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Author(s): Simon A. Cole

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The Tragedy of Extinction

Simon A. Cole

On Uncompahgre and Red Cloud Peaks in the San Juan mountains of Colorado, the Uncompahgre fritillary butterfly is becoming extinct. The Uncompahgre fritillary never should have been there in the first place. The climate was perfectly habitable 10,000 years ago during the Ice Age, but the butterfly failed to retreat with the glaciers and ended up trapped in the mountains, thousands of miles from its proper arctic climate. Facing several consecutive years of warm weather, the butterfly has steadily climbed the mountain in search of cooler climes. Now it has reached the top, and it can climb no more; it's being ecologically squeezed off the top. When the end finally comes, say conservation biologists, the Uncompahgre fritillary will be merely one of hundreds of simultaneously occurring extinctions that we happen to notice. In short, this sort of thing happens all the time. The Uncompahgre fritillary serves as a synecdoche for the phenomenon of mass extinction.

The specificity is poignant, the generality tragic, but the question is: why is it tragic *for us*? Increasingly, the answer is being provided and packaged for us by science, represented by a discipline known as conservation biology. What do conservation biologists do? One thing they do is try to prevent extinctions; the other is to chronicle their occurrence. In the words of Hugh Britten, a conservation biologist at the Nevada Biodiversity Research Center who studies the Uncompahgre fritillary, "I am presiding over the extinction of this species."¹ Like priests, shamans, and oracle interpreters, conservation biologists have constructed a position of authority for themselves within society by "presiding" over death, in this case over deaths imbued with a special significance. They have been largely successful in creating a cult(ure) of extinction, and any of us who feel a pang when we think about the extinction of, say, the tiger, panda, rhinoceros, whale, or elephant must consider ourselves included.² As in the Hair Club for Men, conservation biologists may preside over the cult(ure) of extinction, but they are also members. The responses to extinction which they help us shape are also their own.

The first response conservation biologists might offer would probably appeal to our own economic self-interest in a finite chemical resource. "The loss of any species should be considered a tragedy," says E. O. Wilson. Why? Because

every organism—animal, plant, microorganism—contains a million to ten billion bits of information in its genetic code, hammered in to existence by an astronomical number of mutations and episodes in natural selection.³

But conceiving species as information capital seems a rather crass justification for preserving them, as some conservation biologists, who see economic arguments as unnecessary concessions to a materialist ethic, readily admit.⁴ A second reason for the tragedy is based on feeling rather than reason. We are somehow moved by the slow death of the Uncompaghre fritillary. But why? At bottom, extinction is merely the death of an individual, a common enough occurrence in a brutal world, but something in an extinction compels a stronger response, akin to empathy.

It is the *last* butterfly, like George Schaller's "last panda,"⁵ that provokes an empathic response in its human observers. It is the idea of being the last of one's kind that we find so disconcerting. This is a loneliness we would not wish upon ourselves, as we are reminded when we read the story of Ishi, "the last wild Indian in North America."⁶ Ishi lived his whole life as a member of a dwindling band of Yahi trying to survive the encroachment of white settler society by retreating further and further up the slope of Mount Lassen, in much the same manner as the Uncompaghre fritillary. Following the death of his mother, Ishi spent an unknown period of time, possibly as long as three years, alone. Although unaware that he was "the last wild Indian," Ishi must have understood that in some way he was the last Yahi.

In those last years in the wild, Ishi personifies the tragedy of extinction. His situation is analogous to that of the last Uncompaghre fritillary. Alone, trapped, pursued by climates or cultures that they only vaguely understand, neither can find a way of going on. By "going on," I mean both continuing to struggle as an individual and reproducing, an alternative means of going on. The tragedy of extinction involves removing the possibility of mating, thereby erasing one's reason for living. For the Yahi who tried to survive in hiding,

those who remained were hopelessly crippled not solely because they had suffered the loss of two thirds of their number, but because amongst those two thirds were almost all their young. The real hazard to the possible success of the long concealment may have been that those who were left faced a future in which they shared no sure investment. (Kroeber 10)

After a few years alone, Ishi could not go on. It is at this moment that he wandered out of the mountains and into white America.

Ishi's arrival at the slaughter house was the culmination of unprecedented behavior on his part. A few days earlier, without hope, indifferent whether

he lived or died, he had started on an aimless trek in a more or less southerly direction which took him into a country he did not know. Exhaustion was added to grief and loneliness. He lay down in the corral because he could go no farther. He was then about forty miles from home, a man without living kin or friends, a man who had probably never been beyond the borders of his own tribal territory. (93)

While Ishi had every reason to anticipate murder—and indeed his feet carried him, of all places, to a slaughterhouse—it turns out he found a way, albeit unconventional, of going on. The anthropologists who took charge of him catalogued his language, collected his artifacts, and, most importantly, recorded his story. In narrative, Ishi found a form of immortality. His genes did not go on, but his story, or some version of his story, did. There might have been, of course, other endings to the story. Ishi might have died alone in the woods; he might have dropped out of history instead of finding himself a place in it. Ishi might have mated following his rescue. Or he might have been captured and sold into intermarriage, as some of his female cousins apparently were. (And, in fact, it is they, not Ishi, who have dropped out of history.) Some Indian tribes were offered the opportunity to assimilate; others, including the Yahi, were not.

The Uncompaghre fritillary may also find a way of going on. When pressed, biologists become less confident about predicting the imminent extinction of the Uncompaghre fritillary. Population fluctuations are difficult to interpret, population counts are unreliable, and—the most tantalizing possibility—additional colonies may yet remain undiscovered.

Even Dr. Britten, who has made numerous searches, admits it is impossible to be sure whether or not there are hidden colonies in the wilderness of the San Juans. It is particularly difficult because the butterflies are visible and in flight for only about three weeks a year, in July. “There have been reports of additional colonies by one other lepidopterist who is refusing to reveal where they are.”⁷

The Palos Verdes blue butterfly, long presumed extinct, turned up in a meadow in southern California just this year. The Uncompaghre fritillary may yet have some tricks up its sleeve.

