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The Promises of Monsters: A Regenerative Politics for Inappropriate/d Others

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If primates have a sense of humor, there is no reason why intellectuals may not share in it. (Plank, 1989)

A Biopolitics of Artifactual Reproduction

“The Promises of Monsters” will be a mapping exercise and travelogue through mindscapes and landscapes of what may count as nature in certain local/global struggles. These contests are situated in a strange, allochronic time—the time of myself and my readers in the last decade of the second Christian millenium—and in a foreign, allotopic place—the womb of a pregnant monster, here, where we are reading and writing. The purpose of this excursion is to write theory, i.e., to produce a patterned vision of how to move and what to fear in the topography of an impossible but all-too-real present, in order to find an absent, but perhaps possible, other present. I do not seek the address of some full presence; reluctantly, I know better. Like Christian in *Pilgrim’s Progress*, however, I am committed to skirting the slough of despond and the parasite-infested swamps of nowhere to reach more salubrious environs.¹ The theory is meant to orient, to provide the roughest sketch for travel, by means of moving within and through a relentless artifactualism, which forbids any direct si(gh)tings of nature, to a science fictional, speculative factual, SF place called, simply, elsewhere. At least for those whom this essay addresses, “nature” outside artifactualism is not so much elsewhere as nowhere, a different matter altogether. Indeed, a reflexive artifactualism offers serious political and analytical hope. This essay’s theory is modest. Not a systematic overview, it is a little siting device in a long line of such craft tools. Such sighting devices have been known to reposition worlds for their devotees—and for their opponents. Optical instruments are subject-shifters. Goddess knows, the subject is being changed relentlessly in the late twentieth century.

My diminutive theory’s optical features are set to produce not effects of distance, but effects of connection, of embodiment, and of responsibility for an imagined elsewhere that we may yet learn to see and build here. I have high stakes in reclaiming vision from the technopornographers, those theorists of minds, bodies, and planets who insist effectively—i.e., in practice—that sight is the sense made to realize the fantasies of the phalocrats.² I think sight can be remade for the activists and advocates engaged in fitting political filters to see the world in the hues of red, green, and ultraviolet, i.e., from the

perspectives of a still possible socialism, feminist and anti-racist environmentalism, and science for the people. I take as a self-evident premise that “science is culture.”³ Rooted in that premise, this essay is a contribution to the heterogeneous and very lively contemporary discourse of science studies *as* cultural studies. Of course, what science, culture, or nature—and their “studies”—might mean is far less self-evident.

Nature is for me, and I venture for many of us who are planetary fetuses gestating in the amniotic effluvia of terminal industrialism,⁴ one of those impossible things characterized by Gayatri Spivak as that which we cannot not desire. Excruciatingly conscious of nature’s discursive constitution as “other” in the histories of colonialism, racism, sexism, and class domination of many kinds, we nonetheless find in this problematic, ethno-specific, long-lived, and mobile concept something we cannot do without, but can never “have.” We must find another relationship to nature besides reification and possession. Perhaps to give confidence in its essential reality, immense resources have been expended to stabilize and materialize nature, to police its/her boundaries. Such expenditures have had disappointing results. Efforts to travel into “nature” become tourist excursions that remind the voyager of the price of such displacements—one pays to see fun-house reflections of oneself. Efforts to preserve “nature” in parks remain fatally troubled by the ineradicable mark of the founding expulsion of those who used to live there, not as innocents in a garden, but as people for whom the categories of nature and culture were not the salient ones. Expensive projects to collect “nature’s” diversity and bank it seem to produce debased coin, impoverished seed, and dusty relics. As the banks hypertrophy, the nature that feeds the storehouses “disappears.” The World Bank’s record on environmental destruction is exemplary in this regard. Finally, the projects for representing and enforcing human “nature” are famous for their imperializing essences, most recently reincarnated in the Human Genome Project.

So, nature is not a physical place to which one can go, nor a treasure to fence in or bank, nor as essence to be saved or violated. Nature is not hidden and so does not need to be unveiled. Nature is not a text to be read in the codes of mathematics and biomedicine. It is not the “other” who offers origin, replenishment, and service. Neither mother, nurse, nor slave, nature is not matrix, resource, or tool for the reproduction of man.

Nature is, however, a *topos*, a place, in the sense of a rhetorician’s place or topic for consideration of common themes; nature is, strictly, a commonplace. We turn to this topic to order our discourse, to compose our memory. As a topic in this sense, nature also reminds us that in seventeenth-century English the “topick gods” were the local gods, the gods specific to places and peoples. We need these spirits, rhetorically if we can’t have them any other way. We need them in order to reinhabit, precisely, *common* places—locations that are widely shared, inescapably local, worldly, enspirited; i.e., topical. In this sense, nature is the place to rebuild public culture.⁵ Nature is also a *trópos*, a trope. It is figure, construction, artifact, movement, displacement. Nature cannot pre-exist its construction. This construction is based on a particular kind of move—a *trópos* or “turn.” Faithful to the Greek, as *trópos* nature is about turning. Troping, we turn to nature as if to the earth, to the primal stuff—geotropic, physiotropic. Topically, we travel toward the earth, a commonplace. In discoursing on nature, we turn from Plato and his heliotropic son’s blinding star to see something else, another kind of figure. I do not turn from vision, but I do seek something other than enlightenment in these sightings of science studies as cultural studies. Nature is a topic of public discourse on which much turns, even the earth.

In this essay’s journey toward elsewhere, I have promised to trope nature through a relentless artifactualism, but what does artifactualism mean here? First, it means that

nature for us is *made*, as both fiction and fact. If organisms are natural objects, it is crucial to remember that organisms are not born; they are made in world-changing technoscientific practices by particular collective actors in particular times and places. In the belly of the local/global monster in which I am gestating, often called the postmodern world,⁶ global technology appears to *denature* everything, to make everything a malleable matter of strategic decisions and mobile production and reproduction processes (Hayles, 1990). Technological decontextualization is ordinary experience for hundreds of millions if not billions of human beings, as well as other organisms. I suggest that this is not a *denaturing* so much as a *particular production* of nature. The preoccupation with productionism that has characterized so much parochial Western discourse and practice seems to have hypertrophied into something quite marvelous: the whole world is remade in the image of commodity production.⁷

How, in the face of this marvel, can I seriously insist that to see nature as artifactual is an *oppositional*, or better, a *differential* siting?⁸ Is the insistence that nature *is* artifactual not more evidence of the extremity of the violation of a nature outside and other to the arrogant ravages of our technophilic civilization, which, after all, we were taught began with the heliotropisms of enlightenment projects to dominate nature with blinding light focused by optical technology?⁹ Haven't eco-feminists and other multicultural and intercultural radicals begun to convince us that nature is precisely *not* to be seen in the guise of the Eurocentric productionism and anthropocentrism that have threatened to reproduce, literally, all the world in the deadly image of the Same?

I think the answer to this serious political and analytical question lies in two related turns: 1) unblinding ourselves from the sun-worshiping stories about the history of science and technology as paradigms of rationalism; and 2) refiguring the actors in the construction of the ethno-specific categories of nature *and* culture. The actors are not all "us." If the world exists for us as "nature," this designates a kind of relationship, an achievement among many actors, not all of them human, not all of them organic, not all of them technological.¹⁰ In its scientific embodiments as well as in other forms, nature is made, but not entirely by humans; it is a co-construction among humans and non-humans. This is a very different vision from the postmodernist observation that all the world is denatured and reproduced in images or replicated in copies. That specific kind of violent and reductive artifactualism, in the form of a hyper-productionism actually practiced widely throughout the planet, becomes *contestable* in theory and other kinds of praxis, without recourse to a resurgent transcendental naturalism. Hyper-productionism refuses the witty agency of all the actors but One; that is a dangerous strategy—for everybody. But transcendental naturalism also refuses a world full of cacophonous agencies and settles for a mirror image sameness that only pretends to difference. The commonplace nature I seek, a public culture, has many houses with many inhabitants which/who can refigure the earth. Perhaps those other actors/actants, the ones who are not human, are our topick gods, organic and inorganic.¹¹

It is this barely admissible recognition of the odd sorts of agents and actors which/whom we must admit to the narrative of collective life, including nature, that simultaneously, first, turns us decisively away from enlightenment-derived modern and postmodern premises about nature and culture, the social and technical, science and society and, second, saves us from the deadly point of view of productionism. Productionism and its corollary, humanism, come down to the story line that "man makes everything, including himself, out of the world that can only be resource and potency to his project and active agency."¹² This productionism is about man the tool-maker and -user, whose highest technical production is himself; i.e., the story line of phallogocentrism. He gains access to this wondrous technology with a subject-constituting, self-deferring, and self-

splitting entry into language, light, and law. Blinded by the sun, in thrall to the father, reproduced in the sacred image of the same, his reward is that he is self-born, an autotelic copy. That is the mythos of enlightenment transcendence.

Let us return briefly to my remark above that organisms are not born, but they are made. Besides troping on Simone de Beauvoir's observation that one is not born a woman, what work is this statement doing in this essay's effort to articulate a relentless differential/oppositional artifactualism? I wrote that organisms are made as objects of knowledge in world-changing practices of scientific discourse by particular and always collective actors in specific times and places. Let us look more closely at this claim with the aid of the concept of the apparatus of bodily production.¹³ Organisms are *biological* embodiments; as natural-technical entities, they are not pre-existing plants, animals, protistes, etc., with boundaries already established and awaiting the right kind of instrument to note them correctly. Organisms emerge from a discursive process. Biology is a discourse, not the living world itself. But humans are not the only actors in the construction of the entities of any scientific discourse; machines (delegates that can produce surprises) and other partners (not "pre- or extra-discursive objects," but partners) are active constructors of natural scientific objects. Like other scientific bodies, organisms are not *ideological* constructions. The whole point about discursive construction has been that it is *not* about ideology. Always radically historically specific, always lively, bodies have a different kind of specificity and effectivity; and so they invite a different kind of engagement and intervention.

Elsewhere, I have used the term "material-semiotic actor" to highlight the object of knowledge as an active part of the apparatus of bodily production, without *ever* implying immediate presence of such objects or, what is the same thing, their final or unique determination of what can count as objective knowledge of a biological body at a particular historical juncture. Like Katie King's objects called "poems," sites of literary production where language also is an actor, bodies as objects of knowledge are material-semiotic generative nodes. Their boundaries materialize in social interaction among humans and non-humans, including the machines and other instruments that mediate exchanges at crucial interfaces and that function as delegates for other actors' functions and purposes. "Objects" like bodies do not pre-exist as such. Similarly, "nature" cannot pre-exist as such, but neither is its existence ideological. Nature is a commonplace and a powerful discursive construction, effected in the interactions among material-semiotic actors, human and not. The siting/sighting of such entities is not about disengaged discovery, but about mutual and usually unequal structuring, about taking risks, about delegating competences.¹⁴

The various contending biological bodies emerge at the intersection of biological research, writing, and publishing; medical and other business practices; cultural productions of all kinds, including available metaphors and narratives; and technology, such as the visualization technologies that bring color-enhanced killer T cells and intimate photographs of the developing fetus into high-gloss art books, as well as scientific reports. But also invited into that node of intersection is the analogue to the lively languages that actively intertwine in the production of literary value: the coyote and protean embodiments of a world as witty agent and actor. Perhaps our hopes for accountability for techno-biopolitics in the belly of the monster turn on revisioning the world as coding trickster with whom we must learn to converse. So while the late twentieth-century immune system, for example, is a construct of an elaborate apparatus of bodily production, neither the immune system nor any other of biology's world-changing bodies—like a virus or an ecosystem—is a ghostly fantasy. Coyote is not a ghost, merely a protean trickster.

This sketch of the artifactuality of nature and the apparatus of bodily production helps us toward another important point: the corporeality of theory. Overwhelmingly, theory is bodily, and theory is literal. Theory is not about matters distant from the lived body; quite the opposite. Theory is *anything* but disembodied. The fanciest statements about radical decontextualization as the historical form of nature in late capitalism are tropes for the embodiment, the production, the literalization of experience in that specific mode. This is not a question of reflection or correspondences, but of technology, where the social and the technical implode into each other. Experience is a semiotic process—a semiosis (de Lauretis, 1984). Lives are built; so we had best become good craftspeople with the other worldly actants in the story. There is a great deal of rebuilding to do, beginning with a little more surveying with the aid of optical devices fitted with red, green, and ultraviolet filters.

Repeatedly, this essay turns on figures of pregnancy and gestation. Zoe Sofia (1984) taught me that every technology is a reproductive technology. She and I have meant that literally; ways of life are at stake in the culture of science. I would, however, like to displace the terminology of reproduction with that of generation. Very rarely does anything really get *reproduced*; what's going on is much more polymorphous than that. Certainly people don't reproduce, unless they get themselves cloned, which will always be very expensive and risky, not to mention boring. Even technoscience must be made into the paradigmatic model not of closure, but of that which is contestable and contested. That involves knowing how the world's agents and actants work; how they/we/it come into the world, and how they/we/it are reformed. Science becomes the myth not of what escapes agency and responsibility in a realm above the fray, but rather of accountability and responsibility for translations and solidarities linking the cacophonous visions and visionary voices that characterize the knowledges of the marked bodies of history. Actors, as well as actants, come in many and wonderful forms. And best of all, "reproduction"—or less inaccurately, the generation of novel forms—need not be imagined in the stodgy bipolar terms of hominids.¹⁵

If the stories of hyper-productionism and enlightenment have been about the reproduction of the sacred image of the same, of the one true copy, mediated by the luminous technologies of compulsory heterosexuality and masculinist self-birthing, then the differential artifactualism I am trying to envision might issue in something else. Artifactualism is askew of productionism; the rays from my optical device diffract rather than reflect. These diffracting rays compose *interference* patterns, not reflecting images. The "issue" from this generative technology, the result of a monstrous¹⁶ pregnancy, might be kin to Vietnamese-American filmmaker and feminist theorist Trinh Minh-ha's (1986/7b; 1989) "inappropriate/d others."¹⁷ Designating the networks of multicultural, ethnic, racial, national, and sexual actors emerging since World War II, Trinh's phrase referred to the historical positioning of those who cannot adopt the mask of either "self" or "other" offered by previously dominant, modern Western narratives of identity and politics. To be "inappropriate/d" does not mean "not to be in relation with"—i.e., to be in a special reservation, with the status of the authentic, the untouched, in the allochronic and allotopic condition of innocence. Rather to be an "inappropriate/d other" means to be in critical, deconstructive relationality, in a diffracting rather than reflecting (ratio)nality—as the means of making potent connection that exceeds domination. To be inappropriate/d is not to fit in the *taxon*, to be dislocated from the available maps specifying kinds of actors and kinds of narratives, not to be originally fixed by difference. To be inappropriate/d is to be neither modern nor postmodern, but to insist on the *amodern*. Trinh was looking for a way to figure "difference" as a "critical difference within," and not as special taxonomic marks grounding difference as apartheid.

She was writing about people; I wonder if the same observations might apply to humans and to both organic and technological non-humans.

