Science Careers www.sciencemag.org.

COVER
View of Beijing and Tianjin, China, from the International Space Station. Though cities have different sizes and characteristics, mathematical theory can relate size and population density to social, spatial, and infrastructural properties. Such modeling provides a view of the nature of cities and may help urban planners determine how cities evolve and whether they have reached their full potential. See pages 1418 and 1438.

Image: Image Science and Analysis Laboratory, NASA–Johnson Space Center

DEPARTMENTS
1373 This Week in Science
1377 Editors’ Choice
1382 Science Staff
1479 New Products
1480 Science Careers

www.sciencemag.org  SCIENCE  VOL 340  21 JUNE 2013  Published by AAAS
RESEARCH ARTICLE

1421 Pliocene Warmth, Polar Amplification, and Stepped Pleistocene Cooling Recorded in NE Arctic Russia
J. Brigham-Grette et al.
A sediment core from Lake El’gygytgyn, in northeast Russia, provides a high-latitude climate record of the late Pliocene.

REPORTS

1427 Massive Dirac Fermions and Hofstadter Butterfly in a van der Waals Heterostructure
B. Hunt et al.
A band gap is observed in a monolayer graphene–hexagonal boron nitride heterostructure.
>> Perspective p. 1413

1431 Engineering Coherence Among Excited States in Synthetic Heterodimer Systems
D. Hayes et al.
Small molecules comprising bridged chromophores manifest a quantum mechanical effect observed in light-harvesting proteins.
>> Report p. 1448

1434 Direct Imaging of Covalent Bond Structure in Single-Molecule Chemical Reactions
D. G. de Oteyza et al.
Noncontact atomic force microscopy imaged the bond structure of an adsorbed organic reactant and its cyclization products.
>> Perspective p. 1417

1438 The Origins of Scaling in Cities
L. A. Bettencourt
Cities of all sizes can be modeled as interdependent networks of interactions and infrastructure.
>> Perspective p. 1416

1442 Topology of Feather Melanocyte Progenitor Niche Allows Complex Pigment Patterns to Emerge
S. J. Lin et al.
The patterns of colors in feathers are produced via temporal and spatial regulation of melanocyte stem cells.

1445 Protein Equilibration Through Somatic Ring Canals in Drosophila
P. F. McLean and L. Cooley
Ring canals ensure that the have share with their have-not neighbors.

1448 Quantum Coherent Energy Transfer over Varying Pathways in Single Light-Harvesting Complexes
R. Hildner et al.
A phase relation observed in ensemble measurements of photosynthetic proteins is borne out at the single-molecule level.
>> Report p. 1431

1451 Structure of Parkin Reveals Mechanisms for Ubiquitin Ligase Activation
J.-F. Trempe et al.
The complete structure of a protein linked to Parkinson’s disease suggests how to activate it.

1456 GPR15-Mediated Homing Controls Immune Homeostasis in the Large Intestine Mucosa
S. V. Kim et al.
A G protein–coupled receptor helps to localize regulatory T cells in the large intestine.

1459 H5N1 Hybrid Viruses Bearing 2009/H1N1 Virus Genes Transmit in Guinea Pigs by Respiratory Droplet
Y. Zhang et al.
Some reassortants between H5N1 and H1N1 influenza viruses are transmissible by respiratory droplet among mammals.

An Airborne Transmissible Avian Influenza H5 Hemagglutinin Seen at the Atomic Level
W. Zhang et al.
Mutations in avian H5N1 influenza virus cause conformational changes that increase binding affinity to mammalian receptors.

GWAS of 126,559 Individuals Identifies Genetic Variants Associated with Educational Attainment
C. A. Rietveld et al.
Three genetic loci are found to explain variation associated with educational achievement.
>> Perspective p. 1416

1472 BigBrain: An Ultrahigh-Resolution 3D Human Brain Model
K. Amunts et al.
A freely available microscopic model of human brain architecture with a spatial resolution of 20 micrometers is presented.
>> Science Podcast

1475 Compartmentalized Calcium Transients Trigger Dendrite Pruning in Drosophila Sensory Neurons
T. Kanamori et al.
During fruit fly metamorphosis, dendritic calcium signaling defines the branches to be eliminated in sensory neurons.

