

ПУ
Vasle

OUTLOOK
The spine

nature

THE INTERNATIONAL WEEKLY JOURNAL OF SCIENCE

SKYFALL

*The trajectory, origin and airburst behaviour
of the Chelyabinsk fireball*

PAGES 202, 235 & 238



TROPICAL DISEASE

CAN WE BEAT THE PARASITES?

*Cryptosporidiosis and
malaria are prime targets*

PAGES 186 & 189

DRUGS

CHANGING MINDS

*Cultural and medical
histories of psychotropics*

PAGE 194

OCEANOGRAPHY

TIME CAPSULE

*Ancient sea water preserved
in Chesapeake Bay crater*

PAGE 252

NATURE.COM/NATURE

14 November 2013 £10

Vol. 503, No. 7475



CONTENTS

14 November 2013 / Vol 503 / Issue No 7475

THIS WEEK

EDITORIALS

165 AFRICA

Precautionary measures

Major campaigns targeting AIDS and malaria require proper monitoring

165 GENOMICS

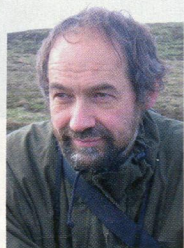
Data deadline

The NIH's proposed revamp of data-sharing rules urgently needs input

166 POLICY

Keep asking

Government drug policies should be based on evidence, not prejudice



WORLD VIEW

167 Review by quality not quantity for better policy

William J Sutherland
Global assessments need to sharpen up the way they collate and review evidence

RESEARCH HIGHLIGHTS

168 SELECTIONS FROM THE SCIENTIFIC LITERATURE

Economy sets warming pace / Viking sacrifices / A bit secret / The physics of traffic / New bat flu virus / Gut flora and arthritis / Healing protein



SEVEN DAYS

170 THE NEWS IN BRIEF

Typhoon devastates the Philippines / Record high for greenhouse gases / Scant evidence of poisoning for Yasser Arafat or Pablo Neruda / Personal Genome Project expands

CAREERS

301 FIELDWORK

The great outdoors

Combine environmental research with a spot of peace and quiet

303 COLUMN

Fast-tracked talent

Conor O'Carroll

Ireland's approach to 'scientific visas' is a model others would do well to follow

NEWS IN FOCUS



173 POLICY

Big science takes budgetary hit at NIH

174 CLIMATE CHANGE

Warsaw talks aim to smooth the path to new climate treaty

177 PARTICLE PHYSICS

Physicists dream of giant collider to succeed LHC

178 PLANETARY SCIENCE

NASA's Mars mission prepares for lift-off

179 POLITICS

US social scientists gear up for fight over grant restrictions

180 PUBLISHING

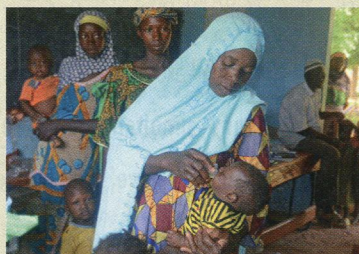
Preprint server for life sciences opens for business

FEATURES

182 AIDS PREVENTION

Africa's circumcision challenge

A bid to circumcise 20 million men is raising questions over true efficacy



MALARIA

The big push

Older drugs are being pressed into service to try to quash malaria infections **PAGE 186**

COMMENT

189 PARASITIC INFECTIONS

Time to tackle cryptosporidiosis

Boris Striepen

No more neglect for *Cryptosporidium*, a major threat to child health across Africa and Asia

191 GLOBAL CHANGE

Ecology must evolve

Georgina Mace

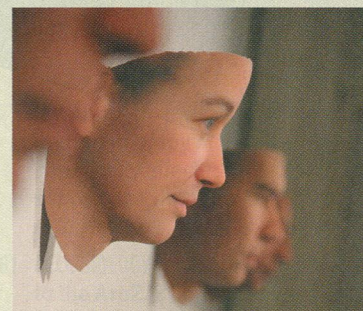
Environmental research needs to be rebooted to tackle today's problems

BOOKS & ARTS

SYNTHETIC BIOLOGY

The second creation

Anthony King gets to grips with the heady scent of synthesis **PAGE 196**



194 HUMAN BEHAVIOUR

Bending minds, building medicine

Andrew Robinson

195 BOOKS IN BRIEF

197 ORNITHOLOGY

World wide wings

Stuart Pimm



CORRESPONDENCE

198 Impact metrics / Government shutdowns / Scientific stories

FUTURES

306 Bottled up

Anatoly Belilovsky

CONTENTS

14 November 2013 / Vol 503 / Issue No 7475

RESEARCH

NEW ONLINE

199 Papers published this week at nature.com

NEWS & VIEWS

200 APPLIED PHYSICS

A cascade laser's random walk

An electrically pumped mid-infrared random laser

Hui Cao & Stafford W Sheehan

201 BIOCHEMISTRY

Metal ghosts in the splicing machine

Small nuclear RNAs coordinate catalytic metal ions in the spliceosome

Scott A Strobel [SEE ARTICLE P.229](#)