The term “inappropriate/d others” can provoke rethinking social relationality within artifactual nature—which is, arguably, global nature in the 1990s. Trinh Minha’s metaphors suggest another geometry and optics for considering the relations of difference among people and among humans, other organims, and machines than hierarchical domination, incorporation of parts into wholes, paternalistic and colonialist protection, symbiotic fusion, antagonistic opposition, or instrumental production from resource. Her metaphors also suggest the hard intellectual, cultural, and political work these new geometries will require. If Western patriarchal narratives have told that the physical body issued from the first birth, while man was the product of the heliotropic second birth, perhaps a differential, diffracted feminist allegory might have the “inappropriate/d others” emerge from a third birth into an SF world called elsewhere—a place composed from interference patterns. Diffraction does not produce “the same” displaced, as reflection and refraction do. Diffraction is a mapping of interference, not of replication, reflection, or reproduction. A diffraction pattern does not map where differences appear, but rather maps where the *effects* of difference appear. Tropically, for the promises of monsters, the first invites the illusion of essential, fixed position, while the second trains us to more subtle vision. Science fiction is generically concerned with the interpenetration of boundaries between problematic selves and unexpected others and with the exploration of possible worlds in a context structured by transnational technoscience. The emerging social subjects called “inappropriate/d others” inhabit such worlds. SF—science fiction, speculative futures, science fantasy, speculative fiction—is an especially apt sign under which to conduct an inquiry into the artifactual as a reproductive technology that might issue in something other than the sacred image of the same, something inappropriate, unfitting, and so, maybe, inappropriated.

Within the belly of the monster, even inappropriate/d others seem to be interpellated—called through interruption—into a particular location that I have learned to call a cyborg subject position.¹⁸ Let me continue this travelogue and inquiry into artifactualism with an illustrated lecture on the nature of cyborgs as they appear in recent advertisements in *Science*, the journal of the American Association for the Advancement of Science. These ad figures remind us of the corporeality, the mundane materiality, and literality of theory. These commercial cyborg figures tell us what may count as nature in technoscience worlds. Above all, they show us the implosion of the technical, textual, organic, mythic, and political in the gravity wells of science in action. These figures are our companion monsters in the *Pilgrim’s Progress* of this essay’s travelogue.

Consider Figure 1, “A Few Words about Reproduction from a Leader in the Field,” the advertising slogan for Logic General Corporation’s software duplication system. The immediate visual and verbal impact insists on the absurdity of separating the technical, organic, mythic, textual, and political threads in the semiotic fabric of the ad and of the world in which this ad makes sense. Under the unliving, orange-to-yellow rainbow colors of the earth-sun logo of Logic General, the biological white rabbit has its (her? yet, sex and gender are not so settled in this reproductive system) back to us. It has its paws on a keyboard, that inertial, old-fashioned residue of the typewriter that lets our computers feel natural to us, user-friendly, as it were.¹⁹ But the keyboard is misleading; no letters are transferred by a mechanical key to a waiting solid surface. The computer-user interface works differently. Even if she doesn’t understand the implications of her lying keyboard, the white rabbit is in her natural home; she is fully artifactual in the most literal sense. Like fruit flies, yeast, transgenic mice, and the humble nematode worm, *Caenorhabditis elegans*,²⁰ this rabbit’s evolutionary story transpires in the lab; the

lab is its proper niche, its true habitat. Both material system and symbol for the measure of fecundity, this kind of rabbit occurs in no other nature than the lab, that preeminent scene of replication practices.

With Logic General, plainly, we are not in a biological laboratory. The organic rabbit peers at its image, but the image is not her reflection, indeed, *especially* not her reflection. This is not Lacan's world of mirrors; primary identification and maturing metaphoric substitution will be produced with other techniques, other writing technologies.²¹ The white rabbit will be translated, her potencies and competences relocated radically. The guts of the computer produce another kind of visual product than distorted, self-birthing reflections. The simulated bunny peers out at us face first. It is she who locks her/its gaze with us. She, also, has her paws on a grid, one just barely reminiscent of a typewriter, but even more reminiscent of an older icon of technoscience—the Cartesian coordinate system that locates the world in the imaginary spaces of rational modernity. In her natural habitat, the virtual rabbit is on a grid that insists on the world as a game played on a chess-like board. This rabbit insists that the truly rational actors will replicate themselves in a virtual world where the best players will not be Man, though he may linger like the horse-drawn carriage that gave its form to the railroad car or the typewriter that gave its illusory shape to the computer interface. The functional privileged signifier in this system will not be so easily mistaken for any primate male's urinary and copulative organ. Metaphoric substitution and other circulations in the very material symbolic domain will be more likely to be effected by a competent mouse. The if-y femaleness of both of the rabbits, of course, gives no confidence that the new players other to Man will be women. More likely, the rabbit that is interpellated into the world in this non-mirror stage, this diffracting moment of subject constitution, will be literate in a quite different grammar of gender. *Both* the rabbits here are cyborgs—compounds of the organic, technical, mythic, textual, and political—and they call us into a world in which we may not wish to take shape, but through whose “Miry Slough” we might have to travel to get elsewhere. Logic General is into a very particular kind of *écriture*. The reproductive stakes in this text are future life forms and ways of life for humans and unhumans. “Call toll free” for “a few words about reproduction from an acknowledged leader in the field.”

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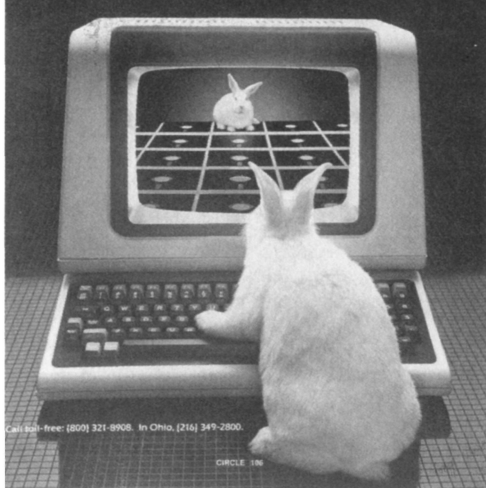
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FIGURE 2.

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FIGURE 3.

fishes and amphibians, *Ichthyostega* is firmly on the margins, those potent places where theory is best cultured. It behooves us, then, to join this heroic reconstructed beast with LKB, in order to trace out the transferences of competences—the metaphoric-material chain of substitutions—in this quite literal apparatus of bodily production. We are presented with a travel story, a *Pilgrim's Progress*, where there are no gaps, no “missing links.” From the first non-original actor—the reconstructed *Ichthyostega*—to the final printout of the DNA homology search mediated by LKB's software and the many separating and writing machines pictured on the right side of the advertisement, the text promises to meet the fundamental desire of phallogocentrism for fullness and presence. From the crawling body in the Miry Sloughs of the narrative to the printed code, we are assured of full success—the compression of time into instantaneous and full access “to the complete GenBank . . . on one laser disk.” Like Christian, we have conquered time and space, moving from entrapment in body to fulfillment in spirit, all in the everyday workspaces of the Electrophoresis Division, whose Hong Kong, Moscow, Antwerp, and Washington phone numbers are all provided. Electrophoresis: *pherein*—to bear or carry us relentlessly on.

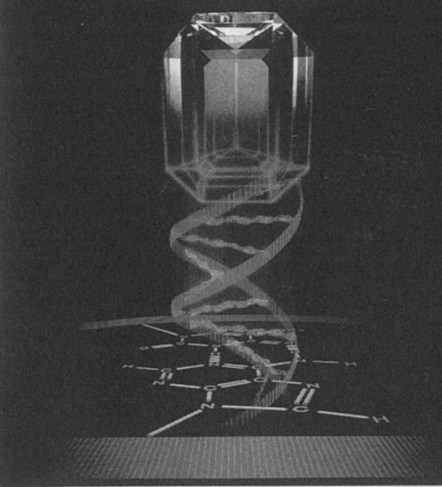
Bio-Response, innovators in many facets of life's culture, interpellates the cyborg subject into the barely secularized, evangelical, Protestant Christianity that pervades American techno-culture: “Realize the potential of your cell line” (Figure 4). This ad addresses us directly. We are called into a salvation narrative, into history, into biotechnology, into our true natures: our cell line, ourselves, our successful product. We will testify to the efficacy of this culture system. Colored in the blues, purples, and ultraviolets of the sterilizing commercial rainbow—in which art, science, and business arch in lucrative grace—the virus-like crystalline shape mirrors the luminous crystals of New Age promises. Religion, science, and mysticism join easily in the facets of modern and postmodern commercial bio-response. The simultaneously promising and threatening crystal/virus unwinds its tail to reveal the language-like icon of the Central Dogma, the code structures of DNA that underlie all possible bodily response, all semiosis, all culture. Gem-like, the frozen, spiraling crystals of Bio-Response promise life itself. This is a jewel of great price—available from the Production Services office in Hayward, California. The imbrications of layered signifiers and signifieds forming cascading hierarchies of signs guide us through this mythic, organic, textual, technical, political icon.²²

Finally, the advertisement from Vega Biotechnologies graphically shows us the final promise, “the link between science and tomorrow: Guaranteed. Pure” (Figure 5). The graph reiterates the ubiquitous grid system that is the signature and matrix, father and mother, of the modern world. The sharp peak is the climax of the search for certainty and utter clarity. But the diffracting apparatus of a monstrous artifactualism can perhaps interfere in this little family drama, reminding us that the modern world never existed and its fantastic guarantees are void. Both the organic and computer rabbits of Logic General might re-enter at this point to challenge all the passive voices of productionism. The oddly duplicated bunnies might resist their logical interpellation and instead hint at a neo-natalogy of inappropriate/d others, where the child will not be in the sacred image of the same. Shape-shifting, these interfering cyborgs might craft a diffracted logic of sameness and difference and utter a different word about reproduction, about the link between science and tomorrow, from collective actors in the field.

II. The Four-Square Cyborg: Through Artifactualism to Elsewhere

It is time to travel, therefore, with a particular subset of shifted subjects, Cyborgs for Earthly Survival,²³ into the mindscapes and landscapes indicated at the beginning of this

Realize the potential
of your cell line.



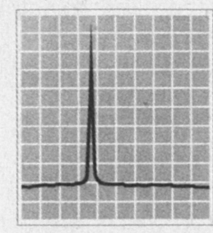
Innovators in the many facets
of animal cell culture, Bio-Response advances
your product's commercial success.

Bio Response

FOR SERVICE INFORMATION OR TO ORDER CONTACT YOUR LOCAL REPRESENTATIVE OR CALL 1-800-378-7524. SEE LISTING ON PAGE 107. ©1992 BIO-RESPONSE, INC. A DIVISION OF VEGA BIOTECHNOLOGIES, INC. Circle No. 126 on Reader Service Card

FIGURE 4.

Guaranteed. Pure.



Vega nucleotide synthesis reagents. Their purity is guaranteed. A certificate of analysis including HPLC is available with each lot we produce, for positive proof of purity.

And Vega's guarantee goes even further. If you're not completely satisfied with our biochemicals, we'll replace your order or refund your money in full.

Vega offers a comprehensive selection of nucleotide synthesis reagents including DMT nucleosides, fully protected phosphotriester reagents, diisopropyl phosphoramidites, resin supports, and DMT chloride. All manufactured to Vega's strict quality standards and covered by Vega's guarantee. Whether you're synthesizing oligonucleotides yourself or using DNA

fragments in your research, Vega can provide you with the service and product purity you demand. And Vega processes your order quickly in 24 hours or less. Even bulk orders.

Vega's extensive selection of reagents and other research biochemicals are right at your fingertips—in Vega's 1983/84 Biochemical Catalog. Vega can also provide custom synthesis of specialized biochemicals not listed.

Call toll free, 1-800-528-4882, for your free copy of Vega's catalog.

Vega biochemicals. They're guaranteed. They're pure.

Vega Biotechnologies, Inc.
P.O. Box 1968, Tucson, AZ 85724
9025 798 661 890 528 4882 Canada AZ
TELEX 30522 (VEGA BIO TUC)

The link between science and tomorrow.

VEGA

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Circle No. 292 on Reader Service Card

FIGURE 5.

essay. To get through the artifactual to elsewhere, it would help to have a little travel machine that also functions as a map. Consequently, the rest of the “Promises of Monsters” will rely on an artificial device that generates meanings very noisily: A. J. Greimas’s infamous semiotic square. The regions mapped by this clackety, structuralist meaning-making machine could never be mistaken for the transcendental realms of Nature or Society. Allied with Bruno Latour, I will put my structuralist engine to amodern purposes: this will not be a tale of the rational progress of science, in potential league with progressive politics, patiently unveiling a grounding nature, nor will it be a demonstration of the social construction of science and nature that locates all agency firmly on the side of humanity. Nor will the modern be superseded or infiltrated by the postmodern, because belief in something called the modern has itself been a mistake. Instead, the amodern refers to a view of the history of science as culture that insists on the absence of beginnings, enlightenments, and endings: the world has always been in the middle of things, in unruly and practical conversation, full of action and structured by a startling array of actants and of networking and unequal collectives. The much-criticized inability of structuralist devices to provide the narrative of diachronic history, of progress through time, will be my semiotic square’s greatest virtue. The shape of my amodern history will have a different geometry, not of progress, but of permanent and multi-patterned interaction through which lives and worlds get built, human and unhuman. This Pilgrim’s Progress is taking a monstrous turn.

I like my analytical technologies, which are unruly partners in discursive construction, delegates who have gotten into doing things on their own, to make a lot of noise, so that I don’t forget all the circuits of competences, inherited conversations, and coa-

litions of human and unhuman actors that go into any semiotic excursions. The semiotic square, so subtle in the hands of a Fredric Jameson, will be rather more rigid and literal here (Greimas, 1966; Jameson, 1972). I only want it to keep four spaces in differential, relational separation, while I explore how certain local/global struggles for meanings and embodiments of nature are occurring within them. Almost a joke on “elementary structures of signification” (“Guaranteed. Pure.”), the semiotic square in this essay nonetheless allows a contestable collective world to take shape for us out of structures of difference. The four regions through which we will move are A, Real Space or Earth; B, Outer Space or the Extraterrestrial; not-B, Inner Space or the Body; and finally, not-A, Virtual Space or the SF world oblique to the domains of the imaginary, the symbolic, and the real (Figure 6).