1476 Respiration of Lactobacillus Acidophilus: Oxidized Ferredoxin Drives Electrogenic Reductions
S. E. Fisker et al.
Protons and electrons are transferred across the cytoplasmic membrane of Lactobacillus under anaerobic conditions.

1479 Extreme Alkalinity of an Australian Lake
M. D. Williams et al.
A shallow freshwater lake in Western Australia is among the most alkaline lakes in the world.

1480 Protein-Ethanolamine Interactions in the Brain
B. D. Schendel et al.
An interaction analysis identifies the ethyl groups of ethanolamine as a part of protein–protein interactions in the brain.

1481 Single-Pair Lifespan Extension in Drosophila
L. K. N. de Almeida et al.
Repeated reproduction by juvenile females results in significant extension of lifespan of the subsequent offspring.

1482 Human Papillomavirus Type 16 Is Repressed by Its Own Mammalian Cellular Protein
S. M. Hulshof et al.
A cellular immune response targets the viral genome and provides protection against HPV infection.

1483 Early Growth of the Human Brain
J. G. H. van der Toorn et al.
Quantitative magnetic resonance imaging shows that the human brain is growing more rapidly in the perinatal period than previously thought.

1484 Molecular Architecture of the Retinal Rod Outer Segment
I. K. Eliaz et al.
A nanometer-resolution structural model of isometric outer segments in the retina is presented.

1485 Visualizing Ion Channel Kinetics Using Single-Channel Current Spectroscopy
T. B. Geppert et al.
A new technique allows the visualization of the structure and conformation of single ion channels in native membranes.

1486 Large-Scale Quantification of the Human Protein Interactome
T. Ideker et al.
A comprehensive dataset of protein–protein interactions in human cells is presented.

1487 The Biological Clocks of Arabidopsis Thaliana
L. F. Haughn et al.
A network of transcription factors regulates the circadian rhythm in Arabidopsis.

1488 Sensitivity of the Melanin-Polyphenol Oxidase System to Changes in pH
R. C. Williams et al.
The oxidation rate of melanosomes is sensitive to changes in pH, which may have implications for the skin and eye pigmentation.

1489 Human Neurotransmitter Receptors
D. J. Morris et al.
A comprehensive database of human neurotransmitter receptors is presented.

1490 High-Throughput Screening by Adenosine Permeabilization
D. T. Milstein et al.
A novel assay for high-throughput screening using adenosine permeabilization is described.

1491 A Binomial Model for the Spread of Disease in a Network of Interacting Populations
J. M. Page et al.
A binomial model for the spread of disease in a network of interacting populations is presented.

1492 The Drosophila Genome as a Model for Evolutionary Studies
J. L. Rieger et al.
The Drosophila genome is a valuable model for evolutionary studies.

1493 Protein Structures from Mixed-Density Arrays
J. H. S. Park et al.
A new technique for the determination of protein structures from mixed-density arrays is described.

1494 The Role of the Vascular System in the Regulation of Blood Pressure
M. L. E. B. O. Almqvist et al.
The role of the vascular system in the regulation of blood pressure is discussed.

1495 The Origins of Scaling in Cities
L. M. A. Bettencourt
Cities of all sizes can be modeled as interdependent networks of interactions and infrastructure.
>> Perspective p. 1418

1496 Topology of Feather Melanocyte Progenitor Niche Allows Complex Pigment Patterns to Emerge
S. J. Lin et al.
The patterns of colors in feathers are produced via temporal and spatial regulation of melanocyte stem cells.

1497 Protein Equilibration Through Somatic Ring Canals in Drosophila
P. F. McLean and L. Cooley
Ring canals ensure that the have share with their have-not neighbors.

1498 Quantum Coherent Energy Transfer over Varying Pathways in Single Light-Harvesting Complexes
R. Hildner et al.
A phase relation observed in ensemble measurements of photosynthetic proteins is borne out at the single-molecule level.
>> Report p. 1431