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**Playing Dolly**  
*Technocultural Formations,  
Fantasies, and Fictions  
of Assisted Reproduction*

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# Confessions of a Bioterrorist

CHARIS THOMPSON CUSSINS

## *Subject Position and Reproductive Technologies*

THE FOLLOWING STORY about reproductive possibilities is informed and inspired in virtually every detail by conversations with patients and practitioners in infertility clinics during fieldwork that stretches back intermittently to the late 1980s and by my experiences with people and animals in in situ wildlife conservation (parks and community-based conservation) and ex situ (zoo) animal conservation. The common thread running through these sites and explored in this story is the valuing of reproductions: Who and what gets to reproduce where and under what conditions? Why are resources committed to enhancing some human and nonhuman reproductions and to restricting or obliterating others? The story suggests that what is reproductively subversive or liberatory varies from one situation to another. The story makes an ethical argument for movement beyond a single standpoint and tries to show how one's standpoint and its conditions of transgression allow such movement.

### *Confessions of a Bioterrorist*

Mary, a thirty-something white middle-class mother of two, had a daughter and a son, born almost three years apart, who were both in school now. With a Ph.D. in animal physiology, Mary fell into the "postponed-childbearing" model of the highly educated Western women. Her daughter was born when she was in her first postdoctoral position, "unplanned, but wanted," as she and her husband (married five months before the birth) liked to say. Two years later they embarked on the requisite sibling, and nature obliged by providing a boy. On a whim perhaps, recalling the vagaries and imperatives of contra-

ception in the university years, Mary asked to have her tubes tied at her son's birth.

Her son had been delivered minutes previously by planned cesarean section for the sin of remaining head up in her uterus into the thirty-eighth week of pregnancy. Though woozy from the spinal, Mary understood with utter clarity that he was a boy and that somehow she had done what needed to be done. She lay in the operating room, separated from her opened belly by a sterile blue sheet. From the masked, covered, bowed, and bobbing heads that appeared over the sterile screen she knew that at least some of the layers of her severed abdomen remained to be stitched back together again. "It's now or never," she thought, with pre-sedative lucidity. Mary managed somehow to attract the attention of the crowd on the belly side of the screen. "Wait, I want you to tie my tubes while you're in there." The heads looked up, stilled, featureless in masks. Her husband beside her, cradling the new and swaddled baby, laughed, as if to laugh it off. She turned first to him, overwhelmed with joint love for the baby. A drugged sleep and a fairly successful breast-feed later found her in the recovery ward confronted by a doctor reading from her medical notes; the notes plainly confirmed that she had just had her fallopian tubes tied to prevent future conceptions.

Before her son's birth, Mary had moved from her East Coast postdoc to a large western coastal military town where her husband had taken up a tenure-track position. Her infant daughter began nursery school, and Mary followed up a friend's suggestion and applied for a physiology job in the research department at the world-famous zoo next to the naval hospital. She was hired on a temporary basis on a grant from the Friends of the Zoo. Within a week Mary learned from a business school graduate student who was studying the zoo that it was a marvel in corporate self-reinvention, transforming itself overnight from an unprofitable and cruel relic of U.S. envy for French and English menagerie imperialism to a hugely lucrative modern Noah's ark, saving the world's habitat-deprived creatures from going the way of Cuvier's megatherium. She and Dr. Thomson, a woman about a decade older than herself, had the run of the physiology lab, such as it was. Mary quickly became a reproductive physiologist. She worked with a majority of women colleagues on soft money, only tangentially connected to the university by adjunct positions and shared lecture audiences, only somewhat in day-to-day awe and resentment of their few senior male colleagues who ranked in cyberspace and stability of funding by being such things as worldwide species coordinators for highly endangered captive animal populations. Above all, Mary learned about science in a world where science and technology could not yet be taken off the shelf and were not yet regulated. "Empirical," to a zoo reproductive physiologist, meant that one did not yet know how to *obtain* hippo semen, let alone

what temperature it needed to be frozen at or how quickly it could safely be thawed. Technological resources were scarce by university lab standards and correspondingly flexible; the microwave oven was used for isolating DNA from condor eggshell lining as well as for heating one's lunch.

Mary's first five years at the zoo saw her grant renewed, the birth of her son (and the tying of her tubes), and the establishment of the frozen zoo. The frozen zoo came in with rhetorical flourish, vociferously promoted by senior scientists and the zoo administration, and echoed back ratcheted up in the media as the panacea to conservation. By freezing germ plasm in perpetuity, it would buy time for human civilization to decide what they wanted/needed to save and how to save it. It would replace the need for or provide the time to reconstruct lost habitat. It was the obvious successor to the embattled Endangered Species Act, riding high on the wave of favor for a genetic conception of "species." And, it was a prospector's dream come true, banking genetic diversity for posterity/prosperity. No one seemed to be asking who or what would benefit, and the funds came pouring in from an enthusiastic urban public.

Dr. Thomson and Mary, having set up the thing, knew that the reality was rather different from the rhetoric. The frozen zoo was a dingy concrete room filled with a motley selection of cooling devices, liquid nitrogen tanks, and liquid-nitrogen-filled freezers. Most of the freezers looked just like the domestic versions, only with a different coolant, disciplined by frequent liquid nitrogen truck visits to replenish the tanks, careful temperature control feedback mechanisms, and a backup generator. The freezers contained spun and washed sperm specimens in freezing straws, some cell preparations, and a growing number of frozen embryos. And in any case, for all their genetic essentialism, those researchers most excited about banking the genetic resources of wild animals still needed the species intact so as to correlate genes with the desired traits they believed they were banking. The majority of wild animals hadn't even been karyotyped; armadillos were not yet *Drosophila*. There were only two rules for the frozen zoo.

First, there had to be a consensus that the species in question was worth saving. Under the new prospecting biodiversity mentality, that was almost no constraint at all. While the Endangered Species Act had exempted from protection, in fine Orwellian fashion, pests and vermin and certain representatives of the "class insecta," frozen zoos dealt with the pestilence-irrelevant world of suspended animation and genetic diversity. Bioprospectors (those "pure" scientists interested in the priceless genetic resources trapped inside millennia of adaptive organisms, just as much as those who were funded by or worked for Merck and the other pharmaceutical bioprospecting conglomerates) told the policy-making community that we didn't yet know enough;

didn't yet know what would turn out to have been worth saving; couldn't speak with scientific certainty. And so, they argued, to be on the safe side (or to maximize opportunity benefits), the whole lot should be saved. Field biologists, on their side, presented policy makers with algorithms for preserving processes maintaining biodiversity, unique habitats, endemic species, and representative ecosystems. Not enough knowledge to adjudicate said one side; not enough time or resources not to adjudicate said the other.

The only other rule was no hybrids. Hybrids were OK in agriculture and domestic breeds of animals; accessions of agricultural plants and seed banks were, after all, the prototype of *ex situ* gene and germ plasm conservation, and the DNA of hybridized domesticated animals was well represented in frozen tissue banks around the world. But the zoo was freezing to save endangered species, and Mary and Dr. Thomson were sufficiently constrained by their mission to operate under an absolute moratorium on a sideline in on-site hybridization experiments. The Chicago Zoo was just about to start doing interspecies gestational surrogacy, using common domestic species to gestate the embryos of endangered species, but genetic hybridization was absolutely illicit there too. Sometimes zoo spokespeople said hybrids were not "natural," but zoos were themselves sensitive to the charge of being unnatural. Besides, there were too many countries where historically domesticated and feral stocks had blended to produce eagerly sought-after traits. The powerful business and science bioprospecting constituency pushing the frozen zoo didn't want to lean too heavily on the "no human interference" Western understanding of "natural." Many valuable animals existed in non-Western democracies, where different understandings of nature and unreliable interest in compliance with international standards and treaties on conservation prevailed; the politics were simply too delicate, as all conservationists knew, to get hung up on whether or not something was "natural."

Dr. Thomson and Mary had had little luck with freezing the eggs of the large mammals they were especially interested in, and collecting eggs was a tricky business. Access to eggs meant surgical intervention, and any surgery had to be approved by the ethics committee and have zoo veterinary resources committed to it. In practice this restricted egg collection to opportunistic harvesting, when a female animal was going into surgery for an independent procedure. If the animal was still unconscious when the procedure was over, and Mary had prior committee approval, she would be allowed to excise a small amount of ovarian tissue or to aspirate mature eggs. They used this protocol, too, for sperm collection in large or dangerous animals like rhinos, which were electro-ejaculated at surgery, although in the case of rhinos this added thirty to forty minutes to anesthesia time. Animals kept in fields rather than cages at the zoo were also collected at surgery because it was too difficult to get an

animal in a large enclosure to ejaculate at the right place and time. This meant getting approval for ruminants, which was always dicey because you could not fast grazers before surgery and the longer the anesthesia, the more likely they were to regurgitate food at surgery.

