# CONTENTS

13 March 2014 / Vol 507 / Issue No 7491

# THIS WEEK

#### **EDITORIALS**

139 POLICY

#### Don't hide the decline

The flat budget is a myth and US researchers should not be fooled

#### 139 ECOLOGY

#### An elegant chaos

The lack of a universal theory is what makes ecology tick

# 140 PUBLISHING

# Share alike

Open data-sharing requires careful thought and better controls



# **WORLD VIEW**

141 Practical science has a global reach and appeal John Baruch English schools' retreat from teaching practical science is the wrong move at the wrong time

# **RESEARCH HIGHLIGHTS**

142 SELECTIONS FROM THE
SCIENTIFIC LITERATURE
Fin evolution / Those Egyptian
cats / Droplets on film / Inevitable
extinctions / Warm food hazard /
Lipid link to prostate tumour

# **SEVEN DAYS**

# 144 THE NEWS IN BRIEF

Hubble captures shattering asteroid / Stem-cell paper under fire / Second child 'cured' of HIV / Craig Venter seeks secrets of longevity

# CAREERS

# **263 GEOSCIENCE**

# Fracking fundamentals

The US fracking boom is producing lots of energy and job opportunities for scientists

# **265 TURNING POINT**

Johan Bollen's decentralized crowdsourced funding model looks to be gaining followers

**265 CAREER BRIEFS** 

# **NEWS IN FOCUS**



# 147 POLICY Obama's flat budget frustrates scientists

#### 148 POLICY

Basic science receives boost in Chinese spending plan

# 150 NUTRITION

WHO calls for halving of sugar levels in food

#### 151 GEOSCIENCE

Seismic network plots course for the oceans

#### 152 ENERGY

Biofuel industry plays catch up with cellulosic ethanol

#### **FEATURES**

154 ENERGY

# Islands of light

Microgrids are bringing power to rural communities



# COMMENT

#### 161 HISTORY

#### A medieval multiverse

Tom C B McLeish, Richard G Bower, Brian K Tanner, Hannah E Smithson, Cecilia Panti, Neil Lewis & Giles E M Gasper In De Luce, thirteenth-century thinker Robert Grosseteste created a cosmos with features we recognize today

#### POLICY

# A word to the wise

An experienced practitioner offers ten useful tips for would-be science advisers PAGE163



# **BOOKS & ARTS**

# 166 IN RETROSPECT

Sylva

Gabriel Hemery

# 168 PARTICLE PHYSICS

Higgs on the big screen Alexandra Witze

# CORRESPONDENCE

169 China's carbon emissions / Biomedical statistics / Physics off road map / Nepal's education / Flood risks

# **FUTURES**

268 A kite for Sarah David G Blake



# CONTENTS

13 March 2014 / Vol 507 / Issue No 7491

# RESEARCH

# **NEW ONLINE**

171 Papers published this week at nature.com

# **NEWS & VIEWS**

172 EVOLUTIONARY BIOLOGY
Sex, lies and butterflies
The gene doublesex governs
sex-specific mimicry in Papilio polytes
David W Loehlin & Sean B Carroll

SEE LETTER P.229

173 ASTROPHYSICS

Cosmic lens reveals spinning black hole

A distant giant black hole that grew through coherent mass accretion Guido Risaliti SEE LETTER P.207

174 GEOLOGY

Earth's deep water reservoir
A tiny sample of ringwoodite from
Earth's mantle transition zone
Hans Keppler SEE LETTER P.221

175 NEURODEGENERATIVE DISEASES

G-quadruplex poses quadruple threat
A hexanucleotide-repeat expansion in
C9orf72 disrupts gene function
J Paul Taylor SEE ARTICLE P.195

177 NEUROSCIENCE

Ordered randomness in fly love songs Sensory inputs instruct motor outputs in courting male fruit flies Bence P Ölveczky SEE LETTER P.233

178 EVOLUTIONARY BIOLOGY

Speciation undone

Loss of a Galapagos finch population through hybridization Peter R Grant & B Rosemary Grant

#### REVIEW

181 BIOMEDICAL ENGINEERING The present and future role of microfluidics in biomedical research E K Sackmann, A L Fulton & D J Beebe

#### ARTICLES

- 190 STEM CELLS Alveolar progenitor and stem cells in lung development, renewal and cancer
  T J Desai, D G Brownfield & M A Krasnow
- 195 NEURODEGENERATIVE DISEASE C9orf72 nucleotide repeat structures initiate molecular cascades of disease A R Haeusler et al. SEE N&V P.175



201 IMMUNOLOGY Proof of principle for epitope-focused vaccine design B E Correia et al.

### **LETTERS**

- 207 ASTROPHYSICS Reflection from the strong gravity regime in a lensed quasar at redshift z = 0.658

  R C Reis, M T Reynolds, J M Miller
  & D J Walton SEE N&V P.173
- 210 CHEMISTRY Interrogating selectivity in catalysis using molecular vibrations A Milo, E N Bess & M S Sigman
- 215 CHEMISTRY Conformation-induced remote meta-C-H activation of amines

  R-Y Tang, G Li & J-Q Yu
- 221 SOLID EARTH SCIENCES Hydrous mantle transition zone indicated by ringwoodite included within diamond D G Pearson et al. SEE N&V P.174
- 225 GENETICS Derived immune and ancestral pigmentation alleles in a 7,000-year-old Mesolithic European | Olalde et al.
- 229 EVOLUTIONARY GENETICS doublesex is a mimicry supergene
  K Kunte et al. SEE N&V P.172
- 233 NEUROSCIENCE Dynamic sensory cues

- shape song structure in *Drosophila P Coen* et al. SEE N&V P.177
- 238 NEUROSCIENCE An excitatory paraventricular nucleus to AgRP neuron circuit that drives hunger M J Krashes et al.
- 243 IMMUNOLOGY L-Myc expression by dendritic cells is required for optimal T-cell priming Wumesh KC et al.
- 248 PARASITOLOGY A transcriptional switch underlies commitment to sexual development in malaria parasites B F C Kafsack et al.
- 253 PARASITOLOGY A cascade of DNA-binding proteins for sexual commitment and development in Plasmodium A Sinha et al.
- 258 MICROBIOLOGY DNA-guided DNA interference by a prokaryotic Argonaute D C Swarts et al.
- 262 CORRIGENDUM Crystal structure of a nitrate/nitrite exchanger H Zheng, G Wisedchaisri & T Gonen
- 262 CORRIGENDUM An environmental bacterial taxon with a large and distinct metabolic repertoire M C Wilson et al.
- 262 CORRIGENDUM Mesoangioblast stem cells ameliorate muscle function in dystrophic dogs

  M Sampaolesi et al.

# **EVOLUTIONARY GENETICS**

# Wing tips

The workings of a supergene revealed in the swallowtail butterfly PAGE 229

