



COVER

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

DEPARTMENTS

- 379 Science Online
- 381 This Week in *Science*
- 387 Editors' Choice
- 388 Contact *Science*
- 391 Random Samples
- 393 Newsmakers
- 422 AAAS News & Notes
- 486 AAAS Meeting Program
- 497 New Products
- 498 Science Careers

EDITORIAL

- 385 Solutions for Nigeria
by Rita R. Colwell and Michael Greene

NEWS OF THE WEEK

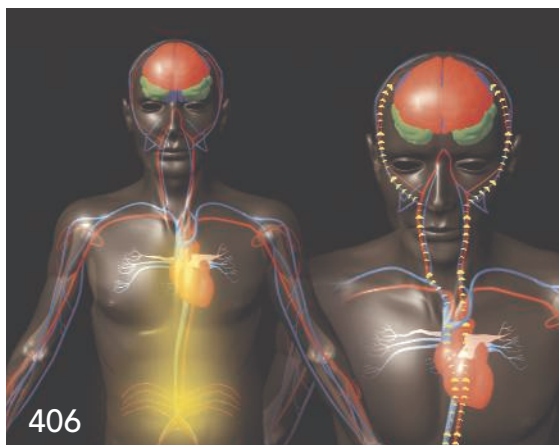
- Dust Storm Rising Over Threat to Famed Rock Art in Utah 394
- A Plan to Capture Human Diversity in 1000 Genomes 395
- Max Planck Accused of Hobbling Universities 396
- France Launches Public Health School à l'Anglo-Saxonne 397

SCIENCE SCOPE

- Got Data Questions? NSF's Indicators Has (Most of) the Answers 398
- "Little" Cosmic Ray Observatory Aims to Make a Big Mark 400
- Where Has All the Stardust Gone? 401
>> Report p. 447
- Dutch Universities Split Over Nobel Laureate's Rehabilitation 401

NEWS FOCUS

- A Time War Over the Period We Live In 402
- Why We're Different: Probing the Gap Between Apes and Humans 404
- Shell Shock Revisited: Solving the Puzzle of Blast Trauma 406



406

LETTERS

- Antarctica Invaded *A. Ricciardi* 409
- 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 410

BOOKS ET AL.

- Vienna in the Age of Uncertainty** Science, Liberalism and Private Life
D. R. Coen, reviewed by M. D. Laubichler 412
- Musicophilia** Tales of Music and the Brain
O. Sacks, reviewed by J. Phillips-Silver 413

EDUCATION FORUM

- Application of Bloom's Taxonomy Debunks the "MCAT Myth" 414
A. Y. Zheng, J. K. Lawhorn, T. Lumley, S. Freeman

PERSPECTIVES

- Lining Up to Avoid Bias 416
A. Rokas >> Report p. 473
- Enlightening Rhythms 417
O. Lipan >> Report p. 482
- The Rise and Fall of a Great Idea 418
A. Meibom >> Report p. 453
- Structural Nanocomposites 419
Y. Dzenis
- Adaptive Composites 420
R. Vaia and J. Baur

ASSOCIATION AFFAIRS

- Science and Technology for Sustainable Well-Being 424
J. P. Holdren



413

Downloaded from <http://science.sciencemag.org/> on May 9, 2021

SCIENCE EXPRESS

www.sciencexpress.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.

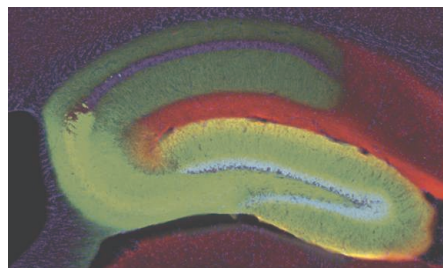
10.1126/science.1149357

IMMUNOLOGY

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

BREVIA

COMPUTER SCIENCE

100% Accuracy in Automatic Face Recognition

435

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.

REPORTS

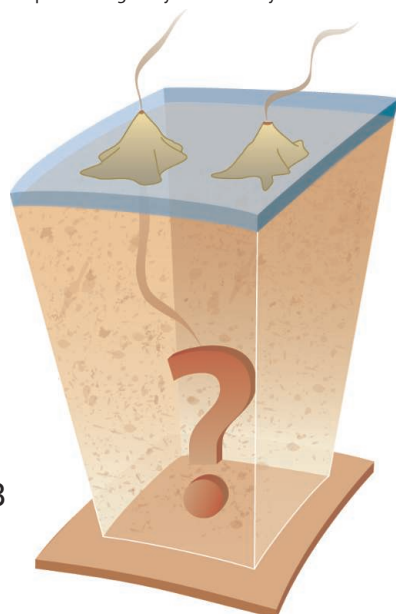
PHYSICS

Probing the Carrier Capture Rate of a Single Quantum Level

436

M. Berthe 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.



453

CHEMISTRY

Spin Conservation Accounts for Aluminum Cluster Anion Reactivity Pattern with O₂

438

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.