Somewhat unconventionally, we will move through the square clockwise to see what kinds of figures inhabit this exercise in science studies as cultural studies. In each of the first three quadrants of the square, I will begin with a popular image of nature and science that initially appears both compelling and friendly, but quickly becomes a sign of deep structures of domination. Then I will switch to a differential/oppositional

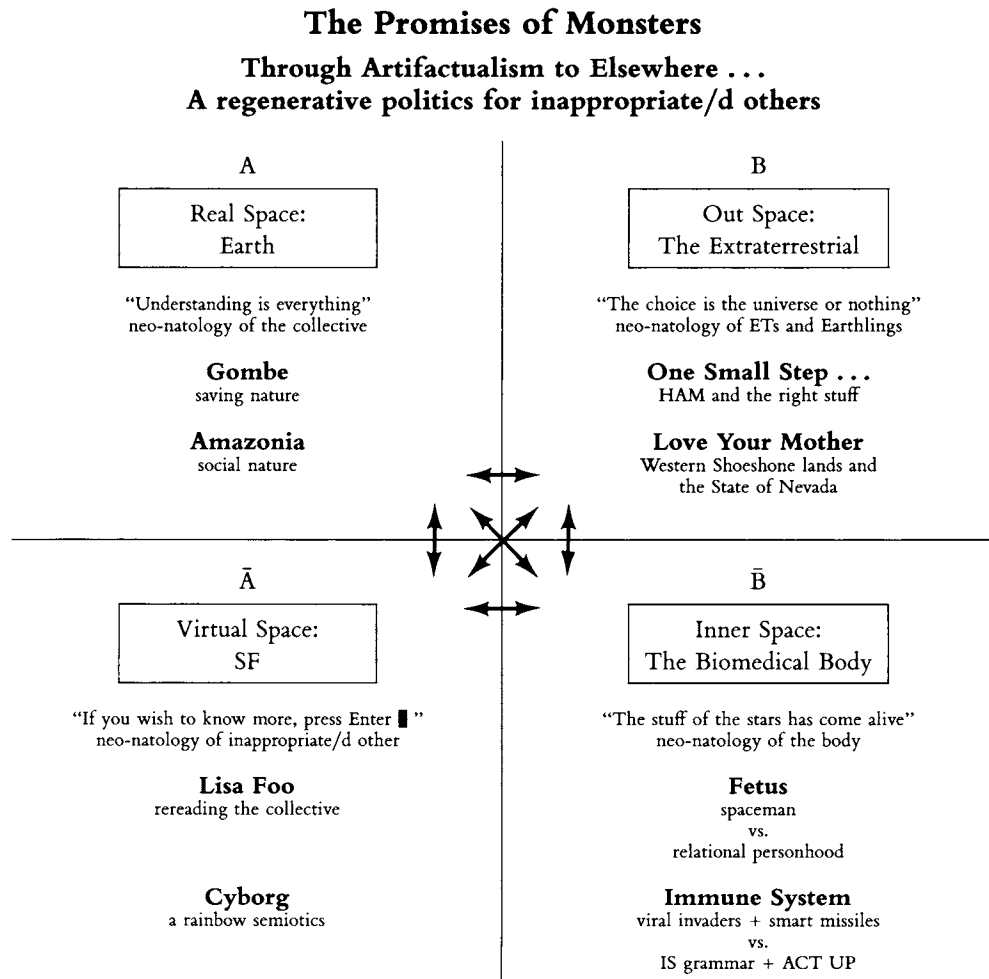


FIGURE 6

image and practice that might promise something else. In the final quadrant, in virtual space at the end of the journey, we will meet a disturbing guide figure who promises information about psychic, historical, and bodily formations that issue, perhaps, from some other semiotic processes than the psychoanalytic in modern and postmodern guise. Directed by John Varley's (1986) story of that name, all we will have to do to follow this disquieting, amodern Beatrice will be to "Press Enter." Her job will be to instruct us in the neo-natology of inappropriate/d others. The goal of this journey is to show in each quadrant, and in the passage through the machine that generates them, metamorphoses and boundary shifts that give grounds for a scholarship and politics of hope in truly monstrous times. The pleasures promised here are not those libertarian masculinist fantasmics of the infinitely regressive practice of boundary violation and the accompanying *frisson* of brotherhood, but just maybe the pleasure of regeneration in less deadly, chiasmatic borderlands.²⁴ Without grounding origins and without history's illuminating and progressive tropisms, how might we map some semiotic possibilities for other topick gods and common places?

A. Real Space: Earth

In 1984, to mark nine years of underwriting the National Geographic Society's television specials, the Gulf Oil Corporation ran an advertisement entitled "Understanding Is Everything" (Figure 7). The ad referred to some of the most watched programs in the history of public television—the nature specials about Jane Goodall and the wild chimpanzees in Tanzania's Gombe National Park. Initially, the gently clasped hands of the ape and the young white woman seem to auger what the text proclaims—communication, trust, responsibility, and understanding across the gaps that have defined human existence



Understanding is everything.

In a spontaneous gesture of trust, a chimpanzee in the wilds of Tanzania holds the weathered hand of Jane Goodall—selfless research for Dr. Goodall's years of patience.

The moment occurred in one of the National Geographic Specials, a series underwritten throughout its nine consecutive years on public television by the Gulf Oil Corporation.

In a sense, it symbolizes what the whole series is about. Dr. Goodall's quiet triumph grew slowly over years of studying the chimpanzee: from curiosity to observation and learning to understanding.

Gulf underwrites the National Geographic Specials in the belief that the same sequence can occur within the vast PBS audience. Our goal is to provide curiosity about the world and the fragile complexity of its natural order; to satisfy that curiosity through observation and learning; to create an understanding of man's place in the ecological structure, and his responsibility to it—on the simple theory that no thinking person can share in the destruction of anything whose value he understands.

It's an ambitious goal, but we have embraced that challenge. Since 1975 when we helped bring the National Geographic Specials to PBS, the series has become one of the most watched in public-television history. It has earned eight Emmy awards, an Oscar nomination, and the coveted George Foster Peabody Award for "outstanding excellence in documentaries."

Association with the National Geographic Society and the television specials is only one aspect of Gulf's daily concern for the environment. But it is an especially proud one.



Gulf Oil Corporation

FIGURE 7.

in Nature and Society in “modern” Western narratives. Made ready by a scientific practice coded in terms of “years of patience,” through a “spontaneous gesture of trust” *initiated by the animal*, Goodall metamorphoses in the ad copy from “Jane” to “Dr. Goodall.” Here is a natural science, coded unmistakably feminine, to counter the instrumentalist excesses of a military-industrial-technoscience complex, where the code of science is stereotypically anthropocentric and masculine. The ad invites the viewer to forget Gulf’s status as one of the Seven Sisters of big oil, ranking eighth among the Forbes 500 in 1980 (but acquired by Chevron by the end of the decade’s transnational capitalist restructuring). In response to the financial and political challenges mounted in the early 1970s by the Organization of Oil Exporting Countries (OPEC) and by ecological activism around the globe, by the late 1970s the scandal-ridden giant oil corporations had developed advertising strategies that presented themselves as the world’s leading environmentalists—indeed, practically as the mothers of eco-feminism. There could be no better story than that of Jane Goodall and the chimpanzees for narrating the healing touch between nature and society, mediated by a science that produces full communication in a chain that leads innocently “from curiosity, to observation, to learning, to understanding.”²⁵ Here is a story of blissful incorporation.

There is another repressed set of codes in the ad as well, that of race and imperialism, mediated by the dramas of gender and species, science and nature. In the National Geographic narrative, “Jane” entered the garden “alone” in 1960 to seek out “man’s” closest relatives, to establish a knowing touch across gulfs of time. A natural family is at stake; the PBS specials document a kind of inter-species family therapy. Closing the distance between species through a patient discipline, where first the animals could only be known by their spoor and their calls, then by fleeting sightings, then finally by the animal’s direct inviting touch, after which she could name them, “Jane” was admitted as “humanity’s” delegate back into Eden. Society and nature had made peace; “modern science” and “nature” could co-exist. Jane/Dr. Goodall was represented almost as a new Adam, authorized to name not by God’s creative hand, but by the animal’s transformative touch. The people of Tanzania disappear in a story in which the actors are the anthropoid apes and a young British white woman engaged in a thoroughly modern sacred secular drama. The chimpanzees and Goodall are both enmeshed in stories of endangerment and salvation. In the post-World War II era the apes face biological extinction; the planet faces nuclear and ecological annihilation; and the West faces expulsion from its former colonial possessions. If only communication can be established, destruction can be averted. As Gulf Oil insists, “Our goal is to provoke curiosity about the world and the fragile complexity of its natural order; to satisfy that curiosity through observation and learning; to create an understanding of man’s place in the ecological structure, and his responsibility to it—on the simple theory that no thinking person can share in the destruction of anything whose value he understands.” Progress, rationality, and nature join in the great myth of modernity, which is so thoroughly threatened by a dozen looming apocalypses. A cross-species family romance promises to avert the threatened destruction.

Inaudible in the Gulf and National Geographic version, communication and understanding are to emerge in the communion between Jane/Dr. Goodall and the spontaneously trusting chimpanzee at just the historical moment when dozens of African nations are achieving their national independence, 15 in 1960 alone, the year Goodall set out for Gombe. Missing from the family romance are such beings as Tanzanians. African peoples seek to establish hegemony over the lands in which they live; to do that the stories of the natural presence of white colonists must be displaced, usually by extremely complex and dangerous nationalist stories. But in “Understanding Is Everything,” the metonymic “spontaneous gesture of trust” from the animal hand to the

white hand obliterates once again the invisible bodies of people of color who have never counted as able to represent humanity in Western iconography. The white hand will be the instrument for saving nature—and in the process be saved from a rupture with nature. Closing great gaps, the transcendentals of nature and society meet here in the metonymic figure of softly embracing hands from two worlds, whose innocent touch depends on the absence of the “other world,” the “third world,” where the drama actually transpires.

In the history of the life sciences, the great chain of being leading from “lower” to “higher” life forms has played a crucial part in the discursive construction of race as an object of knowledge and of racism as a living force. After World War II and the partial removal of explicit racism from evolutionary biology and physical anthropology, a good deal of racist and colonialist discourse remained projected onto the screen of “man’s closest relatives,” the anthropoid apes.²⁶ It is impossible to picture the entwined hands of a white woman and an African ape without evoking the history of racist iconography in biology and in European and American popular culture. The animal hand is metonymically the individual chimpanzee, all threatened species, the third world, peoples of color, Africa, the ecologically endangered earth—all firmly in the realm of Nature, all represented in the leathery hand folding around that of the white girl-woman under the Gulf sun logo shining on the Seven Sisters’ commitment to science and nature. The spontaneous gesture of touch in the wilds of Tanzania authorizes a whole doctrine of representation. Jane, as Dr. Goodall, is empowered to speak for the chimpanzees. Science speaks for nature. Authorized by unforced touch, the dynamics of representation take over, ushering in the reign of freedom and communication. This is the structure of depoliticizing expert discourse, so critical to the mythic political structures of the “modern” world and to the mythic political despair of much “post-modernism,” so undermined by fears about the breakdown of representation.²⁷ Unfortunately, representation, fraudulent or not, is a very resilient practice.

The clasping hands of the Gulf ad are semiotically similar to the elution peak in the Vega ad of Figure 5: “Guaranteed. Pure.”; “Understanding Is Everything.” There is no interruption in these stories of communication, progress, and salvation through science and technology. The story of Jane Goodall in Gombe, however, can be made to show its conditions of possibility; even in the footage of the National Geographic specials we see the young woman on a mountain top at night eating from a can of pork and beans, that sign of industrial civilization so crucial to the history of colonialism in Africa, as Orson Welles’s voice-over speaks of the lonely quest for contact with nature! In one of Goodall’s published accounts of the early days at Gombe, we learn that she and her mother, enroute to the chimpanzee preserve, were stopped on the shores of Lake Tanganyika in the town of Kigoma, across from the no-longer-Belgian Congo, as *uhuru*, freedom, sounded across Africa. Goodall and her mother made 2000 spam sandwiches for fleeing Belgians before embarking for the “wilds of Tanzania” (Goodall, 1971, p. 27). It is also possible to reconstruct a history of Gombe as a research site in the 1970s. One of the points that stands out in this reconstruction is that people—research staff and their families, African, European, and North American—considerably outnumbered chimpanzees during the years of most intense scientific work. Nature and Society met in one story; in another story, the structure of action and the actants take a different shape.

It is hard, however, to make the story of Jane Goodall and the wild chimpanzees shed its “modern” message about “saving nature,” in both senses of nature as salvific and of the scientist speaking for and preserving nature in a drama of representation. Let us, therefore, leave this narrative for another colonized tropical spot in the Real/Earth

quadrant in the semiotic square—Amazonia. Remembering that all colonized spots have, euphemistically stated, a special relation to nature, let us structure this story to tell something amodern about nature and society—and perhaps something more compatible with the survival of all the networked actants, human and unhuman. To tell this story we must disbelieve in both nature and society and resist their associated imperatives to represent, to reflect, to echo, to act as a ventriloquist for “the other.” The main point is there will be no Adam—and no Jane—who gets to name all the beings in the garden. The reason is simple: there is no garden and never has been. No name and no touch is original. The question animating this diffracted narrative, this story based on little differences, is also simple: is there a consequential difference between a political semiotics of articulation and a political semiotics of representation?

The August 1990 issue of *Discover* magazine has a story entitled “Tech in the Jungle.” A one and one-half page color photo of a Kayapó Indian, in indigenous dress and using a videocamera, dramatically accompanies the opening paragraphs. The caption tells us the man is “tap[ing] his tribesmen, who had gathered in the central Brazilian town of Altamira to protest plans for a hydroelectric dam on their territory” (Zimmer, 1990, 42-5). All the cues in the *Discover* article invite us to read this photo as the drama of the meeting of the “traditional” and the “modern,” staged in this popular North American scientific publication for audiences who have a stake in maintaining belief in those categories. We have, however, as disbelieving members of those audiences, a different political, semiotic responsibility, one made easier by another publication, Susanna Hecht and Alexander Cockburn’s *The Fate of the Forest* (1989; see also T. Turner, 1990) through which I propose to suggest articulations and solidarities with the *filming practice* of the Kayapó man, rather than to read the *photograph of him*, which will not be reproduced in this essay.²⁸

In their book, which was deliberately packaged, published, and marketed in a format and in time for the 1989 December gift-giving season, a modest act of cultural politics not to be despised, Hecht and Cockburn have a central agenda. They insist on deconstructing the image of the tropical rain forest, especially Amazonia, as “Eden under glass.” They do this in order to insist on locations of responsibility and empowerment in current conservation struggles, on the outcome of which the lives and ways of life for people and many other species depend. In particular, they support a politics not of “saving nature” but of “social nature,” not of national parks and walled-off reserves, responding with a technical fix to whatever particular danger to survival seems most inescapable, but of a different organization of land and people, where the practice of justice restructures the concept of nature.

The authors tell a relentless story of a “social nature” over many hundreds of years, at every turn co-inhabited and co-constituted by humans, land, and other organisms. For example, the diversity and patterns of tree species in the forest cannot be explained without the deliberate, long-term practices of the Kayapó and other groups, whom Hecht and Cockburn describe, miraculously avoiding romanticizing, as “accomplished environmental scientists.” Hecht and Cockburn avoid romanticizing because they do not invoke the category of the modern as the special zone of science. Thus, they do not have to navigate the shoals threatening comparisons of, according to taste, mere or wonderful “ethnoscience” with real or disgusting “modern science.” The authors insist on visualizing the forest as the dynamic outcome of human as well as biological history. Only after the dense indigenous populations—numbering from six to twelve million in 1492—had been sickened, enslaved, killed, and otherwise displaced from along the rivers could Europeans represent Amazonia as “empty” of culture, as “nature,” or, in later terms, as a purely “biological” entity.

