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LETTERS

Milk Safety

By reducing the bovine somatatropin (BST) controversy to one of milk safety alone, Daniel E. Koshland Jr. (Editorial, 1 Apr., p. 11) overlooks many of the issues that make this method for boosting milk production so troubling. His approach is symptomatic of a wider trend in biotechnology that considers one positive aspect of a problem as all-important while ignoring the negative consequences.

To be sure, milk safety *is* important. This is evident in the attempts by industry and government to reassure the public of the essential equivalence of milk from BST- and non-BST–treated animals. However, legitimate disagreement remains. Many drugs, some of them unauthorized, have been used to treat pathologies arising in cows kept in a state of hyperlactation by hormone injection (*1*). Because it is unclear whether these drugs are detectable in the milk supply with the use of accessible technologies, protection of the public from exposure is not assured. This is particularly relevant in view of the current decline in the effectiveness of many antibiotics that has resulted from overuse and overexposure. Concern has also been expressed over the effects of possible human exposure to IGF-1 (a hormonal "second messenger" released by the cow liver in response to BST) or other substances that could plausibly find their way into milk through changes in nutrient partitioning.

Closely related to milk safety is the problem of animal health. Milk production requires a period of catabolic stress during which tissues and molecules are broken down to provide precursors for milk synthesis. Because catabolic stress is associated with greater susceptibility to metabolic and infectious disorders, it should not be surprising that a hormonally enhanced catabolic period increases the incidence of conditions such as mastitis and infertility (*1*). In addition, some data suggest that other conditions unrelated to milk production may result from continued hormonal stimulation at high concentrations. Finally, caution has been raised about the interpretation of pooled data that underestimate the adverse effects of BST on individual herds or strains (*1*).

Another area of concern is the potential for economic displacement of small dairy operations secondary to the anticipated increase in milk supply and drop in price. Some argue that this would favor the consolidation of milk production in the hands of large dairies, thus contributing to the general decline in viability of small farms and rural communities (*2*). While such a trend may be economically expedient and even necessary in a competitive food market (*3*), it may not be consistent with the development of a truly sustainable agriculture.

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2. D. Campbell, in (*1*), pp. 190–193.
3. R. J. Kalter, in *Biotechnology and Sustainable Agriculture: Policy Alternatives*, J. F. MacDonald, Ed. (National Agricultural Biotechnology Council, Ithaca, NY, 1989), p. 277–316.

Koshland often uses Dr. Noitall to good effect to ridicule nonscientific views, but ridicule can backfire when it minimizes or misrepresents legitimate public concerns. This is the case with his editorial "A milk-free zone" about the use of BST to increase milk yields from dairy cows.

The editorial focuses on overblown public fears over "artificial" hormone residues in milk, but ignores substantial reasons for concern.

1) The use of BST has been linked to increased rates of udder infection in cows. Not only is this harmful to the cows, but it could lead to an increased use of antibiotics and increased residues of antibiotics in milk, exacerbating the growing public health problem of bacteria that are resistant to antibiotics.

2) There is no shortage of milk and no need to increase milk yields. Increasing milk production will only exacerbate the current oversupply and put increasing demands on federal dairy price support programs.

3) The use of BST further industrializes milk production, creating pressures that could drive more traditional dairy farmers out of business. The public has every right to be concerned about the increasing in-

dustrialization of agricultural production as a matter of public policy, quite apart from notions of risk and efficiency.

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NAGPRA's Implications

I would like to add a comment to Virginia Morell's thoughtful article about the Native American Graves Protection and Repatriation Act (NAGPRA) and its implications for the archaeology of Native American people (News & Comment, 1 Apr., p. 20).

Contrary to the common assumption, NAGPRA does not mandate the reburial of human remains and funerary objects. The purpose of the law is to give control over final disposition of these materials to the most appropriate native claimant. While reburial may be the preferred option for some groups, others have chosen different alternatives, including long-term curation.

NAGPRA gives the archaeological community a unique opportunity to work with native claimants as colleagues. It is my experience that, whatever our tactical differences, archaeologists and native people share the same strategic concern—how does the past, and our knowledge of it, best ensure our future? Or, as the Iroquois would say, what is the impact of our decision on "the seventh generation"? While the final choice may belong to the native people, we can still play a strong role by working with them to assess their options.

Other behavioral sciences have learned to work with constraints when humans are involved. I believe the archaeological community can as well.

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There is a simple solution to the demands of the new laws requiring reburial of excavated American Indian remains: make Indian mounds out of the museums by covering them with dirt and dig them up as soon as the tide of political correctness has receded.

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Indirect Pesticide Costs

Petr Karlovsky (Letters, 4 Mar., p. 1208) questions the bird data used in our analysis (*1*) of the environmental impacts of pesticide use by stating that "most modern pesticides do not seem to have an adverse effect on bird populations. . . ." He attributes this conclusion to Hall (*2*), but Hall made no such statement. Hall did conclude that pesticide impacts on birds have decreased with the banning of DDT and other chlorinated insecticides, but there are still major pesticide-poisoning incidents in U.S. bird populations. Karlovsky's statement appears to ignore a wealth of data concerning the toxicity of pesticides to birds (*1–3*). Some pesticides highly toxic to birds now in widespread use in the United States include methyl parathion, parathion, guthion, carbofuran, chlorprifos, terbufos, fonofos, and phorate (*1–3*).

Karlovsky further states that our figure of 10% (or 0.4) of all birds killed by pesticides per hectare per year is much too high, but does not present another statistic. Our estimate is based in part on the data of Mineau (*3*), who reports that the number of birds killed just by pesticide-treated seed and granules ranges from 0.25 to 8.9 per hectare per year.

Karlovsky also questions our value of $30 per bird, but again does not suggest a more reliable published figure. A review of the literature indicates that the values per bird are as follows (*1*). The cost per individual for bird watching is 40 cents, the cost per bird for hunters is $216, and the cost to rear a replacement bird is $800. Thus, our $30-per-bird estimate is relatively conservative, and this was confirmed by consulting with numerous wildlife specialists (*1*).

Related to this statistic is the fact that the Environmental Protection Agency (EPA) recently fined a company $10 per fish killed (*1*). Karlovsky could substitute $10 per bird in our analysis, and the total cost of direct costs of pesticide use would be about $7 billion a year. Further confirming that our statistics were relatively conservative, we used a value of only $1.70 per fish killed by pesticides, and not the EPA figure (*1*).

We welcome any scientific data Karlovsky would share on the indirect costs of pesticide use. We stick by our estimate that the environmental impacts of pesticide use are more than $8 billion in the United States (*1*).

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