Mary and Dr. Thomson frequently joked about the manual, mechanical, and electrical means they had perfected to obtain their bestiary of ejaculates. They discovered the precise stroking required to maximize the sperm entering the vas deferens in pheasants. They indulged the bizarre individuality of the male cheetahs, allowing each his specific object of fixation. Of the hand-reared cheetahs, one liked a human female keeper to be in the cage with him and would not ejaculate into the artificial vagina mounted on the crate containing him unless that keeper was present, and a second needed his favorite stuffed animal toy. Of the cheetahs raised in the zoo in social groups, one could be collected by hand as long as he was moved to an empty female cheetah cage where the smell of estrous hormones was sufficient stimulation.

In a serendipitous linkup, the small reproductive physiology lab became the recipient of weekly charitable donations of ovarian tissue from the local cat and dog spay clinic, and an experimental program of *in vitro* maturation of immature eggs was begun. If they could reliably get immature eggs to ripen *in vitro* for the dog and cat family—excellent model species—they would gain invaluable experience and enhance the prospects of being able to ripen eggs to fertilize with fresh or thawed semen on demand. This would massively improve the prognosis for a comprehensive frozen embryo bank. Mary's job had developed its own momentum and research agenda, and she was well satisfied.

After Mary had been at the zoo approximately five years and seen her younger child into preschool, four significant things happened in a short space of time. Together these four things were to take her to an altogether different level of involvement with her work and immerse the so reproductively normal Mary in a labyrinth of other reproductions. First, Mary was assigned to take Professor Jung Yingqian, a representative of the Chinese Academy of Science Biodiversity Committee, around the zoo and its research facilities. Second, Mary went to a lecture on population control and met Gabriela Richards, a professor of sociology. Third, she began informally to collaborate with Eva Avery, an embryologist at a nearby human infertility clinic. And fourth, she was sent by the Nature Conservancy to a cattle-ranching area in southwestern New Mexico to get some reproductive data on an endangered species of quail and a threatened leopard frog.

Professor Jung Yingqian followed her itinerary as planned by the Chinese Academy of Sciences. At fifty-two this was her second overseas assignment since becoming the public relations delegate for the Biodiversity Committee of the academy. The first trip had been eighteen months ago, when she had

been a representative to the 1992 United Nations Conference on Environment and Development in Rio de Janeiro. After a quarter of a century as an invertebrate zoologist, the change in orientation had been a challenge, but her immaculate English and diplomatic demeanor won her instant favor. In Rio, Jung was able to describe a vast country blessed with great biogeographic richness and an unusually high proportion of endemic and relic species that had survived in the large areas that had not been affected by the glaciation of the late Tertiary. The Chinese Academy of Sciences was interested in getting pledges of funding for biodiversity conservation, and Jung carefully swapped promises of Chinese compliance and monitoring for international investment. This second trip was a follow-up to the Earth Summit; Jung had spent six days meeting with government ministers, nongovernmental organizations, and funding institutions in Washington, making good on some of the pledges made in 1992.

From Washington, Professor Jung flew to California. Mary met her at the airport and spent the rest of the day taking her around the zoo's research facilities before taking her back to the airport for the night flight out again. Jung was visiting the zoo because an unprecedented deal was being brokered between the zoo and the Chinese government. The zoo badly wanted a giant panda, one of the highest-ranked animals in the world in terms of zoo visitor appeal. But, as part of the new conservation ethos, they neither wanted nor stood any chance of getting a panda without in some way claiming to be adding to the long-term thriving of this endangered animal. A deal was taking shape, and it looked like a pair of captive-born pandas would be delivered to the zoo shortly, in exchange for more than a million dollars, all earmarked for Chinese panda conservation and habitat restoration. The pandas were to be a gift of the Chinese government, and the earmarked money was to be a gift in turn from the zoo. In this way, the Appendix 1 CITES listing and other bureaucratic obstacles could be circumvented, and zoo gate receipts and China's international conservation profile would soar. Professor Jung was acting as an ambassador, checking the facilities out and gauging the level of research and animal welfare at the zoo. She was also, of course, estimating the trustworthiness of the private sector zoo administration and the soundness of the deal.

Mary found Professor Jung courteous and interested but gleaned little of either her person or the state of *ex situ* biodiversity conservation in China during their seven hours together. Jung conveyed the Chinese government's desire that panda germ plasm be collected and stored in the frozen zoo, to complement China's own national germ plasm banking initiative. The zoo research department's director agreed to this request by signing on a dotted line over lunch. Mary enjoyed the day's break from her usual routine but thought

little about it afterward. Five months later, however, she received a letter asking her to take responsibility for oversight of the panda germ plasm and cell lines. A Chinese physiologist would be arriving with the pandas to do the cell cultures and any gamete preparations, and Mary (thanks to her personal contact with Professor Jung) was formally requested to become the independent monitor of the well-being of the precious tissue. Her colleagues at the research department at the zoo were amused by the letter and urged Mary to take up her new "policing" role. With good humor, and a genuine feeling of having had some honor conferred on her, Mary accepted the job.

Mary's law enforcement role had no practical consequences whatsoever until the Chinese physiologist had visited and successfully ensconced the panda tissue in the cryobank. From then on, an additional security system was added to the door to the frozen zoo, and Mary was the lone possessor (aside from the zoo director and the Chinese Academy of Sciences) of the combination required to open the lock. The janitor could activate it at six every evening, but no one could get access to the room again the next morning until Mary opened the lock. This was not quite as onerous as it seemed, for the lock could be deactivated electronically via modem from her home. Nonetheless, it changed her relation to her workplace and to the contents of the freezers, instilling in her a combination of proprietary interest and faint disgust at the idea that she was the person keeping out whatever it was that should not be let in. She noticed, but only on reflection, that she accepted security for the germ plasm as readily as she accepted the predominant rhetoric of fear governing her children's movements in her suburban neighborhood, where she had equally little idea from whom or what she was protecting them.

Lectures in the endowed public lecture hall at the zoo were usually book-signing affairs attended by the more earnest and older, wealthier sector of the zoo membership through advance purchase of tickets. A smattering of researchers and students drifted over from the zoo or the university for most of them. Presentations by white women primatologists with worldwide followings for their Edenic lives in the bush compiling soap-operatic genealogies of individual chimpanzees or orangutans were sellout events. Tales of swimming with dolphins or living among elephants were equally popular. Occasionally there would be a lecture on a conservation-related topic that did not directly concern the ecology or natural history of an individual species or ecosystem. One such lecture was given in the fall of 1994 by a prominent Australian conservationist and public policy adviser. Mary attended his lecture on human population control and conservation along with an almost 100 percent turnout of the zoo research division.

The talk began, crescendoed, ended; the audience clapped heartily, and an intermission before questions was announced. The speaker was still standing

in the middle of the stage, grinning and swaying with bravado, as Mary got up from her seat. A zoo official hustled him offstage, but his final slogan about the magic bullet of conservation—condoms for humans, of course—hung in the air like something from the nearby naval boot camp: "Elastic is too drastic but plastic is fantastic!" Mary made her way to the ladies' lavatories at the back of the building that only zoo personnel knew about, glad to be missing the usual line. The woman who had been sitting next to her in the auditorium was right behind her. Mary hesitated as she held open the bathroom door for the other woman, and the woman offered an explanation in a British accent. "I've given up waiting for architects of public places to work out that it takes longer to pee if you have to bare your bum first; I always look for someone who knows where they're going, and nine times out of ten there's a loo stashed somewhere else, reserved for insiders." She laughed and smiled all at once and, waiting by the outside door, gestured Mary into the one cubicle. Mary went in, grinning, agreeing, wondering to herself what made her stand out as an insider. They exchanged more smiles as Mary came out and the English woman went in, and Mary decided to take her time washing her hands on the pretext that the woman might need showing back around to the front of the auditorium. Together they walked out of the bathroom and joined the crowd buying plastic glasses of California wine.

The woman's name was Dr. Gabriela Richards, daughter of first-generation Caribbean Londoners, father returned to Jamaica some time ago, mother and aunt still in Battersea. She was the only English black woman in her year to have gotten a graduate place at Oxford, and she was now a lecturer in sociology at University College, London. How long had she been in California, Mary asked. Just a couple of weeks, since the beginning of the academic year. Was she here to stay? No, she was on a one-year fully funded sabbatical to research contemporary American issues in race and ethnicity. Weren't there any race issues in England? Yes, all too many, but a different colonial history and little or no shared national identity—Irish, Pakistanis, Bangladeshis, Sikhs, Caribbean Islanders—but some things were the same, the comparison would be productive. If you were black in the United Kingdom academy, did you have to work on race and ethnicity to get listened to? It helped, but, if you think about it, you can talk about anything under that umbrella, and in the United Kingdom we use umbrellas a lot.

