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References and Notes
1. Information on the Protocol to the Biological and Toxin Weapons Convention is available at http://www.brad.ac.uk/acad/sbtwcl
2. UNSCOM report S/1999/94 on status of disarmament and monitoring of Iraq's proscribed weapons, 29 January 1999, available at http://www.un.org/depts/unscom/s99-94.htm

First Words

THIS REJOINDER COULD BE TITLED, "GET cause before effect." The Random Samples item "Walk before you talk" (29 Jun., p. 2429) briefly describes the work of Robert Provine, a developmental neuroscientist at the University of Maryland, Baltimore County, who has concluded that bipedality, which allowed "the redirection of breathing in the service of soundmaking," is "the key event in human evolution necessary for the emergence of speech." This conclusion, however, is eminently disputable.

Out of the mouths of...dogs?

First, what payoff that has anything to do with breathing for speech could have changed quadrapeds into bipeds when even the precursors to speech had not yet evolved? More to the point, most if not all quadrapedal animals make sounds. To invoke bipedality as "the key event in human evolution necessary for the emergence of speech" misses the pivotal point for evolution of speech.

If such "key events" were the case, consider a recording I made of Mr. Lucky, a Boston terrier, howling, in his quadrapedal stance, "I want my momma!" I played this recording for four decades to students of phonetics and speech physiology. Some thought it was a cerebral-palsied child. Not one suspected it was an animal, such as a parrot, let alone a dog. His owner was an elderly woman who unintentionally did what a mother teaching her child speech would do. She discovered her accomplishment when she left Mr. Lucky in her backyard while shopping. When she returned, her neighbor told her that someone had been calling for her. It was her dog. Why didn't Mr. Lucky, with his head start, develop speech? He did learn several other phrases by rote conditioning; none, however, were cognitive expressions of an idea.

My nomination for the key evolutionary event that opened the door to speech would not be soundmaking ability. After all, sign language does not require sounds, and of the almost 300 sounds used in all various languages, no language uses more than a small fraction. The key element has to be the cognitive capacity to linguistically convert thoughts into speech. What event could lead evolution in this direction? Probably the discovery that abstract sounds can symbolize objects and conditions. In sum, events and facts require a theory in which they are pivotal in a causal explanation before they can be tested for importance, let alone key importance.

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Effects of Lead Exposure

THE RANDOM SAMPLES ITEM "NO BENEFIT from lowering lead" (25 May, p. 1483) and a paper by Rogan *et al.* in *The New England Journal of Medicine* (*1*) that is the topic of discussion both start by saying that low levels of lead exposure cause cognitive deficits and other developmental problems.

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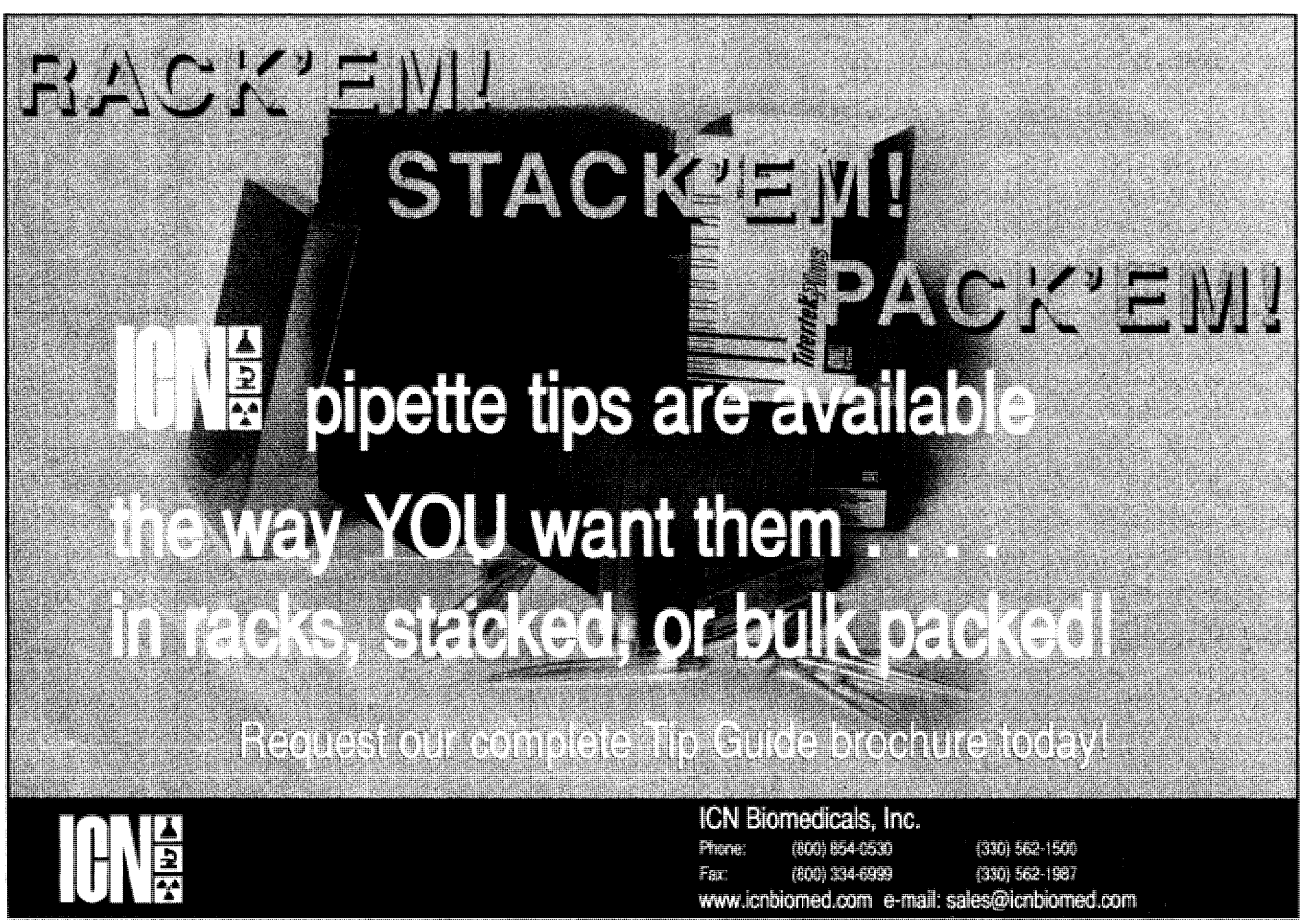

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