This essay is about our responses, empathic and opportunistic, to the plight of “others” struggling to find a way to go on. This essay will in some sense take the form of a dialogue between science fiction novels, principally Philip K. Dick’s *Do Androids Dream of Electric Sheep?* (1968), popular newspaper accounts, ecologists’ discussions of the endangered species crisis, and scholarly analyses of genetic engineering. Such a dialogue is already taking place without my intervention. Dick included a clipping from Reuters as his epigraph for the novel, suggesting that cur-

rent events as reported by the newspapers inspired some of his ideas.⁸ Popular and scholarly discussions of genetic engineering and species preservation draw liberally on science fiction, although not necessarily on Dick's own texts. Academics have practically made an industry of explicating the themes played out in Ridley Scott's *Blade Runner* (1982), the film adaptation of *Do Androids Dream of Electric Sheep?*, much in the way that the semioticians in Malcolm Bradbury's novel *Doctor Criminalale* (1992) only study *Casablanca*.⁹ In short, I am following Gregg Mitman in locating "science" not in specialized scientific journals, but at a point where a variety of texts—ecology journals, newspaper popularizations, science fiction novels and films—intersect.¹⁰

Do Androids Dream?

Dick's eponymous question asks what makes us human. Do androids dream? If they do, if they have emotional lives, humans will be hard pressed to maintain the boundary between themselves and the cyborg "other." This is the issue that has commanded the attention of most treatments of the book and film, but in fact Dick asks not whether androids dream, but "Do androids dream of *electric sheep*?" The animal other is crucial to Dick's exploration of what it means to be human. The animal theme was largely omitted in the film version—it shows up only subtly when at all. Consequently, most critics have ignored it.¹¹ It is in the interest of reconstructing in the 1990s Dick's animal-human-android love triangle that I am dredging up the original, twenty-five-year-old text.

Do Androids Dream of Electric Sheep?

Do Androids? tells the story of Rick Deckard, a policeman (called a "blade runner" in the film) whose job is to "retire" any androids that manage to escape to Earth from their enslavement in the "off-world" colonies. Androids are almost indistinguishable from humans, so the police identify them by testing them with a polygraph-like apparatus which measures their emotional response to a series of provocative questions. The paradox, of course, is that in order to continue to function effectively as an assassin and interrogator, Deckard must suppress his emotions to the point that his targets appear to have richer emotional lives than he does. It is this exploration of what distinguishes humans from androids that makes the film so compelling. But what is not explained in the film is that the emotional responses are all provoked by scenarios involving animal suffering. Why *animal* suffering? Because "animal empathy" is the one aspect of humanity that androids are unable to fake. In the future society

imagined by the novel, which I will call, for lack of a better term, “blade-runner society,” animal empathy is the highest virtue.¹² The historical explanation for this peculiar social value lies in the mass extinction of most animal species due to environmental degradation following “World War Terminus.” The remaining animals are protected by strict laws and held as spiritual totems. Directly following the war, all citizens were required to care for an animal of some kind. Caring for an animal is now enforced not by law but by social pressure: lacking a pet is viewed as an ethical lapse. Pets have replaced automobiles as status symbols. Neighbors vie to outdo one another by possessing rarer, costlier animals. In a society where everyone loves and covets animals, androids are exposed by their lack of animal empathy. Androids, it seems, do *not* dream of electric sheep, and that is their undoing when a blade runner catches up with them.

Do Androids Dream of *Electric* Sheep?

But we may read Dick’s title another way. Do androids dream of *electric* sheep? With animals so rare and yet so highly prized as status symbols, a flourishing market in artificial pets has arisen. Deckard, in fact, can afford only an electric sheep on his civil service salary, but he is tormented by the inadequacy of his bogus sheep and obsessed by his desire for what he calls a “real animal.” Deckard’s longing for an animal companion is at once mercenary and spiritual. In the same breath, he articulates his spiritual need to care for a live animal and calculates the number of bounties for android retirements he would need to be able to afford it. In blade-runner society, animals have become both status symbols and objects of genuine love, and, although sometimes themselves of questionable authenticity, they have become the wedge with which the “real” is distinguished from the “fake” among humanoids. While animals’ ability to “pass” is viewed as a social good, androids’ even greater ability to “pass” is dangerous. Androids that attempt to pass on Earth must be “sniffed out”—by emotionally deadened humans and by animals, most of which are “fake.” It may be true that, as Donna Haraway says, “the cyborg appears in myth precisely where the boundary between human and animal is transgressed,”¹³ but it would also appear that animals police the boundary between humans and cyborgs, extending the role animals already play in policing; we now employ dogs to sniff out truth from falsity, legitimate cargo from contraband. And it is in the dystopian future posited by a science fiction film contemporary with *Blade Runner*, James Cameron’s *Terminator* (1984), that dogs are employed to sniff out cyborg infiltrators because they, unlike humans, are capable of distinguishing fake humanoids from the real thing.

This strange situation becomes even stranger in the case of Phil Resch, a fellow bounty hunter Deckard encounters. In a plot twist far too complex to have been incorporated wholesale into the film adaptation, Resch is told that he is an android himself. Resch is deeply shaken by this revelation, as we might well imagine. But what he finds most difficult to comprehend is his relationship with his animal. Resch protests,

I own an animal; not a false one but the real thing. A squirrel. I love the squirrel, Deckard; every goddamn morning I feed it and change its paper—you know, clean up its cage—and then in the evening when I get off work I let it loose in my [apartment] and it runs all over the place.¹⁴

Resch's remonstrance disturbs Deckard, who considers himself a "real" human but cares for an electric sheep.

At another point in the book, the Tyrell Corporation, manufacturer of androids, tries to bribe Deckard, whose weakness they easily discern, with an owl, a supposedly extinct animal. Is the owl really an illegally obtained rare animal, affordable only to large corporations, as Tyrell claims? Or is it merely an elaborate fake?

This owl is one of few animal symbols preserved in the film.¹⁵ It appears in a scene with the android Rachael, to whom the screenwriters have assigned Resch's dilemma—she's an android, but she doesn't know it yet.

"Do you like our owl?" Rachael asks. "Is it expensive?" Deckard replies.

"Very."

"It's fake, isn't it?"

"Of course it is . . . I'm Rachael."