Mary asked Gabriela what she thought of the lecture they had just heard. "Oh, mostly it was predictable, don't you think?" replied Gabriela. "An Aussie male worried sick that the Indonesians would manage in the twenty-first century what the Aborigines never even threatened: dilute the racial purity of low birth rate white Australians and end the illusion of Australia as an outpost Western economy with Western living standards; the underpopulated con-

tinents could absorb the human settlement, too, and he knows that." But wasn't he talking generally about protecting animal habitats by restricting human population growth? "If you think so; seems to me human population's nearly always a red herring as a starting place—educate women, work out what ecological role people play in each ecosystem, then we can talk human population numbers—and as he said himself, it's the "ecological footprint" that counts; how much space and resources each person uses up . . . isn't it funny the way men use these primordial metaphors—couldn't you just picture the huge white Western ecological footprint on the dusts of the northern Rift Valley being excavated in some distant millennium by a new family of Leakeys and their black field assistants?" Mary was laughing again, off balance, enjoying herself.

By this time three of Mary's colleagues had joined them, also with plastic glasses of wine in hand. Mary introduced Gabriela, omitting to mention that they had only just met. Mary's boss, the species coordinator for the Przewalski's horse, Professor Walker, was among the three zoo researchers. They were discussing a risky effort to reintroduce the horse into its former range in Mongolia. Mary's colleagues were assessing the prospects for the repatriation given Mongolia's attempts to move to a multiparty political system. The chance to acquire an international profile by being associated with a high-publicity conservation campaign was being fiercely contested by the different potential party candidates. Professor Walker was skeptical about the genuine commitment to the conservation success of the process, though.

He was worried that the Mongolian planes that were not IATA-certified would not be safe for the horses. Elaborating for Gabriela, he said, "Moving animals safely is the stock and trade of zoos; it's the one thing we know we do well. But once those horses leave Beijing, that's as far as the zoo's network of expertise penetrates." He said he was worried too that the horses would end up either being corralled in an airplane hangar in Ulan Bator once the foreign press had left town, or be let loose onto the plains only to die out again from being genetically swamped by the domestic and feral horses there with whom they could easily interbreed. He had modeled the number of Przewalski's horses needed to ward off the threat of genetic dilution, but the model relied on the subsequent tracking and contracepting of hybrid horses in the target area. Gabriela, visibly agog, whispered to Mary, "Repatriation? 'Contracept?'—are you people the animal division of the INS?" Mary explained to Gabriela that the entire Przewalski's horse population was descended from thirteen ancestral captive individuals and that the zoo kept tabs on the whole pedigree, now thirteen or fourteen generations. "Eat your hearts out, anthropologists," muttered Gabriela. The thousand or so extant horses spread out in zoos around the world were one of the great successes of *ex situ* conservation; each horse was carefully monitored and match-made according to genetic representation.

of the four surviving matrilineages. They were one of the species Mary and Dr. Thomson collected semen from by electro-ejaculation at surgery.

The hand bell was being rung to call the audience back to the auditorium for questions. Mary asked Gabriela one last question as they returned to their seats. "Where are you going to be studying this year?" "Well," said Gabriela, "after the conversation we have just had, I think I might try the zoo." "Great," said Mary. During questions they exchanged e-mail addresses on sections of Mary's wine-stained napkin that she pulled out of her pocket.

Gabriela began visiting the zoo research department about once a week, for a morning or afternoon in the lab, or a lecture or veterinary procedure. Sometimes she just watched and listened; occasionally she would ask questions or interview people. Mary and Gabriela always had lunch or a coffee together on these visits and often went through the back entrance of the research buildings into the zoo proper to see the animals. Gabriela was as interested in who came to zoos as in the animals themselves. She commented on the high number of African American and Latino families and pointed out to Mary that all the black girls at the zoo had elaborate plaits or cornrows and barrettes and hair fixtures, not the middle-class (straightened, parted just once, and virtually unadorned) hairstyles worn by the few black girls at Mary's children's school. Gabriela joked to Mary about how subversive it was for her to be coming to see caged animals as an upwardly mobile black. "Like a successful black homeowner going camping in the wilderness for pleasure!" she said. Mary grinned and winced; that was one of the things Mary really enjoyed doing with her husband.

Mary began to decipher a hitherto hidden reality around her in the comings and goings of people. Gabriela in turn was more and more drawn to the interfaces of human skills, technology, and animals that piece by piece built up the facts of Mary's research world. And she was more and more interested in the comparisons and interactions between the ways humans and animals were sorted and valued through access to and constraints on reproductive possibilities. Mary's and Gabriela's main medium of communication was e-mail, and after a month or so of seemly missives, their correspondence became increasingly playful. Mary saved all Gabriela's messages and knew that they were friends.

About the time that they started spending most of their zoo-visiting lunchtimes at the nonhuman primate exhibits, Gabriela started addressing Mary as "the Virgin" in her e-mails. Mary complained vigorously in her response to the first such message, pointing out that she had had no say in her naming and that, anyway, she was not one. Gabriela wrote back that it was an acronym celebrating Mary's daring in deciding in surgical delicto flagrante to contracept herself. Gabriela now used the active verb "to contracept," which

the animal researchers used, as often as she could for humans, so as, she said to Mary, to be able to see through the euphemisms of choice that drenched all human discussions of contraception. But, Mary wanted to know, what did the acronym stand for? Already Mary could tell that she was going to let Gabriela get away with this, like everything else Gabriela teased her about. "Virtual Impregnation Required; Gonads Inaccessible Now" came back the one-line response.

Pygmy chimpanzees, bonobo chimps, *Pan paniscus*. The pygmy, or bonobo, chimps were Mary's and Gabriela's favorite animals in the zoo. The "habitat" exhibit was less ghastly than many primate exhibits, and the individuals on display were alternated so as to give each bonobo a break from public human scrutiny. Nonetheless, two or three hours watching these animals confirmed Mary's feeling that, endangerment notwithstanding, captivity and display was inappropriate for this species. The first day they spent on the bench at the bonobo exhibit they watched an oldish-looking male walk off and try to position himself to pee so that he wouldn't lose face with or offend either his fellow bonobos on one side of the glass or the public on the other. "Poor sod," said Gabriela.

The "bonobo bench" became Mary's and Gabriela's locale for serious discussions of reproductions. Gabriela spoke with the primate behaviorists at the zoo and some of the itinerant graduate students and other researchers working on nonhuman primates. She found out that the boundary between what humans and nonhuman primates were supposed to be able to do was still the Holy Grail, and still shifting continuously. Now that language was no longer the separating criterion, the researchers were looking to conscious cognitive and social capabilities that carried eerie echoes of justifications of slavery and colonialism, apartheid and prohibitions on miscegenation to Gabriela: the ability to have abstract thought, to self-represent, consciously to navigate by cognitive maps, to maintain complex social relationships over space and time, to delegate work to other animals and things, to engage in symbolic cultural transmission. Mary tried to convince Gabriela of the social and moral virtues, as well as the truth value, of decreasing the cognitive gap between humans and nonhuman animals. Gabriela in turn tried to make Mary see that if you were going to keep looking for this gap, you had better make sure that all human beings fell on the right side of it, because history showed that it was by no means self-evident that they all would.

Gabriela also spent a morning with the reproductive endocrinologist, Dr. Patten, who was a specialist in great ape and pachyderm fertility. Bemused, Dr. Patten tried to think of compelling examples of great ape infertility, teenage pregnancy, and homosexuality for Gabriela. Mostly, thought Dr. Patten, these were conditions that showed up under stress, in captivity or, in the case

of homosexuality, as a means of brokering conflict. The incidence of infertility among the great apes in the wild was so low that primatologists usually measured the end of subadulthood and the beginning of adulthood for females by the onset of the first pregnancy. Captive great apes such as Penny Patterson's sign language-using gorilla, Koko, however, quite often had problems getting pregnant. Many of Biruté Galdikas's ex-captive orangutans were sexually precocious, becoming pregnant while still of an age that was labeled by Galdikas as "adolescence" for the wild orangutans of Kalimantan and leaving little space between subsequent births. And a groundbreaking study had just been done on female/female sexuality among the masterfully reconciliatory bonobos here at the zoo by Franz de Waal and his students. Gabriela thanked Dr. Patten profusely for her time and ran to get Mary. "Drop what you're doing, Our Lady Maria, let's go!"

On the bonobo bench Gabriela talked fast and furious. "It's all there," she told Mary; "all the links are there." "The ethologists thought the problem was anthropomorphism and that the human-centeredness had to be purged when we studied nonhuman primate behavior. And we've been struggling ever since on how to bring back in the knowledge gained by experience of, and empathy with, the apes. But "bias" was never one way only; the zoomorphism was always there too; the traffic had to go both ways and told us what was noble and what pathological; which animals *and* which people were *sui generis* and so worth caring for . . ." "Hold on, hold on," said Mary. "What's been going on? I'm completely lost. Dr. Patten told you this?" "No, but she told me that the apes enact the sins of modernity too, and do so *pace* Margaret Mead—did you know that unnatural orangutan upbringings create dysfunctional adolescents who have teenage pregnancies and don't understand optimal birth spacing? Doesn't that sound a bit like a racialized narrative of the reproductive predicament of the urban poor and the developing world that you've heard somewhere before? There's a primatologist who calls these orangutans 'rehabilitants' when she tries to return them to the wild—we blame their social environment, but that environment is nonetheless criminalizing."

