7. Do the other species now in the ecosystem to which the thylacine might be restored have any rights or interests that should be considered as the project moves forward?
8. Now that you have read this case, go back and reread the "true but twisted" version in the preface. Would it be professionally unethical for a journalist to write this case up along the lines of the paragraph in the preface? (For related issues about professional responsibility in journalism, see question 3 in Case 35: Bhopal and Case 38: Scientific Integrity at EPA.)

NOTES

1. Department of Primary Industries, Water and Environment, Government of Tasmania, *Tasmanian Tiger*, August 2002, available at www.dpiwe.tas.gov.au/inter.nsf/WebPages/BHAN-53777B?open.
2. James Meek, "Special Report: The Ethics of Genetics. Scientists Pledge to Clone Extinct Tasmanian Tiger," *Guardian*, May 29, 2002, available at www.guardian.co.uk/genes/article/0,2763,723868,00.html.
3. Meek, "Special Report."

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26

TASMANIAN TIGERS

It has been almost seventy years since anyone has seen a live Tasmanian tiger. But scientists at the Australian Museum in Sydney are hoping that within a decade the animal will be reborn and new generations will be able to witness one of the world's most intriguing carnivores.

The Tasmanian tiger, or thylacine (*Thylacinus cynocephalus*), was a marsupial carnivore. Two feet high at the shoulders and six feet long from nose to tail, the thylacine was the region's largest predator until its extinction. Its name is derived from the distinctive tigerlike stripes along its hindquarters despite the fact that the thylacine resembles a large wolf more closely than a cat.

At one time, the thylacine roamed the wilds of Australia, New Guinea, and Tasmania. Nearly 6,000 years ago, it was driven out of Australia and New Guinea when the human tribes then native to those islands introduced dogs to their ecosystems. The eventual colonization of Tasmania by Europeans and the introduction of sheep in 1924 sealed the thylacine's fate. A bounty on the animal was instituted by the Van Diemens Land Company in 1830 and by the Tasmanian Parliament in 1888. Although the government bounty was repealed in 1909, the thylacine never recovered. The last known thylacine was captured in 1933 and died in the Hobart Zoo on July 9, 1936.[1]

Now scientists are attempting to map the thylacine's genome and re-create its DNA sequence by using preserved specimens. Their most important resource is a six-month-old pup that has been preserved in alcohol since 1866. Fragments of thylacine DNA have already been replicated, and the researchers

are working to create a complete genetic library. Once the genome has been completely mapped, scientists will construct a full set of thylacine chromosomes. The chromosomes will then be inserted into a host marsupial oocyte from which the nuclear DNA has been removed. If all goes well, the fertilized egg will then be implanted into the uterus of a surrogate animal, most likely a Tasmanian devil, where it will gestate. In due course, the cloned thylacine will be delivered at full term by the surrogate.

Even if one or several individual animals can be produced, restoring a viable thylacine population will still be a serious challenge. Because there are only a handful of specimens to provide DNA, it will be extremely difficult to achieve a significant degree of genetic diversity in a laboratory-produced population of the animals. It may also be impossible to train the animals to live in the wild since scientists have little understanding of the social and predatory skills that might once have been taught to thylacine pups by their elders.

DISCUSSION

Mike Archer, director of the Australian Museum, regards the project as an effort to undo past wrongs, an act of morally obligatory restoration ecology. In his words, the project seeks "to redress our immoral actions when we willfully and wrongly exterminated this animal." As to the morality of using genetic reconstruction and cloning techniques, his view seems to be that the *technical means* by which restoration projects are accomplished do not raise any independent ethical issues. Indeed, he argues that we have a duty to employ such means in the interests of restoration goals: "Most people agree that the 'immoral act' was the extermination of the Tasmanian tiger in the first place; to bring it back, if we can, would be to me a *moral imperative* aimed at undoing that black act." Indeed, Archer claims that the project will even relieve Australian national guilt: "The Tasmanian tiger is an iconic Australian animal. It's woven in a complex web of guilt, because Australians made it extinct. We need to lift this burden."[2]

Some others in the government are less than enthusiastic about the project. An official of the Tasmanian Department of Primary Industries, Water and Environment, Parks and Wildlife, for example, is particularly concerned about the expense of the cloning attempt: "Even if cloning were possible, it should be asked whether such effort and expense is justifiable when many other species are currently threatened with extinction, and when we allow the same processes that threaten habitats and wildlife to continue."[3] Neither the technology nor the

project are unique; however, a similar project is under way in the United States to clone the extinct Bucardo, a mountain goat once native to the Pyrenees.

QUESTIONS

1. How legitimate is the concern that resource-intensive efforts to restore extinct species will divert scarce resources from environmental protection programs and habitat restoration projects aimed at protecting multiple living species?
2. Is the museum director correct in asserting that Earth's present human community has a moral obligation to undo the ecological damage inflicted by previous generations? If we do have such a moral obligation, how far back into the past does it extend? Many scientists have theorized, for example, that the human inhabitants of Pleistocene-era North America helped exterminate the megafauna (mastodons, giant sloths, and so on) of their time through overhunting. Supposing that sufficient genetic material for some of these species could be recovered, would we be morally obligated to bring them back?
3. Compare the issues raised by this case to the issues raised in Case 27: Golden Rice. Is it easier to justify the use of genetic manipulation to bring back extinct species than to modify existing species?
4. Is the ability to establish a viable population of the thylacine crucial to the morality of creating single individuals? Would it be moral to produce just a few of the animals for scientific and educational purposes even if a population of wild thylacines could not be restored?
5. Some religious groups in Tasmania have accused the museum scientists of "playing God." The phrase is not uncommon in debates about genetic engineering, but what exactly does the criticism mean? Suppose it is meant to assert that there are some ways in which humans should never tinker with nature (such as by using genetic technologies to restore lost species or to create new species). Is there any truth in the claim? Or suppose that the religious groups simply mean to accuse the researchers of excessive hubris. Is the accusation fair?
6. Both this case and Case 5: Yellowstone Wolves involve attempts to restore a top predator species to an ecosystem from which it has been absent for almost a century. Does the fact that the thylacine is extinct raise moral issues not presented by Case 5? Does the use of genetic technologies raise such issues?