CONTENTS

EDITORIAL
627 Investing in Distant Rewards
William H. Press

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

NEWS & ANALYSIS
635 Chu’s Legacy at DOE: Some Fields Gain, Others Falter
636 BP Research Dollars Yield Signs of Cautious Hope
638 Forecasting Regional Climate Change Flunks Its First Test
639 Supreme Court to Review the Scope of Monsanto’s Seed Patents

POLICY FORUM
650 Is Europe Evolving Toward an Integrated Research Area?
A. Chessa et al.

PERSPECTIVES
652 Shielding Broken DNA for a Quick Fix
J. Lukas and C. Lukas
>> Reports pp. 700 and 711
653 Pollution, Politics, and Vultures
A. Balmford
>> Science Podcast
654 Metamaterials with Quantum Gain
O. Hess and K. L. Tsakmakidis
655 Impact and Extinction
H. Pälike
>> Report p. 684
656 Fossils Versus Clocks
A. D. Yoder
>> Research Article p. 662
658 Copying Biology’s Ways with Hydrogen
F. A. Armstrong
>> Report p. 682
659 Jack of All Trades, Master of Flowering
J. Å. H. Danielsson and W. B. Frommer
>> Report p. 704
661 Retrospective: Carl R. Woese (1928–2012)
N. Goldenfeld and N. R. Pace

LETTERS
646 Physical Laws Shape Biology
K. Selvarajoo and M. Tomita
Biodiversity Despite Selective Logging
D. P. Edwards and W. F. Laurance
Legal Limits to Data Re-Identification
S. Wilson
647 NextGenVOICES
647 TECHNICAL COMMENT ABSTRACTS

BOOKS ET AL.
648 The Annotated and Illustrated Double Helix
J. D. Watson, A. Gann and J. Witkowski, Eds.,
reviewed by N. Comfort
649 A Cultural History of Heredity
S. Müller-Wille and H.-J. Rheinberger,
reviewed by H. Landecker

NEWS FOCUS
640 Giant Marine Reserves Pose Vast Challenges
642 Archaeologist Hammers Away at ‘Modern’ Behavior
644 Losing Arable Land, China Faces Stark Choice: Adapt or Go Hungry
>> Science Podcast

PAGES
640
659
704

CONTENTS continued >>
RESEARCH ARTICLE

662 The Placental Mammal Ancestor and the Post–K-Pg Radiation of Placentals
M. A. O’Leary et al.
Fossil and DNA phylogenies suggest that placental mammals diversified in the Cenozoic and reconstruct the ancestral form.

>> Perspective p. 656

REPORTS

668 Gravity Field of the Moon from the Gravity Recovery and Interior Laboratory (GRAIL) Mission
M. T. Zuber et al.
The Moon’s gravity field reveals that impacts have homogenized the density of the crust and fractured it extensively.

671 The Crust of the Moon as Seen by GRAIL
M. A. Wieczorek et al.
The Moon’s gravity field shows that the lunar crust is less dense and more porous than was thought.

675 Ancient Igneous Intrusions and Early Expansion of the Moon Revealed by GRAIL Gravity Gradiometry
J. C. Andrews-Hanna et al.
The Moon’s gravity map shows that the crust is cut by extensive magmatic dikes, perhaps implying a period of early expansion.

678 Proton Donor Acidity Controls Selectivity in Nonaromatic Nitrogen Heterocycle Synthesis
S. Duttwyler et al.
Acids of different strengths propel a common intermediate to a diverse array of compounds sought in pharmaceutical research.

682 A Functional [NiFe]Hydrogenase Mimic That Catalyzes Electron and Hydride Transfer from H2
S. Ogo et al.
A bimetallic complex mimics a widely studied enzyme class of particular interest in renewable energy research.

684 Time Scales of Critical Events Around the Cretaceous-Paleogene Boundary
P. R. Renne et al.
Radiometric dating establishes the mass extinction that killed the dinosaurs as synchronous with a large asteroid impact.

687 Stress State in the Largest Displacement Area of the 2011 Tohoku-Oki Earthquake
W. Lin et al.
Borehole stress measurements indicate a nearly total stress drop in the region of largest slip.

690 Paramyxovirus V Proteins Disrupt the Fold of the RNA Sensor MDA5 to Inhibit Antiviral Signaling
C. Motz et al.
The crystal structure of a viral protein core complex reveals how paramyxoviruses inhibit the innate immune response.

694 Structural Basis for Hijacking of Cellular LxxLL Motifs by Papillomavirus E6 Oncoproteins
K. Zanier et al.
Crystal structures show how a key oncoprotein in human papillomavirus binds host proteins.

A Histone Mutant Reproduces the Phenotype Caused by Loss of Histone-Modifying Factor Polycarbonyl
A. R. Pengelly et al.
Histone genetics provides functional evidence for the importance of histone modifications in gene regulation.

53BP1 Regulates DSB Repair Using Rif1 to Control 5′ End Resection
M. Zimmermann et al.
In mammalian cells, Rap1-interacting factor 1 protects DNA ends against resection.

700 Regulation of Flowering by Trehalose-6-Phosphate Signaling in Arabidopsis thaliana
V. Wahl et al.
Specific sugar signals integrate carbohydrate status with day length and developmental age to regulate flowering.

708 Host-Derived Nitrate Boosts Growth of E. coli in the Inflamed Gut
S. E. Winter et al.
During inflammation, Escherichia coli uses nitrate respiration to gain a growth advantage over other gut bacteria.

Rif1 Prevents Resection of DNA Breaks and Promotes Immunoglobulin Class Switching
M. Di Virgilio et al.
In mammalian cells, Rap1-interacting factor 1 protects DNA ends against resection.
339 (6120)

Science 339 (6120), 625-718.