"But there's more," Gabriela continued. "I've cracked the problem of how to become a scarce and highly valued reproducer. My great grandparents were owned, and so was their reproduction; their children were chattel, someone else's property. Like cattle or chickens, right? But more flexible. The endangered animals here all have highly valued reproduction; in fact, we even swallow disgust that anyone would place these amazing bonobos in a zoo in the name of the scarcity and value of their offspring to be. We don't ask, 'How did this ape in front of me come to be more precious than my great grandmother?' because the answer is self-evident—or so we think—scarcity of the species. That's the main sorting concept between indentured humans/domes-

ticated animals on the one side and free humans/wild animals on the other, right now. But if you think about human reproduction, we go to extraordinary lengths to enable wealthy infertile couples to reproduce their one or two infinitely precious offspring; well, lo and behold, the most upwardly mobile of all the apes, the quasi language-using Koko of the Palo Alto Hills, turns out to have been infertile and to have needed reproductive technologies. She surpassed my great-granny in recognized cultural capital, and while granny was dropping babies in the sugarcane, of unasked-for paternity, to increase plantation property, Koko was getting the chance to bear an intrinsically valued child, no matter the cost. QED!" Gabriela was ablaze and excited. "And, what's more, it turns out that the Greeks were right about homosexuality and a stable polity; only difference is, if we believe the bonobos, it was the women, not the men, who kept it all together!"

Mary queried and protested, of course, as she always did. She replied that the reproductive politics of endangered species were far more complicated than Gabriela thought; that the hierarchy of animals had its own politics; that hybrid and domestic strains often got the most resources; that many conservationists were more interested in dynamic systems' well-being and process and variety and in their own way were a major force for diversity and could be thought of as the multiculturalists in a field dominated by the often nativist, preservationist types. She also said, thinking of couples she knew who were going through infertility treatments, that seeking medical help for infertility did not at all mean that your reproduction was highly valued or that you had vast resources.

While Gabriela was doing fieldwork at the zoo, Mary started to collaborate with a woman named Eva Avery, embryologist and senior lab technician at a nearby infertility clinic. They met at a Tap Pharmaceuticals-sponsored lecture on the new techniques for maturing unripe human eggs *in vitro*, which was held at the university Faculty Club. Mary, Dr. Thomson, and Dr. Patten were there in connection with their spay clinic project. Eva was there to get any tips going to help her set up *in vitro* egg maturation to improve her clinic's egg donation program. If she could freeze ovarian tissue obtained from willing donors at the time of tubal ligation, then she could defrost and mature eggs for donor egg cycles of *in vitro* fertilization without having to go through the costly process of getting donor's and recipient's menstrual cycles synchronized. It would also relieve the expense and risk to the donor of going to surgery specially for egg retrieval. Like the eggs of other large mammals, ripe human ova were very difficult to freeze and thaw successfully. Eva also had another motivation for acting fast. She had a case of a young woman who was about to undergo chemotherapy. The woman did not have children yet but did not want to lose the chance of having them in the future. As she had no



partner in mind at present, the possibility of making in vitro embryos and freezing those for future implantation was not there. Eva was hoping successfully to be able to freeze some ovarian tissue for subsequent in vitro egg maturation, when the time was right.

Dr. Patten, in her rather gruff manner, introduced herself and Mary to Eva. Dr. Patten had long believed that human infertility clinics and zoo reproductive endocrinologists and physiologists should share expertise, and was she envious of the resources that endocrinologists and embryologists at infertility clinics had. The clinic where Eva worked had opened about a year ago and was unique in the area for its huge technical budget. The clinic had been designed especially for infertility procedures and included egg and andrology labs that connected directly to the operating room, and a video linkup that enabled patients in the operating room to watch their gametes and embryos as they were being manipulated in the lab. Dr. Patten began the conversation by "reminding" Eva that the biochemical urinalysis that was a mainstay of choreographing the timing of infertility procedures had been developed for nonhuman animals. "It's not just mice and hamster ova that you got from us." To Mary's surprise, Eva rose to the challenge and offered to come down and look at the facilities at the zoo and see if she had any equipment she no longer needed, or reagents that had passed their human sell-by date that would still be fine for experimenting on spay clinic tissue. She also offered to show Mary, Dr. Thomson, and Dr. Patten around her labs and teach them what she knew about micromanipulation and freezing and let them practice on her teaching microscopes.

Later in the week, at the bonobo bench, Gabriela debriefed Mary. "How come you didn't invite me to the lecture?" "It didn't occur to me that you'd be interested in a Tap Pharmaceuticals event." "But they're going to freeze ovarian tissue with undeveloped follicles in it; and girl's ovaries contain germ plasm from early on in gestation. That means they could use the ovaries of aborted female fetuses and stillborn female fetuses to help menopausal women get pregnant, couldn't they? Did they talk about that? That could really screw up the succession of generations!" Mary assured her that no scientists in America would want to touch anything to do with abortion. "But why?" insisted Gabriela; "you could easily imagine it being marketed for right-to-lifers the same as organ donation: 'Your chance to turn death back into the gift of life.' Hey, we could even bank the unripe eggs and racialize and meritocratize them like they do the sperm in sperm banks: 'Sample number 7B: mother never lived, but had she lived, would have been attractive black woman with Nobel prize who played varsity volleyball' . . ." "Stop!" demanded Mary. "No one's going to start farming or raiding abortuses any time soon."

Eva and Mary visited each other fairly frequently. Mary acquired micro-

manipulation skills that enabled her to insert a single sperm under the zona pellucida of an egg, using a hand-blown micropipette, a high-powered scope, mouth suction, and a little acid tyrodes. Stunning a fast-swimming sperm by thwacking it on the tail with the pipette tip and then sucking it up the pipette tail first was the most difficult skill, and it took several sessions on the teaching scope to get it right. They used "reagents" to practice on, arguing that they were acquiring skills, not experimenting. "Reagents" were patients' gametes that had passed into the "junk" category for such reasons as failure to fertilize, religious objections of source patients to freezing or donation of excess gametes, polyspermic fertilization, necrosis, arrested development. Eva proclaimed Mary proficient and stopped her training the day she got what appeared to be a viable fertilization. Eva destroyed the two pro-nuclei-stage embryos the next morning, despite the temptation to watch them grow. She did not want to dabble in life after death and was rid of the pre-embryos before they entered the "resurrected" category of embryos, with all the legal and moral registrations of the lab that would bring back into effect.

Eva, for her part, acquired access at the zoo lab to cat and dog ovarian tissue and to premises where it was not contravening OSHA or Animal Welfare regulations to work on nonhuman gametes other than frozen mouse or hamster eggs. Eva let Mary have a decent haul of superfluous clinic equipment, in exchange for a day spent doing the cleaning and inventory in preparation for Eva's in vitro lab certification. During the course of that day, Mary found out a little about how Eva had ended up in the field and some possible reasons why she was making a connection with reproductive technologies at the zoo.

Eva was the mother of two girls, born three months apart, because it took Eva a few more cycles than her partner to get pregnant using the rudimentary turkey baster version of artificial insemination that they had both used sixteen years ago. Wanting a family, but not being able to decide who should bear the baby, she and her partner had decided that twins would be fine. The sperm came from a mutual friend, masturbated into sterile specimen cups, in the bathroom at Eva's apartment. The friend liked masturbating and hated the idea of paternity, so what seemed to Eva in retrospect to have been an appallingly risky and low-tech business had gone smoothly. The girls were great, too. Eva had custody of both of the teenagers now, although it was not called that because there had been no contest over where they should go when Eva and her partner split up. The girls wanted to stay put and to stay together.

Eva had been trained as a cytogeneticist and had received the biggest shock of her life when she karyotyped a chimpanzee somatic cell for the first time, in connection with a project for the Center for Disease Control. She had simply not been prepared for the similarity between human and chimp

chromosomes. Her daughters' conceptions, and a fervent commitment to safe options for lesbian and gay parenting in the age of AIDS, had subsequently induced Eva to become involved in a local sperm bank, which in turn eventually led to her applying for and accepting a job in an infertility clinic. She was an excellent technician and welcomed the involvement of patients in their treatment. The physician directors of the clinic did not want to lose her, and she enjoyed a large degree of autonomy in the lab.

