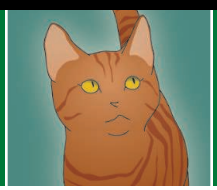
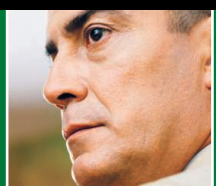


Photons take a random walk

1477



Cognitive certainty

1478

taries or interpretations of classical works. Bhashyas contain interpretations from opposing perspectives by different commentators. The body of work, collectively known as Upanishads, is considered by many to be a collaborative exploration of knowledge by student and teacher. In a culture that usually gives an exalted position to the teacher, questioning authority is permissible, albeit with decorum.

Ideally, education should strike a balance between sound training in the fundamentals and motivation to critically question those fundamentals in order to advance knowledge. C. V. Raman (who discovered the Raman effect), Megnad Saha (distinguished astrophysicist), and Jagdish Chandra Bose and Satyen Bose (both renowned physicists), who functioned during the Indian colonial rule, were not only well trained in the fundamentals of science but also capable of questioning established ideas. It is not clear that the lack of an adventurous spirit in modern Indian science, or for that matter, in the humanities and the social sciences, can be readily attributed to India's cultural roots.

T. N. NARASIMHAN

Department of Materials Science and Engineering, University of California at Berkeley, Berkeley, CA 94720–1760, USA. E-mail: tnnarasimhan@LBL.gov

Archaeology Augments Tibet's Genetic History

T. S. SIMONSON *ET AL.* ("GENETIC EVIDENCE for high-altitude adaptation in Tibet," Reports, 2 July, p. 72) and especially X. Yi *et al.* ("Sequencing of 50 human exomes reveals adaptation to high altitude," Reports, 2 July, p. 75) estimate that the genetic divergence of Tibetan populations with unique high-altitude adaptations occurred as late as ~2750 years ago. We have investigated this same problem from an archaeological perspective. Our results partly support the genetic-based scenario but suggest some contradictions between the two data sets. We currently have no evidence of permanent occupations on the Qinghai-Tibet Plateau before the middle Holocene, ~7000 years before the present (yr B.P.) (*1*), contrary to claims of occupations as old as 30,000 yr B.P. (*2*, *3*). Mobile foragers did exploit the Plateau margins up to 3300 m by ~15,000 yr B.P. (*4*). Directly dated sites documenting human presence above 4000 m are younger still, at ~11,000 to 8000 yr B.P. (*1*). These early sites represent intermittent, seasonal occupations by populations who most likely spent much of their time at lower elevations. Foragers may have established more permanent occupations on the Plateau margins as high as 3300 m after ~7000 yr B.P. (*5*–*7*), but these groups interacted extensively with agricultural populations in low-elevation environments. Year-round occupation above 4000 m likely became possible only after 4000 yr B.P. with the emergence of dedicated pastoralist adaptations centered on domesticated yaks (*6*, *8*). If the genetic traits suggested by Simonson *et al.* and Yi *et al.* evolved in response to selection on populations living exclusively above 4000 m, then the genetic divergence dates of ~2750 yr B.P. reasonably agrees with the archaeological evidence. If selection for these traits occurred among populations below 4000 m (*2*), where most Tibetans currently live, then more complex population dynamics are indicated. Understanding the archaeological chronology behind the peopling of the Qinghai-Tibet Plateau is critical to evaluating the tempo of selection operating on contemporary human populations.

P. JEFFREY BRANTINGHAM,[1]* DAVID RHODE,[2] DAVID B. MADSEN[3]

[1]Department of Anthropology, University of California, Los Angeles, Los Angeles, CA 90095, USA. [2]Desert Research Institute, Reno, NV 89512, USA. [3]Texas Archaeological Research Laboratory, University of Texas at Austin, Austin, TX 78758, USA.

*To whom correspondence should be addressed. E-mail: branting@ucla.edu

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Response

WE THANK BRANTINGHAM *ET AL.* FOR THEIR interest in our study; we agree that both molecular and archaeological evidence should be

CORRECTIONS AND CLARIFICATIONS

News Focus: "From pigs to people: The emergence of a new superbug" by D. Ferber (27 August, p. 1010). Tara Smith's affiliation is the University of Iowa in Iowa City.