The situation becomes all the more interesting since, as any experienced moviegoer could easily anticipate, Rachael and Deckard end up sleeping together. In the book, a jilted Rachael punishes Deckard by pushing his *real* sheep, purchased with bounties from retiring her fellow androids, off his roof. What we have here is a love triangle, or at least an "empathy triangle," between humans, androids, and animals.

Episodes in Extinction

If this all sounds like science fiction to you, consider the following excerpt from *The Handy Boy's Book*, an early-twentieth-century primer aimed at young boys, part of a body of literature concerned with "the reasserting of *the natural* in machine culture," what Mark Seltzer calls "boyology":¹⁶

Every boy ought to keep at least one pet, but not unless he is prepared to give all of the care and attention necessary to keep it in health and comfort. If you have a real affection for your pet, you will never neglect it; if you have not that affection, you have no right to keep the animal.¹⁷

Animal empathy, then, is not such a futuristic idea after all. Rather, it is an extension of attitudes present early in the twentieth century in a “handy boy’s” culture, which shares its notion of stewardship with the contemporaneous “teddy bear patriarchy.” Teddy Roosevelt and other great white hunters and natural historians sought to turn boys into men through contact with, and exploitation of, nature.¹⁸ Let us see how the handy boy’s descendants tackle the problems of animal conservation.

Today, responses to the endangered species crisis are turning increasingly toward economic incentives to preserve wildlife. Efforts are now being focussed upon uniting economic and ecological goals—“making conservation pay.” Such efforts take many forms: ecotourism, wildlife ranches in Africa, debt-for-nature swaps, captive breeding and biodiversity prospecting. In all these cases, the aim is generally the same: to convince some reluctant poor nation that allowing extinction to occur is simply poor resource management. Timber and cattle may appear profitable in the short run, but, conservationists argue, in the long run maintaining a region’s species diversity will be more profitable as a sustainable resource, whether as spectacle for tourists, nuts for Ben & Jerry’s Rainforest Crunch, ingredients for skin lotion, quarry for big-game hunters, or raw material for pharmaceutical firms. Consider, for example, the following vignettes from the strange world of endangered species preservation—not a fictional world, but our own:

In Zimbabwe, to promote the conservation of the wildlife resources found on communal lands, private game reserves have been established where revenues from hunting are paid to local communities. Recreational hunting is now the most positive and widespread economic incentive for the conservation of large mammals in Zimbabwe.¹⁹

The *Instituto Nacional de Biodiversidad* (INBio), founded by conservation biologist Daniel Janzen and the Costa Rican government, is based upon the premise that biodiversity is best preserved by commercialization. In 1991, INBio signed an agreement with the pharmaceutical giant, Merck, selling the rights to useful products emerging from INBio’s project of locating and cataloging the species of Costa Rica’s exceptionally rich biota. The Merck-INBio deal has been almost universally praised in conservation circles as a “win-win” agreement.²⁰

Meanwhile in China, black-market entrepreneurs are reportedly

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breeding tigers in captivity to supply the herbal medicine market with pulverized bones and other parts.

A tiger-breeding farm in northeast China that started with 14 animals in 1986 now has 62 Siberian tigers. With modern techniques, it will be possible to breed 2,000 “industrial” tigers every seven years.²¹

Since poachers have decimated the wild tiger population, commercial captive breeding of tigers appears to be smart resource management. It just might also save the tiger from extinction.

Antonie Blackler, a geneticist, is experimenting with a biotechnological conservation method. He is trying to impregnate common frog species with embryos from endangered species, thus enabling common animals to serve as surrogate mothers for rare ones. In theory, he argues, the same method may be applicable to large mammals.²²

Arguing that habitat preservation on a large scale is neither politically nor technically feasible, conservation biologists, like Michael Soulé, are increasingly turning to biotechnological methods for preserving endangered species. Since “biotechnology is accelerating at a pace that could not have been foreseen thirty years ago,” it promises far greater rewards in the future than low-tech methods like habitat preservation and conventional captive breeding. Among the methods Soulé expects to flourish in the twenty-first century are cryogenics, DNA fingerprinting, cloning, gene transplants, and automated taxonomy. Soulé suggests that it may be possible to bank gametes of all vertebrates.²³ Cryopreservation, unlike habitat preservation, treats extinction solely as a reproductive problem.

In short, the conservation community is striving by other means to attain the same goal achieved by blade-runner society: the merger of avarice and sentiment into a single force for the preservation of animals. The valorization of animals is achieved by reducing them to their constituent parts. Tiger parts, for instance, are now even more valuable than their pelts. Biodiversity prospecting takes this reductionism to its fullest extent; it posits an economic system in which the value of an animal is located in its chemicals:

Although we are beginning to grasp that extinction is forever, we have yet to comprehend what we lose when species disappear. The point that cannot be overemphasized is that biotic impoverishment is tantamount to chemical impoverishment. Loss of a species means a loss of chemicals that are potentially unique in nature, not likely to be invented independently in the laboratory, and of possible use. Aside from other measures of worth, species have chemical value.²⁴

A nonentity fifty years ago, DNA is now being touted as the natural resource of the twenty-first century.

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Certainly, one of the primary tasks of the new breed of conservation biologists is the construction of a market for genetic materials. As David Takacs observes, the conservation biologists and parataxonomists at INBio “*love* biodiversity. It is their life’s blood. But to sustain this love, they need to sell off the objects of their affection, and fast.”²⁵ The primary locus of this work is the business world, where established companies like Merck and entrepreneurial start-ups like Shaman Pharmaceuticals reside. The invisible hand of the market offers an appealing alternative to centralized planning and resource management. Whereas Andrew Ross suggests that ecologists have used ecological crises to justify “the new corporate logic of planetary management,” the extinction crisis is more in tune with free-market ideology.²⁶

In blade-runner society, citizens want to keep animals, but it is not clear where status seeking and social pressure end and where animal empathy begins.

You know how some people are about not taking care of an animal; they consider it immoral and anti-empathetic. I mean technically it’s not a crime like it was right after W. W. T. [World War Terminus] but the feeling’s still there.²⁷

The private game reserve program in Zimbabwe is designed to be profitable for ranchers in the long run, but for now “the social incentive of the prestige of having a black rhino on their land has been sufficient to encourage a number of ranchers to apply for such responsibilities.”²⁸ Notice that the exploitation of rhinos is at once a commercial venture and, as in blade-runner society, a “responsibility.”