But, of course, the Amazon was not and did not become “empty,” although “nature” (like “man”) is one of those discursive constructions that operates as a technology for making the world over into its image. First, there are indigenous people in the forest, many of whom have organized themselves in recent years into a regionally grounded, world-historical subject prepared for local/global interactions, or, in other terms, for building new and powerful collectives out of humans and unhumans, technological and organic. With all of the power to reconstitute the real implied in discursive construction, they have become a new discursive subject/object, the Indigenous Peoples of the Amazon, made up of national and tribal groups from Colombia, Ecuador, Brazil, and Peru, numbering about one million persons, who in turn articulate themselves with other organized groups of the indigenous peoples of the Americas. Also, in the forest are about 200,000 people of mixed ancestry, partly overlapping with the indigenous people. Making their living as petty extractors—of gold, nuts, rubber, and other forest products—they have a history of many generations in the Amazon. It is a complex history of dire exploitation. These people are also threatened by the latest schemes of world banks or national capitals from Brasília to Washington.²⁹ They have for many decades been in conflict with indigenous peoples over resources and ways of life. Their presence in the forest might be the fruit of the colonial fantasies of the *bandeirantes*, romantics, curators, politicians, or speculators; but their fate is entwined intimately with that of the other always historical inhabitants of this sharply contested world. It is from these desperately poor people, specifically the rubber tappers union, that Chico Mendes, the world-changing activist murdered on December 22, 1988, came.³⁰

A crucial part of Mendes’s vision for which he was killed was the union of the extractors and the indigenous peoples of the forest into, as Hecht and Cockburn argue, the “true defenders of the forest.” Their position as defenders derives not from a concept of “nature under threat,” but rather from a *relationship* with “the forest as the integument in their own elemental struggle to survive” (p. 196).³¹ In other words, their authority derives *not* from the power to represent from a distance, *nor* from an ontological natural status, but from a constitutive social relationality in which the forest is an integral partner, part of natural/social embodiment. In their claims for authority over the fate of the forest, the resident peoples are articulating a social collective entity among humans, other organisms, and other kinds of non-human actors.

Indigenous people are resisting a long history of forced “tutelage,” in order to confront the powerful representations of the national and international environmentalists, bankers, developers, and technocrats. The extractors, for example, the rubber tappers, are also independently articulating their collective viewpoint. Neither group is willing to see the Amazon “saved” by their exclusion and permanent subjection to historically dominating political and economic forces. As Hecht and Cockburn put it, “The rubber tappers have not risked their lives for extractive reserves so they could live on them as debt peons” (p. 202). “Any program for the Amazon begins with basic human rights: an end to debt bondage, violence, enslavement, and killings practiced by those who would seize the lands these forest people have occupied for generations. Forest people seek legal recognition of native lands and extractive reserves held under the principle of collective property, worked as individual holdings with individual returns” (p. 207).

At the second Brazilian national meeting of the Forest People’s Alliance at Rio Branco in 1989, shortly after Mendes’s murder raised the stakes and catapulted the issues into the international media, a program was formulated in tension with the latest Brazilian state policy called *Nossa Natureza*. Articulating quite a different notion of the first person plural relation to nature or natural surroundings, the basis of the program of the Forest People’s Alliance is control by and for the peoples of the forest. The core

matters are direct control of indigenous lands by native peoples; agrarian reform joined to an environmental program; economic and technical development; health posts; raised incomes; locally controlled marketing systems; an end to fiscal incentives for cattle ranchers, agribusiness, and unsustainable logging; an end to debt peonage; and police and legal protection. Hecht and Cockburn call this an “ecology of justice” that rejects a technicist solution, in whatever benign or malignant form, to environmental destruction. The Forest People’s Alliance does not reject scientific or technical know-how, their own and others’; instead, they reject the “modern” political epistemology that bestows jurisdiction on the basis of technoscientific discourse. The fundamental point is that the Amazonian Biosphere is an irreducibly human/non-human collective entity.³² There *will be* no nature without justice. Nature and justice, contested discursive objects embodied in the material world, will become extinct or survive together.

Theory here is exceedingly corporeal, and the body is a collective; it is an historical artifact constituted by human as well as organic and technological unhuman actors. Actors are entities which do things, have effects, build worlds in concatenation with other *unlike* actors.³³ Some actors, for example specific human ones, can try to reduce other actors to resources—to mere ground and matrix for their action; but such a move is contestable, not the necessary relation of “human nature” to the rest of the world. Other actors, human and unhuman, regularly resist reductionisms. The powers of domination do fail sometimes in their projects to pin other actors down; people can work to enhance the relevant failure rates. Social nature is the nexus I have called artifactual nature. The human “defenders of the forest” do not and have not lived in a garden; it is from a knot in the always historical and heterogeneous nexus of social nature that they articulate their claims. Or perhaps, it is within such a nexus that I and people like me narrate a possible politics of articulation rather than representation. It is our responsibility to learn whether such a fiction is one with which the Amazonians might wish to connect in the interests of an alliance to defend the rain forest and its human and non-human ways of life—because assuredly North Americans, Europeans, and the Japanese, among others, cannot watch from afar as if we were not actors, willing or not, in the life and death struggles in the Amazon.

In a review of *Fate of the Forest*, Joe Kane, author of another book on the tropical rain forest marketed in time for Christmas in 1989, the adventure trek *Running the Amazon (1989)*,³⁴ raised this last issue in a way that will sharpen and clarify my stakes in arguing against a politics of representation generally, and in relation to questions of environmentalism and conservation specifically. In the context of worrying about ways that social nature or socialist ecology sounded too much like the multi-use policies in national forests in the United States, which have resulted in rapacious exploitation of the land and of other organisms, Kane asked a simple question: “[W]ho speaks for the jaguar?” Now, I care about the survival of the jaguar—and the chimpanzee, and the Hawaiian land snails, and the spotted owl, and a lot of other earthlings. I care a great deal; in fact, I think I and my social groups are particularly, but not uniquely, *responsible* if jaguars, and many other non-human, as well as human, ways of life should perish. But Kane’s question seemed wrong on a fundamental level. Then I understood why. His question was precisely like that asked by some pro-life groups in the abortion debates: Who speaks for the fetus? What is wrong with both questions? And how does this matter relate to science studies as cultural studies?

Who speaks for the jaguar? Who speaks for the fetus? Both questions rely on a political semiotics of representation.³⁵ Permanently speechless, forever requiring the services of a ventriloquist, never forcing a recall vote, in each case the object or ground of representation is the realization of the representative’s fondest dream. As Marx said

in a somewhat different context, “They cannot represent themselves; they must be represented.”³⁶ But for a political semiology of representation, nature and the unborn fetus are even better, epistemologically, than subjugated human adults. The effectiveness of such representation depends on distancing operations. The represented must be disengaged from surrounding and constituting discursive and non-discursive nexuses and relocated in the authorial domain of the representative. Indeed, the effect of this magical operation is to disempower precisely those—in our case, the pregnant woman and the peoples of the forest—who are “close” to the now-represented “natural” object. Both the jaguar and the fetus are carved out of one collective entity and relocated in another, where they are reconstituted as objects of a particular kind—as the ground of a representational practice that *forever* authorizes the ventriloquist. Tutelage will be eternal. The represented is reduced to the permanent status of the recipient of action, never to be a co-actor in an articulated practice among unlike, but joined, social partners.

Everything that used to surround and sustain the represented object, such as pregnant women and local people, simply disappears or re-enters the drama as an agonist. For example, the pregnant woman becomes *juridically* and *medically*, two very powerful discursive realms, the “maternal environment” (Hubbard, 1990). Pregnant women and local people are the *least* able to “speak for” objects like jaguars or fetuses because they get discursively reconstituted as beings with opposing “interests.” Neither woman nor fetus, jaguar nor Kayapó Indian is an actor in the drama of representation. One set of entities becomes the represented, the other becomes the environment, often threatening, of the represented object. The *only* actor left is the spokesperson, the one who represents. The forest is no longer the integument in a co-constituted social nature; the woman is in no way a partner in an intricate and intimate dialectic of social relationality crucial to her own personhood, as well as to the possible personhood of her social—*but unlike*—internal co-actor.³⁷ In the liberal logic of representation, the fetus and the jaguar must be protected precisely from those closest to them, from their “surround.” The power of life and death must be delegated to the epistemologically most disinterested ventriloquist, and it is crucial to remember that all of this *is* about the power of life and death.

Who, within the myth of modernity, is less biased by competing interests or polluted by excessive closeness than the expert, especially the scientist? Indeed, even better than the lawyer, judge, or national legislator, the scientist is the perfect representative of nature, that is, of the permanently and constitutively speechless objective world. Whether he be a male or a female, his passionless distance is his greatest virtue; this discursively constituted, structurally gendered distance legitimates his professional privilege, which in these cases, again, is the power to testify about the right to life and death. After Edward Said quoted Marx on representation in his epigraph to *Orientalism*, he quoted Benjamin Disraeli’s *Tancred*, “The East is a career.” The separate, objective world—non-social nature—is a career. Nature legitimates the scientist’s career, as the Orient justifies the representational practices of the Orientalist, even as precisely “Nature” and the “Orient” are the *products* of the constitutive practice of scientists and orientalists.

These are the inversions that have been the object of so much attention in science studies. Bruno Latour sketches the double structure of representation through which scientists establish the objective status of their knowledge. First, operations shape and enroll new objects or allies through visual displays or other means called inscription devices. Second, scientists speak as if they were the mouthpiece for the speechless objects that they have just shaped and enrolled as allies in an agonistic field called science. Latour defines the actant as that which is represented; the objective world *appears* to be the actant solely by virtue of the operations of representation (Latour, 1987, pp. 70–74, 90).

The authorship rests with the representor, even as he claims independent object status for the represented. In this doubled structure, the simultaneously semiotic and political ambiguity of representation is glaring. First, a chain of substitutions, operating through inscription devices, relocates power and action in “objects” divorced from polluting contextualizations and named by formal abstractions (“the fetus”). Then, the reader of inscriptions speaks for his docile constituencies, the objects. This is not a very lively world, and it does not finally offer much to jaguars, in whose interests the whole apparatus supposedly operates.

In this essay I have been arguing for another way of seeing actors and actants—and consequently another way of working to position scientists and science in important struggles in the world. I have stressed actants as collective entities doing things in a structured and structuring field of action; I have framed the issue in terms of articulation rather than representation. Human beings use names to point to themselves and other actors and easily mistake the names for the things. These same humans also think the traces of inscription devices are like names—pointers to things, such that the inscriptions and the things can be enrolled in dramas of substitution and inversion. But the things, in my view, do not pre-exist as ever-elusive, but fully pre-packaged, referents for the names. Other actors are more like tricksters than that. Boundaries take provisional, never-finished shape in articulatory practices. The potential for the unexpected from unstripped human and unhuman actants enrolled in articulations—i.e., the potential for generation—remains both to trouble and to empower technoscience. Western philosophers sometimes take account of the inadequacy of names by stressing the “negativity” inherent in all representations. This takes us back to Spivak’s remark cited early in this paper about the important things that we cannot not desire, but can never possess—or represent, because representation depends on possession of a passive resource, namely, the silent object, the *stripped* actant. Perhaps we can, however, “articulate” with humans and unhumans in a social relationship, which for us is always language-mediated (among other semiotic, i.e., “meaningful,” mediations). But, for our unlike partners, well, the action is “different,” perhaps “negative” from our linguistic point of view, but crucial to the generativity of the collective. It is the empty space, the undecidability, the wiliness of other actors, the “negativity,” that give me confidence in the *reality* and therefore ultimate *unrepresentability* of social nature and that make me suspect doctrines of representation and objectivity.

My crude characterization does not end up with an “objective world” or “nature,” but it certainly does insist on the *world*. This world must always be articulated, from people’s points of view, through “situated knowledges” (Haraway, 1988; 1991). These knowledges are friendly to science, but do not provide any grounds for history-escaping inversions and amnesia about how articulations get made, about their political semiotics, if you will. I think the world is precisely what gets lost in doctrines of representation and scientific objectivity. It is *because* I care about jaguars, among other actors, including the overlapping but non-identical groups called forest peoples and ecologists, that I reject Joe Kane’s question. Some science studies scholars have been terrified to criticize their constructivist formulations because the only alternative seems to be some retrograde kind of “going back” to nature and to philosophical realism.³⁸ But above all people, these scholars should know that “nature” and “realism” are precisely the consequences of representational practices. Where we need to move is not “back” to nature, but *elsewhere*, through and within an artifactual social nature, which these very scholars have helped to make expressible in current Western scholarly practice. That knowledge-building practice might be articulated to other practices in “pro-life” ways that aren’t about the fetus or the jaguar as nature fetishes and the expert as their ventriloquist.

Prepared by this long detour, we can return to the Kayapó man videotaping his tribesmen as they protest a new hydroelectric dam on their territory. The National Geographic Society, *Discover* magazine, and Gulf Oil—and much philosophy and social science—would have us see his practice as a double boundary crossing between the primitive and the modern. His representational practice, signified by his use of the latest technology, places him in the realm of the modern. He is, then, engaged in an entertaining contradiction—the preservation of an unmodern way of life with the aid of incongruous modern technology. But, from the perspective of a political semiotics of articulation, the man might well be forging a recent collective of humans and unhumans, in this case made up of the Kayapó, videocams, land, plants, animals, near and distant audiences, and other constituents; but no boundary violation is involved. The way of life is not unmodern (closer to nature); the camera is not modern or postmodern (in society). Those categories should no longer make sense. Where there is no nature and no society, there is no pleasure, no entertainment to be had in representing the violation of the boundary between them. Too bad for nature magazines, but a gain for inappropriate/d others.

The videotaping practice does not thereby become innocent or uninteresting; but its meanings have to be approached differently, in terms of the kinds of collective action taking place and the claims they make on others—such as ourselves, people who do not live in the Amazon. *We are all* in chiasmatic borderlands, liminal areas where new shapes, new kinds of action and responsibility, are gestating in the world. The man using that camera is forging a practical claim on us, morally and epistemologically, as well as on the other forest people to whom he will show the tape to consolidate defense of the forest. His practice invites further articulation—on terms shaped by the forest people. They will no longer be represented as Objects, not because they cross a line to represent themselves in “modern” terms as Subjects, but because they powerfully form articulated collectives.

In May of 1990, a week-long meeting took place in Iquitos, a formerly prosperous rubber boom-town in the Peruvian Amazon. COICA, the Coordinating Body for the Indigenous Peoples of the Amazon, had assembled forest people (from all the nations constituting Amazonia), environmental groups from around the world (Greenpeace, Friends of the Earth, the Rain Forest Action Network, etc.), and media organizations (*Time* magazine, CNN, NBC, etc.) in order “to find a common path on which we can work to preserve the Amazon forest” (Arena-De Rosa, 1990, pp. 1–2). Rain forest protection was formulated as a necessarily joint human rights-ecological issue. The fundamental demand by indigenous people was that they must be part of *all* international negotiations involving their territories. “Debt for nature” swaps were particular foci of controversy, especially where indigenous groups end up worse off than in previous agreements with their governments as a result of bargaining between banks, external conservation groups, and national states. The controversy generated a proposal: instead of a swap of debt-for-nature, forest people would support swaps of debt-for-indigenous-controlled territory, in which non-indigenous environmentalists would have a “redefined role in helping to develop the plan for conservation management of the particular region of the rain forest” (Arena-De Rosa, 1990). Indigenous environmentalists would also be recognized not for their quaint “ethnoscience,” but for their *knowledge*.