Reports: "Down-regulation of a host microRNA by a *Herpesvirus saimiri* noncoding RNA" by D. Cazalla *et al.* (18 June, p. 1563). The third author should have been listed as Joan A. Steitz. The correction has been made in the HTML version online.

Reports: "Evolution of an expanded sex-determining locus in *Volvox*" by P. Ferris *et al.* (16 April, p. 351). The legend for figure S12 (Alternative splicing of female and male MAT3) in the Supporting Online Material should include the citation A. Kianianmomeni *et al.*, *Plant Cell* **20**, 2399 (2008), which reported two instances of unregulated intron retention (corresponding to E1_3.3, E3_5.4) and one instance of unregulated alternative splice site usage (corresponding to E13_16.5) in female MAT3. A revised Supporting Online Material has been posted online at www.sciencemag.org/cgi/content/full/328/5976/351/DC1.

Reports: "N-doping of graphene through electrothermal reactions with ammonia" by X. Wang *et al.* (8 May 2009, p. 768). After publication, the authors discovered that the graphene sheet (GS) sample used to take the x-ray photoelectron spectroscopy (XPS) and nanometer-scale secondary ion mass spectroscopy data in Fig. 4 was unintentionally oxidized by air from a leak that had not been detected during the experiment. The NH_3 annealing environment for the GS sample in Fig. 4 should be corrected to ~800 mtorr of NH_3 and an estimated partial pressure of oxygen of tens of millitorr.

Later, the authors found that as-made GSs annealed in NH_3 without any oxygen showed little n-doping within the detection limit of XPS, which is much lower than the doping level for the gas-phase–oxidized GS in Fig. 4. In a systematic study, they used XPS to observe n-doping and covalent N incorporation into the lattice of pre-oxidized GSs upon annealing in NH_3 [X. Li *et al.*, *J. Am. Chem. Soc.* **131**, 15939 (2009)]. They found that graphene oxide (with reduced oxidation and defect densities by stepwise thermal treatment) showed reduced n-doping levels upon NH_3 annealing [X. Li *et al.*, *J. Am. Chem. Soc.* **131**, 15939 (2009)], suggesting that the degree of n-doping scales with the degree of oxidation or concentration of defects in the graphene lattice.

The above findings are consistent with each other and do not change the main conclusions of the original publication—i.e., that annealing of graphene in NH_3 affords n-doping most likely at the edges and defect sites. The sample in Fig. 4 with unintended oxidation showed higher N signals than later samples without oxidation after similar NH_3 annealing, because gas-phase oxidation generated more defects and oxygen groups in the GS and increased its reactivity, allowing for large amounts of n-dopants to be incorporated into the GS. This finding is consistent with the authors' original suggestion and also shows that a higher defect density in graphene introduced by gas-phase oxidation allows for higher n-doping.

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used to understand the demographic history of the Tibetan people. Our Report focused not on the demographic history of the Tibetan population, but rather the selection acting on specific putatively adaptive mutations segregating in the Tibetan population. We included some limited demographic analyses because they helped illuminate our results regarding natural selection. The real demographic model is clearly likely to be more complex than the simple models of two populations diverging from each other. For example, Zhao *et al*. (*1*) used mitochondrial DNA to argue that late settlers of the Tibetan plateau may not have entirely replaced the original population but that a small proportion of them carry mitochondrial DNA lineages tracing back to Late Paleolithic inhabitants on the plateau. If this is the case, even if the EPAS1 variant was present in the early inhabitants of Tibet, strong selection would be needed to increase its frequency in the modern Tibetan gene pool. The understanding that the majority of the current population of the Tibetan plateau may trace their genetic ancestry back to quite recent immigrants into Tibet, even though humans have lived in Tibet for a much longer time—possibly with some continuity of culture—is important for understanding the difference between inferences based on archaeology and inferences based on genetics.