CHEMISTRY

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

442

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.

APPLIED PHYSICS

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

445

H. Matsubara et al.

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

GEOCHEMISTRY

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

447

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*

Downloaded from <http://science.sciencemag.org/> on May 9, 2021

CONTENTS continued >>

REPORTS CONTINUED...

GEOCHEMISTRY

Elasticity of (Mg,Fe)O Through the Spin Transition of 451
Iron in the Lower Mantle

J. C. Crowhurst, J. M. Brown, A. F. Goncharov, S. D. Jacobsen

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 453
Explained by Metasomatic Sulfides

A. Lugué 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.

>> *Perspective p. 418*

CLIMATE CHANGE

Irreconcilable Differences: Fine-Root Life Spans and 456
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 459
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* 462
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 466
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, 469
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 473

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. >> *Perspective p. 416*

IMMUNOLOGY

NFAT Binding and Regulation of T Cell Activation 476
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 482
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 p. 417*



462



ADVANCING SCIENCE. SERVING SOCIETY

SCIENCE (ISSN 0036-8075) is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1200 New York Avenue, NW, Washington, DC 20005. Periodicals Mail postage (publication No. 484460) paid at Washington, DC, and additional mailing offices. Copyright © 2008 by the American Association for the Advancement of Science. The title SCIENCE is a registered trademark of the AAAS. Domestic individual membership and subscription (51 issues): \$144 (\$74 allocated to subscription). Domestic institutional subscription (51 issues): \$770; Foreign postage extra: Mexico, Caribbean (surface mail) \$55; other countries (air assist delivery) \$85. First class, airmail, student, and emeritus rates on request. Canadian rates with GST available upon request, GST #1254 88122. Publications Mail Agreement Number 1069624. SCIENCE is printed on 30 percent post-consumer recycled paper. Printed in the U.S.A.

Change of address: Allow 4 weeks, giving old and new addresses and 8-digit account number. Postmaster: Send change of address to AAAS, P.O. Box 96178, Washington, DC 20090-6178. Single-copy sales: \$10.00 current issue, \$15.00 back issue prepaid includes surface postage; bulk rates on request. Authorization to photocopy material for internal or personal use under circumstances not falling within the fair use provisions of the Copyright Act is granted by AAAS to libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that \$20.00 per article is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923. The identification code for Science is 0036-8075. Science is indexed in the Reader's Guide to Periodical Literature and in several specialized indexes.

CONTENTS continued >>>



U.S. jaguars are in danger.

SCIENCE NOW

www.sciencenow.org DAILY NEWS COVERAGE

No Recovery Plan for U.S. Jaguars

In controversial decision, Fish and Wildlife Service says plan would not promote conservation.

The Secret Ingredient in Yellowstone's Travertine

Researcher presents first evidence that microbes are key to Mammoth Hot Springs mineralization.

An Eye for Sexual Orientation

People are able to spot a gay or straight face in less than a second.



Human ITPK1.

SCIENCE SIGNALING

www.stke.org THE SIGNAL TRANSDUCTION KNOWLEDGE ENVIRONMENT

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.



Handling troublesome lab colleagues.

SCIENCE CAREERS

www.sciencereers.org CAREER RESOURCES FOR SCIENTISTS

Mastering Your Ph.D.: Dealing With Difficult Colleagues

P. Gosling and B. Noordam

Some troublesome types who frequent laboratories require special handling.

MiSciNet: Educated Woman, Postdoc Edition, Chapter 12—Reflections

M. P. DeWhyse

The fog on Micella's steamy mirror starts to clear.

Opportunities: The Curse of Brains

P. Fiske

Effectiveness requires more than just intellectual smarts.

From the Archives: Scientists as Parents

When it comes to the question of balancing parenting and careers, the answers are contingent on one or two (and eventually more) individuals.

SCIENCE PODCAST



Download the 25 January *Science* Podcast to hear about improving improving automatic face recognition, synthesis of a bacterial genome, subtle effects of brain trauma, and more.

www.sciencemag.org/about/podcast.dtl

Separate individual or institutional subscriptions to these products may be required for full-text access.

Science

319 (5862)

Science **319** (5862), 381-502.

ARTICLE TOOLS

<http://science.sciencemag.org/content/319/5862>

PERMISSIONS

<http://www.sciencemag.org/help/reprints-and-permissions>

Use of this article is subject to the [Terms of Service](#)

Science (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. The title *Science* is a registered trademark of AAAS.

Copyright © 2008 The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works.