Gabriela met Eva on a couple of occasions and got on well with her. One evening Eva came down to the zoo labs after work to try a new egg-thawing regimen with Mary. Mary's children were camping with her husband for four days, and so Mary was free to work late. Gabriela came down too, armed with the accoutrements of her latest enthusiasm, a video camera and tripod. Gabriela was going to take some more ethnographic film of Eva and Mary at work, she said. Mary pretended not to notice Gabriela's incorrigible hand in the label scribbled on the spine of the videocassette: "CVS (Cogito Virgo Sum); Parts I and II." CVS was the chorionic villi sampling procedure that Eva had taught Mary a couple of weeks ago. In humans it was used as an earlier diagnostic test for genetic anomalies than amniocentesis. Its advantage was that it allowed "therapeutic abortions" to be carried out in the first trimester of pregnancy, rather than well into the second. Mary and Dr. Thomson agreed to learn how to do it on the zoo animals so as to collaborate with the geneticists, who wanted to establish some baseline data on inherited diseases and inbreeding. Gabriela had filmed the session just because of her fascination with the expression "therapeutic abortion" and the idea of incest—inbreeding—in nonhumans. At the bonobo bench, though, she had later told Mary that she felt as if she had seen the web of constraint and possibility extending into and out of the previously inscrutable, inseparable bodies of mother and fetus; had seen the opening, separating, and attaching of facts and values by linking biological skills and technology to the fetus via its extracted and cultured cells. She couldn't stop thinking about the proliferating trails moving between in utero and ex utero. "Mary, Mary," Gabriela intoned almost plaintively, "what I didn't realize is that there are so many ways to be a Virgin."

Gabriela's filming of the thawing that night became another entry in her anthology of taken virginites; of trails in and out of impregnation and gestation. After they had finished their work, the three women decided to go down into the zoo proper. They used the microwave to reheat some coffee, which they put in a flask, and locking up behind themselves (including relocking the frozen zoo that Mary had deactivated to allow them to work late), they made for the bonobo bench. The bonobos were nowhere to be seen, asleep somewhere probably. The women sat down anyway, and the indefatigable

Gabriela began to talk. As she talked, Mary realized that Gabriela was talking about herself, something that, for all her openness and loquacity, Gabriela rarely did. The dark and the late hour and the privacy of the abandoned public place made for intimacy.

It turned out that Gabriela had a northern European lover waiting for her back in London. She joked to Mary and Eva that she had been so successful in acquiring the academy's baggage of mobility—posh accent, good hair, short fingernails, dowdy clothes—that she had selected herself out of all but a handful of intellectuals in her choice of mate. "I really like him. I'm even into the whole genetic parenting thing; I'd like to make babies with him—or one, anyway. But this is what I'm scared of: you hear of those tricks of nature where a black person and a white person produce a blond-haired child. Of course I'd love the child anyway, but when I think of being a mother to a school-aged child, I imagine a black kid in his suburban school having everything I didn't have, but being able to resist at the same time; you know, a dose of 'in your face' blackness." They were all laughing, and the warmth disarmed Gabriela. "So this is what you two can do for me: can you use your reproductive technologies to engineer a bit of genetic essentialism? Do you think you can make sure my baby is black enough if you grow the embryo in the lab? I'll get Anders to Fed Ex us a few cryovials of semen, and we can have conception without penetration for racial purity, just like those Mongolian horses of Dr. Walker's . . ." Gabriela, Eva, and Mary began speculating about what they would have to do; how long it would be before gene therapy could be deployed in that sort of way; and whether the conglomerate of things that made someone count as black enough in different countries today was the kind of thing that would ever be amenable to therapeutic incision or excision from chromosomes. "The only gene therapy procedures we have at the moment involve biopsying an entire cell from an embryo, and then, if the problem genes are present or if the chromosomes are male in sex-linked diseases, we just throw the embryo away; if they are absent or the embryo is a girl for sex-linked diseases, we go ahead and implant," lamented Eva. "These procedures are not exactly fine-tuned yet."

"Well, that's my Virgin fantasy; what about you two?" said Gabriela, deflecting the intimacy from herself without stifling it. Mary denied having any, but Eva immediately began. "You must know why I'm here so much; what my interest is?" Gabriela and Mary looked nonplussed but sat up in anticipation for the revelation. "You know the micromanipulation techniques we use for severe male infertility that I taught you, Mary? If you think about it, you manually put the sperm inside the egg for fertilization. So we don't need sperm morphology for fertilization anymore; it's just the chromosomes and a few activating proteins, right? What I would really love to do is to take two eggs

and fertilize one with the other. Not as the only way to get pregnant; not as parthenogenesis; no cloning; fully normal meiotic recombinant reproduction; just combining two eggs, rather than having to involve sperm. There are some guys who tried it on mice and found that there was a problem with the placenta—but if it becomes possible eventually, I want to know how to do it.” Gabriela was impressed. Mary was shocked. “Is it legal?” demanded Mary, “and what responsibility do I have if you’ve been doing this in my lab?” Eva reassured her; Mary settled into the idea, and the three of them sat quiet for a while, sipping their coffee and mentioning the need to go home as it was getting late.

A scuffling from the bonobo exhibit saw a female bonobo come into view, dimly lit by the night-lights on the visitors’ side of the glass. The bonobo peed decorously and disappeared from view again. Mary found the night prowling strangely moving; exactly what she might have done. “That’s mine,” she said quietly. “Your what?” asked Gabriela. “I’ve just thought of my Virgin fantasy.” “Tell us, Mother of Us All!” exclaimed Gabriela, delighted and fully animated once more. Eva grinned, too, and leaned forward. Mary looked shy, which was normal for her, but began. “Well, I work all day with these highly endangered species, and their gametes and embryos. Meanwhile, my human reproducing is over. But my pituitary hasn’t got the message and churns out the same old hormones; I plump up a juicy endometrium every month, of proven fertility, and then shed it in that endless cycle of sapping and waste. I could use that uterine lining for some of the embryos; I could gestate endangered animals; “donor embryo, or gestational surrogacy” as they call it in your field, Eva. I wouldn’t kid myself I was being saintly; but that’s the whole point about the Virgin, isn’t it? You can’t know—even if the emissary Gabriela comes to you in your reveries!—which gestations will save the world. The ethics of rearing the baby myself or reintroducing it to zoo bonobos or the wild would be hellish to decide about,” Mary continued, fast. “It’s the erotics, really, that’s the fantasy. Having a bonobo growing inside me out of my own proteins into a different species; the honor of the international VIP guest pregnancy; watching my stomach stretched from the inside by furry hands and feet; breastfeeding an ape child . . . the politics could come later.” Gabriela hugged Mary; Eva said “Yuck!”; they all laughed. Mary felt a mixture of exhilaration and embarrassment, for having spoken. “This is wonderful; we have to get all of these down on the camera next week; CVS Part III!” declared Gabriela, dancing with pleasure, as the three women started toward the zoo exit. In fact though, all three of them knew that the fantasies they had just exchanged would not ever become part of Gabriela’s ethnographic record; the moment of confession had passed.

Shortly afterward, in early May 1995, a guy with a neatly trimmed beard

and cowboy boots came to the zoo, and Professor Walker brought him into the lab to meet Mary. Mary was told that he was a field biologist with the Arizona chapter of the Nature Conservancy. Thinking of what Gabriela would say, she decided that the cowboy boots were part of a uniform that he imagined gave him access to the southwestern rural communities among which he worked. He seemed nice, actually; that disarming and compelling combination of enthusiastic, earnest, and nerdy that characterized many conservation biologists. Why there weren’t more prominent women in conservation biology Mary didn’t know. The men were outdoors types but feminized in many ways: nontraditional career trajectories, mission scientists, activists for a more just and more interrelated world. Mary was being offered the chance to go and stay on a cattle ranch in southwestern New Mexico for a few days to collect tissue samples from an endangered species of quail and the threatened Chiricahuan leopard frog.

Mary wasn’t sure whether to go, but Professor Walker was excited. At something of a juncture in his own life, he was pushing formally and informally for links to be made between the *ex situ* and *in situ* conservation communities. “It’s the age of unholy alliances,” he told Mary in his office that afternoon. “Five years ago the Nature Conservancy would have bought out the cattle ranches those animals are on and left the wildlife in preservationist exclusion to flourish or flounder. Or at least they would have bought conservation easements on the land, exchanging cattle for quail, ranchers for curators. Now this guy is on the same side as the cowboys, working for them, helping them get the science they need to benefit from the wildlife on their land, as a side product of reclaiming their grasslands. Their existence is marginal, and many of them are in debt. They’re going for increasing stocking rates of cattle *and* wildlife species, to stop the carrying capacity for ranchers dropping to zero and forcing them off the land! A couple of months ago the cowboy president of the group went on TV telling the nation that now that the Soviet Union had fallen, cooperation over land use was possible—we could be witnessing a new era in American politics and history, Mary. Please go. I’d go myself in a shot if it wasn’t such a critical time for the Przewalski’s reintroduction.”

