

# CONTENTS

2 June 2011 / Vol 474 / Issue No 7349

## THIS WEEK

### EDITORIALS

#### 5 HEALTH

##### **A big disease with a little name**

Thirty years on from its discovery, AIDS still poses a significant challenge

#### 6 EUROPEAN SCIENCE

##### **Board the eurostar**

It's time to engage with the European Open Science Forum 2012

#### 6 ZOOLOGY

##### **Gold mine**

A humble nematode highlights the rich diversity of life on Earth

### WORLD VIEW

#### 7 **China needs no foreign help to feed itself**

Peng Gong

If it has the will, China has the land to produce sufficient grain for its growing population

### RESEARCH HIGHLIGHTS

#### 8 **SELECTIONS FROM THE SCIENTIFIC LITERATURE**

Stem-cell repair / What makes plants die / Crystals with edge / Cancer splits cell division and metabolite supply / Where to find gravity waves / Kiwi cloak DNA

### SEVEN DAYS

#### 10 **THE NEWS IN BRIEF**



Farewell to Spirit / Italian seismologists in court / South Africa unveils research budget / CO<sub>2</sub> emissions reach all time high / *E. coli* outbreak in Germany

## CAREERS

#### 115 **CAREER PATHS**

##### **Back to the bench**

Working around a career break

#### 117 **COMMUNICATION**

##### **Voices for Careers**

Six new competition-winning columnists

## NEWS IN FOCUS

#### 13 **ECOLOGY**

Lasers map tropical ecosystems from the air

#### 15 **SEISMOLOGY**

Italian seismologists face manslaughter charges over L'Aquila deaths

#### 15 **ENERGY**

Japan disaster poses fresh problems for ITER fusion experiment



#### 16 **PARTICLE PHYSICS**

Tevatron's data are in danger of disappearing for good

#### 17 **EDUCATION**

Turkish students cry foul over university entrance exam

#### 18 **TECHNOLOGY**

Lockheed Martin buys first commercial quantum computer

#### 19 **MICROBIOLOGY**

Researchers behind claim of arsenic-based life offer doubters their microbes

## FEATURES

#### 20 **PROFILE**

##### **The disruptor**

Cosmologist Paul Davies takes on cancer



## COMMENT



#### 27 **SOCIETY**

##### **Children of the AIDS pandemic**

Lucie Cluver

#### 29 **HEALTH**

##### **Stigma impedes AIDS prevention**

Salim S Abdool Karim

## BOOKS & ARTS

### Q&A

## Note form

Composer Eduardo Reck Miranda is experimenting at the boundary between sound and language [PAGE 35](#)



#### 32 **ECONOMICS**

##### **Trial and error**

Matt Ridley

#### 33 **BOOKS IN BRIEF**

#### 34 **NEUROSCIENCE**

##### **Recalling the future**

Linnaea Ostroff

## CORRESPONDENCE

36 Embryos defined / REDD in Cameroon / The problems with population maps

## OBITUARY

#### 37 **Willard Boyle (1924–2011)**

George Smith

## FUTURES

#### 120 **Private exploration**

T C McCarthy



# CONTENTS

2 June 2011 / Vol 474 / Issue No 7349

## RESEARCH

### NEW ONLINE

39 Papers published this week at nature.com

### NEWS & VIEWS

#### 40 MALARIA

##### Mosquitoes bamboozled

A new line of defence against malaria transmission

Mark Stopfer [SEE LETTER P.87](#)

#### 41 QUANTUM INFORMATION

##### Entanglement as elbow grease

Quantum correlations can do physical work

Patrick Hayden [SEE LETTER P.61](#)

#### 42 IMMUNOLOGY

##### In command of commensals

Controls on the intestinal microbiota and gut inflammation

Menno van Lookeren Campagne & Vishva M Dixit

#### 43 PALAEOANTHROPOLOGY

##### In search of the australopithecines

Strontium isotopes shed light on early hominin group dynamics

Margaret J Schoeninger [SEE LETTER P.76](#)

#### 45 MOLECULAR EVOLUTION

##### Hidden diversity sparks adaptation

Cryptic genetic variation and ribozyme adaptation

Jeremy A Draghi & Joshua B Plotkin  
[SEE LETTER P.92](#)

#### 46 CLIMATE CHANGE

##### Ancient Antarctic fjords

Subglacial landscapes revealed

Sandra Passchier [SEE LETTER P.72](#)

### ARTICLES

#### 49 CELL BIOLOGY Crystal structure of the

FimD usher bound to its cognate FimC–FimH substrate

G Phan et al.

#### 54 STRUCTURAL BIOLOGY Principles of

activation and permeation in an anion-selective Cys-loop receptor

R E Hibbs & E Gouaux

### LETTERS

#### 61 PHYSICS The thermodynamic meaning of negative entropy

L del Rio, J Åberg, R Renner, O Dahlsten & V Vedral [SEE N&V P.41](#)

### ON THE COVER

## Air force

Volatile odorants that modify the CO<sub>2</sub> detection pathway in the three deadliest mosquito species can disrupt the breath-seeking attraction behaviour of these disease carriers. This work could lead to a new generation of insect repellents and lures. [PAGES 40 & 87](#)

#### 64 APPLIED PHYSICS A graphene-based broadband optical modulator

M Liu et al.

#### 68 EARTH SCIENCES A hydrothermal origin for isotopically anomalous cap dolostone cements from south China

T F Bristow, M Bonifacie, A Derkowski, J M Eiler & J P Grotzinger

#### 72 CLIMATE SCIENCE A dynamic early East Antarctic Ice Sheet suggested by ice-covered fjord landscapes

D A Young et al. [SEE N&V P.46](#)

#### 76 PALAEOANTHROPOLOGY Strontium isotope evidence for landscape use by early hominins

S R Copeland et al. [SEE N&V P.43](#)

#### 79 EVOLUTION Nematoda from the terrestrial deep subsurface of South Africa

G Borgonie et al.

#### 83 EVOLUTION Earliest evidence of mammalian social behaviour in the basal Tertiary of Bolivia

S Ladevèze, C de Muizon, R M D Beck, D Germain & R Cespedes-Paz

#### 87 NEUROSCIENCE Ultra-prolonged activation of CO<sub>2</sub>-sensing neurons disorients mosquitoes

S L Turner et al. [SEE N&V P.40](#)

92 **SYSTEMS BIOLOGY** Cryptic genetic variation promotes rapid evolutionary adaptation in an RNA enzyme  
E J Hayden, E Ferrada & A Wagner  
[SEE N&V P.45](#)

96 **IMMUNOLOGY** Non-apoptotic role of BID in inflammation and innate immunity  
G Yeretssian et al.

100 **NEUROSCIENCE** Glutamate induces *de novo* growth of functional spines in developing cortex  
H-B Kwon & B L Sabatini

105 **BIOCHEMISTRY** UBCH7 reactivity profile reveals parkin and HHARI to be RING/HECT hybrids  
D M Wenzel, A Lissounov, P S Brzovic & R E Klevit

109 **BIOPHYSICS** Substrate-modulated gating dynamics in a Na<sup>+</sup>-coupled neurotransmitter transporter homologue  
Y Zhao et al.

114 **ERRATUM** Duplications of the neuropeptide receptor gene *VIPR2* confer significant risk for schizophrenia  
V Vacic et al.

### CLIMATE SCIENCE

## Deep freeze

Radar reveals a fjord-like landscape deep beneath the East Antarctic ice.  
[PAGES 46 & 72](#)