Nothing in this structure of action rules out articulations by scientists or other North Americans who care about jaguars and other actors; but the patterns, flows, and intensities of power are most certainly changed. That is what articulation does; it is always a non-innocent, contestable practice; the partners are never set once and for all. There is no ventriloquism here. Articulation is work, and it may fail. All the people

who care, cognitively, emotionally, and politically, must articulate their position in a field constrained by a new collective entity, made up of indigenous people and other human and unhuman actors. Commitment and engagement, not their invalidation, in an emerging collective are the conditions of joining knowledge-producing and world-building practices. This is situated knowledge in the New World; it builds on common places, and it takes unexpected turns. So far, such knowledge has not been sponsored by the major oil corporations, banks, and logging interests. That is precisely one of the reasons why there is so much work for North Americans, Europeans, and Japanese, among others, to do in articulation with those humans and non-humans who live in rain forests and in many other places in the semiotic space called earth.

B. Outer Space: The Extraterrestrial

Since we have spent so much time on earth, a prophylactic exercise for residents of the alien “First World,” we will rush through the remaining three quadrants of the semiotic square. We move from one topical commonplace to another, from earth to space, to see what turns our journeys to elsewhere might take.

An ecosystem is always of a particular type, for example, a temperate grassland or a tropical rain forest. In the iconography of late capitalism, Jane Goodall did not go to that kind of ecosystem. She went to the “wilds of Tanzania,” a mythic “ecosystem” reminiscent of the original garden from which her kind had been expelled and to which she returned to commune with the wilderness’s present inhabitants to learn how to survive. This wilderness was close in its dream quality to “space,” but the wilderness of Africa was coded as dense, damp, bodily, full of sensuous creatures who touch intimately and intensely. In contrast, the extraterrestrial is coded to be fully general; it is about escape from the bounded globe into an anti-ecosystem called, simply, space. Space is not about “man’s” origins on earth but about “his” future, the two key allochronic times of salvation history. Space and the tropics are both utopian topical figures in Western imaginations, and their opposed properties dialectically signify origins and ends for the creature whose mundane life is supposedly outside both: modern or postmodern man.

The first primates to approach that abstract place called “space” were monkeys and apes. A rhesus monkey survived an 83 mile-high flight in 1949. Jane Goodall arrived in “the wilds of Tanzania” in 1960 to encounter and name the famous Gombe Stream chimpanzees introduced to the National Geographic television audience in 1965. However, other chimpanzees were vying for the spotlight in the early 1960s. On January 31, 1961, as part of the United States man-in-space program, the chimpanzee HAM, trained for his task at Holloman Air Force Base, 20 minutes by car from Alamogordo, New Mexico, near the site of the first atom bomb explosion in July 1945, was shot into suborbital flight (Figure 8). HAM’s name inevitably recalls Noah’s youngest and only black son. But this chimpanzee’s name was from a different kind of text. His name was an acronym for the scientific-military institution that launched him, *Holloman Aero-Medical*; and he rode an arc that traced the birth path of modern science—the parabola, the conic section. HAM’s parabolic path is rich with evocations of the history of Western science. The path of a projectile that does not escape gravity, the parabola is the shape considered so deeply by Galileo, at the first mythic moment of origins of modernity, when the unquantifiable sensuous and countable mathematical properties of bodies were separated from each other in scientific knowledge. It describes the path of ballistic weapons, and it is the trope for “man’s” doomed projects in the writings of the existentialists in the 1950s. The parabola traces the path of Rocket Man at the end of World

War II in Thomas Pynchon's *Gravity's Rainbow* (1973). An understudy for man, HAM went only to the boundary of space, in suborbital flight. On his return to earth, he was named. He had been known only as #65 before his successful flight. If, in the official birth-mocking language of the Cold War, the mission had to be "aborted," the authorities did not want the public worrying about the death of a famous and named, even if not quite human, astronaut. In fact, #65 did have a name among his handlers, Chop Chop Chang, recalling the stunning racism in which the other primates have been made to participate.³⁹ The space race's surrogate child was an "understudy for man in the conquest of space" (Eimerl and De Vore, 1965, p. 173). His hominid cousins would transcend that closed parabolic figure, first in the ellipse of orbital flight, then in the open trajectories of escape from earth's gravity.

HAM, his human cousins and simian colleagues, and their englobing and interfacing technology were implicated in a reconstitution of masculinity in Cold War and space race idioms. The movie *The Right Stuff* (1985) shows the first crop of human astronaut(gh)ts struggling with their affronted pride when they realize their tasks were competently performed by their simian cousins. They and the chimps were caught in the same theater of the Cold War, where the masculinist, death-defying, and skill-requiring heroics of the old jet aircraft test pilots became obsolete, to be replaced by the media-hype routines of projects Mercury, Apollo, and their sequelae. After chimpanzee Enos completed a fully automated orbital flight on November 29, 1961, John Glenn, who would be the first human American astronaut to orbit earth, defensively "looked toward the future by affirming his belief in the superiority of astronauts over chimponauts." *Newsweek* announced Glenn's orbital flight of February 20, 1962, with the headline, "John Glenn: One Machine That Worked Without Flaw."⁴⁰ Soviet primates on both sides of the line of hominization raced their U.S. siblings into extraterrestrial orbit. The space ships, the recording and tracking technologies, animals, and human beings were joined as cyborgs in a theater of war, science, and popular culture.

Henry Burroughs's famous photograph of an interested and intelligent, actively participating HAM, watching the hands of a white, laboratory-coated, human man release him from his contour couch, illuminated the system of meanings that binds humans and apes together in the late twentieth century (Weaver, 1961). HAM is the perfect child, reborn in the cold matrix of space. *Time* described chimponaut Enos in his "fitted contour couch that looked like a cradle trimmed with electronics."⁴¹ Enos and HAM were cyborg neonates, born of the interface of the dreams about a technician automaton and masculinist autonomy. There could be no more iconic cyborg than a telemetrically implanted chimpanzee, understudy for man, launched from earth in the space program, while his conspecific in the jungle, "in a spontaneous gesture of trust," embraced the hand of a woman scientist named Jane in a Gulf Oil ad showing "man's place in the ecological structure." On one end of time and space, the chimpanzee in the wilderness modeled communication for the stressed, ecologically threatened and threatening, modern human. On the other end, the ET chimpanzee modeled social and technical cybernetic communication systems, which permit postmodern man to escape both the jungle and the city, in a thrust into the future made possible by the social-technical systems of the "information age" in a global context of threatened nuclear war. The closing image of a human fetus hurtling through space in Stanley Kubrick's *2001: A Space Odyssey* (1968) completed the voyage of discovery begun by the weapon-wielding apes at the film's gripping opening. It was the project(ile) of self-made, reborn man, in the process of being raptured out of history. The Cold War was simulated ultimate war; the media and advertising industries of nuclear culture produced in the

bodies of animals—paradigmatic natives and aliens—the reassuring images appropriate to this state of pure war (Virilio and Lotringer, 1983).⁴²

In the aftermath of the Cold War, we face not the end of nuclearism, but its dissemination. Even without our knowing his ultimate fate as an adult caged chimpanzee, the photograph of HAM rapidly ceases to entertain, much less to edify. Therefore, let us look to another cyborg image to figure possible emergencies of inappropriate/d others to challenge our rapturous mythic brothers, the postmodern spacemen.

At first sight, the T-shirt worn by anti-nuclear demonstrators at the Mother's and Others' Day Action in 1987 at the United States's Nevada nuclear test site seems in simple opposition to HAM in his electronic cradle (Figure 9). But a little unpacking shows the promising semiotic and political complexity of the image and of the action. When the T-shirt was sent to the printer, the name of the event was still the "Mother's Day Action," but not long after some planning participants objected. For many, Mother's Day was, at best, an ambivalent time for a women's action. The overdetermined gender coding of patriarchal nuclear culture all too easily makes women responsible for peace while men fiddle with their dangerous war toys without semiotic dissonance. With its commercialism and multi-leveled reinforcement of compulsory heterosexual reproduction, Mother's Day is also not everybody's favorite feminist holiday. For others, intent



FIGURE 8. Ham awaits release in his couch aboard the recovery vessel LSD *Donner* after his successful Mercury Project launch. Photograph by Henry Borroughs.



FIGURE 9. Mother's Day 1987 Nevada Test Site Action T-shirt.

on reclaiming the holiday for other meanings, mothers, and by extension women in general, do have a special obligation to preserve children, and so the earth, from military destruction. For them, the earth is metaphorically mother and child, and in both figurations, a subject of nurturing and birthing. However, this was not an all-women's (much less all-mothers') action, although women organized and shaped it. From discussion, the designation "Mother's and Others' Day Action" emerged. But then, some thought that meant mothers and men. It took memory exercises in feminist analysis to rekindle shared consciousness that mother does not equal woman and vice versa. Part of the day's purpose was to recode Mother's Day to signify men's obligations to nurture the earth and all its children. In the spirit of this set of issues, at a time when Baby M and her many debatable—and unequally positioned—parents were in the news and the courts, the all-female affinity group which I joined took as its name the Surrogate Others. These surrogates were not understudies for man, but were gestating for another kind of emergence.

From the start, the event was conceived as an action that linked social justice and human rights, environmentalism, anti-militarism, and anti-nuclearism. On the T-shirt, there is, indeed, the perfect icon of the union of all issues under environmentalism's rubric: the "whole earth," the lovely, cloud-wrapped, blue, planet earth is simultaneously a kind of fetus floating in the amniotic cosmos and a mother to all its own inhabitants, germ of the future, matrix of the past and present. It is a perfect globe, joining the changeling matter of mortal bodies and the ideal eternal sphere of the philosophers. This snapshot resolves the dilemma of modernity, the separation of Subject and Object, Mind and Body. There is, however, a jarring note in all this, even for the most devout. That particular image of the earth, of Nature, could only exist if a camera on a satellite had taken the picture, which is, of course, precisely the case. Who speaks for the earth? Firmly in the object world called nature, this bourgeois, family-affirming snapshot of mother earth is about as uplifting as a loving commercial Mother's Day card. And yet, it *is* beautiful, and it is ours; it must be brought into a different focus. The T-shirt is part of a complex collective entity, involving many circuits, delegations, and displacements of competencies. Only in the context of the space race in the first place, and the militarization and commodification of the whole earth, does it make sense to relocate that image as the special sign of an anti-nuclear, anti-militaristic, earth-focused politics. The relocation does not cancel its other resonances; it contests for their outcome.

I read Environmental Action's "whole earth" as a sign of an irreducible artifactual social nature, like the Gaia of SF writer John Varley and biologist Lynn Margulis. Relocated on this particular T-shirt, the satellite's eye view of planet earth provokes an ironic version of the question, who speaks for the earth (for the fetus, the mother, the jaguar, the object world of nature, all those who must be represented)? For many of us, the irony made it possible to participate—indeed, to participate as fully committed, if semiotically unruly, eco-feminists. Not everybody in the Mother's and Others' Day Action would agree; for many, the T-shirt image meant what it said, love your mother who is the earth. Nuclearism is misogyny. The field of readings in tension with each other is also part of the point. Eco-feminism and the non-violent direct action movement have been based on struggles over differences, not on identity. There is hardly a need for affinity groups and their endless process if sameness prevailed. Affinity is precisely *not* identity; the sacred image of the same is not gestating on this Mother's and Others' Day. Literally, enrolling the satellite's camera and the peace action in Nevada into a new collective, this Love Your Mother image is based on diffraction, on the processing of small but consequential differences. The processing of differences, semiotic action, is about ways of life.

The Surrogate Others planned a birthing ceremony in Nevada, and so they made a birth canal—a sixteen-foot long, three-foot diameter, floral polyester-covered worm with lovely dragon eyes. It was a pleasingly artifactual beast, ready for connection. The worm-dragon was laid under the barbed-wire boundary between the land on which the demonstrators could stand legally and the land on which they would be arrested as they emerged. Some of the Surrogate Others conceived of crawling through the worm to the forbidden side as an act of solidarity with the tunneling creatures of the desert, who had to share their subsurface niches with the test site's chambers. This surrogate birthing was definitely not about the obligatory heterosexual nuclear family compulsively reproducing itself in the womb of the state, with or without the underpaid services of the wombs of "surrogate mothers." Mother's and Others' Day was looking up.

It wasn't only the desert's non-human organisms with whom the activists were in solidarity as they emerged onto the proscribed territory. From the point of view of the demonstrators, they were quite legally on the test-site land. This was so not out of some "abstract" sense that the land was the people's and had been usurped by the war state, but for more "concrete" reasons: all the demonstrators had written permits to be on the land signed by the Western Shoshone National Council. The 1863 Treaty of Ruby Valley recognized the Western Shoshone title to ancestral territory, including the land illegally invaded by the U.S. government to build its nuclear facility. The treaty has never been modified or abrogated, and U.S. efforts to buy the land (at 15 cents per acre) in 1979 was refused by the only body authorized to decide, the Western Shoshone National Council. The county sheriff and his deputies, surrogates for the federal government, were, in "discursive" and "embodied" fact, trespassing. In 1986 the Western Shoshone began to issue permits to the anti-nuclear demonstrators as part of a coalition that joined anti-nuclearism and indigenous land rights. It is, of course, hard to make citizens' arrests of the police when they have you handcuffed and when the courts are on their side. But it is quite possible to join this ongoing struggle, which is very much "at home," and to articulate it with the defense of the Amazon. That articulation requires collectives of human and unhuman actors of many kinds.

There were many other kinds of "symbolic action" at the test site that day in 1987. The costumes of the sheriff's deputies and their nasty plastic handcuffs were also symbolic action—highly embodied symbolic action. The "symbolic action" of brief, safe arrest is also quite a different matter from the "semiotic" conditions under which most people in the U.S., especially people of color and the poor, are jailed. The difference is not the presence or absence of "symbolism," but the force of the respective collectives made up of humans and unhumans, of people, other organisms, technologies, institutions. I am not unduly impressed with the power of the drama of the Surrogate Others and the other affinity groups, nor, unfortunately, of the whole action. But I do take seriously the work to relocate, to diffract, embodied meanings as crucial work to be done in gestating a new world.⁴³ It is cultural politics, and it is technoscience politics. The task is to build more powerful collectives in dangerously unpromising times.

Not-B. Inner Space: The Biomedical Body

The limitless reaches of outer space, joined to Cold War and post-Cold War nuclear technoscience, seem vastly distant from their negation, the enclosed and dark regions of the inside of the human body, domain of the apparatuses of biomedical visualization. But these two quadrants of our semiotic square are multiply tied together in technoscience's heterogeneous apparatuses of bodily production. As Sarah Franklin noted, "The two new investment frontiers, outer space and inner space, vie for the futures market."

In this “futures market,” two entities are especially interesting for this essay: the fetus and the immune system, both of which are embroiled in determinations of what may count as nature and as human, as separate natural object and as juridical subject. We have already looked briefly at some of the matrices of discourse about the fetus in the discussion of earth (who speaks for the fetus?) and outer space (the planet floating free as cosmic germ). Here, I will concentrate on contestations for what counts as a self and an actor in contemporary immune system discourse.

The equation of Outer Space and Inner Space, and of their conjoined discourses of extraterrestrialism, ultimate frontiers, and high technology war, is literal in the official history celebrating 100 years of the National Geographic Society (Bryan, 1987). The chapter that recounts the magazine’s coverage of the Mercury, Gemini, Apollo, and Mariner voyages is called “Space” and introduced with the epigraph, “The Choice Is the Universe—or Nothing.” The final chapter, full of stunning biomedical images, is titled “Inner Space” and introduced with the epigraph, “The Stuff of the Stars Has Come Alive.”⁴⁴ The photography convinces the viewer of the fraternal relation of inner and outer space. But, curiously, in outer space, we see spacemen fitted into explorer craft or floating about as individuated cosmic fetuses, while in the supposed earthy space of our own interiors, we see non-humanoid strangers who are the means by which our bodies sustain our integrity and individuality, indeed our humanity in the face of a world of others. We seem invaded not just by the threatening “non-selves” that the immune system guards against, but more fundamentally by our own strange parts.

