A male lark bunting in the Pawnee National Grassland, Colorado. The plumage quality of the males determines their reproductive success, but different aspects of the black and white markings are preferred by females in different years. This variability alters the long-term sexual selection dynamics and may favor the evolution of multiple sexual ornaments. See page 459.

Photo: Bruce Lyon

Solutions for Nigeria
by Rita R. Colwell and Michael Greene

Antarctica Invaded
A. Ricciardi

A Closer Look at the IPCC Report
S. Solomon, R. Alley, J. Gregory, P. Lemke, M. Manning
Response M. Oppenheimer et al.

CORRECTIONS AND CLARIFICATIONS

Vienna in the Age of Uncertainty
D. R. Coen, reviewed by M. D. Laubichler

Musicophilia
Tales of Music and the Brain
O. Sacks, reviewed by J. Phillips-Silver

The Rise and Fall of a Great Idea
A. Meibom

Structural Nanocomposites
Y. Dzenis

Adaptive Composites
R. Vaia and J. Baur

ASSOCIATION AFFAIRS
Science and Technology for Sustainable Well-Being
J. P. Holdren

www.sciencemag.org
### APPLIED PHYSICS

**Chemically Derived, Ultrasmooth Graphene Nanoribbon Semiconductors**

X. Li, X. Wang, L. Zhang, S. Lee, H. Dai

Unlike nanotubes, 10-nanometer-wide graphene nanoribbons have smooth edges and can act as semiconductors.

10.1126/science.1150878

### IMMUNOLOGY

**Innate Immune Homeostasis by the Homeobox Gene Caudal and Commensal-Gut Mutualism in Drosophila**

J.-H. Ryu et al.

*A Drosophila* gene important in development also inhibits the production of harmful antimicrobial peptides that could kill off beneficial gut microbes.

10.1126/science.1149357

**The Right Resident Bugs**

N. Silverman and N. Paquette

10.1126/science.1154209

### NEUROSCIENCE

**Transgenic Inhibition of Synaptic Transmission Reveals Role of CA3 Output in Hippocampal Learning**

T. Nakashiba, J. Z. Young, T. J. McHugh, D. L. Buhl, S. Tonegawa

Blockade of neural activity in the CA3 region of the hippocampus with a reversible, inducible transgenic method inhibits rapid learning but spares certain spatial tasks.

10.1126/science.1151120

### MOLECULAR BIOLOGY

**Complete Chemical Synthesis, Assembly, and Cloning of a Mycoplasma genitalium Genome**

D. G. Gibson et al.

A complete bacterial genome is synthesized, assembled, and cloned, providing a method that will be useful for generating large DNA molecules de novo.

10.1126/science.1151721

### CHEMISTRY

**Spin Conservation Accounts for Aluminum Cluster Anion Reactivity Pattern with O2**

R. Burgert et al.

Small metal clusters with an even number of atoms react rapidly with oxygen because electron spin is conserved, whereas odd clusters are more stable because it is not.

**NMR Imaging of Catalytic Hydrogenation in Microreactors with the Use of para-Hydrogen**

L.-S. Bouchard et al.

The flow of para-hydrogen through industrial catalytic reactors allows magnetic resonance imaging of the gas flow and of the hydrogenation reactions, facilitating optimization.

**GaN Photonic-Crystal Surface-Emitting Laser at Blue-Violet Wavelengths**

H. Matsubara et al.

Surface-emitting lasers fabricated with photonic crystal structures can now emit at technologically relevant blue-violet wavelengths.

**Comparison of Comet 81P/Wild 2 Dust with Interplanetary Dust from Comets**

H. A. Ishii et al.

The silicate minerals found in interplanetary dust particles are not seen in Comet 81P/Wild 2, implying that the comet is devoid of material from the outer solar system.