Mary was sitting in the middle of the front bench seat of a truck, about an hour before dawn, driving on a superior version of a dirt road toward the Arizona/New Mexico/Mexican border and Guadalupe Canyon. Breakfast at the ranch where she was staying had been a plethora of fried foods served at 5 A.M., which her sleepy stomach had refused. The tall, gaunt, and handsome rancher who was their host drank milk by the glassful, perhaps to loosen his stiff, cowboy bow legs that, together with his poor hearing, made him seem older than his fifty-nine years; the visitors drank tepid instant coffee.

and the two men in the truck were on their way to meet with a local Fitzcarraldo type who pumped considerable land management skills, private money (Mary gathered that he was an heir to some part of a beer fortune), and enthusiasm into the area. On the way they were going to stop off at a colony of the leopard frogs, where Mary was hoping to get the frog tissue samples she needed. She would also take some samples from the non-native bullfrogs that were preying on the leopard frogs, and the geneticists could give her some hybridization and genetic drift information when she got back. Yesterday she had gone with the TNC guy to set traps and get the quail samples, so things were going well.

The altitude of about five thousand feet gave them a view from the truck in all directions of the desert scrub and tobosa grasslands, the coniferous peaks rising to eighty-five hundred feet, and the canyons and riparian corridors filled with sycamores and cottonwoods, amid the lichen-covered rocky semiarid landscape. Dim shadows and light were cast on one side by the full moon still high in the western sky, and from the other side by the sun not yet up but already lighting the underside of the clouds and the tops of the hills on the eastern horizon. Mary could not remember seeing so much space; it was, as they say, breathtakingly beautiful.

On one side of Mary, at the wheel, sat her cattle-ranching host, Bill. She watched his weathered face, which was just a few inches from hers, remembering the tales of mountain lion hunting he had told the night before, at the dinner of more fried meat, which itself had followed an ad lib saying of grace. Suburban Mary had listened to the hunting stories intently, confused by the mixture of killing, love of the animals, and the give and take of the land. What had happened to the Indian and Mexican inhabitants of the area whose photos adorned the ranch walls, Mary wondered, and what role had they played in the ecosystem of the area in previous centuries? Clearly it was a long time since this area had been wilderness, whatever that meant, even though it was so sparsely populated. The land now had so much brush that it only supported one cow per fifty acres, and it took about fifty thousand acres for a family of four to scrape a living off ranching. When Mary heard the stocking rates, she understood why the human fertility rates of one or two children (and in some families, a single girl child—like Professor Jung) were so low. Only the Fitzcarraldo guy had a luxurious third child. Mary should get these people in contact with the Australian population control guru. This was a rural Protestant population that obviously knew how to use condoms or abstinence; the land was not productive enough to justify dousing it with many exogenous chemicals, so it was not likely to be infertility caused by contamination of the water. On the other side of Mary in the truck sat a board member of one of the major private funding foundations. He was also a prominent

member of the East African conservation community and a pioneer in community-based conservation, it turned out.

Several hours later, but still only the middle of the morning, they were sitting around a table drinking more coffee (this time freshly ground, with hot milk) at the Fitzcarraldo guy's ranch. The frog tissue samples were safely in their Styrofoam containers in the back of the truck. The bearded Fitzcarraldo had shown them the areas that had been burned as part of a let-burn and prescribed burn policy that flew in the face of fifty years of Smoky the Bear "no fire" land management in the United States. The three men had examined the burn, discussed its heat, and marveled at the regeneration of young palatable grasses and seedlings in its wake. By burning lands in rotation, they hoped to improve cattle-stocking rates and fight brush encroachment. To burn systematically, or to rest land from grazing, landowners and federal agencies had to cooperate, so that cattle could be moved off one person's or agency's land and onto another's when necessary.

The second proactive element of the cattle ranchers' group was what they called "grass banking." Gabriela would like that expression, thought Mary; sounds wonderfully pre- (or perhaps post-) capitalist. Grass banking involved the conservation organization buying conservation easements from ranchers, exchanging promises not to develop or subdivide their land in the future, for the lost land value as calculated by land assessors. This hypothetical dollar value was then redeemable for the use of charitably held grasslands where the rancher could graze his or her cattle while resting or burning or reseeding his or her own land. The idea, Mary was told, was that the whole thing could be managed locally, be advantageous to both conservation and the local economy, and be self-sustaining. This did not sound like the usual conservation debates, on which she and her zoo colleagues based their assessments of the dismal future facing biodiversity. It was more than "sustainable use," and it certainly wasn't preservationism. She would have plenty to tell Professor Walker when she returned.

Fitzcarraldo had also shown them his new landing strip and hangar that stood atop a peak immediately behind his house. To build the strip, Fitzcarraldo had simply had the top taken off the mountain. He might as well have topped a boiled egg with a silver spoon, thought Mary, struck by the scale and daring of it all. Mary sat at the table, only half paying attention to the three men. It occurred to her that if she drove out straight after lunch she could return to California a day early. She decided that that was what she would do—call her family from Tucson airport and get in late tonight. Suddenly Mary's attention was brought back to the table. The East African guy was proposing something outrageous, and Fitzcarraldo and Bill were nodding seriously and joining in with their own elaborations. Mary turned a little in her seat to face

the East African. The man spoke with the clipped, neutral accent of a descendant of the British colonial elite who had refused himself to take on the more drawling expatriate version of the queen's English and the colonial relations that went with it. He seemed to be making two equally preposterous suggestions.

First, the East African was equating the grass banking to nomadic pastoralism and was inviting representatives of Bill's and Fitzcarraldo's group to come out to East Africa to learn from pastoralists there about drought refuges and intensive but shifting, communal grazing and how to improve cattle-stocking rates by moving cattle with the wildlife migrations. In turn he was suggesting sending some Maasai out to see if they could learn anything from the New Mexican cowboys. Mary was startled by the idea that Maasai would get on the plane to check out some Americans' ranching operations and then flit back again to instruct their novice western counterparts in how to get grass banking right—the combination of modern mobility with traditional land tenure, along with the reverse of the usual direction of flow of expertise and information, was galvanizing. Fitzcarraldo looked about ready to book his next vacation.

Bill was so involved in working out the details of the other suggestion that his East African safari itinerary was temporarily on hold. The other suggestion was that Bill and his neighbors should take delivery of a cargo of elephants. The East African knew a few places where there were too many elephants to be compatible with other land uses and biodiversity—somewhere near Mount Kenya, it seemed. Rather than cull them or have them starve themselves and a lot of the other species that depended on their presence for grass regeneration, he was proposing to ship twenty or so over. He reckoned they could stand the winter cold, coming from the slopes of Mount Kenya, and he guaranteed that they would chomp their way through thousands of tons of unpalatable brush and open up grassland for Bill's cattle. What was more, he was claiming that rhinos or elephants were just what was missing from this landscape. The Pleistocene extinctions and recent overhunting had wiped out the large browsers that this vegetation evolved with and depended on for succession and its variety of habitats. Elephants would fill an empty ecological role and restore diversity-creating dynamism to the system. Mary was reeling. Sending in pronghorn or Coos deer was one thing, or even bringing in some wartime goats to eat what nothing else would eat. But savannah elephants? The most exotic of the exotics! Preservationism was antediluvian; sustainable use had been surpassed, and now it seemed that nativism, too, was out the window. Bill had taken it all on board with absolute equanimity and was wondering aloud whether the nearest airport at Douglas, Arizona, had a strip long enough to land the size of plane that would be required to transport elephants.

Driving herself back down the Geronimo trail toward Tucson, Mary considered the possibility that elephants might be as natural ascending the slopes of the Madrean Sky Islands as those of the Aberdares and Mount Kenya (even if the East African had been exaggerating, to get the ranchers to think adventurously). It was a delightful twist in the annals of appeals to nature to justify conserving one kind of life or another. Mary was beginning to make the links between the *ex situ* and *in situ* wildlife conservation that Professor Walker was so keen on and the links between human and nonhuman reproductions that she was learning to track with Gabriela. Whose reproduction was valued and by whom, and whose reproduction was owned and by whom. Ownership and value were enunciated through an intricate articulation of all sorts of possible and partially conflicting utopias, all sorts of potential futures worth caring about and investing in. Resistance and oppression resided in the very same niches, but one had to dare to transgress.

