CONTENTS
CONTENTS continued >>

NEWS OF THE WEEK
Full-Genome Sequencing Paved the Way From Spores to a Suspect 898
Seasonal-Climate Forecasts Improving Ever So Slowly 900
Bizarre ‘Metamaterials’ for Visible Light in Sight? 900
>> Brevia p. 930

SCIENCESCOPE
Treatment and Prevention Exchange Vows at International Conference 901

NEWS FOCUS
Going Deeper Into the Grotte Chauvet 904
>> Science Podcast
Olivera Finn: Directing a Life in Science 906
Science Scholarships Go Begging 908
Climate Change Hot Spots Mapped Across the United States 909

LETTERS
Reservations About Dam Findings D. J. Bain et al. 910
What to Do About Those Dammed Streams P. Wilcock
Response R. C. Walter and D. J. Merritts
Looking for Familiar Faces L. Shamir
Response R. Jenkins and A. M. Burton

CORRECTIONS AND CLARIFICATIONS 912

BOOKS ET AL.
Lost Land of the Dodo A. Cheke and J. Hume, reviewed by S. L. Olson 913
On Deep History and the Brain D. L. Smail, reviewed by A. A. Ghazanfar 914

POLICY FORUM
Research Alone Is Not Enough L. M. Branscomb 915

PERSPECTIVES
Neutrophil Soldiers or Trojan Horses? B. John and C. A. Hunter >> Report p. 970
Halogen Versus Hydrogen P. Metrangolo and G. Resnati 918
Directing Self-Assembly Toward Perfection R. A. Segalman >> Reports pp. 936 and 939
The Elusive Onset of Geomagnetic Substorms A. A. Petrukovich >> Research Article p. 931
Secret Weapon R. F. Young III >> Report p. 960
Retrospective: Victor A. McKusick (1921–2008) F. S. Collins 925

EDITORIAL 891 Dying for Science? by M. R. C. Greenwood, Gordon Ringold, and Doug Kellogg

DEPARTMENTS
887 Science Online
888 This Week in Science
892 Editors’ Choice
894 Contact Science
895 Random Samples
897 Newsmakers
981 New Products
982 Science Careers

www.sciencemag.org  SCIENCE  VOL 321  15 AUGUST 2008
Published by AAAS
COMPUTER SCIENCE
reCAPTCHA: Human-Based Character Recognition via Web Security Measures
L. von Ahn, B. Maurer, C. McMillen, D. Abraham, M. Blum
A security system that relies on the superior performance of humans in comparison to computers in reading distorted text can be harnessed for digitized scanned documents.
10.1126/science.1160379

MATERIALS SCIENCE
Polymer Pen Lithography
F. Huo et al.
An array that can support millions of thin, flexible polymer pens can be used to deposit tiny molecular ink dots of variable size over large areas.
10.1126/science.1162193

PHYSICS
Transient Electronic Structure and Melting of a Charge Density Wave in TbTe$_3$
F. Schmitt et al.
Photoemission spectroscopy is extended to reveal the dynamics of correlated electronic phase transitions, showing how ordered electrons “melt” upon heating of TbTe$_3$.
10.1126/science.1160778

CELL BIOLOGY
Conformational Switch of Syntaxin-1 Controls Synaptic Vesicle Fusion
S. H. Gerber et al.
The synaptic vesicle protein that mediates membrane fusion during exocytosis also regulates the rate and extent of this process by controlling vesicle tethering.
10.1126/science.1163174

MEDICINE
Germline Allele-Specific Expression of TGFBR1 Confers an Increased Risk of Colorectal Cancer
L. Valle et al.
In patients with colorectal cancer, one allele of the transforming growth factor–β gene produces less messenger RNA and thus less protein, a likely contributor to disease risk.
10.1126/science.1159397

TECHNICAL COMMENT ABSTRACTS

COMPUTER SCIENCE
Comment on “100% Accuracy in Automatic Face Recognition”
W. Deng, J. Guo, J. Hu, H. Zhang
full text at www.sciencemag.org/cgi/content/full/321/5891/912c
Response to Comment on “100% Accuracy in Automatic Face Recognition”
R. Jenkins and A. M. Burton
full text at www.sciencemag.org/cgi/content/full/321/5891/912d

REVIEW

ECOLOGY
Spreading Dead Zones and Consequences for Marine Ecosystems
R. J. Diaz and R. Rosenberg
919, 936 & 939
RESEARCH REPORTS

CHEMISTRY

X-ray Diffraction and Computation Yield the Structure of Alkanethiols on Gold(111)
A. Cossaro et al.
The structure of monolayers of alkyl thiols on gold—widely useful in nanotechnology—depends on the packing of the alkyl chains; long chains disorder the gold surface.