But, as in blade-runner society, these efforts provoke self-doubt among conservationists. True, some endeavors are less suspect than others. The Merck-INBio agreement has been widely acclaimed as a model for future conservation partnerships. The other measures, however, are more difficult for conservationists to swallow. In response to proposals like Soulé’s, Dale Jamison asks, “In doing this, aren’t we using animals as mere vehicles for their genes?”²⁹ And Soulé himself concedes, “Some biologists might object to the idea of ‘cryoconservation’ on ethical grounds.”³⁰ Peter Jackson, chairman of the Cat Specialist Group of the World Conservation Union, says he is “tortured” by the prospect of industrial breeding but that it must, nonetheless, be considered one of the only remaining opportunities to protect tigers from extinction.³¹

Some of these initiatives certainly do appear to embrace the very values that have historically led to endangerment in the first place. How ironic for the tiger’s last refuge to be industrial breeding farms which serve the very market that drove it from the wild. Private-game farms “reserve” large mammals for the use in latter-day “great white hunts,” the

very same unsustainable hunting practices, according to most ecologists, that were responsible for endangering the animals in the first place. In this sense, these farms continue the European elites' practice of reserving African mammals for their own pursuit and pleasure. Indeed, historians have suggested that this elitism lies at the root of the species preservation movement in Africa.³² Critics have argued that INBio, by commodifying biodiversity, perpetuates the same values that caused the extinction crisis in the first place.³³

Do Electric Humans Dream of Sheep?

Charismatic megafauna—the panda, rhinoceros, whale, and now the tiger—have all galvanized public sentiment on behalf of endangered species. Dick's conception of animal empathy maps out a widespread cultural phenomenon. But the principle of animal empathy in blade-runner society is not just a cultural norm. It has become religious dogma. The religion is called Mercerism after its founder Wilbur Mercer, a martyred prophet now preserved, Max Headroom-like, only as an image in a sort of interactive television program which allows viewers to share one another's, and Mercer's, joy and pain. Mercerism is a sort of new-age religion which combines martyrdom, communal sharing, and reverence for animals.

Following the completion of his harrowing and morally ambiguous task of "retiring" six androids, Deckard wanders out into the bare northern California wasteland. Delirious, he becomes convinced that he has transformed into Mercer. But today it would appear that it is E. O. Wilson, the eminent sociobiologist, who has become Mercer. Wilson, too, believes that animal empathy is a fundamental human value. For Wilson, animal empathy, rather than being a religious principle, is dictated by the inexorable logic of natural selection. Wilson suggests that what he calls "biophilia," the love of nature, is an evolved genetic trait.

Wilson has thus conceived a new method of linking selfishness and sentiment. Biophilia yields evolutionary, rather than economic, gain. For Wilson, evolution is an even more powerful engine of self-interest than economics. For Wilson, a vaguely defined "nature" comprises the milieu in which the human personality has evolved. Changing this milieu, by removing "the natural" from it, therefore constitutes risk.

For if the whole process of our life is directed toward preserving our species and personal genes, preparing for future generations is an expression of the highest morality of which human beings are capable. It follows that the destruction of the natural world in which the brain was assembled over millions of years is a risky step. And the worst gamble of all is to let species slip

into extinction wholesale, for even if the natural environment is conceded more ground later, it can never be reconstituted in its original diversity.³⁴

Wilson and his allies claim that humans will encounter difficulties in an artificial environment. According to David Orr, “if we complete the destruction of nature, we will have succeeded in cutting ourselves off from the source of sanity itself.”³⁵ Such an artificial environment is, of course, easily found in Dick’s novel—in the off-world colonies where humans inhabit a manufactured environment with only android slaves for companionship.

In other words, electric sheep will not do, unless we propose to become cyborgs ourselves. Surprisingly, a late-twentieth-century conservation biologist takes the very position held by Wilbur Mercer: if we don’t love animals, we cease to be human. Thus, we return once again to Dick’s question: do androids dream of electric sheep? Is it our relationship with animals that makes us human? Will humans and animals still inhabit one another’s dreams in a cyborg world? And if so, what kind of humans and what kind of animals? *Time* mourns, “all too soon, dreams may be the only place where tigers roam freely,” but Haraway and Dick suggest other possibilities.³⁶ There might be cyborg animals, or we might be cyborgs or hybrids ourselves.

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Do Imperialists Dream of Electric Natives?

The damage wrought by nuclear radiation in Dick’s *World War Terminus* is not restricted to animals. Human fertility has diminished as well, and radiation has left many humans mentally and/or physically incapacitated. Humans whose reproductive capacity remains intact are encouraged to emigrate “off-world”:

The U.N. had made it easy to emigrate, difficult if not impossible to stay. Loitering on Earth potentially meant finding oneself abruptly classed as biologically unacceptable, a menace to the pristine heredity of the race.³⁷

There is, therefore, an air of denial surrounding the outpouring of concern for animal welfare in blade-runner society. It is not clear that humans, faced with the choice between extinction or self-imposed exile, are in any position to pity other creatures. The tragedy that humans project onto animals is their own, and animal *empathy* is just that.

Once again, we must return to the late twentieth century, where animal extinctions are metaphors for reproductive anxiety, and for concerns about human extinction and genetic purity. Is our solicitous attitude toward animals merely an expression of our own anxiety?

To begin with, the rhetoric of biodiversity does not distinguish between the human and the nonhuman. Calls for cataloging the genes of vanishing species are accompanied by calls for preserving the genes of vanishing races.³⁸ Like the endangered species of the rain forest, the post-mortem on the endangered “races” of the rain forest has already been performed by the appropriate scientific institutions. With impending extinction presumed, scientists propose to preserve cryogenically indigenous peoples’ DNA before it is too late. It is assumed that other means of reproduction of this precious genetic material, such as miscegenation, will not occur. This racist assumption actually accompanies the valorization of these same peoples’ genetic material. First Tier³⁹ science is at last prepared to hybridize with the indigene, but only on its own terms, through mediations of ritual purity and prophylaxis: the freezer, the syringe, the polymerase chain reaction. Science offers to preserve racial purity as well as a valuable natural resource simultaneously.

