LETTERS

Edited by **Jennifer Sills**

Hot genome leaves natural histories cold

ON 3 JUNE, the Avian Phylogenomics Consortium announced an ambitious plan to generate draft genome sequences for about 10,500 extant bird species over the next 5 years (*1*). This news has excited global ornithologists and evolutionary biologists, who long to understand how avian phylogeny, morphology, life history, ecology, behavior, and physiology have been shaped over the past billion years.

In contrast, species' natural history information—the crucial phenotypes for interpreting the patterns of genome sequences—is still poor in birds. Clutch size as a basic demographic parameter remains unknown for 50% of the 10,500 bird species on the list to be sequenced (*2*), in spite of at least 150 years of naturalists' efforts. Knowledge gaps are even bigger for other aspects of the species' natural history. Fewer than 270 species have been evaluated for genetic mating systems (*3*) and fewer than 80 species for metabolic rates in the wild (*4*). We are unlikely to learn these phenotypic data in the next 5 years.

Why is natural history research, in contrast to genomics, left out in the cold? One reason is likely the currently prevailing academic evaluation system. The fact that time-consuming natural history studies have few opportunities to get published in high–impact factor journals forces many ornithologists to turn to molecular-based studies, especially sequencing genomes (*5*). Another reason could be that many young people are losing their passion to work in such exciting places as the Tibetan plateau and Amazon rainforests due largely to an increasingly urbanized and digitalized lifestyle.

It is time to make an effort to collect species' natural history information, both to make sense of the ever-booming genome sequencing projects and to enrich human's knowledge about nature.

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Documenting rare disease data in China

RARE DISEASES HAVE benefited from increasing public awareness in China. The upcoming establishment of a Rare Diseases Prevention and Treatment Law (*1*) and the foundation of the Chinese Organization for Rare Disorders (CORD) have promoted the development of rare-disease management. However, for most rare diseases, our understanding of their etiology and pathogenesis is poor, and few effective treatment methods exist.

Many Western countries are aware of the importance of rare-disease data and have made substantial efforts to promote data sharing and consolidated data collection for rare diseases, such as the Canadian Organization for Rare Disorders and the European Reference Networks (*2*). By contrast, there is still no similar public database or cooperative platform being developed in China, although this country supports relatively abundant patient resources. Undoubtedly, this is a huge loss for rare disease research, not only in China but also worldwide.

With support from local regulatory bodies and the Ministry of Science and Technology of China Grants (973 program, 2015CB964600), a pilot project aimed at conducting clinical and translational research on congenital cataracts, Childhood Cataract Program of the Chinese Ministry of Health (CCPMOH), is being conducted at Zhongshan Ophthalmic Center, Sun Yat-sen University in Guangzhou, one of China's largest eye care facilities. Since 2011, we have included clinical data for over 1300 patients in our clinical database [the largest clinical database of congenital cataracts registered at www.clinicaltrials.gov (NCT01417819)], containing information on the entire treatment process and the follow-up records. In addition, more than 200 bio-specimens from pediatric patients have been collected and stored in our bio-bank, which can be used for future biological research.

Efforts made by a single center or an independent team are clearly insufficient. Changing this situation in China will be a win-win both for doctors and their patients with rare diseases. We hope that this model, along with those of Canada and Europe, will serve as a guide for policy-makers working to promote easier access to data exchange and integration and to construct a nationwide data-sharing platform in China.

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The *Pipra fasciicauda* is among the many bird species with unknown natural histories.

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Acknowledging AI's dark side

THE 17 JULY special section on Artificial Intelligence (AI) (p. 248), although replete with solid information and ethical concern, was biased toward optimism about the technology.

The articles concentrated on the roles that the military and government play in "advancing" AI, but did not include the opinions of any

political scientists or technology policy scholars trained to think about the unintended (and negative) consequences of governmental steering of technology. The interview with Stuart Russell touches on these concerns ("Fears of an AI pioneer," J. Bohannon, News, p. 252), but as a computer scientist, his solutions focus on improved training. Yet even the best training will not protect against market or military incentives to stay ahead of competitors.

Likewise double-edged was M. I. Jordan and T. M. Mitchell's desire "that society begin now to consider how to maximize" the benefits of AI as a transformative technology ("Machine learning: Trends, perspectives, and prospects," Reviews, p. 255). Given the grievous shortcomings of national governance and the even weaker capacities of the international system, it is dangerous to invest heavily in AI without political processes in place that allow those who support and oppose the technology to engage in a fair debate.

The section implied that we are all engaged in a common endeavor, when in fact AI is dominated by a relative handful of mostly male, mostly white and east Asian, mostly young, mostly affluent, highly educated technoscientists and entrepreneurs and their affluent customers. A majority of humanity is on the outside looking in, and it is past time for those working on AI to be frank about it.

The rhetoric was also loaded with positive terms. AI presents a risk of real harm, and any serious analysis of its potential future would do well to unflinchingly acknowledge that fact.

The question posed in the collection's introduction—"How will we ensure that the rise of the machines is entirely under human control?" ("Rise of the machines," J. Stajic *et al.*, p. 248)—is the wrong question to ask. There are no institutions adequate to "ensure" it. There are no procedures by which all humans can take part in the decision process. The more important question is this: Should we slow the pace of AI research and applications until a majority of people, representing the world's diversity, can play a meaningful role in the deliberations? Until that question is part of the debate, there is no debate worth having.

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TECHNICAL COMMENT ABSTRACTS

Comment on "Glacial cycles drive variations in the production of oceanic crust"

John A. Goff

Crowley *et al.* (Reports, 13 March 2015, p. 1237) propose that abyssal hill topography can be generated by variations in volcanism at mid-ocean ridges modulated by Milankovitch cycle–driven changes in sea level. Published values for abyssal hill characteristic widths versus spreading rate do not generally support this hypothesis. I argue that abyssal hills are primarily fault-generated rather than volcanically generated features.

Full text at http://dx.doi.org/10.1126/science.aab2350

Response to Comment on "Glacial cycles drive variations in the production of oceanic crust"

John W. Crowley, Richard F. Katz, Peter Huybers, Charles H. Langmuir, Sung-Hyun Park

Goff comments that faulting is important for creation of abyssal hills and is the dominant process at slow-spreading ridges. We respond that faulting is indeed important but cannot alone explain the bathymetric signal predicted by our models and observed at the Australian-Antarctic Ridge. We show that for intermediate- to fast-spreading ridges, abyssal hill spacing is consistent with the periodicity of the obliquity cycle.

Full text at http://dx.doi.org/10.1126/science.aab3497