

**PHOSPHORUS FAMINE**  
The Threat to Our Food Supply

**SCIENTIFIC AMERICAN 10**  
Guiding Science for Humanity

# SCIENTIFIC AMERICAN

June 2009

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The  
Evolution of  
**HOUSE  
CATS**  
page 56



Programa de  
Biotecnología  
**009**

## Unlikely Suns, Improbable Planets

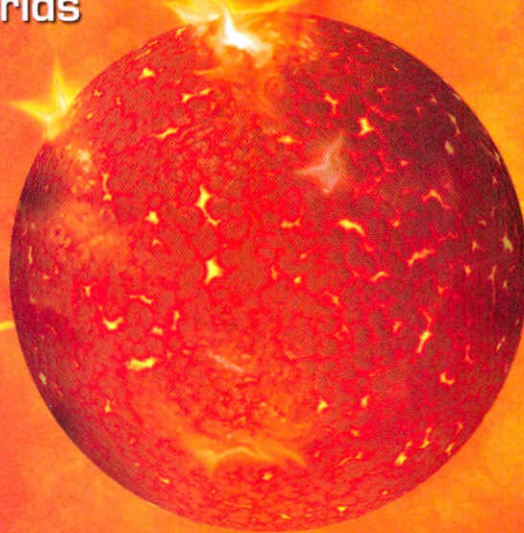
Astronomers find new worlds  
around surprisingly  
small stars

### Silent Mutations

Seemingly Trivial DNA  
Changes Can Hurt Health

### Racetrack Memory

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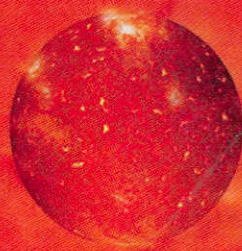
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ASTRONOMY

## Improbable Planets

By Michael W. Werner  
and Michael A. Jura

Astronomers are finding abundant planets around stars that are not much bigger than planets themselves. Also, see page 45: Donald Goldsmith on what it will take to see new Earths.

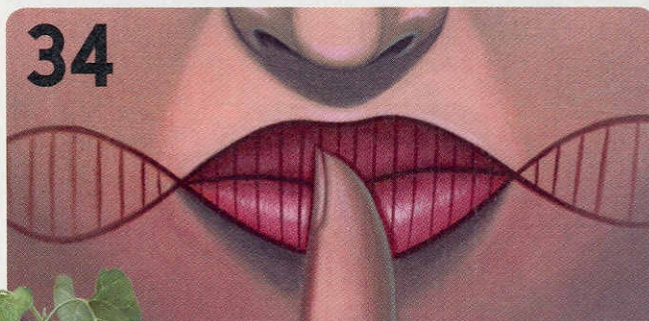


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Small changes to DNA sequences that seemingly should not affect the proteins encoded by genes are proving to be remarkably important in human diseases, evolution and biotechnology.

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This underappreciated element could become one of the key sustainability issues of our time. Even as excesses of phosphorus in agricultural runoff cause dangerous algal blooms, global reserves of it are depleting rapidly.

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TECHNOLOGY LEADERSHIP

## 48 Scientific American 10

Certain researchers, politicians, business executives and philanthropists have recently demonstrated outstanding commitment to making sure that the benefits of new technologies and knowledge will accrue to humanity. SCIENTIFIC AMERICAN gives credit where credit is due.



## ON THE COVER

A brown dwarf star glows dully in the sky of one of its orbiting planets, as imagined by artist Phil Saunders of Space Channel Ltd. Astronomers long dismissed the idea of planetary systems around such small stars as unlikely.

## EVOLUTION

### 56 The Taming of the Cat

By Carlos A. Driscoll, Juliet Clutton-Brock, Andrew C. Kitchener and Stephen J. O'Brien  
Genetic and archaeological findings hint that wildcats became the first house cats earlier—and elsewhere—than previously thought.