Biodiversity, human and nonhuman, serves as a potential resource for genetic engineering—of drugs, agricultural products, or, indeed, human beings. Whether the object of study is human or not, genetic surveys inevitably undergo successive phases of knowledge and exploitation: knowledge facilitates exploitation.

All of the information—ecological, chemical, behavioral, genetic, etc.—to be gathered on Costa Rica’s biodiversity can be organized, cross-referenced, manipulated, and offered to the country, region, and world through the public domain and commercial sales.⁴⁰

The genetic survey of indigenous people represents the ultimate manifestation of anthropology’s imperialist project. No longer content with recording the ritual structure of “primitive” people, First Tier scientists now wish to extract and catalog their genetic structure as well. Genetic surveys prepare the way for the First Tier self to plunder genetic resources in order to reconstruct itself. “Anthropologists of possible selves,” writes Haraway, “we are technicians of realizable futures.”⁴¹

In this territory, too, we find our way mapped by science fiction, in this case Octavia Butler’s novel *Dawn* (1987). In *Dawn*, the imperialists are extraterrestrials, the Oankali. As Haraway puts it, “their own origins lost to them through an infinitely long series of mergings and exchanges reaching deep into time and space, the Oankali *are* gene traders.” Like our First Tier scientists, the Oankali offer preservation, of a sort, to a doomed people, in this case the entire human race. But, of course, the form of preservation they offer—merger and gene exchange—carries a price: the loss of identity, of the distinguishable, pure self. Once again, extinction engenders commerce: the closer a social group approaches extinction, the more it awakens mercantile interest in a gene-hungry universe. Endan-

gered species, indigenous people, and First Tier beneficiaries of genetic engineering might say, with the Oankali, that “their essence is embodied commerce.”⁴²

Do Chinese Dream of Electric Tigers?

Critics of ecological change are eager to identify agents of change, to apportion blame. Ecologists tend to blame most environmental degradation, such as rain forest destruction, desertification, global warming, ozone depletion, and habitat destruction on the consumption patterns of industrialized countries. These countries’ appetite for timber and beef, for instance, creates economic incentives for less developed countries to degrade their own native ecology in order to feed these appetites.

In the case of endangered species, however, the moral ground shifts. While it is again Third Tier peasants who carry out the actual destruction, this time the offending appetites are located not in the industrialized world but in the “tradition-bound” consumer nations of Asia: China, Taiwan, and Korea. The “insatiable demand” for rhinoceros horns and tiger bones in the herbal medicine shops of these countries is driving these animals to extinction. The *New York Times* describes the crisis like this:

The trade is driven by booming markets for ancient Chinese medicines and potions made from tiger parts. In Hong Kong, China, and Taiwan, and in Chinatowns across Europe and North America, Chinese apothecaries do a steady trade in tiger wines, tiger balms, and tiger pills, celebrated among Chinese and other Asian peoples for their supposed powers to treat rheumatism, to restore failing energy and to enhance sexual prowess, as well [as] for the treatment of rat bites, typhoid fever, and dysentery, among other ailments.⁴³

The problem is one of Asian consumption, which is sensitive neither to the sentimental value of large mammals nor to the ecological peril of African and Asian ecosystems. (It should be noted that Chinese herbal healers are, of course, exploiting tigers for precisely the same purpose Merck is exploiting the Costa Rican rain forest: healing.)

When it comes to rhinoceroses and tigers, there are, in fact, two animals, existing in different geographic locations. There is a First *Tier*, an animal that is valued for sentimental reasons, and there is a Third *Tier*, an animal that is viewed in purely economic terms.⁴⁴ Traditional roles have been reversed. Stereotypically, Asian culture is more attuned to living in harmony with nature, in contrast to the European tendency to exploit nature and ravage landscapes.⁴⁵ Now Westerners are the spiritual sentimentalists, while Asians become the rational economic actors, something they have for so long been criticized as *not* being.⁴⁶

After decades of “great white hunting” in Africa, after the great buffalo slaughter of the American West, Europeans have at last found remorse and conservation, only to find their best efforts stymied by another breed of hunters: traders as well as wasteful, profligate consumers. Our frustration has primarily been vented by criticizing Chinese “values,” which allow them to remain indifferent to the ultimate fate of the species. We could save these magnificent beasts, we lament, if we could only wean those Asians from their superstitious beliefs. Surely, someone has already thought of peddling ersatz pulverized tiger. Amidst a farrago of imitations and fakes, we are again reminded of their curious tendency to usurp and yet still further valorize the “real.”

Keeping *Do Androids Dream of Electric Sheep?* in mind, it is clear that this questioning of Asian values in fact entails questioning Asians’ very humanity. This is, of course, not the first time Westerners have portrayed Asians as monsters or robots.⁴⁷ Indeed, the criticism can occasionally lapse into castigating the Chinese simply for being so darn numerous:

When advances in hunting techniques are combined with lower trade barriers and rapidly growing populations that demand medicines made from exotic wildlife, an entire species can be wiped out in one generation.⁴⁸

This reference to Asian overpopulation is hardly accidental, especially in light of the prominence given to the sexual angle of Asian demand for tiger parts. As it did with its last “poster” species, the rhinoceros, the conservation movement has pinned a large portion of the blame for the tiger’s decline on its use as an aphrodisiac by superstitious cultures. This supercilious argument smacks of reproductive correctness:

Affluent Taiwanese with flagging libidos pay as much as \$320 for a bowl of tiger-penis soup, thinking the soup will make them like tigers, which can copulate several times an hour when females are in heat.⁴⁹

Western sensibilities find this repugnant, but, as with everything else we criticize Asians for these days, our complaints about what they do mask our resentment at the fact that they did it first. In this haughtiness, we might perhaps detect a note of apprehension. Does the West perceive itself to be in reproductive competition with Asia? And if so, are we perturbed by the specter of the Asian male wielding a prosthetic tiger penis?

