### CONTENTS

19 April 2012 / Vol 484 / Issue No 7394

#### THIS WEEK

#### **EDITORIALS**

287 POLICY

#### Justice for all

The US needs to compensate the Guatemalans experimented on in the 1940s

#### 287 PHYSICS

#### No shame

The OPERA experiment is an example of how science should work

#### 288 RESEARCH

#### All together now

Europe should embrace the opportunities for broader collaborations

#### **WORLD VIEW**

#### 289 Deep-water drilling remains a risky business

Donald Boesch

Legal reforms are needed to ensure Deepwater Horizon is not repeated

# RE 2

#### RESEARCH HIGHLIGHTS

### 290 SELECTIONS FROM THE SCIENTIFIC LITERATURE

Obesity link to inflammation / Nanoscale protein factories / Adaptable corals / Fuel-cell miniatures / Monsoon models

#### **SEVEN DAYS**

#### 292 THE NEWS IN BRIEF

North Korea's rocket takes a dive / Tennessee schools get green light to teach scepticism on science / Powerful quake shakes Sumatra / Envisat falls silent / The rising tide of dementia

#### CAREERS

#### 405 ASTROBIOLOGY

#### Alien encounters

The interdisciplinary nature of astrobiology makes it a good choice

#### **407 TURNING POINT**

Medical researcher Marc Modat has seen his software code widely adopted

**407 CAREER BRIEFS** 

#### NATUREJOBS ADVERTISING FEATURE

Spotlight on geosciences

#### **NEWS IN FOCUS**



#### 295 RESEARCH CONSORTIA

Europe looks beyond continental boundaries for partners in science

#### 296 DISASTER PREPAREDNESS

Japan overwhelmed by revised threat of tsunamis

#### 298 FRANCE

The leading candidates in the French presidential election talk science

#### 301 TECHNOLOGY

Japanese technology giants tune in to the mobile-display market

#### **302 MEDICAL GENETICS**

Researchers seek genetic roots of mental disability

#### **FEATURES**

#### **308 PARTICLE PHYSICS**

#### A matter of detail

Fermilab physicists zero in on a superaccurate measure of neutrino speed

#### NEUROSCIENCE

## Arrested development

MRI scans of the adolescent brain are informative, but do they belong in court? PAGE 304



#### COMMENT

#### 311 PLANETARY SCIENCE

### Prepare for the coming space weather storm

Mike Hapgood

Our electronic society is worryingly vulnerable to the next big solar outburst

#### **BOOKS & ARTS**

#### MEDICINE

## Leonardo the anatomist

The artist's medical discoveries merit recognition, says Martin Clayton PAGE 314



#### 317 EVOLUTION

Work-life balance John Whitfield

#### CORRESPONDENCE

318 Protect personalized medicine / Safe water in China / Answer for agriculture lies in the soil

#### **FUTURES**

410 Monkeys Ken Liu



### CONTENTS

19 April 2012 / Vol 484 / Issue No 7394

#### RESEARCH

#### **NEW ONLINE**

319 Papers published this week at nature.com

#### **NEWS & VIEWS**

320 SENSORY BIOLOGY

Search for the compass needles 'Magnetosensing neurons' in bird beaks may actually be macrophages Henrik Mouritsen SEE LETTER P.367

#### 321 ELECTRONICS

Carbon nanotubes finally deliver Carbon-nanotube transistor outperforms leading silicon analogues Franz Kreupl

#### 322 GEOSCIENCE

Fossil raindrops and ancient air A determination of atmospheric density 2.7 billion years ago William S Cassata & Paul R Renne SEE LETTER P.359

#### 324 QUANTUM PHYSICS

Tunnelling across a nanowire Coherent quantum phase slip across a superconductor Alexey Bezryadin SEE LETTER P.355

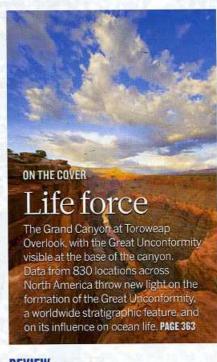
#### 325 CIRCADIAN RHYTHMS

No lazing on sunny afternoons Lab fruitflies behave very differently when outdoors François Rouyer SEE LETTER P.371

#### EARTH SCIENCE

Fossilized raindrops reveal the secrets of a long-gone atmosphere. PAGE 359





#### REVIEW

327 GEOPHYSICS Deformation cycles of subduction earthquakes in a viscoelastic Earth K Wang, Y Hu & J He

#### ARTICLES

- 333 PHYSIOLOGY A novel ChREBP isoform in adipose tissue regulates systemic glucose metabolism M A Herman et al.
- 339 DEVELOPMENTAL BIOLOGY A unique regulatory phase of DNA methylation in the early mammalian embryo ZD Smith et al.
- 345 STRUCTURAL BIOLOGY The 2.8 Å crystal structure of the dynein motor domain T Kon et al.

#### LETTERS

- 351 ASTRONOMY An absence of neutrinos associated with cosmic-ray acceleration in y-ray bursts IceCube Collaboration
- 355 PHYSICS Coherent quantum phase slip O V Astafiev et al. SEE N&V P.324

- 359 EARTH SCIENCE Air density 2.7 billion years ago limited to less than twice modern levels by fossil raindrop imprints S M Som et al. SEE N&V P.322
- 363 EARTH SCIENCE Formation of the 'Great Unconformity' as a trigger for the Cambrian explosion S E Peters & R R Gaines
- **ANIMAL BEHAVIOUR Clusters of** iron-rich cells in the upper beak of pigeons are macrophages not magnetosensitive neurons CD Treiber et al. SEE N&V P.320
- 371 ANIMAL BEHAVIOUR Unexpected features of Drosophila circadian behavioural rhythms under natural conditions S Vanin et al. SEE N&V P.325
- 376 NEUROSCIENCE Local generation of glia is a major astrocyte source in postnatal cortex W-P Ge, A Miyawaki, F H Gage, Y N Jan & LY Jan
- 381 NEUROSCIENCE Optogenetic stimulation of a hippocampal engram activates fear memory recall X Liu et al.
- 386 BIOCHEMISTRY DBIRD complex integrates alternative mRNA splicing with RNA polymerase II transcript elongation P Close et al.
- 390 CELL BIOLOGY Differential positioning of adherens junctions is associated with initiation of epithelial folding Y-C Wang, Z Khan, M Kaschube & E F Wieschaus
- 394 DISEASE Hsp72 preserves muscle function and slows progression of severe muscular dystrophy S M Gehrig et al.
- 399 STRUCTURAL BIOLOGY Crystal structure of a membrane-embedded H+-translocating pyrophosphatase S-M Lin et al.
- 404 CORRIGENDUM Recovery rates reflect distance to a tipping point in a living system A J Veraart et al.