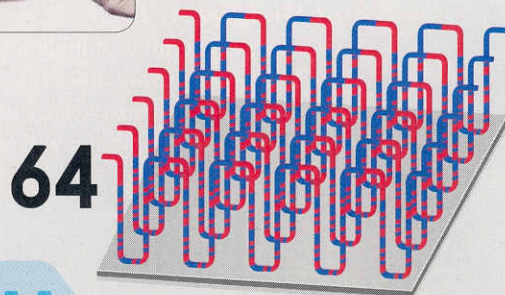


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### 64 Data in the Fast Lanes of Racetrack Memory

By Stuart S. P. Parkin

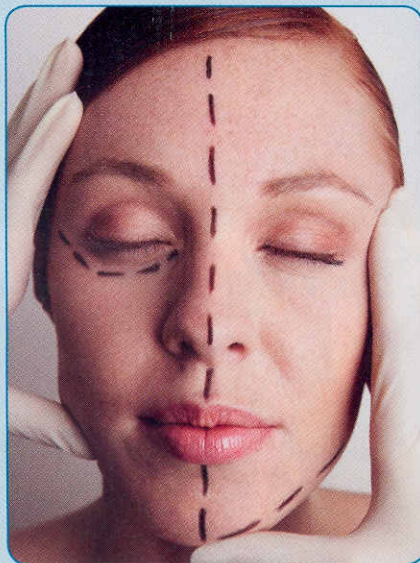
Devices that slide magnetic bits along nanowire “racetracks” could store information in three-dimensional microchips. They might eventually replace nearly all forms of conventional data storage.



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#### Slide Show

##### Five Ways Science Is Trying to Keep Your Food Safe

In the wake of salmonella outbreaks, scientists are developing technologies that could protect against future threats.



#### 60-Second Science Blog

##### PCs Idling Overnight Waste Billions in Energy Costs

Because nearly half of U.S. workers leave their computers running overnight, offices rack up an extra \$2.8 billion annually in wasteful electricity bills, according to one tally.



#### News

##### The First Meteorites Recovered from a Tracked Asteroid

Fragments in the Sudanese desert complete an “asteroid trifecta”—discovery in space, prediction of the impact site and recovery of fragments.



#### 60-Second Science Podcast

##### Caffeine Cuts Workout Pain

New research suggests that caffeine, by keeping you from feeling the burn, can help you get more bang for your workout buck.



#### Slide Show

##### The Hidden Face of Nefertiti

The famous carved bust of the ancient Egyptian queen has held many secrets. Now researchers are applying computed tomography to bring them to light.

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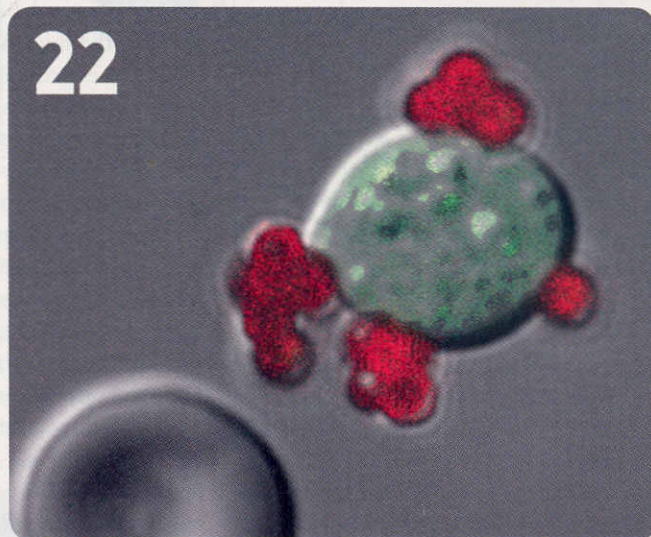
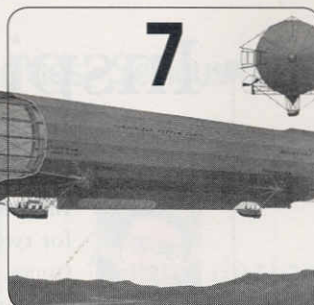
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