According to this scenario, Asians have, in effect, already gained an edge in the genetic arms race, by harnessing the reproductive power of the tiger, a power that they, with their low-tech methods, threaten to exhaust *before* we get the opportunity to exploit it with our high-tech methods. Asians have already hybridized with tigers and rhinoceroses, a move we now wish to counter by drawing on the resources of biodiversity. Remem-

ber, conservation biologists and parataxonomists “*love* biodiversity.” They may actually want to consummate this relationship and *have babies* with biodiversity. Notice that the two cultures are pursuing profoundly different strategies in this reproductive war. Notice, also, that neither culture has achieved autarky; both must use resources gleaned not from within their own borders but, like the Oankali, from economically subservient client states like India and Costa Rica.

The response of the Western nations has been to impose trade sanctions on Taiwan and threaten to impose them on China.⁵⁰ By imposing trade restrictions on Taiwan, the U.S. threatens to exclude it from trade, the vehicle of global re/production. Exclusion from the race’s common re/productive project is indeed the worst punishment. Consider, for example, the plight of “specials,” the radioactively damaged humans in *Do Androids?*

Once pegged as special, a citizen, even if accepting sterilization, dropped out of history. He ceased in effect to be part of mankind.⁵¹

The specials thus find themselves in much the same position as members of endangered species: they are the last of their kind, destined to “drop out of history,” doomed by their humiliating inability to reproduce in sufficient numbers. Trade and reproduction are part of the same project, and the punishment imposed upon the specials, the recalcitrant humans in *Dawn*, and the Taiwanese is of the same form: ostracism and exclusion from some type of trade.

Did Alexander Graham Bell Dream of Electric Sheep?

Having established sex as our subject, let us briefly reinsert Dick and his electric sheep into our discussion. It seems that in 1889 Alexander Graham Bell bought a sheep farm and was intrigued to find that ewes, in contrast to many other mammals, have only two nipples. Bell spent the next thirty years trying to breed multi-nippled sheep. He eventually succeeded, and the sheep did, as Bell had hypothesized, bear twins rather than single offspring. We might well ask, as does Avital Ronell, my source for this strange story, “What is going on here?” What is the inventor of electric *speech* doing genetically engineering *sheep*? Ronell’s answer lies in the concept of prosthesis:

What compels attention here is the way the telephone, in the figure and person of Alexander Graham Bell, splitting itself off into the poesy of body parts, conceptually plugs into genetic research and engineering—something that should come as no great surprise to those who maintain a theory of

organ extension or amputation as concerns technological tools. Precisely because the telephone was itself conceived as a prosthetic organ, as supplement and technological double to an anthropomorphic body, it was from the start installed within a concept of organ transplant, implant, or genetic remodeling in a way that the Promethean Frankenstein monster already had foreshadowed. It is beyond the scope of this switchboard to establish more than the extreme and troubling coherency linking the addition of technological perceptual tools to the phantasm of the reorganization of body parts in the movement from electric *speech* to the nipples of a *sheep*.⁵²

It would seem genetic engineering, reproduction, and technological innovation are all part of a single project of re/production.

Roy Willis suggests that tribes concerned with fertility and reproduction bestow symbolic meaning upon animals, whereas tribes concerned with production imbue their animals with economic value.⁵³ Where does our tribe stand? I would argue that the cases presented here demonstrate that Willis' dichotomy has broken down, if it ever held up at all. These twin meanings are not opposed but are two sides of the same coin. Our responses to extinction—empathy and avarice—are not so different. The empathetic and exploitative responses yield essentially similar outcomes: various forms of merger, exchange, inclusion, and sexual union. These outcomes may all be of a kind, but they are infinitely varied. Haraway's cyborg manifesto holds that a genetically engineered world opens new possibilities for strange, hitherto unimagined couplings.

Conclusion

Do androids pulverize tiger bones to use as aphrodisiacs? Yes, they would, but not because they are stupid, superstitious, cruel, or unempathic. They would because, like any other living thing, they will do what they have to in order to go on. This common urge to go on is what unites animals, humans, and possibly—only the future will tell—androids. How might androids go on? As Haraway argues, androids will be compelled to devise new and innovative solutions to the problem of going on. Might they try to manufacture new and better-living machines themselves, literally a form of re/production?⁵⁴ They will try that and more, even something as crazy as eating pulverized tiger parts.

The question about androids, then, is: do they struggle to go on? An android with the resources to find a way to go on is morally and practically indistinguishable from a human being; an android that cannot find a way, that "dies" at its appointed (by its maker) hour, is just a machine. The androids in Dick's original text are of the latter type. When Deckard threatens to kill Rachael,

the dark fire waned; the life force oozed out of her, as he had so often witnessed before with other androids. The classic resignation. Mechanical, intellectual acceptance of that which a genuine organism—with two billion years of the pressure to live and evolve hagridding it—could never have reconciled itself to. “I can’t stand the way you androids give up,” he said savagely.⁵⁵

The androids in *Blade Runner* are not like those in the book. The most brilliant coup of the screenplay lay in making Roy Baty, the leader of the renegade “replicants,” as the androids are called, to some extent the hero of the movie. The dramatic force in the film lies not with the assassin Deckard, but with Roy in his search for his father and maker, his loss of his replicant mate, Pris, his quest to avenge her, and, finally, his realization of *empathy*, which inspires him to eschew vengeance and let Deckard live. It is Deckard himself who observes that Roy possesses all the trappings of the legendary dramatic hero of uncertain paternity: “All he wanted were the same answers the rest of us want. Where do I come from? Where am I going? How long have I got?”

