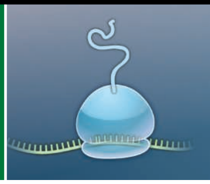

LETTERS

edited by Jennifer Sills

Battling the Paper Glut

THE ACADEMIC COMMUNITY CONTINUES TO BELIEVE THAT THE FORMAL SCHOLARLY PUBLISHING process separates sound research from shoddy or biased counterparts. Unfortunately, scholarly publishing may not be able to effectively fulfill its role as a gatekeeper much longer.

As soon as the "publish or perish" concept (the imperative to publish work constantly to further or sustain an academic career) surfaced in the United States in the early 1950s, academics criticized it openly as a recipe for disaster (*1*, *2*). Nevertheless, in the early to mid-1980s, administrators in universities systematically began to use the number of articles published per year by individual faculty members as a measure of their productivity.

The shift transformed scholarly publishing. Researchers began "salami slicing" their manuscripts in ever smaller "least publishable units" and began rushing manuscripts to publication before proper replication or evaluation of results. Multi-authored manuscripts increased, regardless of true contribution to the work. Doctoral students began to write dissertations as a series of publishable chapters, some submitted even before the defense. As a result, the quantity of articles published in scholarly journals increased on average by about 200 to 300% from the early 1980s to the late 1990s (*3*).

Researchers in countries such as China and India are subjected to a numbers game similar to that in the West, sometimes with the added incentive of monetary rewards for articles published in "top" journals. In 2008, China passed the United States to become the second scholarly producer (in total number of articles) after Europe.

Researchers have reacted to this publication glut by developing bibliometric indices, such as the h- and g-indexes, based on citation counts, to evaluate a researcher's impact in their discipline. Perhaps these indexes do evaluate impact better than counting annual number of articles. However, in various ways, they also encourage researchers to publish more articles to directly inflate their own citations or to cite friends who then cite them in return.

The top journals now are flooded with numbers of manuscripts beyond most editors' capacity to handle. Reviewers are solicited to scrutinize not just manuscripts but also research proposals and governmental reports. Yet, peer-reviewing is rarely, if ever, valued by academic institutions as a fruitful way for researchers to spend their time, so finding good reviewers has become more and more difficult.

Researchers need to fight to contain the current paper glut. The number of articles published per year should never be used, under any circumstance, as a criterion in tenure or promotion decisions, or to rank academic institutions. As the medical community proposed 25 years ago (*4*), researchers should never be allowed to include more than three publications per year in activity reports; in research proposals, principal investigators should cite no more than 10 papers. University administrators should consider peer-reviewing as not only legitimate, but a vitally important way for researchers to contribute to scholarship, and should reward it as such. One way to accomplish this would be a new generation of review impact indexes, based on information provided by publishers (*3*, *5*). Effectiveness in peer-reviewing should be viewed as an essential skill to acquire for Ph.D. students, worldwide. Journals should demand that for every paper submitted, an author provide three reviews of other manuscripts. Perhaps if authors knew that their reviewing workload would increase dramatically with the number of papers they submit, they would craft fewer and better papers, ultimately benefiting all involved.

DONALD SIEGEL[1]* AND PHILIPPE BAVEYE[2]

[1]Department of Earth Sciences, Syracuse University, Syracuse, NY 13244, USA. [2]SIMBIOS Centre, Abertay University, Dundee DD1 1HG, UK.

*To whom correspondence should be addressed. E-mail: disiegel@syr.edu

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India's Courteous Creativity

IN HIS EDITORIAL "IRREVERENCE AND INDIAN science" (30 April, p. 547), R. A. Mashelkar observes that Indian science lacks adventure and a spirit of questioning established ideas. He suggests that the situation has deep roots in Indian culture and tradition.

I disagree. Creativity can and does exist in a society that values decorum over irreverence, such as India. In fact, a healthy skepticism, an ability to be introspective, and an urge to revisit and reexamine existing ideas have always been part of India's intellectual tradition. Take, for example, literary works known as bhashyas, which are commen-

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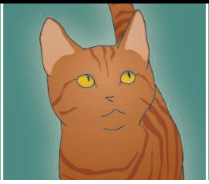
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taries or interpretations of classical works. Bhashyas contain interpretations from opposing perspectives by different commentators. The body of work, collectively known as Upanishads, is considered by many to be a collaborative exploration of knowledge 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.

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.

Archaeology Augments Tibet's Genetic History––Response

Xin Yi, Yu Liang, Emilia Huerta-Sanchez, Xin Jin, Zha Xi Ping Cuo, John E. Pool, Xun Xu, Hui Jiang, Nicolas Vinckenbosch, Thorfinn Sand Korneliussen, Hancheng Zheng, Tao Liu, Weiming He, Kui Li, Ruibang Luo, Xifang Nie, Honglong Wu, Meiru Zhao, Hongzhi Cao, Jing Zou, Ying Shan, Shuzheng Li, Qi Yang, Asan, Peixiang Ni, Geng Tian, Junming Xu, Xiao Liu, Tao Jiang, Renhua Wu, Guangyu Zhou, Meifang Tang, Junjie Qin, Tong Wang, Shuijian Feng, Guohong Li, Huasang, Jiangbai Luosang, Wei Wang, Fang Chen, Yading Wang, Xiaoguang Zheng, Zhuo Li, Zhuoma Bianba, Ge Yang, Xinping Wang, Shuhui Tang, Guoyi Gao, Yong Chen, Zhen Luo, Lamu Gusang, Zheng Cao, Qinghui Zhang, Weihan Ouyang, Xiaoli Ren, Huiqing Liang, Huisong Zheng, Yebo Huang, Jingxiang Li, Lars Bolund, Karsten Kristiansen, Yingrui Li, Yong Zhang, Xiuqing Zhang, Ruiqiang Li, Songgang Li, Huanming Yang, Rasmus Nielsen, Jun Wang and Jian Wang (September 16, 2010)

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