There was a phrase that Gabriela used: "Dare to know." She said it came from Kant and was probably really about a masochistic process of disembodiment required in the act of knowing that had been proposed as an antidote to the off-the-shelf Cartesian version of disembodied knowledge. Gabriela thought it was important because it recognized that knowing was acting and that knowing was tied up with a moral self. What interested Mary was the connection between building a self and daring to know the world. She hadn't thought that much about it, but she suspected that the moral trick in knowing was being able to move to and with other places and points of view. Taken right, that was the true privilege of mobility. Her mistake, her middle-class heritage, was that she had grown up sorting the good from the bad according to a stable self, a static point of moral reference, fallible only insofar as she failed to live up to the standards of the institutions of family, school, church, and a democratic polity that calibrated that point of reference. Working with animals, and more recently, seeing the huge variation and interconnections in human points of view, had slowly shown Mary the arrogance of such moral passivity. You had to have compassion for the bonobo, for the rancher, for the director of the zoo, for the slave owner and the slave, and for the hunter and the hunted. This meant being prepared to have the whole self move, not simply collapsing into the object of study—the sentimental anthropological fantasy of "going native"—or ethnocentrically translating the object of knowledge into your own scheme of things. Compassion didn't stop you from judging or acting; it was the precondition of it.

When the three men had been talking about bringing in exotic animals to increase indigenous biodiversity, Mary remembered Professor Walker's words about "unholy alliances." Her reflections on compassion and the plurality of values it entailed seemed to come full circle. She had been seized by the

boldness of the possibility, so graphically elaborated by the East African and Bill, so instantly assimilated and normalized. The principal thing that Mary derived from these two days was that she now had no excuse not to act. Arriving at the Tucson airport, she failed to call home to let her family know that she would be home early.

It is just after midnight, and Mary is parking her car at the zoo, pulling into her place with her headlights already turned off. She has not gone home, and she has let no one know that she is back. She gets out of the car and runs for the outside door to the research department. She lets herself in and heads for her lab. She hastily prepares some equipment and goes back downstairs to the frozen zoo. There she deactivates the Chinese lock and then the regular bolt. She then punches in the combination for one of the freezers. She knows that each time one of the combination numbers is used, the time and date are automatically logged, for security reasons. It is a risk she is willing to take, though; no one but herself and Dr. Thomson ever checks the logs. Using a pair of huge insulated gloves, Mary reaches into the liquid nitrogen and brings out a straw containing four bonobo embryos. She closes up the freezer and the room again and heads upstairs with her precious contraband.

Mary works frantically for the next couple of hours, feeling no fatigue, only a pulsing exultation. The embryos are thawed, her blood is drawn and prepared; the embryos are examined for viability. It is day fifteen of Mary's cycle; she hopes the timing is right. With the bonobo embryos and Mary's serum in petri dishes in the CO<sub>2</sub> hood and the Edwards catheter from Eva's lab ready to go, Mary undresses her lower half, swabs her genital area, and scrubs her hands once more. She takes three painkillers and an antibiotic. Mary then loads the embryos into the catheter, watching her actions through the microscope. She gets onto her makeshift bed—the lab bench with the microscope on it, covered with semisterile disposable sheets they use for the animals. Using a speculum and a mirror to guide her, she inserts the flexible catheter tip into her vagina and gently through the opening of her cervix. She breathes deeply for two or maybe three minutes, before pulling back slightly on the catheter to make sure that it is inserted fully. Everything is OK. Mary exerts pressure on the plunger, releasing the serum containing the bonobo embryos into her uterine cavity. She waits for a further five minutes and then removes the catheter. Without getting up, she shuffles her bottom slightly, so as to be able to look at the catheter tip under the microscope once more. There are no embryos in sight. At least some of them must be inside her. Mary puts down the catheter and lies back to wait. Eva always has the infertility patients stay lying down for two hours after embryo transfer, so Mary does the same.

Mary cannot relax, but she can lie very still. Her mind is racing, almost hallucinogenic; her body is rigid. Elephants and her own children and bonobos

and cowboys and Eva's girls and catheters and Maasai warriors and Gabriela and the cheetahs are swirling around her; one moment she is pregnant, the next minute she has lost it all in a monthly bleed; then she is choosing names for her bonobo babies, not knowing what sex they are and in her confusion, unable to remember how to tell the gender; a priest is leaning over her threatening that he cannot baptize them if she doesn't choose a name, but Mary doesn't know how to name them until she can find out which is a boy and which a girl; then she hears the bonobos at the zoo calling her, demanding their baby back, and an INS official is handing out visas to all the bonobos to return to Zaire; they are traveling first class on British Airways, and her babies are wearing diapers and sitting in car seats; then a flight attendant rushes out and says that Mary can come too, and she gets on and sits in economy, listening to the cries of her babies, so that she can go up and breast-feed them whenever they get hungry . . . Mary jolts herself back to the present. She is trying to bring herself back around, to clear her head, like chasing a terrifying nightmare that won't let you go even though you are defying it with obvious signs of being fully awake. Only forty minutes have passed since the embryo transfer. Mary is frightened.

Somehow Mary gets through the next hour and a half. Then she stays on the bench for another forty-five minutes, for good measure. Dawn has long since penetrated the lab, and Mary realizes that she probably has only a few minutes to get dressed and cleaned up before the ever hardworking Californians start to arrive for the day's work. Mary erases the trails of the night's activities as best she can and quietly lets herself out of the back of the building to have a walk. An hour later she returns, unable to be away from the scene of her crime, sure that she will be caught any minute, and only finding peace in being there to witness her own apprehension. Dr. Thomson is pleased that Mary is back at work a day early, and together they put in a thoroughly normal day's work. At home that night, Mary doesn't mention that there had been a change in her travel plans.

The daily routine of the next two weeks takes on a mantric quality. Mary's sleep is troubled, her every waking action the performance of a puppet, herself concealed and living out a wholly distinct and unseen narrative. The normality of everything around her is what passes the time. Mary tells no one that she is now a remorseless criminal (Gabriela had said that she especially liked Mary's Virgin fantasy because white middle-class Mary, keeper of the panda germ plasm, would never in real life know what it was like to be a potential criminal in the eyes of others). And Mary tells no one that she wants more than anything in the world for her bioterroristic act to succeed: she longs to be pregnant.

It is fourteen days after the embryo transfer. Mary has not yet begun to

bleed. She has had sex with her husband a few times since the transfer, but she has no reason to doubt the soundness of her tubal ligation; she is certain that if she is pregnant, it is with bonobo, not child. She goes to the bathroom and checks the toilet tissue one last time, just to be sure that there is no blood. There isn't. She drives to work and heads for the cupboard where she and Dr. Thomson stored the things that Eva gave them from her lab. There are some pregnancy strips past their sell-by date; Mary takes one of the strips out of the container, slips it into her pocket, and locks the cupboard back up. In the bathroom at the zoo she holds the strip under a stream of urine and then waits a minute, watching. "One Mississippi, two Mississippi, three . . ." The diagnostic band changes color, faintly at first, and then unmistakably. Mary is ecstatic; terrified; paralyzed. She wants to run out into the corridor and have someone else read the strip, someone else confirm the pregnancy and begin the anticipation with her, but there is absolutely no one; cannot be. Slowly she pulls her panties and jeans back up, looking tenderly, respectfully at her stomach as she does so.

What now? She has to have a plan. She goes to the bonobo bench to think. There are some obvious ground rules. No one must know, not her husband, not Gabriela, so she will have to conduct her life with a degree of privacy that she has had no need for until now. There can be no prenatal care or medical care of any kind, so she must stay healthy by herself. And she must find out all she can about hybrid pregnancies and bonobo babies so that she can be prepared and be a good mother when the time comes. Those are the three ongoing priorities, she decides. The fourth issue is what to do when the baby or babies arrive, if all goes well. There are three options, as she sees it now. There is the Moses solution; she can simply leave the baby on the zoo doorstep in a wicker basket. Or she can have someone take the baby (or take it herself) to somewhere where it has a chance of surviving in the wild. Or she can raise it as her own. Each option is fraught with contradictions and shortcomings; none presents itself as clearly more desirable than the others. She resolves to wait and see how the pregnancy progresses. Watching the early morning play of the bonobo group in front of her, Mary feels herself slowly relax for the first time in two weeks. She stretches out her legs in front of her and rolls her shoulders back, sighing. Four bonobos are in sight in the exhibit, and, for a moment, Mary is completely and utterly happy.

As the weeks pass, Mary manages better than she had anticipated with her three priorities. Telling no one is hard, but not as hard as it might have been, given that she would have had no idea how to begin to tell anyone. She is more anxious that her body will give her away. There is morning nausea, but nothing like as bad as it had been with her other children, which she finds counterintuitive but interesting. She puts salted crackers instead of her

usual oatmeal cookies on her early morning tea tray, and no one comments on the difference. Then there is the fact that she is not cycling. The only person who would notice that is her husband. She decides to wait until he does notice, and say nothing in the meantime. About nine weeks into the pregnancy he asks her when she last had her period. She replies, offhandedly, that she isn't sure, a couple of weeks ago, wasn't it? The subject is dropped. And then there are the signs of pregnancy; the bloated tummy and the anticipatory breasts. Mary is slender, and her stomach is still small; in any case bonobo babies are quite a bit smaller than human babies, and gestation is shorter; Mary hopes she is pregnant with a singleton and that she can get through the majority of the pregnancy without her stomach giving her away. Her breasts are somewhat tender and somewhat fuller, but despite appreciative touching from her husband, he does not question.