The dramatic structure of the film is centered around Roy’s efforts to go on. He mates with Pris, of course, but to no avail. He breaks into the Tyrell Corporation’s headquarters, where he demands repairs to the fail-safe system in his genetically engineered body that restricts him to a four-year lifespan. Neither polite persuasion nor savage threats are of any use. Finally, struggling to stay alive just long enough to have his revenge, he desists from killing Deckard at the last moment. Deckard muses, “maybe in those last moments he loved life more than he ever had before. Not just his life: anybody’s life. My life.” And again, like Ishi, the last of his kind, Baty achieves immortality of a sort by storytelling. He passes some version of his story, no matter how brief and incomplete, on to Deckard, his enemy and the murderer of his people, much as Ishi was forced to tell his story to white social scientists. “I’ve seen things you *people* wouldn’t believe,” Roy says contemptuously in his final testimony. “Attack ships on fire off the shoulders of Orion. All those moments will be lost in time like tears in rain. Time to die.”⁵⁶

All the tension and boundary-drawing between humans, animals, and androids, then, can be ascribed to a struggle for inclusion in a common reproductive project. The criteria for inclusion are not consistent, nor are the winners selected according to neat distinctions between humans and nonhumans. Instead, genetic engineering, like all forms of re/production, is shaped by elements of both love and exploitation. Some participants, like the First Tier and the Oankali, will be in the game by virtue of their superior strength. Others may choose to join in as the most palatable means of escape from a difficult situation. Others, like the specials, may be excluded altogether. And, of course, dark horses and Trojan horses, of

Genetic

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which we may not even be aware, will be involved. We are all hosts to parasites and parasites within parasites.⁵⁷ Lynn Margulis and Dorion Sagan, for instance, speculate that space travel allows humans to function as vehicles for microbes contained within our bodies. While humans may “go extinct” in the conventional sense, we may well gain immortality for our role in facilitating a galactic “microbial diaspora.”⁵⁸ While opportunistic microbes are winging their way across space, cryogenic gene banks, perhaps deep underground, when their long-lasting power supplies give out, might simply repeat the extinction of the life forms they “preserved”—the first time a tragedy, the second a farce. Extinction may not be the inescapable destiny that it might at first glance appear to be, for the “other” or for “us.” Given imagination and opportunity, there are ways of going on, in some form or another.

Notes

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1. Carol Kaesuk Yoon, “Rare Butterfly Consigned to Extinction,” *New York Times*, 26 April 1994.

2. I am conceiving the cult(ure) of extinction as somewhat akin to the “cult of death” that permeated the British upper classes in the years prior to the First World War. The bluebloods managed to fulfill their death wishes vicariously by sending their sons off to the war. Edward L. Pulling, “Philosophy and Death in the Coterie,” (unpublished thesis, Princeton University, 1989).

3. Edward O. Wilson, “Biodiversity, Prosperity, and Value,” in *Ecology, Economics, Ethics: The Broken Circle*, ed. F. Herbert Bormann and Stephen R. Kellert (New Haven, Conn.: Yale University Press, 1991), 9.

4. David Ehrenfeld, “Thirty Million Cheers for Diversity,” *New Scientist* 110 (12 June 1986): 38–43.

5. George B. Schaller, *The Last Panda* (Chicago: University of Chicago Press, 1993).

6. Theodora Kroeber, *Ishi in Two Worlds: A Biography of the Last Wild Indian in North America* (Berkeley: University of California Press, 1961).

7. Yoon, “Rare Butterfly.”

8. The clipping reports the death of a 200-year-old turtle that had been kept and treated as a chief in Tonga. Dick’s use of this epigraph supports my argument that animals are the central theme in the novel.

9. Malcolm Bradbury, *Doctor Criminal* (New York: Viking, 1992), 128. See, for example, Peter Fitting, "The Lessons of Cyberpunk," in *Technoculture*, ed. Constance Penley and Andrew Ross (Minneapolis: University of Minnesota Press, 1991); David Harvey, *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change* (Oxford: Basil Blackwell, 1989); Paul Edwards, forthcoming. Also see essays in *Retrofitting Blade Runner: Issues in Ridley Scott's "Blade Runner" and Philip K. Dick's "Do Androids Dream of Electric Sheep?"*, ed. Judith B. Kerman (Bowling Green, Ohio: Bowling Green State University Popular Press, 1991) and the 40-page *Blade Runner* bibliography by William M. Kolb contained therein.

10. Gregg Mitman, "Cinematic Nature: Hollywood Technology, Popular Culture, and the American Museum of Natural History," *Isis* 84 (1993): 638.

11. The lone exception that I found is Marleen Barr, "Metahuman 'Kipple' Or, Do Male Movie Makers Dream of Electric Women?: Speciesism and Sexism in *Blade Runner*," in *Retrofitting Blade Runner*, ed. Judith B. Kerman, 25–31.

12. The theme of empathy is taken to its fullest in Octavia Butler's latest novel, *The Parable of the Sower* (New York: Four Walls Eight Windows, 1993). Butler's heroine suffers from "hyperempathy," which causes her to experience directly the pain of people, and some animals, around her. We shall run into Butler again later.

13. Donna Haraway, "A Manifesto for Cyborgs: Science, Technology, and Socialist Feminism in the 1980s," *Socialist Review* 15 (1985): 68.

14. Philip K. Dick, *Do Androids Dream of Electric Sheep?* (New York: Ballentine, 1968), 112.

15. For a visual explication of the animal imagery in the film, placed in the context of contemporary endangered species conservation initiatives, see the homemade video by Kavita Philip and myself entitled "*Blade Runner: The Nature Lover's Cut*" (1994).

16. Mark Seltzer, *Bodies and Machines* (New York: Routledge, 1992), 152. Seltzer does not cite *The Handy Boy's Book*.

17. John Barnard, *The Handy Boy's Book* (London: Ward Lock, n.d.), 238.

18. Donna Haraway, *Primate Visions: Gender, Race, and Nature in the World of Modern Science* (New York: Routledge, 1989), 26–58.

19. Jeffrey A. McNeely, "Economic Incentives for Conserving Biodiversity: Lessons for Africa," *Ambio* 22 (1993): 147.

20. Elissa Blum, "Making Biodiversity Conservation Profitable: A Case Study of the Merck/INBio Agreement," *Environment* 35 (1993): 20.

21. Malcolm W. Browne, "Folk Remedy Demand May Wipe Out Tigers," *New York Times*, 22 September 1992.

22. Personal communication, 5 April 1994. H. D. M. Moore concurs with Blackler's prediction in "*In Vitro* Fertilization and the Development of Gene Banks for Wild Mammals," *Zoological Symposium* 64 (1992): 89–99.

23. Michael E. Soulé, "Conservation Biology in the Twenty-First Century: Summary and Outlook," in *Conservation for the Twenty-First Century*, ed. David Western and Mary C. Pearl (New York: Oxford University Press, 1989), 297–303.