Lennart Nilsson’s photographs, in the coffee table art book *The Body Victorious* (1987), as well as in many medical texts, are landmarks in the photography of the alien inhabitants of inner space⁴⁵ (Figure 10). The blasted scenes, sumptuous textures, evocative colors, and ET monsters of the immune landscape are simply *there*, inside *us*. A white extruding tendril of a pseudopodinous macrophage ensnares bacteria; the hillocks of chromosomes lie flattened on a blue-hued moonscape of some other planet; an infected cell buds myriads of deadly virus particles into the reaches of inner space where more cells will be victimized; the auto-immune disease-ravaged head of a femur glows against a sunset on a dead world; cancer cells are surrounded by the lethal mobil squads of killer T-cells that throw chemical poisons into the self’s malignant traitor cells.

A diagram of the “Evolution of Recognition Systems” in a recent immunology textbook makes clear the intersection of the themes of literally “wonderful” diversity, escalating complexity, the self as a defended stronghold, and extraterrestrialism in inner space (Figure 11). Under a diagram culminating in the evolution of the mammals, represented without comment by a mouse and a *fully-suited spaceman*, is this explanation: “From the humble amoeba searching for food (top left) to the mammal with its sophisticated humoral and cellular immune mechanisms (bottom right), the process of ‘self versus non-self recognition’ shows a steady development, keeping pace with the increasing need of animals to maintain their integrity in a hostile environment. The decision at which point ‘immunity’ appeared is thus a purely semantic one” (Playfair, 1984, emphasis in the original). These are the “semantics” of defense and invasion. The perfection of the fully defended, “victorious” self is a chilling fantasy, linking phagocytotic amoeba and space-voyaging man cannibalizing the earth in an evolutionary teleology of post-apocalypse extraterrestrialism. When is a self enough of a self that its boundaries become central to institutionalized discourses in biomedicine, war, and business?

Images of the immune system as a battlefield abound in science sections of daily newspapers and in popular magazines, e.g., *Time* magazine’s 1984 graphic for the AIDS virus’s “invasion” of the cell-as-factory. The virus is a tank, and the viruses ready for

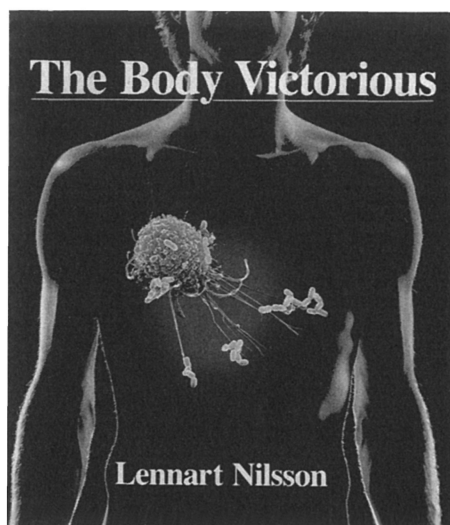


FIGURE 10. Design for Lennart Nilsson book.

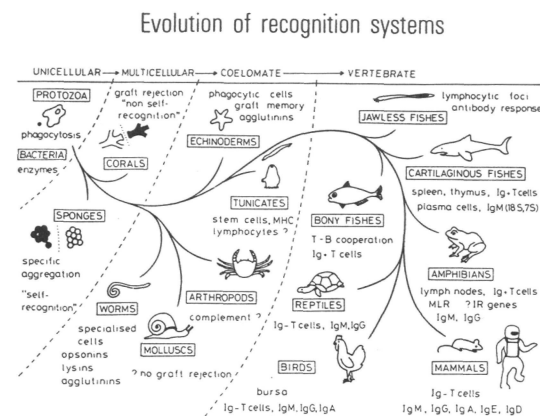


FIGURE 11. From a recent immunology textbook.

export from the expropriated cells are lined up ready to continue their advance on the body as a productive force. The *National Geographic* explicitly punned on Star Wars in its graphic called “Cell Wars” (Jaret, 1986). The militarized, automated factory is a favorite convention among immune system technical illustrators and photographic processors. The specific historical markings of a Star Wars-maintained individuality are enabled by high-technology visualization technologies, which are also basic to conducting war and commerce, such as computer-aided graphics, artificial intelligence software, and specialized scanning systems.

It is not just imagers of the immune system who learn from military cultures; military cultures draw symbiotically on immune system discourse, just as strategic planners draw directly from and contribute to video game practices and science fiction. For example, arguing for an elite special force within the parameters of “low-intensity conflict” doctrine, a U.S. army officer wrote: “The most appropriate example to describe how this system would work is the most complex biological model we know—the body’s immune system. Within the body there exists a remarkably complex corps of internal bodyguards. In absolute numbers they are small—only about one percent of the body’s cells. Yet they consist of reconnaissance specialists, killers, reconstitution specialists, and communicators that can seek out invaders, sound the alarm, reproduce rapidly, and swarm to the attack to repel the enemy. . . . In this regard, the June 1986 issue of *National Geographic* contains a detailed account of how the body’s immune system functions” (Timmerman, 1987).

The circuits of competencies sustaining the body as a defended self—personally, culturally, and nationally—spiral through the fantasy entertainment industry, a branch of the apparatus of bodily production fundamental to crafting the important consensual hallucinations about “possible” worlds that go into building “real” ones. In Epcot Center of Walt Disney World, we may be interpellated as subjects in the new Met Life Pavilion, which is “devoted to dramatizing the intricacies of the human body.” A special thrill ride, called “Body Wars,” promises that we will “experience the wonders of life,” such as encountering “the attack of the platelets.”⁴⁶ This lively battle simulator is promoted

as “family entertainment.” The technology for this journey through the human body uses a motion-based simulator to produce three-dimensional images for a stationary observer. As in other forms of high-tech tourism, we can go everywhere, see everything and leave no trace. The apparatus has been adopted to teach medical anatomy at the University of Colorado Health Sciences Center. Finally, we should not forget that more Americans travel to the combined Disney worlds than voyage in most other myth-realizing machines, like Washington, D.C.⁴⁷ Met Life cautions those who journey on “Body Wars” that they may experience extreme vertigo from the simulated motion. Is that merely “symbolic action” too?

In the embodied semiotic zones of earth and outer space, we saw the diffraction patterns made possible by recomposed visualizing technologies, relocated circuits of competencies that promise to be more user-friendly for inappropriate/d others. So also, the inner spaces of the biomedical body are central zones of technoscientific contestation, i.e., of science as culture in the amodern frame of social nature. Extremely interesting new collectives of human and unhuman allies and actors are emerging from these processes. I will briefly sketch two zones where promising monsters are undergoing symbiogenesis in the nutrient media of technoscientific work: 1) theories of immune function based on laboratory research, and 2) new apparatuses of knowledge production being crafted by Persons with AIDS (PWAs) and their heterogeneous allies. Both sets of monsters generate distinctly diffracted views of the self, evident in beliefs and practices in relation to vulnerability and mortality.

Like non-violent direct action and environmentalism, immune system discourse is about the unequally distributed chances of life and death. Since sickness and mortality are at the heart of immunology, it is hardly surprising that conditions of battle prevail. Dying is not an easy matter crying out for “friendly” visualization. But battle is not the only way to figure the process of mortal living. Persons coping with the life-threatening consequences of infection with the HIV virus have insisted that they are *living* with AIDS, rather than accepting the status of *victims* (or prisoners of war?). Similarly, laboratory scientists also have built research programs based on non-militaristic, relational embodiments, rather than on the capabilities of the defended self of atomic individuals. They do this in order to construct IS articulations more effectively, not in order to be nice folks with pacifist metaphors.

Let me attempt to convey the flavor of the artifactual bodily object called the human immune system, culled from major textbooks and research reports published in the 1980s. These characterizations are part of working systems for interacting with the immune system in many areas of practice, including business decisions, clinical medicine, and lab experiments. With about 10 to the 12th cells, the IS has two orders of magnitude more cells than the nervous system. IS cells are regenerated throughout life from pluripotent stem cells. From embryonic life through adulthood, the immune system is sited in several morphologically dispersed tissues and organs, including the thymus, bone marrow, spleen, and lymph nodes; but a large fraction of its cells are in the blood and lymph circulatory systems and in body fluids and spaces. If ever there were a “distributed system,” this is one! It is also a highly adaptable communication system with many interfaces.

There are two major cell lineages to the system: (1) The first is the *lymphocytes*, which include the several types of T cells (helper, suppressor, killer, and variations of all these) and the B cells (each type of which can produce only one sort of the vast array of potential circulating antibodies). T and B cells have particular specificities capable of recognizing almost any molecular array of the right size that can ever exist, no matter how clever industrial chemistry gets. This specificity is enabled by a baroque somatic

mutation mechanism, clonal selection, and a polygenic receptor or marker system. (2) The second immune cell lineage is the *mononuclear phagocyte system*, including the multi-talented macrophages, which, in addition to their other recognition skills and connections, also appear to share receptors and some hormonal peptide products with neural cells. Besides the cellular compartment, the immune system comprises a vast array of circulating acellular products, such as antibodies, lymphokines, and complement components. These molecules mediate communication among components of the immune system, but also between the immune system and the nervous and endocrine systems, thus linking the body's multiple control and coordination sites and functions. The genetics of the immune system cells, with their high rates of somatic mutation and gene product splicings and rearrangings to make finished surface receptors and antibodies, makes a mockery of the notion of a constant genome even within "one" body. The hierarchical body of old has given way to a network-body of amazing complexity and specificity. The immune system is everywhere and nowhere. Its specificities are indefinite if not infinite, and they arise randomly; yet these extraordinary variations are the critical means of maintaining bodily coherence.

In the early 1970s, winning a Nobel Prize for the work, Niels Jerne proposed a theory of immune system self-regulation, called the network theory, which deviates radically from notions of the body victorious and the defended self. "The network theory differs from other immunological thinking because it endows the immune system with the ability to regulate itself using only itself" (Golub, 1987; Jerne, 1985).⁴⁸ Jerne proposed that any antibody molecule must be able to act functionally as both antibody to some antigen *and* as antigen for the production of an antibody to itself, at another region of "itself." These sites have acquired a nomenclature sufficiently daunting to thwart popular understanding of the theory, but the basic conception is simple. The concatenation of internal recognitions and responses would go on indefinitely, in a series of interior mirrorings of sites on immunoglobulin molecules, such that the immune system would always be in a state of dynamic internal responding. It would never be passive, "at rest," awaiting an activating stimulus from a hostile outside. In a sense, there could be no *exterior* antigenic structure, no "invader," that the immune system had not already "seen" and mirrored internally. Replaced by subtle plays of partially mirrored readings and responses, self and other lose their rationalistic oppositional quality. A radical conception of *connection* emerges unexpectedly at the core of the defended self. Nothing in the model prevents therapeutic action, but the entities in the drama have different kinds of interfaces with the world. The therapeutic logics are unlikely to be etched into living flesh in patterns of DARPA's latest high-tech tanks and smart missiles.

Some of those logics are being worked out in and by the bodies of persons with AIDS and ARC. In their work to sustain life and alleviate pain in the context of mortal illness, PWAs engage in many processes of knowledge-building. These processes demand intricate code switching, language bridging, and alliances among worlds previously held apart. These "generative grammars" are matters of life and death. As one activist put it, "ACT UP's humor is no joke" (Crimp and Rolston, 1990, p. 20; see also Crimp, 1983). The AIDS Coalition to Unleash Power (ACT UP) is a collective built from many articulations among unlike kinds of actors—for example, activists, biomedical machines, government bureaucracies, gay and lesbian worlds, communities of color, scientific conferences, experimental organisms, mayors, international information and action networks, condoms and dental dams, computers, doctors, IV drug-users, pharmaceutical companies, publishers, virus components, counselors, innovative sexual practices, dancers, media technologies, buying clubs, graphic artists, scientists, lovers, lawyers, and more. The actors, however, are not all equal. ACT UP has an animating center—PWAs, who

are to the damage wrought by AIDS and the work for restored health around the world as the indigenous peoples of the Amazon are to forest destruction and environmentalism. These are the actors with whom others must articulate. That structure of action is a fundamental consequence of learning to visualize the heterogeneous, artifactual body that is our “social nature,” instead of narrowing our vision that “saving nature” and repelling alien invaders from an unspoiled organic eden called the autonomous self. Saving nature is, finally, a deadly project. It relies on perpetuating the structure of boundary violation and the falsely liberating *frisson* of transgression. What happened in the first Eden should have made that clear.

So, if the tree of knowledge cannot be forbidden, we had all better learn how to eat and feed each other with a little more savvy. That is the difficult process being engaged by PWAs, Project Inform, ACT UP, NIH, clinical practitioners, and many more actors trying to build responsible mechanisms for producing effective knowledge in the AIDS epidemic.⁴⁹ Unable to police the same boundaries separating insiders and outsiders, the world of biomedical research will never be the same again. The changes range across the epistemological, the commercial, the juridical, and the spiritual domains. For example, what is the status of knowledge produced through the new combinations of decision-making in experimental design that are challenging previous research conventions? What are the consequences of the *simultaneous* challenges to expert monopoly of knowledge *and* insistence on both the rapid improvement of the biomedical knowledge base and the equitable mass distribution of its fruits? How will the patently amodern hybrids of healing practices cohabit in the emerging social body? And, who will live and die as a result of these very non-innocent practices?

Not-A. Virtual Space: SF⁵⁰

Articulation is not a simple matter. Language is the effect of articulation, and so are bodies. The articulata are jointed animals; they are not smooth like the perfect spherical animals of Plato’s origin fantasy in the *Timaeus*. The articulata are cobbled together. It is the condition of being articulate. I rely on the articulata to breathe life into the artifactual cosmos of monsters that this essay inhabits. Nature may be speechless, without language, in the human sense; but nature is highly articulate. Discourse is only one process of articulation. An articulated world has an undecidable number of modes and sites where connections can be made. The surfaces of this kind of world are not frictionless curved planes. Unlike things can be joined—and like things can be broken apart—and vice versa. Full of sensory hairs, evaginations, invaginations, and indentations, the surfaces which interest me are dissected by joints. Segmented invertebrates, the articulata are insectoid and worm-like, and they inform the inflamed imaginations of SF filmmakers and biologists. In obsolete English, to articulate meant to make terms of agreement. Perhaps we should live in such an “obsolete,” amodern world again. To articulate is to signify. It is to put things together, scary things, risky things, contingent things. I want to live in an articulate world. We articulate; therefore, we are. Who “I” am is a very limited, in the endless perfection of (clear and distinct) Self-contemplation. Unfair as always, I think of it as the paradigmatic psychoanalytic question. “Who am I?” is about (always unrealizable) identity; always wobbling, it still pivots on the law of the father, the sacred image of the same. Since I am a moralist, the real question must have more virtue: who are “we”? That is an inherently more open question, one always ready for contingent, friction-generating articulations. It is a remonstrative question.