ATMOSPHERIC SCIENCE

Smoke Invigoration Versus Inhibition of Clouds Over the Amazon
Modeling and satellite data show how absorption of light by aerosols can affect cloud properties and growth, linking these particles’ opposing radiative and physical effects.

MOLECULAR BIOLOGY

Ferruginous Conditions Dominated Later Neoproterozoic Deep-Water Chemistry
D. E. Canfield et al.
Low sulfur input caused the deeper ocean to become anoxic and rich in ferrous iron 750 million years ago, a reversal from the more oxidizing conditions of the previous 1 billion years.

PLANT SCIENCE

Plant Immunity Requires Conformational Charges of NPR1 via S-Nitrosylation and Thioredoxins
Y. Tada et al.
After a pathogen invades a plant, a protein, usually kept in a multimeric state by S-nitrosylation, is dissociated by thioredoxin, freeing the monomers for defense responses.

MOLECULAR BIOLOGY

A Global View of Gene Activity and Alternative Splicing by Deep Sequencing of the Human Transcriptome
M. Sultan et al.
Shotgun sequencing of 27–base pair segments of messenger RNA from human kidney and immune cells identifies previously undescribed transcriptional units and splice functions.

MOLECULAR BIOLOGY

Small CRISPR RNAs Guide Antiviral Defense in Prokaryotes
S. J. J. Brouns et al.
Some bacterial genomes contain remnant sequences from previous viral infections, which are transcribed into RNA to guide inactivation of the virus in subsequent infections.

MOLECULAR BIOLOGY

Suppression of the MicroRNA Pathway by Bacterial Effector Proteins
L. Navarro, F. Jay, K. Nomura, S. Y. He, O. Voinnet
Upon bacterial infection, Arabidopsis mounts a microRNA-mediated innate immune defense, which is inhibited by proteins of the bacteria, allowing other infections.

MICROBIOLOGY

Arsenic(III) Fuels Anoxygenic Photosynthesis in Hot Spring Biofilms from Mono Lake, California
T. R. Kulp et al.
A primitive form of photosynthesis in which arsenic is the electron donor occurs in purple bacteria in a California lake, perhaps a relic of early life forms.

IMMUNOLOGY

In Vivo Imaging Reveals an Essential Role for Neutrophils in Leishmaniasis Transmitted by Sand Flies
N. C. Peters et al.
Visualization of the area around a bite from a parasite-infected sand fly shows that the first immune cells to arrive engulf and unexpectedly protect the invading parasite.

MEDICINE

Tumor Regression in Cancer Patients by Very Low Doses of a T Cell–Engaging Antibody
R. Bargou et al.
Tested in a small group of patients, a therapeutic antibody binds to both tumor cells and immune cells, increasing the local concentration and effectiveness of the immune cells.

NEUROSCIENCE

The Contribution of Single Synapses to Sensory Representation in Vivo
A. Arenz, R. A. Silver, A. T. Schaefer, T. W. Margrie
Only 100 synapses are required to accurately code for the animals’ velocity in the mouse cerebellum; the charge transfer into neurons is linearly related to acceleration.
PERSPECTIVE: Dinucleotide-Sensing Proteins—Linking Signaling Networks and Regulating Transcription
H. K. Lamb, D. K. Stammers, A. R. Hawkins
Proteins that bind NAD(H) or NADP(H) may couple cellular redox state to transcription or other signaling pathways.

PERSPECTIVE: Great Times for Small Molecules—c-di-AMP, a Second Messenger Candidate in Bacteria and Archaea
U. Römling
The bacterial checkpoint protein DisA has diadenylate cyclase activity, suggesting that c-di-cAMP acts as a second messenger.