24. Thomas Eisner, "Chemical Prospecting: A Proposal for Action," in *Ecology, Economics, Ethics*, ed. Bormann and Kellert, 197.

25. David Takacs, "Costa Rica's National Institute of Biodiversity (INBio): Biodiversidad Central," (paper presented at The Nature of Science Studies Workshop, Cornell University, April 1994), 18.

26. Andrew Ross, *Strange Weather: Culture, Science and Technology in the Age of Limits* (London: Verso, 1991), 207.
27. Dick, *Androids*, 10.
28. McNeely, "Economic Incentives," 147.
29. Dale Jamison, "Against Zoos," in *In Defense of Animals*, ed. Peter Singer (Oxford: Basil Blackwell, 1985), 115.
30. Soulé, "Conservation Biology," 303. What is left unstated in the disagreement between Soulé and Jamison is a disciplinary struggle between descriptive conservation biologists and geneticists for control of the conservation agenda.
31. Browne, "Folk Remedy."
32. William Beinart, "Empire, Hunting and Ecological Change in Southern and Central Africa," *Past and Present* 128 (1990): 175–6; Haraway, *Primate Visions*, 26–58.
33. Takacs, "Costa Rica's National Institute," 5.
34. Edward O. Wilson, *Biophilia* (Cambridge: Harvard University Press, 1984), 121. Biophilia is a brilliant strategy for "making conservation true," to employ actor-network terminology. Wilson is trying to make biophilia a self-fulfilling prophecy: he seeks to persuade people to behave as conservationists by convincing them that conservationism is written into their genes. To do this he necessarily dispenses with the pesky historical facts which suggest that humans have not proven to be particularly disposed toward preserving nature—quite the opposite, in fact. More perplexing still is how Wilson can believe that conservationist values are a successful evolutionary adaptation, whereas Asian values which hold that tiger parts have medicinal values are unsuccessful.
35. David W. Orr, "Love It or Lose It: The Coming Biophilia Revolution," *The Biophilia Hypothesis* (Washington, D.C.: Island Press, 1993), 437.
36. Eugene Linden, "Tigers on Trial," *Time*, 28 March 1994, 44.
37. Dick, *Androids*, 13.
38. Leslie Roberts, "A Genetic Survey of Vanishing Peoples," *Science* 252 (1991): 1614–7. If the boundary between the human and the nonhuman is becoming blurred, it is perhaps being replaced by a boundary between the civilized and the natural, a system of classification that lumps indigenous peoples in with animals and other rare "species."
39. I am adopting Peter J. Taylor's convention of using the terms "First Tier" and "Third Tier"—which make distinctions based on class—to replace the First/Third World, Western/non-Western, and Northern/Southern antonyms—which make distinctions based on geography. I also resort frequently to the royal "we" in this paper, which I mean to refer to some generalized First Tier culture.
40. Rodrigo Gámez et al., "Costa Rica's Conservation Program and National Biodiversity Institute (INBio)," in *Biodiversity Prospecting: Using Genetic Resources for Sustainable Development*, ed. Walter V. Reid et al. (Baltimore, Md.: World Resources Institute, 1993), 63.
41. Donna Haraway, *Simians, Cyborgs, and Women: The Reinvention of Nature* (New York: Routledge, 1991), 230.
42. Octavia E. Butler, *Dawn: Xenogenesis* (New York: Popular Library, 1987). The quotations are from Haraway, *Simians*, 226–9 (original emphasis). Haraway draws an interesting parallel between Oankali gene trading and the Atlantic slave trade, but she does not connect it to the genetic surveying of indigenous people.

43. John F. Burns, "Medicinal Potions May Doom Tiger to Extinction," *New York Times*, 15 March 1994.

44. To use the German understanding of Taylor's First Tier/Third Tier terminology. At this point, I also have to dispense with the First Tier/Third Tier terminology, and revert to the geographical distinction between Asian and Western.

45. See, for example, Carolyn Merchant, *The Death of Nature: Women, Ecology, and the Scientific Revolution* (San Francisco, Calif.: Harper and Row, 1980).

46. Western commentators on Asia have traditionally criticized Asian cultures for not being sufficiently exploitative of natural resources. This "laziness" has led to their technological backwardness, which in turn serves as the justification for Western imperialism. Michael Adas, *Machines as the Measure of Men: Science, Technology, and Ideologies of Western Dominance* (Ithaca, N.Y.: Cornell University Press, 1989), especially 241–58.

47. John Dower, *War without Mercy: Race and Power in the Pacific War* (New York: Pantheon, 1986).

48. Thomas L. Friedman, "U.S. Puts Sanctions on Taiwan," *New York Times*, 12 April 1994.

49. Linden, "Tigers on Trial," 47.

50. Oddly enough—or perhaps, in light of my argument, not oddly at all—these sanctions consist of excluding Taiwan, not from trade in general, but from the "legitimate" wildlife-product trade. See Friedman, "U.S. Puts Sanctions on Taiwan."

51. Dick, *Androids*, 13.

52. And, moreover, what on earth was Benjamin Franklin doing extemporizing on the subject of the rate of putrefecation of sheep killed by electricity? Avital Ronell, *The Telephone Book: Technology, Schizophrenia, Electric Speech* (Lincoln: University of Nebraska Press, 1989), 337–40, 453 (emphasis added).

53. Roy Willis, "Cosmology, Economy, and Symbolic Loading," in *The Exploitation of Animals in Africa*, ed. Jeffrey C. Stone (Aberdeen, Tex.: Aberdeen University African Studies Group, 1988), 303–14.

54. I am indebted to Peter J. Taylor for this suggestion.

55. Dick, *Androids*, 176.

56. Thanks to Judith B. Kerman, ed., *Retrofitting Blade Runner*, for enhancing my already prodigious ability to quote the film from memory.

57. See, for instance, Francois Delaporte, *The History of Yellow Fever: An Essay on the Birth of Tropical Medicine* (Cambridge, Mass.: MIT Press, 1991).

58. Quoted in Myrdene Anderson, "Concerning Gaia—Semiotic Production of/in/by/for Our Planet," in *Biosemiotics*, ed. Thomas A. Sebeok and Jean Umiker-Sebeok (Berlin: Mouton de Gruyter, 1992), 3.