Mary's health is good, and she ingests daily vitamin supplements and does all the sensible things she can think of like drinking water and taking moderate exercise. She is pleased with her body; how well it is coping, the hardness pressing out between her pelvic bones; the exquisite flutters of movement within her womb. Finding out about hybrid pregnancies in primates has proven a little bit more difficult. In particular, no one seems to be absolutely certain whether labor would be triggered by the fetus or the pregnant mother. Mary is worried about this because a bonobo gestation is about six weeks shorter than a human pregnancy, and her first two children were not born at all prematurely. She will have to make sure there is some oxytocin on hand. Although she is giving it increasing thought, she has made no progress on where she ought to deliver yet and whether she can seek help at that time.

At the end of September, about eighteen weeks into the pregnancy, Mary is invited to a going-away party for Gabriela. Relations with Gabriela have been a little distant lately. Gabriela has stopped coming to the zoo, in a mad rush to write up her data before returning to the United Kingdom. For her part, Mary has barely answered Gabriela's recent e-mails, addressed with unfeeling tenderness to some epithet or other for the Virgin. Gabriela's messages used to fill Mary with pleasure and excitement, but they now invoke such an extreme longing to bring Gabriela into her secret and her crime that she can hardly get beyond the Hail Mary's and Ave Maria's. The message inviting Mary to the going-away party starts "La Virgen con el Niño!" Alone in front of her computer screen, Mary bursts into tears. "Gabriela cannot be leaving," her sobs say; "Gabriela is my midwife, my partner in crime; if she goes, it will be unbearable." Nonetheless, Mary RSVPs in a lighthearted manner. On Friday evening she instructs a baby-sitter on her children's food likes and dislikes, as she and her husband change into party clothes, and the children dance outlandishly to getting-ready music. Mary is in the bathroom wearing just

pantyhose and bra, when her husband runs his hand over her belly, commenting on its firmness. For a second, Mary is stock-still, dreading, knowing that like this she could not lie to him. But he does not ask; just kisses her between her shoulder blades. She has learned in the last few months not to follow every comment with an explanation; a hard lesson for Mary, but one that is standing her in good stead in her need for privacy. As her husband leans down to pull his socks on, Mary longingly traces the outline of his bending torso with her eyes. Never has she been so separated from him. The party is lively, and Mary dances it away, hardly constrained by her condition. She drinks enough wine to be able to bid Gabriela an effusive farewell without breaking down.

A month later Mary receives a fax from the Chinese Academy of Sciences. The physiologist will be back in two weeks' time to check on the panda germ plasm and to take some more tissue samples. Within the course of a single week Mary reencounters the Chinese physiologist and the East African conservationist. Professor Walker had invited the East African to spend a day at the zoo on his next trip to the United States. He and three senior African research scientists spend a whole day at the zoo, including attending a lab meeting and trying out the new laser DNA sequencer that had been a gift to the zoo. There is still an annual ten-thousand-dollar servicing fee, and it still costs a few hundred dollars to run thirty-six samples, though, so the Africans are not convinced that they want one themselves; in any case the verdict is not in on what role phylogenetics should play in in situ conservation. The East African does not really remember Mary, but the sight of him reminds her of the conditions of mental clarity that had precipitated her pregnancy, this time completely disorienting her. She returns to the lab bench and picks up some work. "Routine, normality," she repeats to herself, one hand adjusting the scope and the other cradling the underside of her belly.

Early December Mary comes into work to find everyone in an uproar. The Chinese Academy of Sciences is concerned that there had been a break-in to the frozen zoo back in May. The physiologist apparently Xeroxed the security records before returning. No one has been able to account for the entry into the room or the freezer. Dr. Thomson asks Mary to let her into the frozen zoo. Fifteen minutes later Dr. Thomson has completed an inventory of the freezer and has found four bonobo embryos missing. Professor Walker is strutting and fretting. Mary looks stunned, which she does not have to feign. Then she asks to see the records and the inventory sheets for herself. They fax official reassurances to the Chinese that they are looking into it with every possible means at their disposal and will not let it happen again.

Toward the end of the afternoon Mary notices Dr. Thomson looking at her. Dr. Thomson asks her who she thinks could have broken in. Mary de-

fects that this is not an innocent question; but neither is it an accusatory one. It is a question of someone for whom a solution is starting to dawn but who is not ready yet to follow the solution to its logical conclusion. Mary turns the question around to Dr. Thomson. They come up with nothing. As Mary is leaving, Dr. Thomson asks Mary if she has gained a little weight recently, to which Mary replies that she doesn't think so particularly, but that she doesn't keep track of those kinds of things. In fact, Mary has only gained a handful of pounds, and in her loose clothes she certainly doesn't look obviously pregnant, but her waist has thickened and her stomach is rounded. Mary realizes that it is only a matter of time until Dr. Thomson can no longer refrain from putting the pieces together. That night Mary tells her husband and children that she has to go the following week for a ten-day research trip back to Arizona and New Mexico. This is the first time that she has lied blatantly and implausibly. She says that she will be back before Christmas and will call frequently. Her husband is surprised but so busy with his own end-of-term commitments that he simply complains about the increasing demands of her job and asks her to do the Christmas cards before she leaves. Mary tells Professor Walker and Dr. Thomson that she is going on a family holiday.

Mary leaves work the following Monday with a suitcase in the car and still no idea what she will do in the next few days. To lend some plausibility to her departure, she has a plane ticket to Tucson and a booking at a cheap hotel near the airport. Arriving at Tucson and checking into the hotel, she decides that Tucson was as good a choice as any. She has rarely seen a more anonymous place, and she can easily drive into the hills, even go back to the quails and frogs if she feels like it. The next few days are some of the emptiest Mary can remember spending. She sleeps a lot, although quite fitfully, eats in one or other of the appalling hotel restaurants, and takes walks up and down and behind the row of hotels and service entrances to the airport. She writes intensely ordinary holiday letters to her family and her in-laws and once-a-year friends and phones home every other night, inventing tales of leopard frogs that stand in as bedtime stories for the children.

Mary also tries to plan. The bonobo inside her is moving all the time now, and she knows that it only has a week or two until it is due by bonobo dates. She lies in the bath or in bed for long periods of time thinking about her condition, fantasizing more than she has ever done before, free to caress and touch herself. On the night of 22 December, a day before she is due to return to California, Mary experiences her first light Braxton-Hicks contractions. At first she is not sure, but in the middle of the night she definitely feels the uterine tightening again. She glances at the ampoule of oxytocin from Eva's that she has been carrying around with her, which is just visible in her open wash bag by the basin. Seems like she will not need to set up an IV after all. At



four o'clock in the morning she wakes up again, suddenly petrified. What the hell is she doing? What happens if she hemorrhages? Who will assist at the delivery? What will the baby need? Who will cut the umbilical cord? Frantic, she pulls her handbag toward her and switches on the light. She reaches for the phone and calls Gabriela in London, where it is the middle of the day.

Luckily Gabriela is in. "Gabriela?" says Mary, "can you talk?"

"Maria, is that you?" says Gabriela, taken aback, and instantly modifying her usual jocularly to anxious concern. "What's the matter, what's going on? Where are you? Of course I can talk."

Mary begins before she can give in to the urge just to hang up. "I did it, Gaby. The Virgin fantasy thing. I broke into my own frozen zoo and stole the bonobo germ plasm; I'm wanted back at the zoo or will be any day now, and my family thinks I'm on a research trip. Gab—I think I'm about to go into labor, and I don't know what to do." Mary is crying and choking. "But Gaby, it isn't all bad; the pregnancy is unbelievable . . ."

Gabriela is aghast. "Mary, are you serious? You did it? When!? But Mary, the Virgin can't be a bioterrorist! Tell me you're joking . . ."

"Gaby, don't you get it? She *was* a bioterrorist, a Middle Eastern one . . ." Mary is clearer now, pragmatic, but still desperate. "What should I do? I fly back to California tomorrow, and I've probably got a good twenty-four hours before labor proper. Please help me."

Gabriela is thinking fast. "I'm getting the first plane that's available. I'll be with you as soon as I can. In the meantime you have to call Eva. She will do the delivery. We'll take it from there."

"O.K.," says Mary, overcome with fatigue following on the relief that Gabriela has come through, that she has understood and is coming to be with her for the birth. "But Gaby, its going to be Christmas Eve; Eva's clinic will be closed."

"All the better; Eva has the keys and can let us in. Just call her now, and then call me straight back. I will speak to her too. Tell her everything. And I'll get there as soon as I can. Tell your family you will be back on Christmas day; if they protest, shower them with love and hang up. There's no bed in Bethlehem for you, Mary, but we will make absolutely sure that you have a couple of decent midwives and access to an operating room."

#### Note

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