XIN YI,[1,2] YU LIANG,[1,2] EMILIA HUERTA-SANCHEZ,[3] XIN JIN,[1,4] ZHA XI PING CUO,[2,5] JOHN E. POOL,[3,6] XUN XU,[1] HUI JIANG,[1] NICOLAS VINCKENBOSCH,[3] THORFINN SAND KORNELIUSSEN,[7] HANCHENG ZHENG,[1,4] TAO LIU,[1] WEIMING HE,[1,8] KUI LI,[2,5] RUIBANG LUO,[1,4] XIFANG NIE,[1] HONGLONG WU,[1,9] MEIRU ZHAO,[1] HONGZHI CAO,[1,9] JING ZOU,[1] YING SHAN,[1,4] SHUZHENG LI,[1] QI YANG,[1] ASAN,[1,2] PEIXIANG NI,[1] GENG TIAN,[1,2] JUNMING XU,[1] XIAO LIU,[1] TAO JIANG,[1,9] RENHUA WU,[1] GUANGYU ZHOU,[1] MEIFANG TANG,[1] JUNJIE QIN,[1] TONG WANG,[1] SHUIJIAN FENG,[1] GUOHONG LI,[1] HUASANG,[1] JIANGBAI LUOSANG,[1] WEI WANG,[1] FANG CHEN,[1] YADING WANG,[1] XIAOGUANG ZHENG,[1,2] ZHUO LI,[1] ZHUOMA BIANBA,[10] GE YANG,[10] XINPING WANG,[11] SHUHUI TANG,[11] GUOYI GAO,[12] YONG CHEN,[5] ZHEN LUO,[5] LAMU GUSANG,[5] ZHENG CAO,[1] QINGHUI ZHANG,[1] WEIHAN OUYANG,[1] XIAOLI REN,[1] HUIQING LIANG,[1] HUISONG ZHENG,[1] YEBO HUANG,[1] JINGXIANG LI,[1] LARS BOLUND,[1] KARSTEN KRISTIANSEN,[1,7] YINGRUI LI,[1] YONG ZHANG,[1] XIUQING ZHANG,[1] RUIQIANG LI,[1,7] SONGGANG LI,[1] HUANMING YANG,[1] RASMUS NIELSEN,[1,3,7]* JUN WANG,[1,7]* JIAN WANG[1]*

[1]BGI-Shenzhen, Shenzhen 518083, China. [2]The Graduate University of Chinese Academy of Sciences, Beijing 100062, China. [3]Department of Integrative Biology and Department of Statistics, University of California Berkeley, Berkeley, CA 94820, USA. [4]Innovative Program for Undergraduate Students, School of Bioscience and Biotechnology, South China University of Technology, Guangzhou 510641, China. [5]The People's Hospital of the Tibet Autonomous Region, Lhasa 850000, China. [6]Department of Evolution and Ecology, University of California Davis, Davis, CA 95616, USA. [7]Department of Biology, University of Copenhagen, DK-1165 Copenhagen, Denmark. [8]Innovative Program for Undergraduate Students, School of Science, South China University of Technology, Guangzhou 510641, China. [9]Genome Research Institute, Shenzhen University Medical School, Shenzhen 518060, China. [10]The People's Hospital of Lhasa, Lhasa, 850000, China. [11]The Military General Hospital of Tibet, Lhasa, 850007, China. [12]The Hospital of XiShuangBanNa Dai Nationalities, Autonomous Jinghong 666100, Yunnan, China.

*To whom correspondence should be addressed. E-mail: wangjian@genomics.org.cn (Ji.W.); wangj@genomics.org.cn (Ju.W.); rasmus_nielsen@berkeley.edu (R.N.)

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Letters to the Editor

Letters (~300 words) discuss material published in *Science* in the previous 3 months or issues of general interest. They can be submitted through the Web (www.submit2science.org) or by regular mail (1200 New York Ave., NW, Washington, DC 20005, USA). Letters are not acknowledged upon receipt, nor are authors generally consulted before publication. Whether published in full or in part, letters are subject to editing for clarity and space.

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survival and, where possible, should be used before turning to assisted colonization.

J. B. RUHL

Florida State University College of Law, Tallahassee, FL 32306, USA. E-mail: jruhl@law.fsu.edu

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Assisted Colonization: Protect Managed Forests

IN HIS NEWS FOCUS STORY "HOME, HOME outside the range?" (24 September, p. 1592), R. Stone presents a lucid view of the strengths and weaknesses of assisted colonization of endangered species. Unfortunately, the focus on assisted colonization is overshadowing far-reaching climate change adaptation programs targeting forests managed for producing timber, producing nontimber products, or stocking biomass to capture CO_2.

