

LETTERS

edited by Jennifer Sills

Assessing Chemical Risk: Societies Offer Expertise

THE EFFECT OF ENVIRONMENTAL EXPOSURES ON HUMAN HEALTH IS A GROWING AREA OF concern. The number of new chemicals is increasing exponentially, with approximately 12,000 new substances added daily to the American Chemical Society's CAS registry (1). Although only a portion of these chemicals are introduced into the environment, data on the hazard posed by even high-production volume (HPV) chemicals (those with a production volume exceeding 1000 tons/year) are available for only a fraction of the HPV chemicals produced or imported



Human health. The effects of exposure to chemicals in food, air, water, and other products remain unclear.

into the United States. Currently, the EPA and FDA are charged with safeguarding the health of Americans. This is a daunting task that is hampered by the growing recognition that currently accepted testing paradigms and government review practices are inadequate for chemicals with hormone-like actions.

The need for swifter and sounder testing and review procedures cannot be overstated. Recent scientific evidence has established direct links between exposures that occur during fetal development and adult disease [e.g., (2, 3)]. Data from the U.S. Centers for Disease Control and Prevention have established clearly that most, if not virtually all Americans, are exposed to con-

taminants in the environment that cause serious health effects in animal models [e.g., (4, 5)]. Direct links to humans remain uncertain, but there is sufficient experimental evidence to raise concern. Furthermore, there is growing evidence that some chemicals once thought to be safe and allowed into common and, in some cases, abundant commercial use may not be as benign as previously assumed (4, 5).

Although chemical testing and risk assessment have long been the domain of toxicologists, it is clear that the development of improved testing guidelines and better methods of assessing risks posed by common chemicals to which all Americans are exposed requires the expertise of a broad range of scientific and clinical disciplines. Collectively, our societies represent approximately 40,000 research scientists and clinicians. The membership of our societies represents leaders in the fields of reproductive biology, endocrinology, reproductive medicine, genetics, and developmental biology. As concerned scientists and clinicians, we are writing to offer the expertise of our collective societies. Specifically, we offer the expertise of the Boards of Directors for our societies for the purpose of naming appropriate individuals to serve on panels to review and evaluate current programs for effectiveness, to assess the risk of specific chemicals through the evaluation of data, and to develop new testing guidelines and protocols.

We recognize that the FDA and EPA face challenges on many fronts, and we believe that the vast expertise available through the members of our societies can aid both agencies in achiev-

ing their goals. Thus, we ask that you use our scientific boards to provide access to leading scientists in diverse fields. These experts can help ensure that the most up-to-date scientific methodology and scientific understanding are used when devising and refining regulatory guidelines, and when reviewing scientific data pertinent to risk assessment and risk management decisions.

**THE AMERICAN SOCIETY OF HUMAN GENETICS,
THE AMERICAN SOCIETY FOR REPRODUCTIVE
MEDICINE, THE ENDOCRINE SOCIETY,
THE GENETICS SOCIETY OF AMERICA,
THE SOCIETY FOR DEVELOPMENTAL BIOLOGY,
THE SOCIETY FOR PEDIATRIC UROLOGY,
THE SOCIETY FOR THE STUDY OF REPRODUCTION,
THE SOCIETY FOR GYNECOLOGIC INVESTIGATION**

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References

1. CAS Registry (www.cas.org/expertise/cascontent/registry/regsys.html).
2. M. J. Warner, S. E. Ozanne, *Biochem. J.* **427**, 333 (2010).
3. J. M. Swanson, S. Entringer, C. Buss, P. D. Wadhwa, *Semin. Reprod. Med.* **27**, 391 (2009).
4. T. J. Woodruff, A. R. Zota, J. M. Schwartz, *Environ. Health Perspect.*, 10.1289/ehp.10027272011 (2011).
5. Department of Health and Human Services, Centers for Disease Control and Prevention, "Fourth national report on human exposure to environmental chemicals" (CDC, Atlanta, GA, 2009); www.cdc.gov/exposurereport/pdf/FourthReport.pdf.

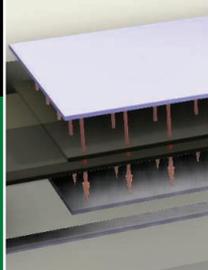
A Defense of the Primitive Cheetah Skull

IN THE NEWS FOCUS STORY "ALTERING the past: China's faked fossils problem" (R. Stone, 24 December 2010, p. 1740), Tao Deng of the Institute of Vertebrate Paleontology and Paleoanthropology in Beijing claimed that the cranium of a primitive cheetah (*Acinonyx kurteni*) that we described in 2009 (1) was "a fake" and that our conclusions were "based on a fossil forgery." These serious allegations were presented without tangible evidence. They were based not on personal study of the specimen,



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layer by layer

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but on a few images in our study. It is true that the occipital area and zygomatic arches have been heavily restored in plaster, probably to make it appear more complete, thus enhancing its commercial value, a common malpractice among Chinese fossil dealers. We indicated this in our study. This does not impinge on *A. kurteni*'s status as a primitive cheetah; the cranium and dentition present a plethora of cheetah apomorphies, conclusively proving its membership of the cheetah lineage, but also several primitive traits hitherto unknown for cheetahs. The occipital area and zygomatic arches have none of these apomorphies. Deng claims that "the skull is a composite"—i.e., a chimera. In our original study, we found no evidence of this.

