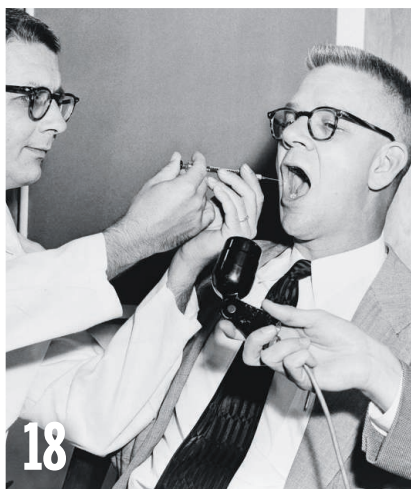




CONTENTS

4 JULY 2014 • VOLUME 345 • ISSUE 6192

NEWS



IN BRIEF

10 Roundup of the week's news

IN DEPTH

13 INJECTION WELLS BLAMED IN OKLAHOMA EARTHQUAKES

State regulators start to take action to reduce risks of induced tremors
By E. Hand

► SCIENCE EXPRESS REPORT
BY K. M. KERANEN ET AL.

14 BIOTECH FEELS A CHILL FROM CHANGING U.S. PATENT RULES

Supreme Court decisions hobble efforts to protect inventions involving natural products
By K. Servick

15 PLAN TO GRADE INSTITUTES RATTLES RUSSIAN ACADEMY

Researchers fear reforms mark path to institute closures
By V. Pokrovsky

16 A CHALLENGE TO PSEUDOSCIENCE

Expat dismisses claims that devices noninvasively detect viruses in blood and treat infections
By J. Bohannon

17 FAULTY DRUG TRIALS TARNISH JAPAN'S CLINICAL RESEARCH

Spate of scandals shows need to reform clinical research regulations and practices
By D. Normile

FEATURES

18 HIGH HOPES

Psychedelic drugs fell from grace in the 1960s. Now, scientists are rediscovering them
By K. Kupferschmidt

22 Can ecstasy treat the agony of PTSD?

Party drug inches toward phase III study
By K. Kupferschmidt

► PODCAST

INSIGHTS

LETTERS

24 NEXTGEN VOICES

PERSPECTIVES

28 A CROWNING ACHIEVEMENT FOR DECIPHERING CORONARY ORIGINS

Postnatal maturation of the heart spurs coronary vessel development from an unanticipated source
By C. G. Burns and C. E. Burns

► REPORT P. 90

29 THE BIRTH OF COOPERATION

Mutualistic symbiosis can arise without prior coevolution
By D. K. Aanen and T. Bisseling

► REPORT P. 94

31 EMERGENT COMPLEX STATES IN BILAYER GRAPHENE

Experiments probe a wealth of exotic electronic behavior
By B. J. LeRoy and M. Yankowitz

► REPORTS PP. 55, 58, & 61

32 FOLLOWING THE SAME NERVE TRACK TOWARD DIFFERENT CELL FATES

Schwann cell precursors can become either neurons or glia
By C. Kalcheim and H. Rohrer

► REPORTS PP. 82 & 87



34 IPCC LESSONS FROM BERLIN

Did the "Summary for Policymakers" become a summary by policy-makers?
By B. Wible

34 Getting serious about categorizing countries

By D. G. Victor et al.

36 Political implications of data presentation

By N. K. Dubash et al.

37 Mapmakers and navigators, facts and values

By O. Edenhofer and J. Minx

39 SHAKING UP VOLCANOES

Data from a Japanese seismic network elucidate how large earthquakes may disrupt volcanic systems
By S. G. Prejean and M. M. Haney

► REPORT P. 80



BOOKS ET AL.

40 THE OPEN MIND

By J. Cohen-Cole, reviewed by J. Isaac

41 ENLIGHTENING SYMBOLS

By J. Mazur, reviewed by G. Donati

DEPARTMENTS

9 EDITORIAL

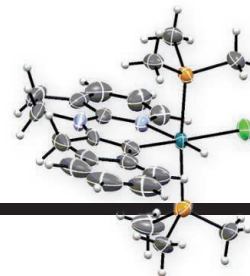
Raising the bar
By Marcia McNutt

110 WORKING LIFE

A giant leap
By John N. (Jack) Kittinger

| | |
|-----------------------|-----|
| Science Staff | 8 |
| New Products | 102 |
| Science Careers | 103 |

CONTENTS



68

Alkylation without byproducts
via rhodium

4 JULY 2014 • VOLUME 345 • ISSUE 6192

RESEARCH

IN BRIEF

42 From *Science* and other journals

REVIEW

45 HUMAN EVOLUTION

Evolution of early *Homo*: An integrated biological perspective *S. C. Antón* et al.