202 SOLAR SYSTEM

Russian skyfall

Analysis of the Chelyabinsk asteroid impact

Natalia Artemieva

[SEE LETTERS P.235 & P.238](#)

204 STEM CELLS

Differentiated cells in a back-up role

Differentiated stomach and lung cells can act like stem cells

Tushar J Desai & Mark A Krasnow

[SEE ARTICLE P.218](#)

205 QUANTUM PHYSICS

The right ambience for a single spin

Long lifetime for a single spin adsorbed on a metal surface

Michael E Flatté [SEE LETTER P.242](#)

206 BIODIVERSITY

The ecological deficit

Small-mammal extinctions after habitat fragmentation

Andrew Gonzalez

207 HIV

Antibodies advance the search for a cure

Broadly neutralizing mAbs suppress viraemia in macaques

Louis J Picker & Steven G Deeks

[SEE ARTICLE P.224 & LETTER P.277](#)

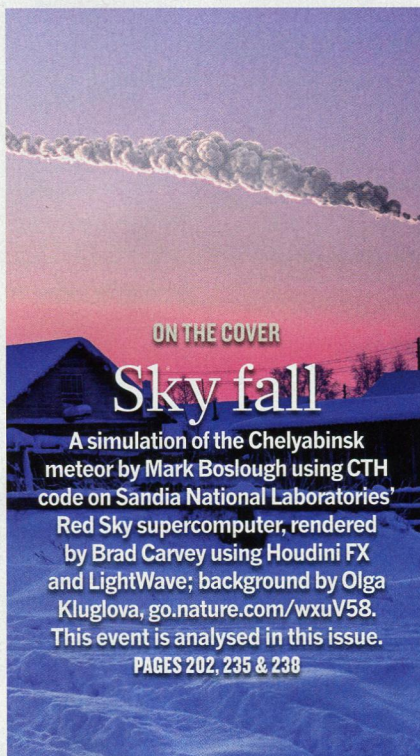
REVIEW

209 PHYSICS Sound and heat revolutions in phononics

M Maldovan

ARTICLES

218 STEM CELLS Dedifferentiation of committed epithelial cells into stem



cells *in vivo*

P R Tata et al. [SEE N&V P.204](#)

224 HIV Therapeutic efficacy of potent neutralizing HIV-1-specific monoclonal antibodies in SHIV-infected rhesus monkeys

D H Barouch et al. [SEE N&V P.207](#)

229 BIOCHEMISTRY RNA catalyses nuclear pre-mRNA splicing

S M Fica et al. [SEE N&V P.201](#)

LETTERS

235 PLANETARY SCIENCE The trajectory, structure and origin of the Chelyabinsk asteroidal impactor

J Borovička et al. [SEE N&V P.202](#)

238 PLANETARY SCIENCE A 500-kiloton airburst over Chelyabinsk and an enhanced hazard from small impactors

P G Brown et al. [SEE N&V P.202](#)

242 PHYSICS Stabilizing the magnetic moment of single holmium atoms by symmetry

T Miyamachi et al. [SEE N&V P.205](#)

247 SELF-ASSEMBLY Guided hierarchical co-assembly of soft patchy nanoparticles

A H Gröschel et al.

252 EARTH SCIENCES Evidence for high salinity of Early Cretaceous sea water from the Chesapeake Bay crater

W E Sanford, M W Doughten, T B Coplen, A G Hunt & T D Bullen

257 PALAEONTOLOGY The earliest known holometabolous insects

A Nel et al.

262 NEUROSCIENCE Feature detection and orientation tuning in the *Drosophila* central complex

J D Seelig & V Jayaraman

267 NEUROSCIENCE SHANK3 and IGF1 restore synaptic deficits in neurons from 22q13 deletion syndrome patients

A Shcheglovitov et al.

272 IMMUNOLOGY Paneth cells as a site of origin for intestinal inflammation

T E Adolph et al.

277 HIV Antibody-mediated immunotherapy of macaques chronically infected with SHIV suppresses viraemia

M Shingai et al. [SEE N&V P.207](#)

281 CELL BIOLOGY Inhibitory signalling to the Arp2/3 complex steers cell migration

I Dang et al.

285 DEVELOPMENTAL BIOLOGY Directional tissue migration through a self-generated chemokine gradient

E Donà et al.

290 MOLECULAR BIOLOGY A high-resolution map of the three-dimensional chromatin interactome in human cells

F Jin et al.

295 PHARMACOLOGY Structural basis for modulation of a G-protein-coupled receptor by allosteric drugs

R O Dror et al.

300 CORRIGENDUM Stereoisomerism of tertiary alcohols to tertiary-alkyl isonitriles and amines

S V Pronin, C A Reiher & R A Shenoi