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Reference

1. P. Christiansen, J. H. Mazák, *Proc. Natl. Acad. Sci. U.S.A.* **106**, 512 (2009).

Response

WE ARE PLEASED TO SEE THAT MAZÁK AND Christiansen note that the occipital area and zygomatic arches of the cheetah skull (1) have been heavily restored in plaster, as we claimed in the News Focus story. We stand by our view that the skull is a composite with fabricated features.

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Reference

1. P. Christiansen, J. H. Mazák, *Proc. Natl. Acad. Sci. U.S.A.* **106**, 512 (2009).

Letters to the Editor

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Habitats at Risk: A Step Forward, a Step Back

TROPICAL FORESTS AND CORAL REEFS ARE well known as bastions of biodiversity, and Southeast Asia contains large areas of both. However, these habitats are threatened not only by human activity but also by climate-induced increases in sea temperatures and drought severity (1, 2). The steps we take to mitigate further degradation may be essential to saving these imperiled habitats. Here, we contrast positive steps taken by Thailand with insufficient action by Indonesia and the possible results of each course of action.

Sharp increases in sea temperature recently triggered widespread coral bleaching in reefs along the entire western length of the Malay Peninsula, from the tip of Sumatra to Myanmar (3). In response, the Thailand government closed several popular dive sites spread across seven Marine National Parks in an attempt to prevent damage by tourists (4), despite the risk of immediate losses to the tourism industry. Coral reefs may be particularly vulnerable to human disturbance during bleaching events (5), and Thailand's decision to take action may ultimately save this valuable natural resource. Bleaching events in the region are expected to become more common in the future (6), and preventative measures like the one implemented by Thailand will be crucial to ensure the survival of this endangered habitat.

Recent forest fire episodes in the region can also be partially attributed to climate change. Increased frequency of El Niño events and associated droughts in Southeast Asia have led to increased frequency of fires that destroy millions of hectares of tropical forests and peat swamps, particularly in Indonesia (7). These fires also produce large amounts of smoke that pollute the surrounding region, causing billions of dollars worth of losses in agriculture, timber, and tourism industries and contributing to

serious health problems (8). In the extreme 1997 El Niño year, fires from Indonesia produced the equivalent of 13 to 40% of mean annual global carbon emissions from fossil fuels (9); these enormous carbon discharges make Indonesia the world's third largest producer of greenhouse gases (10). Despite these threats, the Indonesian government's attempts to prevent these fires and the resulting smoke have been largely ineffective. As recently as October 2010, smoke blanketed the region, producing the worst haze in the region in 4 years (11).

Thailand's protective response to the latest coral bleaching event should serve as a model for other countries in the region and beyond. In contrast, Indonesia should work more actively to alleviate the increasing fire hazards in its forests and peat swamps. Some immediate steps that Indonesia could take include providing financial incentives to local communities to limit burning [e.g., through the United Nation's Reducing Emissions from Deforestation and Forest Degradation Programme (12)], providing alternative methods to clear land without using fire, and ratifying the Association for Southeast Asian Nations (ASEAN) Agreement on Transboundary Haze Pollution to engage neighboring countries and develop strict limits on the use of fire and joint plans to combat large fires (8). Climate change mitigation efforts have been far from satisfactory across the tropics, and Thailand's efforts should inspire others.

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References

1. N. S. Sodhi et al., *Biodivers. Conserv.* **19**, 317 (2010).
2. B. Riegl, A. Bruckner, S. L. Coles, P. Renaud, R. E. Dodge, *Ann. N.Y. Acad. Sci.* **1162**, 136 (2009).
3. J. Skulpichetrat, "Thailand closes dive sites to halt damage to reefs," *Reuters*, 20 January 2011; www.reuters.com/article/idUSLNE70J02220110120.
4. A. Wipatayotin, C. Chinmaneevong, "18 dive sites closed to save coral reefs," *Bangkok Post*, 21 January 2011; www.bangkokpost.com/news/local/217417/18-dive-sites-closed-to-save-coral-reefs.
5. E. H. Meesters, R. P. M. Bak, *Mar. Ecol. Prog. Ser.* **96**, 189 (1993).
6. E. Vivekanandan, M. Hussain Ali, B. Jasper, M. Rajagopalan, *Curr. Sci. India* **97**, 1654 (2000).
7. G. R. van der Werf et al., *Proc. Natl. Acad. Sci. U.S.A.* **105**, 20350 (2008).
8. D. J. Lohman, D. Bickford, N. S. Sodhi, *Science* **316**, 376 (2007).
9. S. E. Page et al., *Nature* **420**, 61 (2002).
10. "Indonesia's Greenhouse Gas Abatement Cost Curve" (Dewan Nasional Perubahan Iklim, Indonesia, 2010).
11. N. Wong-Anan, "Worst haze from Indonesia in 4 years hits neighbors hard," *Reuters*, 21 October 2010; www.reuters.com/article/idUSTRE69K1WF20101021.
12. UN-REDD Programme (www.un-redd.org).