REVIEW SUMMARY; FOR FULL TEXT:

[HTTP://DX.DOI.ORG/10.1126/SCIENCE.1236828](http://dx.doi.org/10.1126/SCIENCE.1236828)

RESEARCH ARTICLES

46 EXOPLANET DETECTION

A terrestrial planet in a ~1-AU orbit around one member of a ~15-AU binary *A. Gould* et al.

50 MOLECULAR KINETICS

Ras activation by SOS: Allosteric regulation by altered fluctuation dynamics *L. Iversen* et al.

REPORTS

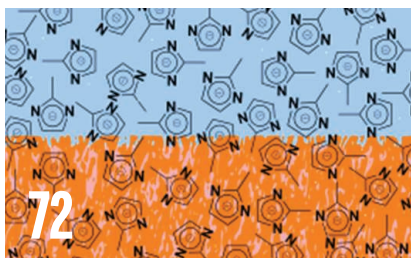
BILAYER GRAPHENE

55 Electron-hole asymmetric integer and fractional quantum Hall effect in bilayer graphene *A. Kou* et al.

58 Chemical potential and quantum Hall ferromagnetism in bilayer graphene *K. Lee* et al.

61 Tunable fractional quantum Hall phases in bilayer graphene *P. Maher* et al.

► PERSPECTIVE P. 31



64 ACTIVE GALAXIES

A fast and long-lived outflow from the supermassive black hole in NGC 5548 *J. S. Kaastra* et al.

68 C-H BOND ACTIVATION

Regioselective ketone α -alkylation with simple olefins via dual activation *F. Mo* and *G. Dong*

72 SEPARATION MEMBRANES

Interfacial microfluidic processing of metal-organic framework hollow fiber membranes *A. J. Brown* et al.

75 SOCIAL PSYCHOLOGY

Just think: The challenges of the disengaged mind *T. D. Wilson* et al.

77 CLIMATE CHANGE

Climate change and wind intensification in coastal upwelling ecosystems *W. J. Sydeman* et al.

80 EARTHQUAKE DYNAMICS

Mapping pressurized volcanic fluids from induced crustal seismic velocity drops *F. Brenguier* et al.

► PERSPECTIVE P. 39

NEURODEVELOPMENT

82 Parasympathetic neurons originate from nerve-associated peripheral glial progenitors *V. Dyachuk* et al.

87 Parasympathetic ganglia derive from Schwann cell precursors *I. Espinosa-Medina* et al.

► PERSPECTIVE P. 32

90 VESSEL FORMATION

De novo formation of a distinct coronary vascular population in neonatal heart *X. Tian* et al.

► PERSPECTIVE P. 28

94 PLANT-FUNGAL ECOLOGY

Niche engineering demonstrates a latent capacity for fungal-algal mutualism *E. F. Y. Hom* and *A. W. Murray*

► PERSPECTIVE P. 29

98 CELL DEATH

Opposing unfolded-protein-response signals converge on death receptor 5 to control apoptosis *M. Lu* et al.



ON THE COVER



Artist's view of a bilayer of graphene, in which two hexagonal carbon lattices are stacked on top of each other. The unusual band structure of bilayer graphene, coupled with external

fields and interactions between electrons, leads to exotic quantum effects. See pages 31, 55, 58, and 61. *Image: C. Bickel/Science*

SCIENCE (ISSN 0036-8075) is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1200 New York Avenue, NW, Washington, DC 20005. Periodicals mail postage (publication No. 484460) paid at Washington, DC, and additional mailing offices. Copyright © 2014 by the American Association for the Advancement of Science. The title SCIENCE is a registered trademark of the AAAS. Domestic individual membership and subscription (51 issues): \$153 (\$74 allocated to subscription). Domestic institutional subscription (51 issues): \$1282; foreign postage extra: Mexico, Caribbean (surface mail) \$55; other countries (air assist delivery) \$85. First class, airmail, student, and emeritus rates on request. Canadian rates with GST available upon request. GST #1254 88122. Publications Mail Agreement Number 1069624. Printed in the U.S.A. Change of address: Allow 4 weeks. Giving old and new addresses and 8-digit account number. Postmaster: Send change of address to AAAS, P.O. Box 96178, Washington, DC 20090-6178. Single-copy sales: \$10.00 current issue, \$15.00 back issue prepaid includes surface postage; bulk rates on request. Authorization to photocopy material for internal or personal use under circumstances not falling within the fair use provisions of the Copyright Act is granted by AAAS to libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that \$30.00 per article is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923. The identification code for Science is 0036-8075. Science is indexed in the Reader's Guide to Periodical Literature and in several specialized indexes.

Science

345 (6192)

Science **345** (6192), 9-110.

ARTICLE TOOLS

<http://science.sciencemag.org/content/345/6192>

PERMISSIONS

<http://www.sciencemag.org/help/reprints-and-permissions>

Use of this article is subject to the [Terms of Service](#)

Science (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. 2017 © The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works. The title *Science* is a registered trademark of AAAS.