In optics, the virtual image is formed by the apparent, but not actual, convergence of rays. The virtual seems to be the counterfeit of the real; the virtual has effects by

seeming, not being. Perhaps that is why “virtue” is still given in dictionaries to refer to women’s chastity, which must always remain doubtful in patriarchal optical law. But then, “virtue” used to mean manly spirit and valor too, and God even named an order of angels the Virtues, though they were of only middling rank. Still, no matter how big the effects of the virtual are, they seem somehow to lack a proper ontology. Angels, manly valor, and women’s chastity certainly constitute, at best, a virtual image from the point of view of late twentieth-century “postmoderns.” For them, the virtual is precisely *not* the real; that’s why “postmoderns” *like* “virtual reality.” It seems transgressive. Yet, I can’t forget that an obsolete meaning of “virtual” was having virtue, i.e., the inherent power to produce effects. “Virtu,” after all, is excellence or merit, and it is still a common meaning of virtue to refer to having efficacy. The “virtue” of something is its “capacity.” The virtue of (some) food is that it nourishes the body. Virtual space *seems* to be the negation of real space; the domains of SF *seem* the negation of earthly regions. But perhaps this negation is the real illusion.

“Cyberspace, absent its high-tech glitz, is the idea of virtual consensual community. . . . A virtual community is first and foremost a community of belief.”⁵¹ For William Gibson (1986), cyberspace is “consensual hallucination experienced daily by billions. . . . Unthinkable complexity.” Cyberspace seems to be the consensual hallucination of too much complexity, too much articulation. It is the virtual reality of paranoia, a well-populated region in the last quarter of the Second Christian Millennium. Paranoia is the belief in the unrelieved density of connection, requiring, if one is to survive, withdrawal and defense unto death. The defended self re-emerges at the heart of relationality. Paradoxically, paranoia is the condition of the impossibility of remaining articulate. In virtual space, the virtue of articulation—i.e., the power to produce connection—threatens to overwhelm and finally to engulf all possibility of effective action to change the world.

So, in our travels into virtual space, if we are to emerge from our encounter with the artifactual articulata into a livable elsewhere, we need a guide figure to navigate around the slough of despond. Lisa Foo, the principal character in a Hugo and Nebula award-winning short story by John Varley (1986), will be our unlikely Beatrice through the System.

“If you wish to know more, press enter” (p. 286).⁵²

With that fatal invitation, Varley’s profoundly paranoid story begins and ends. The Tree of Knowledge is a Web, a vast system of computer connections generating, as an emergent property, a new and terrifyingly unhuman collective entity. The forbidden fruit is knowledge of the workings of this powerful Entity, whose deadly essence is extravagant connection. All of the human characters are named after computers, programs, practices, or concepts—Victor Apfel, Detective Osborne, and the hackers Lisa Foo and Charles Kluge. The story is a murder mystery. With a dubious suicide note, called up by responding to the command “press enter” on the screen of one of the dozens of personal computers in his house, which is also full of barrels of illicit drugs, Kluge has been found dead by his neighbor, Apfel. Apfel is a reclusive middle-aged epileptic, who had been a badly treated prisoner-of-war in Korea, leaving him with layers of psychological terror, including a fear and hatred of “orientals.” When Los Angeles homicide Detective Osborne’s men prove totally inept at deciphering the elaborate software running Kluge’s machines, Lisa Foo, a young Vietnamese immigrant, now a U.S. citizen, is called in from Cal Tech; and she proceeds to play Sherlock Holmes to Osborne’s Lestrade. The story is narrated from Apfel’s point of view, but Foo is the tale’s center and, I insist, its pivotal actor.

Insisting, I wish to exercise the license that is built into the anti-elitist reading conventions of SF popular cultures. SF conventions invite—or at least permit more readily than do the academically propagated, respectful consumption protocols for literature—rewriting as one reads. The books are cheap; they don't stay in print long; why not rewrite them as one goes? Most of the SF I like motivates me to engage actively with images, plots, figures, devices, linguistic moves, in short, with worlds, not so much to make them come out "right," as to make them move "differently." These worlds motivate me to test their virtue, to see if their articulations work—and what they work for. Because SF makes identification with a principal character, comfort within the patently constructed world, or a relaxed attitude toward language, especially risky reading strategies, the reader is likely to be more generous and more suspicious—*both* generous and suspicious, exactly the receptive posture I seek in political semiosis generally. It is a strategy closely aligned with the oppositional and differential consciousness theorized by Chela Sandoval and by other feminists insistent on navigating mined discursive waters.

Our first view of Lisa Foo is through Apfel's eyes; and for him, "[l]eaving out only the moustache, she was a dead ringer for a cartoon Tojo. She had the glasses, ears, and the teeth. But her teeth had braces, like piano keys wrapped in barbed wire. And she was five-eight or five-nine and couldn't have weighed more than a hundred and ten. I'd have said a hundred, but added five pounds for each of her breasts, so improbably large on her scrawny frame that all I could read of the message on her T-shirt was 'POCK LIVE.' It was only when she turned sideways that I saw the esses before and after" (pp. 241–42). Using such messages among the many other languages accessed by this intensely literate figure, Foo communicated constantly through her endless supply of T-shirts. Her breasts turned out to be silicone implants, and as Foo said, "I don't think I've ever been so happy with anything I ever bought. Not even the car [her Ferrari]" (p. 263). From Foo's childhood perspective, "the West . . . [is] the place where you buy tits" (p. 263).

When Foo and Apfel became lovers, in one of the most sensitively structured heterosexual, cross-racial relationships in print anywhere, we also learn that Foo's body was multiply composed by the history of Southeast Asia. Varley gave her a name that is an "orientalized" version of the computer term "fu bar"—"fucked up beyond all recognition." Her Chinese grandmother had been raped in Hanoi by an occupying Japanese soldier in 1942. In Foo's mother's Vietnam, "Being Chinese was bad enough, but being half Chinese and half Japanese was worse . . . My father was half French and half Annamese. Another bad combination" (p. 275). Her mother was killed in the Tet offensive when Foo was ten. The girl became a street hustler and child prostitute in Saigon, where she was "protected" by a pedophilic white U.S. major. Refusing to leave Saigon with him, after Saigon "fell," Foo ended up in Pol Pot's Cambodia, where she barely survived the Khmer Rouge work camps. She escaped to Thailand, and "when I finally got the Americans to notice me, my Major was still looking for me" (p. 276). Dying of a cancer that might have been the result of his witnessing the atom bomb tests in Nevada early in his career, he sponsored her to the U.S. Her intelligence and hustling got her "tits by Goodyear" (p. 275), a Ferrari, and a Cal Tech education. Foo and Apfel struggle together within their respective legacies of multiple abuse, sexual and otherwise, and criss-crossing racisms. They are both multi-talented, but scarred, survivors. This story, its core figure and its narrator, will not let us dodge the scary issues of race/racism, gender/sexism, historical tragedy, and technoscience within the region of time we politely call "the late twentieth century." There is no safe place here; there are, however, many maps of possibility.

But, there is entirely *too much* connection in “Press Enter,” and it is only the beginning. Foo is deeply in love with the power-knowledge systems to which her skills give her access. “This is money, Yank, she said, and her eyes glittered” (p. 267). As she traces the fascinating webs and security locks, which began in military computer projects but which have taken on a vastly unhuman life of their own, her love and her skills bring her too deep into the infinitely dense connections of the System, where she, like Kluge before her, is noticed. Too late, she tries to withdraw. Soon after, a clearly fake suicide note appears on her T-shirt on her ruined body. Investigation showed that she had rewired the microwave oven in Kluge’s house to circumvent its security checks. She put her head in the oven, and she died shortly after in the hospital, her eyes and brain congealed and her breasts horribly melted. The promise of her name, “fu bar,” was all-too-literally fulfilled—fucked up beyond all recognition. Apfel, who had been brought back into articulation with life in his love with Lisa Foo, retreated totally, stripping his house of all its wiring and any other means of connecting with the techno-webs of a world he now saw totally within the paranoid terms of infinite and alien connection. At the end, the defended self, alone, permanently hides from the alien Other.

It is possible to read “Press Enter” as a conventional heterosexual romance, bourgeois detective fiction, technophobic-technophilic fantasy, dragon-lady story, and, finally, white masculinist narrative whose condition of possibility is access to the body and mind of a woman, especially a “Third World” woman, who, here as elsewhere in misogynist and racist culture, is violently destroyed. Not just violently—superabundantly, without limit. I think such a reading does serious violence to the subtle tissues of the story’s writing. Nonetheless, “Press Enter” induces in me, and in other women and men who have read the story with me, an irreconcilable pain and anger: Lisa Foo should not have been killed that way. It really is not alright. The text and the body lose all distinction. I fall out of the semiotic square and into the viciously circular thing-in-itself. More than anything else, that pornographic, gendered and colored death, that excessive destruction of her body, that total undoing of her being—that extravagant final connection—surpasses the limits of pleasure in the conventions of paranoid fiction and provokes the necessity of active rewriting as reading. I cannot read this story without rewriting it; that is one of the lessons of transnational, intercultural, feminist literacy. And the conclusion forces rewriting not just of itself, but of the whole human and unhuman collective that is Lisa Foo. The point of the differential/oppositional rewriting is not to make the story come out “right,” whatever that would be. The point is to rearticulate the figure of Lisa Foo to unsettle the closed logics of a deadly racist misogyny. Articulation must remain open, its densities accessible to action and intervention. When the system of connections closes in on itself, when symbolic action becomes perfect, the world is frozen in a dance of death. The cosmos is finished, and it is One. Paranoia is the only possible posture; generous suspicion is foreclosed. To “press enter” is, in that world, a terrible mistake.

The whole argument of “The Promises of Monsters” has been that to “press enter” is not a fatal error, but an inescapable possibility for changing maps of the world, for building new collectives out of what is not quite a plethora of human and unhuman actors. My stakes in the textual figure of Lisa Foo, and of many of the actors in Varley’s SF, are high. Built from multiple interfaces, Foo can be a guide through the terrains of virtual space, but only if the fine lines of tension in the articulated webs that constitute her being remain in play, open to the unexpected realization of an unlikely hope. It’s not a “happy ending” we need, but a non-ending. That’s why none of the narratives of masculinist, patriarchal apocalypses will do. The System is not closed; the sacred image of the same is not coming. The world is not full.

The final image of this excessive essay is *Cyborg*, a 1989 painting by Lynn Randolph, in which the boundaries of a fatally transgressive world, ruled by the Subject and the Object, give way to the borderlands, inhabited by human and unhuman collectives (Figure 12).⁵³ These borderlands suggest a rich topography of combinatorial possibility. That possibility is called the Earth, here, now, this elsewhere, where real, outer, inner, and virtual space implode. The painting maps the articulations among cosmos, animal, human, machine, and landscape in their recursive sidereal, bony, electronic, and geological skeletons. Their combinatorial logic is embodied; theory is corporeal; social nature is articulate. The stylized DIP switches of the integrated circuit board on the human figure's chest are devices that set the defaults in a form intermediate between hardwiring and software control—not unlike the mediating structural-functional anatomy of the feline and hominid forelimbs, especially the flexible, homologous hands and paws. The painting is replete with organs of touch and mediation, as well as with organs of vision. Direct in their gaze at the viewer, the eyes of the woman and the cat center the whole composition. The spiraling skeleton of the Milky Way, our galaxy, appears behind the cyborg figure in three different graphic displays made possible by high-technology visualizing apparatuses. In the place of virtual space in my semiotic square, the fourth square is an imaging of the gravity well of a black hole. Notice the tic-tac-toe game, played with the European male and female astrological signs (Venus won this game); just to their right are some calculations that might appear in the mathematics of chaos. Both sets of symbols are just below a calculation found in the Einstein papers. The mathematics and games are like logical skeletons. The keyboard is jointed to the skeleton of the planet Earth, on which a pyramid rises in the left mid-foreground. The whole painting has the quality of a meditation device. The large cat is like a spirit animal, a white tiger perhaps. The woman, a young Chinese student in the United States, figures that which is human, the universal, the generic. The “woman of color,” a very particular, problematic, recent collective identity, resonates with local and global conversations.⁵⁴ In this painting, she embodies the still oxymoronic simultaneous statuses



FIGURE 12. Lynn Randolph, “Cyborg” (1989).

of woman, “Third World” person, human, organism, communications technology, mathematician, writer, worker, engineer, scientist, spiritual guide, lover of the Earth. This is the kind of “symbolic action” transnational feminisms have made legible. S/he is not finished.

We have come full circle in the noisy mechanism of the semiotic square, back to the beginning, where we met the commercial cyborg figures inhabiting technoscience worlds. Logic General’s oddly recursive rabbits, forepaws on the keyboards that promise to mediate replication and communication, have given way to different circuits of competencies. If the cyborg has changed, so might the world. Randolph’s cyborg is in conversation with Trinh Minh-ha’s inappropriate/d other, the personal and collective being to whom history has forbidden the strategic illusion of self-identity. This cyborg does not have an Aristotelian structure; and there is no master-slave dialectic resolving the struggles of resource and product, passion and action. S/he is not utopian nor imaginary; s/he is virtual. Generated, along with other cyborgs, by the collapse into each other of the technical, organic, mythic, textual, and political, s/he is constituted by articulations of critical differences within and without each figure. The painting might be headed, “A few words about articulation from the actors in the field.” Privileging the hues of red, green, and ultraviolet, I want to read Randolph’s *Cyborg* within a rainbow political semiology, for wily transnational technoscience studies as cultural studies.

NOTES

1. “They drew near to a very Miry Slough . . . The name of this Slow was Dispond” (John Bunyan, *Pilgrim’s Progress*, 1678; quoted in the Oxford English Dictionary). The non-standardization of spelling here should also mark, at the beginning of the “Promises of Monsters,” the suggestiveness of words at the edge of the regulatory technologies of writing.

2. Sally Hacker, in a paper written just before her death (“The Eye of the Beholder: An Essay on Technology and Eroticism,” manuscript, 1989), suggested the term “pornotechnics” to refer to the embodiment of perverse power relations in the artifactual body. Hacker insisted that the heart of pornotechnics is the military as an institution, with its deep roots and wide reach into science, technology, and erotics. “Technical exhilaration” is profoundly erotic; joining sex and power is the designer’s touch. Technics and erotics are the cross hairs in the focusing device for scanning fields of skill and desire. See also Hacker (1989). Drawing from Hacker’s arguments, I believe that control over technics is the enabling practice for class, gender, and race supremacy. Realigning the join of technics and erotics must be at the heart of anti-racist feminist practice. (cf. Haraway, 1989b; Cohn, 1987).

3. See the provocative publication that replaced *Radical Science Journal*, *Science as Culture*, Free Association Books, 26 Freegrove Rd., London N7 9RQ, England.

4. This incubation of ourselves as planetary fetuses is not quite the same thing as pregnancy and reproductive politics in post-industrial, post-modern, or other posted locations, but the similarities will become more evident as this essay proceeds. The struggles over the outcomes are linked.

5. Here I borrow from the wonderful project of the Journal, *Public Culture*, Bulletin of the Center for Transnational Cultural Studies, The University Museum, University of Pennsylvania, Philadelphia, PA 19104. In my opinion, this journal embodies the best impulses of cultural studies.

