A physicist writes to say that the Alpha Magnetic Spectrometer experiment "was reviewed...by a panel of distinguished...physicists, who strongly endorsed its scientific merit." A top World Bank ecologist answers Kenya Wildlife System's head, David Western, saying that she "never called for the [KWS] to stop all spending outside the parks," but that she thinks the KWS "needs to...prioritize its activities." A "scientific creationist" objects to a description of what he said during a debate: "I did not say...that 'evolution cannot explain embryology.'" And whether "acorn production [is] the major determinant of tick density" is debated.

The Alpha Magnetic Spectrometer

In the 19 June ScienceScope (p. 1825), it is reported that "some experts" think the Alpha Magnetic Spectrometer (AMS) experiment did not undergo "proper peer review."

The AMS experiment was flown by NASA as a Department of Energy (DOE) payload under a long-standing NASA/DOE agreement about the use of the space shuttle and the space station. DOE was responsible for all aspects of payload preparation, including peer review of the experiment and funding of the U.S. share of AMS construction. AMS was reviewed for DOE by a panel of distinguished particle physicists and space physicists who strongly endorsed its scientific merit. Only after this step and the demonstration of the technical feasibility of the project did NASA schedule the mission. This type of arrangement between NASA and another agency is not unique. NASA has also flown payloads for the European Space Agency with a similar division of responsibility.

I believe the community appreciates the progress that has already been made on this challenging project and looks forward to the data that will come from its stay on the space station.

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Kenyan Wildlife Conservation

I wish to correct the misimpression created by David Western's letter (5 June, p. 1507) regarding my views and statements about community-based conservation (CBC). Contrary to his statement, I have never called for the Kenya Wildlife Service (KWS) to stop all spending outside the parks, and I am fully aware that the Protected Area and Wildlife System (PAWS) project was not meant to support only in-park activities. In fact, my role on the World Bank's PAWS project appraisal team in 1992 was to evaluate and help shape the proposed "community wildlife" component of the program. My concern, as I explained to Michael McRae, author of the *Science* article (News & Comment, 24 Apr., p. 510), is that KWS is spending more than it can afford on community development activities outside parks (much of it on basic social welfare projects), with questionable conservation impacts. This has become particularly problematic as KWS is in the midst of a serious cash crisis, unable to meet its most basic recurrent costs, such as staff salaries.

M. MCRAE

Kenyan elephant-tracking project.

Similarly, the implication that Richard Leakey was indifferent to community and "outside park" issues during his tenure is incorrect. In fact, the "Community Wildlife Program" and several of the most promising community-based projects were initiated by KWS under Leakey's leadership. While he did at one point suggest that all the parks should be fenced as a way of tackling human-wildlife conflict, this was never an "initiative" or even a serious proposal, and never became KWS policy or practice. In reality, a clear distinction has always been made between "hard-edged parks," where fencing in the wildlife is ecologically justifiable and the only realistic solution (and where the World Bank and other donors have consequently supported it), versus "soft-edged parks" where animals must be free to disperse or migrate beyond the park boundaries.

Regarding CBC more generally, Western and other commentators (Letters, 5 June, p. 1510) assert that this approach has been highly successful in Kenya and elsewhere, but offer no real evidence that this is the case. Western's statement that "[m]ore than 30 community reserves have been drawn up" (not actually established) cannot be evaluated without information about what this means in terms of specific changes in land use or other activities significant to conservation objectives. Endorsements of the CBC approach abound in the literature, but what is generally lacking, not least for CBC projects being supported by KWS, is independent data demonstrating conservation benefits being achieved by these projects, such as monitorable changes in species richness, population densities, or habitat quality. In my experience, where data do exist to show impacts such as reductions in poaching or encroachment on protected areas, it is hard to argue that these result from community development activities rather than from the improved enforcement measures that these projects also support. Social welfare projects and similar benefits can help bring people to accept and even cooperate with such measures, but the enforcement continues to be an essential element, particularly in projects involving protected areas and species. There is also the issue of sustainability, as the CBC activities supported by KWS (and many others) tend to be highly dependent on external funding, and any goodwill that has been generated by them is likely to evaporate if the funding stops. All in all, I must endorse an observation in the World Bank's forthcoming study of Integrated Conservation and Development Projects (ICDPs) in Indonesia, that is, that the ICDP/CBC concept has moved rapidly from an untested hypothesis to being regarded as "best practice," but without having demonstrated a significant measure of success. Speaking as someone who is involved in decisions on funding for biodiversity conservation, the practical and other limitations of a purely protectionist/exclusionary approach are clear, particularly as protected areas are traditionally underfunded and many are too small to sustain critical biodiversity resources. However, the CBC approach also has its limitations, and successful conservation strategies will have to incorporate a variety of approaches

Finally, I agree with Western that, contrary to our initial expectations (when the World Bank and other donors agreed to finance the PAWS program), it is unrealistic to expect KWS to be fully financially self-sufficient as long as it continues to carry out its current scope and scale of non-revenue–earning activities. Having rejected self-sufficiency as a goal, however, KWS needs to establish and pursue alternative financial targets and to prioritize its activities,

given that ultimately it has no option but to operate within the limits of the funds it is able to obtain from all possible sources. Therefore, KWS needs to take a hard look at how much it should spend on each of its activities, including CBC, and what it gets in return. While there is certainly important biodiversity and critical habitat to be conserved outside the parks, park entry fees currently provide about 95% of KWS's revenues. It is a basic principle of business (and common sense) first and foremost to protect your main source of income. Not only the World Bank, but all the international donors supporting KWS, have repeatedly expressed concern over these issues and pressed KWS to come to grips with these realities.

I hope that the recently designed "minimum viable conservation network" cited by Western is a positive step in that direction, although I have not yet seen any discussion of its financial implications. KWS is entrusted with the care of an enormously valuable national and international heritage. While Western claims that its current strategies and activities were developed with a high degree of consultation and participation among stakeholders countrywide, there are many important and knowledgeable stakeholders who feel otherwise and who believe that KWS is going seriously off track.

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Embryology and Evolution

M. K. Richardson *et al.*, the authors of a study (*1*) demonstrating fraud (E. Pennisi, Research News, 5 Sept. 1997, p. 1435) by 19th-century embryologist Ernst Haeckel have objected (Letters, 15 May, p. 983) that their work was "used in a nationally televised debate to attack evolutionary theory, and to suggest that evolution cannot explain embryology." As the debate participant who discussed Haeckel, I believe their objections are unwarranted.

Richardson *et al.* write that "[d]ata from embryology are fully consistent with Darwinian evolution." Unfortunately, that is a negligible standard. The distinguished authors of a prominent textbook have strongly argued (*2*) that the early stages of embryogenesis should be highly conserved. as Haeckel pictured them. That idea, however, has now been shown to be incorrect (*1*). But if Darwinian theory is "fully consistent" with either conserved or variable embryogenesis, then it is consistent with virtually any scenario and makes no predictions concerning it. Contrary to Richardson *et al.*'s statement that "Haeckel was right to show increasing difference between species as they develop," the earliest stages of development are actually quite different across vertebrate species, and become increasingly similar toward the phylotypic stage (*3*). The "hourglass" pattern of development is a conundrum that is not predicted by Darwinism.

I did not say during the debate, as Richardson *et al.* write, that "evolution cannot explain embryology." Rather, I said, in effect, that for a century, Darwinism easily embraced a false description of a fundamental process and that the problem of development within evolution remains unsolved.

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3. R. Raff, *The Shape of Life* (Univ. of Chicago Press, Chicago, IL, 1996), pp. 192–197.