In an effort to help managed forests respond to the effects of changes in climate, some propose the intentional translocation of tree species outside of their ranges. Forest managers seek to increase forest resilience by introducing new genotypes and new species (*1*). Social pressure to adjust managed forests in response to climate change should not be underestimated; managers are pushed to make decisions immediately, and risks of introducing maladapted genes and invasive populations are inherent to this type of strategy. Some have even proposed introducing subtropical species from the southern hemisphere in northern temperate countries because of the species' suitability to future warmer climates (*2*). As a result, exotic trees could be introduced legally into rural landscapes, thereby modifying terrestrial ecosystems for centuries in the name of responding to climate change.

We agree with Stone's conclusion that scientists should closely advise programs considering assisted colonization, and we add a similar plea for managed forests programs. The attention paid to the ecological, ethical, and legal issues of assisted colonization of endangered species should not eclipse the risk assessment of natural and managed forest adaptation strategies.

JUAN F. FERNÁNDEZ-MANJARRÉS[1,2,3]* AND LOUISE TSCHANZ[4]

[1]Université Paris-Sud 11, UMR 8079, Orsay F-91405, France. [2]CNRS, Orsay F-91405, France. [3]AgroParisTech, Paris F-75231, France. [4]Faculté de Droit Jean Monnet, Université Paris-Sud, Bagneux F-92220, France.

*To whom correspondence should be addressed. E-mail: juan.fernandez@u-psud.fr

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CORRECTIONS AND CLARIFICATIONS

News Focus: "Killer bots are getting human" by J. Bohannon (1 October, p. 30). The game referred to as "Ultimate Tournament 2004" is actually named "Unreal Tournament 2004."

News of the Week: "New type of cosmic dust tells of galaxy's violent history" by Y. Bhattacharjee (24 September, p. 1590). The reference to "unprecedented images of the cloudshine feature" should have read "unprecedented images of the coreshine feature."

News Focus: "Has China outgrown the one-child policy?" by M. Hvistendahl (17 September, p. 1458). In the graph "Having fewer babies anyway" (p. 1459), the top label on the *y* axis should have been 5, not 5%. The graph has been corrected in the HTML version online.

Letters: "Archaeology augments Tibet's genetic history" by P. J. Brantingham *et al*. (17 September, p. 1467). The Letter referred to both the Report by T. S. Simonson *et al.* and the Report by X. Yi *et al.* Only the Report by X. Yi *et al*. should have been cited; T. S. Simonson *et al*. did not estimate a divergence time for high-altitude Tibetans.

Policy Forum: "Achieving scientific eminence within Asia" by A. S. Huang and C. Y. H. Tan (17 September, p. 1471). References 12 and 13 were incomplete. Reference 12 should be "Y. Shi, Y. Rao, *Science* **329**, 1128 (2010)." Reference 13 should be "S. Tole, R. D. Vale, *Science* **329**, 1441 (2010)." The references have been corrected in the HTML version online.

Brevia: "Island biogeography reveals the deep history of SIV" by M. Worobey *et al*. (17 September, p. 1487). A grant was omitted from the acknowledgment. The study was supported in part by Public Health Service grant RR000164.

News Focus: "The dour Frenchman on malaria's frontier" by M. Enserink (3 September, p. 1142). The profile stated that combining an artemisinin-derived drug with another antimalarial was a novel concept in the early 1990s. In fact, others had explored that idea before. Researchers from the Guangzhou College of Traditional Chinese Medicine in Guangdong, China and the Roche Far East Research Foundation Hong Kong described the first clinical trial in which artemisinin was combined with other drugs: G. Q. Li, K. Arnold, X. B. Guo, H. X. Jian, L. C. Fu, *Lancet* **2**, 1360 (1984).

News of the Week: "NSF misfires on plan to revamp minority programs" by J. Mervis (23 July, p. 376). Stephen Cox was identified incorrectly. He is project director for the greater Philadelphia region Louis Stokes Alliance for Minority Participation program.

Review: "Development of monocytes, macrophages, and dendritic cells" by F. Geissmann *et al*. (5 February, p. 656). Reference 71 was incorrect. It should be A. Aziz *et al*., *Science* **326**, 867 (2009).