ПИ N 28/e

nature

THE INTERNATIONAL WEEKLY JOURNAL OF SCIENCE

BURNINGISSUE

Managed ecosystems losing diversity face collapse in the event of stress PAGE 86

CLIMATE

CRACKING MYSTERIES

Ten things we don't know about snow and ice PAGE 27 METAGENOMICS

EARTHLY POWERS

Two views of the microbes that make soil tick PAGE 40 CANCER

A MOVING TARGET

Technologies that track and treat metastasis PAGE 131 O NATURE.COM/NATURE

7 February 2013 £10

Vol. 494, No. 7435



CONTENTS

7 February 2013 / Vol 494 / Issue No 7435

THIS WEEK

EDITORIALS

5 HEALTH

Unknown territory

Japan should beware loopholes as it begins to regulate stem-cell therapies

5 NUCLEAR WASTE

In a hole

Going underground is the only viable choice for storing nuclear waste

6 ARCHAEOLOGY

Body of evidence

Those who discovered the remains of Richard III deserve their time in the sun



WORLD VIEW

7 Genetic privacy needs a more nuanced approach Misha Angrist There are advantage

There are advantages to having your genomic details in the public domain

RESEARCH HIGHLIGHTS

8 SELECTIONS FROM THE SCIENTIFIC LITERATURE

Bacterial gold / Mosquito rivalry / Risk factors for malnutrition / Jet stream on the move / Clock-watching ribosomes / Cats on the prowl / Handy neutrons

SEVEN DAYS

10 THE NEWS IN BRIEF

US seeks to ease immigration laws / Antisense drug wins approval / US collider marked for possible closure / Pfizer spins out animal-health business / Steven Chu steps down / TB vaccine fails clinical trial

CAREERS

137 COMMUNICATION

Two minutes to impress

Researchers need a pitch short enough to deliver in an elevator ride

139 TURNING POINT

Even high-school students can do worthwhile research, says theoretical physicist Yogesh Joglekar

139 CAREER BRIEFS

NEWS IN FOCUS

- EARTH SCIENCE Landsat 8 prepares for liftoff
- 4 NUCLEAR ENERGY Evidence of geological faults rattle Japan's plans to restart reactors
- 15 CHEMICAL SAFETY Hydrogen fluoride leaks raise questions about safety in South Korean industry
- 16 PARTICLE PHYSICS

 Researchers face busy schedule as LHC shuts down for maintenance
- 19 UNIVERSITIES

 UCSF's Mission Bay campus seeks
 ways to combat lean financial climate
- 20 DRUG DEVELOPMENT Public-private consortium aims to re-energize Europe's drug industry

FEATURES

22 ECOLOGY

Survival of the flexible

Extremes of heat and cold could spell the end for tropical species that have had little exposure to either



TRANSLATIONAL SCIENCE

Medicine man

Christopher Austin's bid to jump-start drug discovery PAGE 24

TECHNOLOGY

131 CANCER

Tracking metastasis and tricking cancer

New technologies are being used to predict the movement of metastatic cells — and to destroy them

COMMENT



CHEMICAL PHYSICS

Ten cool questions

Ice is central to the workings of the planet yet it still has too many mysteries, says Thorsten Bartels-Rausch PAGE 27

29 ENERGY

Build a biomass energy market

Heinz Kopetz

Incentives from government are crucial for making the most of biofuels

BOOKS & ARTS

32 IN RETROSPECT

On Growth and Form Philip Ball

33 BOOKS IN BRIEF

34 Q&A

Chronicler of conflict

Richard Rhodes in conversation about nuclear weapons and the Spanish Civil War

CORRESPONDENCE

35 The Royal Institution matters / Vital statistics / Bogus species / We've got enough colliders

OBITUARY

37 Brigitte Askonas (1923–2013) Anne O'Garra

FUTURES

142 Local 623

Donald S Crankshaw

CONTENTS

7 February 2013 / Vol 494 / Issue No 7435

RESEARCH

NEW ONLINE

39 Papers published this week at nature.com

NEWS & VIEWS

40 FORUM: MICROBIOLOGY

The life beneath our feet

Comparing approaches to identify and characterize soil microorganisms Janet K Jansson; James I Prosser

