Martin Sarter
John P. Bruno
Department of Psychology, Ohio State University, Columbus, OH 43210, USA
E-mail: msarter@magnus.acs.ohio-state.edu

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Olfactory "Consciousness"?

The explosion of molecular biological research in the main olfactory and vomeronasal systems, as described in the Nota Bene "Unconscious odors" by Pamela J. Hines (3 Oct., p. 79) has contributed insight into how these systems may function. However, the setting up of a strict dichotomy between pheromones that are detected through the vomeronasal organ (VNO) and other odorants that are detected by way of the main olfactory system (*1*, *2*) has led to the assumption that gene families expressed in the VNO encode pheromone receptors. The accessory olfactory system plays an important role in social communication, but both systems are responsive to pheromones and to other odorants. Garter snakes use the VNO to detect both aggregation pheromones and prey odors (nonpheromones) (*3*). Hamsters can use the main olfactory system to detect pheromones (*4*) and the VNO to recognize the odors of other individuals (*5*). Labeling gene products "pheromone receptors" on the basis of presence in the VNO is therefore premature. Their function remains to be tested.

The suggestion that animals are conscious of "garden-variety" odorants, while pheromones are detected unconsciously remains to be verified (*1*). There is not, to my knowledge, any experimental finding that indicates these animals are "conscious" of some stimuli and unconscious of others, even though they may elicit a behavioral response. Do garter snakes consciously perceive the chemical they use to trail prey, but not those they use to find and aggregate with conspecifics? How do we measure consciousness in any animal? If an animal can use an odorant in an operant task to obtain an unrelated reward, is it conscious of that stimulus? If so, then domestic pigs are conscious of the odor of androstenone, which is a pheromone in that species (*6*).

Kathleen M. Dorries
Department of Neuroscience, Tufts University School of Medicine, Boston, MA 02111, USA
E-mail: kdorries@opal.tufts.edu

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Sexual Selection in Asian Elephants

In an article by Pallava Bagla (Research News, 27 June, p. 1972), a negative correlation between tusk length and parasite numbers in Asian elephant males (*1*) is reported, potentially another example of William Hamilton's theory that secondary sexual characteristics may be indicative of parasite levels (*2*). However, it remains an "unanswered question . . . whether longer tusks really do attract females." We (*3*) investigated the occurrence of tusk-bearing males (tuskers) and males without any tusks (maknas) in Asian elephant populations in a stochastic population simulation based on available data for the last 2000 years in Sri Lanka (with a decrease in tusker frequency from about 90% to about 10%) and in South India (stable tusker frequency of about 90%). The model predicts that, in the framework of preferential human impact on tuskers, the tusk character could only survive if sexual selection were to occur in favor of tuskers. The best fit to census data was achieved if tuskers were 1.4 to 1.5 times more likely than maknas to be chosen by a female. Among tuskers, which differ from one another only by tusk length, the differences in attraction to females might be even smaller. Thus, determining whether sexual selection is based on an elephant's tusk character may not be possible in field studies of Asian elephants, as large sample sizes are difficult to obtain.

Ralph Tiedemann
Department of Molecular Biology,
Free University of Brussels,
B-1050 Brussels, Belgium
E-mail: rtiedemann@ifh.uni-kiel.de

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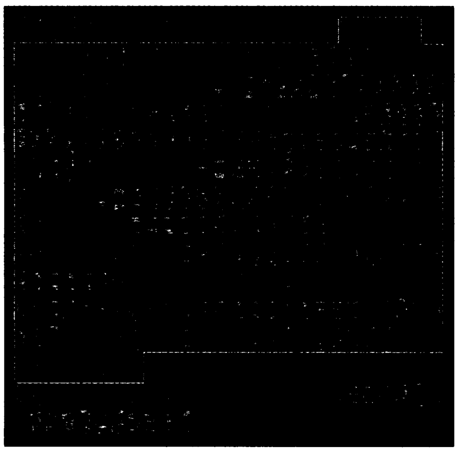
Corrections and Clarifications

The name of the geneticist at the University of Washington, Seattle, cited in Eliot Marshall's article "Whose DNA is it, anyway?" (News & Comment, 24 Oct., p. 564) was incorrect; the name should have been Gerard Schellenberg.

In the Table of Contents for the issue of 12 September (p. 1579), the name of H. Tiedemann, author of the technical comment "'Killer' impacts and life's origin" (p. 1687), was misspelled.

The incorrect photograph was published with "Massively parallel genomics" by Stephen P. A. Fodor (TECH.SIGHT, 18 July, p. 393). The correct photograph appears below.



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