A defense must be better than 99% effective (99% still could allow 100 Soviet nuclear bombs to destroy 100 American cities), whereas an offense is catastrophically devastating if it is only a few percent effective.

8) Can we expect the Soviets to bargain away their offensive missiles while we retain and continue to add first-strike missiles and build a shield from behind which to launch them?

9) The SDI systems now being sought, if even partially successful, would be of greatest threat to existing and future satellites and thus to the SDI's own systems in space. SDI sows the seeds of its own destruction.

10) Rather than slow or stop the arms race, SDI will create a whole new defensive arms race layered upon a renewed and accelerated offensive arms race. Technology development never ceases; it is open-ended. Continuous development of sophisticated defensive technology will be followed by even more sophisticated offensive technology, followed by . . . ad nauseum, ad holocaust.

SDI could end up costing us far more than merely our money and resources.

JOEL SELBIN
*Department of Chemistry,*
*Louisiana State University,*
*Baton Rouge, LA 70803-1804*

## Bipedal Locomotion

James O. Farlow (Letters, 17 Apr., p. 243) discusses the parallel evolution of bipedal locomotion and chastises anthropologists for not looking to other taxa as models for the evolution of human locomotion. Students of paleoanthropology, however, have good reason not to be preoccupied with modeling the locomotion of humans after that of theropod dinosaurs or kangaroos, since the three forms of bipedal locomotion share few features aside from a common adjective.

The development of a two-legged gait in dinosaurs was channeled by the constraints of a reptilian vertebral column flexible mediolaterally, combined with relatively rigid pelvic and shoulder girdles. A bipedal stride would likely involve a forward movement of both limbs on the striding side simultaneously, or keeping the upper body immobile, to produce a lurching or waddling stride. Nonprimate mammals, with backbones more flexible dorsoventrally, move as bipeds (exemplified by the kangaroo) with both anterior limbs moving together and both posterior limbs moving together—a hop. Both groups maintain balance with the aid of a large tail. Humans, generated from an arboreal lineage marked by flexibility of the hip and particularly of the shoulder, stride with the opposing forelimb forward. Balance is achieved in the absence of a tail through rotations of the thorax and pelvis in opposite directions (*1*).

As is usually the case in parallel and convergent evolution, the similarities among the three groups are superficial, which makes it unlikely that the evolution of hominid locomotion could be modeled effectively by recourse to other groups.

Anthropologists have realized that the uniquely derived locomotor features of the different taxa serve as effective contrasts to one another. Hooton, in both editions of *Up from the Ape* (*2*), figured the skeleton of a kangaroo in this regard. Howells, in *Mankind in the Making* (*3*), also gave a cursory contrast among the bipedal groups. A more recent review of hominid locomotion includes a photograph of one of the authors actually locomoting alongside a kangaroo (*4*).

Further, hominid bipedalism, although it is the biological hallmark of our clade, is nevertheless a learned behavior, and there is no evidence that this is the case in other taxa. Major studies therefore assume that the distinctness of human locomotion does not require further belaboring (*5*). Indeed, it does appear to be the case that, as Farlow puts it, "the shift from quadrupedalism to bipedalism is fundamentally different from one vertebrate group to the next," mechanically, historically, and developmentally. The emergence of these derived locomotor features across taxa is no more amenable to a singular explanation than is the parallel loss of an *os baculum* in spider monkeys, tarsiers, and humans (*6*); reduction of the tail in pottos, hominoids, and Manx cats; or the loss of teeth in birds, baleen whales, and hockey players.

It is possible, finally, that the problem perceived by Farlow is the result of a terminological laxity: while "bipedalism" is not uniquely human, "walking" (as biomechanically defined) is (*7*); and that is the focus of the anthropological investigations reported by Lewin (Research News, 27 Feb., p. 969).

JON MARKS
*Department of Anthropology,*
*Yale University,*
*New Haven, CT 06520*

REFERENCES AND NOTES

1. J. Maynard Smith, *The Theory of Evolution* (Penguin, Baltimore, ed. 2, 1966), p. 266; B. Newman, *Biol. J. Linn. Soc.* **2**, 119 (1970).
2. E. A. Hooton, *Up from the Ape* (Macmillan, New York, ed. 1, 1931; *ibid.*, ed. 2, 1946).
3. W. W. Howells, *Mankind in the Making* (Doubleday, New York, 1967) [see also B. Campbell, *Human Evolution* (Aldine, New York, ed. 3, 1985) and J. Buettner-Janusch, *Origins of Man* (Wiley, New York, 1966), p. 310].
4. A. Zihlman and L. Brunker, *Yearb. Phys. Anthropol.* **22**, 132 (1979).
5. J. Napier, *Sci. Am.* **216**, 56 (April 1967); J. T. Robinson, *Early Hominid Posture and Locomotion* (Univ. of Chicago Press, Chicago, 1972); H. McHenry and L.Temerin, *Yearb. Phys. Anthropol.* **22**, 105 (1979); S. Kondo, Ed., *Primate Morphophysiology: Locomotor Analyses and Human Bipedalism* (Univ. of Tokyo Press, Tokyo, 1985).
6. P. Hershkovitz, *Living New World Monkeys*, vol. 1, *Platyrrhini* (Univ. of Chicago Press, Chicago, 1977), p. 118.
7. J. Charteris *et al.*, *J. Anat.* **128**, 803 (1979).

## Immigrant Entrepreneurs

The article on the economic impact of immigration by George J. Borjas and Marta Tienda (6 Feb., p. 645) omits mention of one very important factor—entrepreneurship. The authors discuss the impact of immigration as a matter of competition for jobs. This conventional approach does not acknowledge that immigrants are creating jobs for themselves and others through entrepreneurial pursuits. Such an omission has serious policy implications. To the extent that the problem is viewed as a static jobs allocation issue rather than a dynamic jobs creation issue, some credibility is lent to a familiar congressional reaction to immigration: *They* are stealing jobs from *our* people. Any such implication is unjustified and unfortunate because, clearly, it is not the position of the authors nor is it one implied by their results.

Evidence from my own studies (*1*) of minority and ethnic entrepreneurship complements that in the article. Statistical analysis of microdata from the 1980 Public Use Sample shows that the odds of someone being self-employed increase significantly if the individual has immigrant characteristics. It is high time that labor economists take account of entrepreneurship in their methodology and also recognize that immigrant groups have revitalized many previously run-down urban areas, for instance, the Cubans in Miami and the Koreans in Los Angeles.

PETER BEARSE
*Development Strategies Corporation,*
*Post Office Box 603,*
*Trenton, NJ 08611*

REFERENCES

1. P. Bearse and P. Johnson, *A Comparative Analysis of Minority and Ethnic Entrepreneurship in the U.S. as of 1980* (Office of Research, Minority Business Development Agency, Department of Commerce, Washington, DC, 1986).

*Erratum*: In the letter "Tanker 'dumping' regulations" by T. S. Wyman (5 June, p. 1160), the years of amendations to the International Convention for the Prevention of Pollution from Ships, 1973, mentioned in the second paragraph, were incorrect. The amendations were made in 1978, 1984, and 1985 (not 1987).