43 SOLID-STATE PHYSICS

A new spin on spintronics

Reconfigurable computing blocks based on semiconductor junctions Sayeef Salahuddin SEE LETTER P.72

NEUROSCIENCE

Salty sensations

Identification of TMC proteins as salt sensors in C. elegans Bertrand Coste & Ardem Patapoutian SEE LETTER P.95

FUNGAL BIOLOGY

Multiple mating strategies

Isolation of haploid strains of the pathogen C. albicans Neil A R Gow SEE ARTICLE P.55

ASTROPHYSICS

Going supernova

Outburst from a massive star 40 days before it exploded as a supernova Alexander Heger SEE LETTER P.65

REVIEW

PHYSICS Spin-orbit coupling in quantum gases

V Galitski & I B Spielman

- FUNGAL GENETICS The 'obligate diploid' Candida albicans forms matingcompetent haploids
 - M A Hickman et al. SEE N&V P.45
- IMMUNOLOGY Structural basis for viral 5'-PPP-RNA recognition by human IFIT proteins

Y M Abbas, A Pichlmair, M W Górna, G Superti-Furga & B Nagar

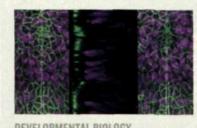
LETTERS

65 ASTRONOMY An outburst from a massive star 40 days before a supernova explosion E O Ofek et al. SEE N&V P.46



- 68 APPLIED PHYSICS Reconstructing state mixtures from diffraction measurements
 - P Thibault & A Menzel
- 72 APPLIED PHYSICS Magneticfield-controlled reconfigurable semiconductor logic S Joo et al. SEE N&V P.43
- 77 INFORMATION TECHNOLOGY Towards practical, high-capacity, low-maintenance information storage in synthesized DNA N Goldman et al.
- **CLIMATE SCIENCE Northern Hemisphere** forcing of Southern Hemisphere climate during the last deglaciation F He et al.
- **ECOLOGY Diversity loss with persistent** human disturbance increases vulnerability to ecosystem collapse A S MacDougall, K S McCann, G Gellner & R Turkington
- NEUROSCIENCE Suppression of neuroinflammation by astrocytic dopamine D2 receptors via αB-crystallin W Shao et al.
- 95 NEUROBIOLOGY tmc-1 encodes a sodium-sensitive channel required for salt chemosensation in C. elegans M Chatzigeorgiou, S Bang, S W Hwang & W R Schafer SEE N&V P.44

- 100 STEM CELLS Negligible immunogenicity of terminally differentiated cells derived from induced pluripotent or embryonic stem cells R Araki et al.
- 105 CARDIOVASCULAR BIOLOGY Studying arrhythmogenic right ventricular dysplasia with patient-specific iPSCs C Kim et al.
- 111 DISEASE Obesity-induced overexpression of miR-802 impairs glucose metabolism through silencing of Hnf1b J-W Kornfeld et al.
- IMMUNOLOGY Microbiota restricts trafficking of bacteria to mesenteric lymph nodes by CX3CR1hi cells G E Diehl et al.
- **BIOCHEMISTRY ATP-directed capture of** bioactive herbal-based medicine on human tRNA synthetase H Zhou, L Sun, X-L Yang & P Schimmel
- 125 DEVELOPMENT Mitotic cell rounding accelerates epithelial invagination T Kondo & S Hayashi
- 130 CORRIGENDUM The zebrafish dorsal axis is apparent at the four-cell stage A V Gore et al.
- 130 CORRIGENDUM How cancer metabolism is tuned for proliferation and vulnerable to disruption A Schulze & A L Harris
- 130 ERRATUM Making sense of palaeoclimate sensitivity PALAEOSENS Project Members



DEVELOPMENTAL BIOLOGY

Round trip

Cell shape is a key factor in mitotic cells in the early embryo. PAGE 125