>> News story p. 401

### BREVIA

**COMPUTER SCIENCE**

**100% Accuracy in Automatic Face Recognition**

R. Jenkins and A. M. Burton

The simple process of image averaging can boost the performance of a commercial face recognition system to 100% accuracy.

**PHYSICS**

**Probing the Carrier Capture Rate of a Single Quantum Level**

M. Berthelot et al.

Scanning tunneling microscopy reveals how electrons tunnel through a single dangling silicon bond and shows that local subsurface doped holes greatly affect the dynamics.
**REPORTS CONTINUED...**

**GEOCHEMISTRY**
Elasticity of (Mg,Fe)O Through the Spin Transition of Iron in the Lower Mantle
Gradual softening of a prominent mineral in Earth’s lower mantle in response to an electronic phase transition may explain the seismic properties of this region.

**GEOCHEMISTRY**
Enriched Pt-Re-Os Isotope Systematics in Plume Lavas Explained by Metasomatic Sulfides
A. Luguet et al.
An isotopic signal thought to be a fingerprint of material from Earth’s core in ocean magmas may instead reflect the presence of sulfide mineralization in the melting region.

**CLIMATE CHANGE**
Irreconcilable Differences: Fine-Root Life Spans and Soil Carbon Persistence
A. E. Strand et al.
Two common ways to measure residence times of root carbon in soils measure different things; neither is correct for inferring carbon cycling in ecosystems.

**EVOLUTION**
Adaptive Plasticity in Female Mate Choice Dampens Sexual Selection on Male Ornaments in the Lark Bunting
A. S. Chaine and B. E. Lyon
Female lark buntings prefer different male traits from year to year, suggesting how multiple ornamental features might evolve as a result of female mate choice.

**MOLECULAR BIOLOGY**
Control of Genic DNA Methylation by a jmjC Domain–Containing Protein in Arabidopsis thaliana
H. Saze, A. Shiraishi, A. Miura, T. Kakutani
A plant demethylase checks the spread of DNA methylation from silenced transposons and repetitive DNA to nearby genes, preventing their inappropriate inhibition.

**MOLECULAR BIOLOGY**
Concurrent Fast and Slow Cycling of a Transcriptional Activator at an Endogenous Promoter
T. S. Karpova et al.
A yeast transcription factor binds onto and off its promoter rapidly, controlling initiation, but also shows a 30-min cycle as the number of accessible promoters varies.

**CELL BIOLOGY**
Centromeric Aurora-B Activation Requires TD-60, Microtubules, and Substrate Priming Phosphorylation
S. E. Rosasco-Nitcher et al.
A kinase that regulates chromosome segregation to daughter cells during metaphase is confined to the inner centromere through its interactions with other centromeric proteins.

**GENETICS**
Alignment Uncertainty and Genomic Analysis
K. M. Wong, M. A. Suchard, J. P. Huelsenbeck
Comparative evolutionary genomics can be improved by taking into account the uncertainties inherent in aligning genes from organism to organism.

**IMMUNOLOGY**
NFAT Binding and Regulation of T Cell Activation by the Cytoplasmic Scaffolding Homer Proteins
G. N. Huang et al.
Signals coming into the T cell are coordinated by two scaffolding proteins, which determine whether the cell will be activated or permanently shut down.

**CELL BIOLOGY**
The Frequency Dependence of Osmo-Adaptation in Saccharomyces cerevisiae
J. T. Mettetal et al.
Modeling the dynamics of the osmotic stress response in yeast reveals an unexpected, rapid nontranscriptional mechanism that may involve glycerol transport.
PERSPECTIVE: Human ITPK1—A Reversible Inositol Phosphate Kinase/Phosphatase that Links Receptor-Dependent Phospholipase C to Ca²⁺-Activated Chloride Channels
A. Saiardi and S. Cockcroft
Studies of ITPK1 reveal subtle interconnections between simple metabolism and regulation of a signaling event.

GLOSSARY
Find out what NOSIP, SIPK, and STAND mean in the world of cell signaling.