6. I demure on the label “postmodern” because I am persuaded by Bruno Latour that within the historical domains where science has been constructed, the “modern” never existed, if by modern we mean the rational, enlightened mentality (the subject, mind, etc.) actually proceeding with an objective method toward adequate representations, in mathematical equations if possible, of the object—i.e., “natural”—world. Latour argues that Kant’s *Critique*, which set off at extreme poles Things-in-Themselves from the Transcendental Ego, is what made us believe ourselves to be “modern,” with escalating and dire consequences for the repertoire of explanatory possibilities

of “nature” and “society” for Western scholars. The separation of the two transcendences, the object pole and subject pole, structures “‘the political Constitution of Truth.’ I call it ‘modern,’ defining modernity as the complete separation of the representation of things—science and technology—from the representation of humans—politics and justice.” (Latour, forthcoming, a).

Debilitating though such a picture of scientific activity should seem, it has guided research in the disciplines (history, philosophy, sociology, anthropology), studying science with a pedagogical and prophylactic vengeance, making culture seem other to science; science alone could get the goods on nature by unveiling and policing her unruly embodiments. Thus, science studies, focused on the edifying object of “modern” scientific practice, has seemed immune from the polluting infections of cultural studies—but surely no more. To rebel against or to lose faith in rationalism and enlightenment, the infidel state of respectively modernists and postmodernists, is not the same thing as to show that rationalism was the emperor that had no clothes, that never was, and so there never was its other either. (There is a nearly inevitable terminological confusion here among modernity, the modern, and modernism. I use modernism to refer to a cultural movement that rebelled against the premises of modernity, while postmodernism refers less to rebellion than loss of faith, leaving nothing to rebel against.) Latour calls his position *amodern* and argues that scientific practice is and has been *amodern*, a sighting that makes the line between real scientific (West’s) and ethnoscience and other cultural expressions (everything else) disappear. The difference reappears, but with a significantly different geometry—that of scales and volumes, i.e., the size differences among “collective” entities made of humans and non-humans—rather than in terms of a line between rational science and ethnoscience.

This modest turn or tropic change does not remove the study of scientific practice from the agenda of cultural studies and political intervention, but places it decisively on the list. Best of all, the focus gets fixed clearly on inequality, right where it belongs in science studies. Further, the addition of science to cultural studies does not leave the notions of culture, society, and politics untouched, far from it. In particular, we cannot make a critique of science and its constructions of nature based on an ongoing belief in culture or society. In the form of social constructionism, that belief has grounded the major strategy of left, feminist, and anti-racist science radicals. To remain with that strategy, however, is to remain bedazzled by the ideology of enlightenment. It will not do to approach science as cultural or social construction, as if culture and society were transcendent categories, any more than nature or the object is. Outside the premises of enlightenment—i.e., of the modern—the binary pairs of culture and nature, science and society, the technical and the social all lose their co-constitutive, oppositional quality. Neither can explain the other. “But instead of providing the explanation, Nature and Society are now accounted for as the historical consequences of the movement of collective things. All the interesting realities are no longer captured by the two extremes but are to be found in the substitution, cross over, translations, through which actants shift their competences” (Latour, 1990, p. 170). When the pieties of belief in the modern are dismissed, both members of the binary pairs collapse into each other as into a black hole. But what happens to them in the black hole is, by definition, not visible from the shared terrain of modernity, modernism, or postmodernism. It will take a superluminal SF journey into elsewhere to find the interesting new vantage points. Where Latour and I fundamentally agree is that in that gravity well, into which Nature and Society as transcendents disappeared, are to be found actors/actants of many and wonderful kinds. Their relationships constitute the artifactualism I am trying to sketch.

7. For quite another view of “production” and “reproduction” than that enshrined in so much Western political and economic (and feminist) theory, see Marilyn Strathern (1988, pp. 290–308).

8. Chela Sandoval develops the distinctions between oppositional and differential consciousness in her forthcoming doctoral dissertation, University of California at Santa Cruz. See also Sandoval (1990).

9. My debt is extensive in these paragraphs to Luce Irigaray’s wonderful critique of the allegory of the cave in *Speculum de l’autre femme* (1974). Unfortunately, Irigaray, like almost all white Europeans and Americans after the mid-nineteenth-century consolidation of the myth that the “West” originated in a classical Greece unsullied by Semitic and African roots, transplants, colonizations, and loans, never questioned the “original” status of Plato’s fatherhood of philosophy,

enlightenment, and rationality. If Europe was colonized first by Africans, that historical narrative element would change the story of the birth of Western philosophy and science. Martin Bernal's extraordinarily important book, *Black Athena*, Vol. 1, *The Fabrication of Ancient Greece, 1785–1985* (1987), initiates a groundbreaking re-evaluation of the founding premises of the myth of the uniqueness and self-generation of Western culture, most certainly including those pinnacles of Man's self-birthing, science and philosophy. Bernal's is an account of the determinative role of racism and Romanticism in the fabrication of the story of Western rationality. Perhaps ironically, Martin Bernal is the son of J. D. Bernal, the major pre-World War II British biochemist and Marxist whose four-volume *Science in History* movingly argued the superior rationality of a science freed from the chains of capitalism. Science, freedom, and socialism were to be, finally, the legacy of the West. For all its warts, that surely would have been better than Reagan's and Thatcher's version! See Gary Wersky, *The Invisible College: The Collective Biography of British Socialist Scientists in the 1930s* (1978).

Famous in his own generation for his passionate heterosexual affairs, J. D. Bernal, in the image of enlightenment second birthing so wryly exposed by Irigaray, wrote his own vision of the future in *The Word, the Flesh, and the Devil* as a science-based speculation that had human beings evolving into disembodied intelligences. In her manuscript (May, 1990) "Talking about Science in Three Colors: Bernal and Gender Politics in the Social Studies of Science," Hilary Rose discusses this fantasy and its importance for "science, politics, and silences." J. D. Bernal was also actively supportive of independent women scientists. Rosalind Franklin moved to his laboratory after her nucleic acid crystallographic work was stolen by the flamboyantly sexist and heroic James Watson on his way to the immortalizing, luminous fame of the *Double Helix* of the 1950s and 60s and its replicant of the 1980s and 90s, the Human Genome Project. The story of DNA has been an archetypical tale of blinding modern enlightenment and untrammelled, disembodied, autochthonous origins. See Ann Sayre (1975); Mary Jacobus (1982); Evelyn Fox Keller (1990).

10. For an argument that nature is a *social* actor, see Elizabeth Bird (1987).

11. Actants are not the same as actors. As Terence Hawkes (1977, p. 89) put it in his introduction to Greimas, actants operate at the level of function, not of character. Several characters in a narrative may make up a single actant. The structure of the narrative generates its actants. In considering what kind of entity "nature" might be, I am looking for a coyote and historical grammar of the world, where deep structure can be quite a surprise, indeed, a veritable trickster. Non-humans are not necessarily "actors" in the human sense, but they are part of the functional collective that makes up an actant. Action is not so much an ontological as a semiotic problem. This is perhaps as true for humans as non-humans, a way of looking at things that may provide exits from the methodological individualism inherent in concentrating constantly on who the agents and actors are in the sense of liberal theories of agency.

12. In this productionist story, women make babies, but this is a poor if necessary substitute for the real action in reproduction—the second birth through self-birthing, which requires the obstetrical technology of optics. One's relation to the phallus determines whether one gives birth to oneself, at quite a price, or serves, at an even greater price, as the conduit or passage for those who will enter the light of self-birthing. For a refreshing demonstration that women do not make babies everywhere, see Marilyn Strathern (1988), pp. 314–18.

13. I borrow here from Katie King's notion of the apparatus of literary production, in which the poem congeals at the intersection of business, art, and technology. See King (1990). See also Donna Haraway (1991), chaps. 8–10.

14. Latour has developed the concept of delegation to refer to the translations and exchanges between and among people doing science and their machines, which act as "delegates" in a wide array of ways. Marx considered machines to be "dead labor," but that notion, while still necessary for some crucial aspects of forced and reified delegation, is too unlively to get at the many ways that machines are part of *social* relations "through which actants shift competences" Latour (1990, p. 170). See also Bruno Latour (forthcoming, b). Latour, however, as well as most of the established scholars in the social studies of science, ends up with too narrow a concept of the "collective," one built up out of only machines and scientists, who are considered in a very narrow time and space frame. But circulations of skills turn out to take some stranger turns. First, with the important

exception of his writing and teaching in collaboration with the primatologist Shirley Strum, who has fought hard in her profession for recognition of primates as savvy social actors, Latour pays too little attention to the non-machine, *other* non-humans in the interactions. See Strum (1987).

The “collective,” of which “nature” in any form is one example from my point of view, is always an artifact, always social, not because of some transcendental Social that explains science or vice versa, but because of its heterogeneous actants/actors. Not only are not all of those actors/actants people; I agree there *is* a sociology of machines. But that is not enough; not all of the other actors/actants were *built* by people. The artifactual “collective” includes a witty actor that I have sometimes called coyote. The interfaces that constitute the “collective” must include those between humans and artifacts in the form of instruments and machines, a genuinely *social* landscape. But the interface between machines and *other* non-humans, as well as the interface between humans and *non-machine* non-humans must also be counted in. Animals are fairly obvious actors, and their interfaces with people and machines are easier to admit and theorize. See Donna Haraway (1989a); Barbara Noske (1989); Paradoxically, from the perspective of the kind of artifactualism I am trying to sketch, animals lose their *object* status that has reduced them to things in so much Western philosophy and practice. They inhabit neither nature (as object) nor culture (as surrogate human), but instead inhabit a place called elsewhere. In Noske’s terms (p. xi), they are other “worlds, whose otherworldliness must not be disenchanting and cut to our size but respected for what it is.” Animals, however, do not exhaust the coyote world of non-machine non-humans. The domain of machine and non-machine non-humans (the unhuman, in my terminology) joins people in the building of the artifactual collective called nature. None of these actants can be considered as simply resource, ground, matrix, object, material, instrument, frozen labor; they are all more unsettling than that. Perhaps my suggestions here come down to re-inventing an old option within a non-Eurocentric Western tradition indebted to Egyptian Hermeticism that insists on the active quality of the world and on “animate” matter. See Martin Bernal (1987, pp. 121–60); Frances Yates (1964). Worldly and enspirited, coyote nature is a collective, cosmopolitan artifact crafted in stories with heterogeneous actants.

But there is a second way in which Latour and other major figures in science studies work with an impoverished “collective.” Correctly working to resist a “social” explanation of “technical” practice by exploding the binary, these scholars have a tendency covertly to reintroduce the binary by worshipping only one term—the “technical.” Especially, *any* consideration of matters like masculine supremacy or racism or imperialism or class structures are inadmissible because they are the old “social” ghosts that blocked real explanation of science in action. See Latour (1987). As Latour noted, Michael Lynch is the most radical proponent of the premise that there is no social explanation of a science but the technical content itself, which assuredly includes the interactions of people with each other in the lab and with their machines, but excludes a great deal that I would include in the “technical” content of science if one really doesn’t want to evade a binary by worshipping one of its old poles. Lynch (1985); Latour (1990, p. 169n). I agree with Latour and Lynch that practice creates its own context, but they draw a suspicious line around what gets to count as “practice.” They *never* ask how the *practices* of masculine supremacy, or many other systems of structured inequality, get *built* into and out of working machines. How and in what directions these transferences of “competences” work should be a focus of rapt attention. Systems of exploitation might be crucial parts of the “technical content” of science. But the SSS scholars tend to dismiss such questions with the assertion that they lead to the bad old days when science was asserted by radicals simply to “reflect” social relations. But in my view, such transferences of competences, or delegations, have nothing to do with reflections or harmonies of social organization and cosmologies, like “modern science.” Their unexamined, consistent, and defensive prejudice seems part of Latour’s (1990, pp. 164–69) stunning misreading of several moves in Sharon Traweek’s *Beam Times and Life Times: The World of High Energy Physicists* (1988). See also Hilary Rose, “Science in Three Colours: Bernal and Gender Politics in the Social Studies of Science,” unpublished manuscript, May 2, 1990.

The same blind spot, a retinal lesion from the old phallogocentric heliotropism that Latour *did* know how to avoid in other contexts, for example in his trenchant critique of the modern and postmodern, seems responsible for the abject failure of the social studies of science as an organized discourse to take account of the last twenty years of feminist inquiry. What counts as “technical”

and what counts as “practice” should remain far from self-evident in science in action. For all of their extraordinary creativity, so far the mappings from most SSS scholars have stopped dead at the fearful seas where the worldly practices of inequality lap at the shores, infiltrate the estuaries, and set the parameters of reproduction of scientific practice, artifacts, and knowledge. If only it were a question of reflections between social relations and scientific constructions, how easy it would be to conduct “political” inquiry into science! Perhaps the tenacious prejudice of the SSS professionals is the punishment for the enlightenment transcendental, the social, that did inform the rationalism of earlier generations of radical science critique and is still all too common. May the topick gods save us from both the reified technical and the transcendental social!

15. See Lynn Margulis and Dorion Sagan (1986). This wonderful book does the cell biology and evolution for a host of inappropriate/d others. In its dedication, the text affirms “the combinations, sexual and parasexual, that bring us out of ourselves and make us more than we are alone” (p. v). That should be what science studies as cultural studies do, by showing how to visualize the curious collectives of humans and unhumans that make up natural/social (one word) life. To stress the point that all the actors in these generative, dispersed, and layered collectives do not have human form and function—and should not be anthropomorphized—recall that the Gaia hypothesis with which Margulis is associated is about the tissue of the planet as a living entity, whose metabolism and genetic exchange are effected through webs of prokaryotes. Gaia is a society; Gaia is nature; Gaia did not read the *Critique*. Neither, probably, did John Varley. See his Gaea hypothesis in the SF book, *Titan* (1979). Titan is an alien that is a world.

16. Remember that *monsters* have the same root as *to demonstrate*; monsters signify.

17. Trinh T. Minh-ha, ed., 1986/7b, *She, the Inappropriate/d Other*. See also her *Woman, Native, Other: Writing Postcoloniality and Feminism* (1989).

18. Interpellate: I play on Althusser’s account of the call which constitutes the production of the subject in ideology. Althusser is, of course, playing on Lacan, not to mention on God’s interruption that calls Man, his servant, into being. Do we have a vocation to be cyborgs? Interpellate: *Interpellatus*, past participle for “interrupted in speaking”—effecting transformations like Saul into Paul. Interpellation is a special kind of interruption, to say the least. Its key meaning concerns a procedure in a parliament for asking a speaker who is a member of the government to provide an explanation of an act or policy, usually leading to a vote of confidence. The following ads interrupt us. They insist on an explanation in a confidence game; they force recognition of how transfers of competences are made. A cyborg subject position results from and leads to interruption, diffraction, reinvention. It is dangerous and replete with the promises of monsters.

19. In *King Solomon’s Ring*, Konrad Lorenz pointed out how the railroad car kept the appearance of the horse drawn carriage, despite the different functional requirements and possibilities of the new technology. He meant to illustrate that biological evolution is similarly conservative, almost nostalgic for the old, familiar forms, which are reworked to new purposes. Gaia was the first serious bricoleuse.

20. For a view of the manufacture of particular organisms as flexible model systems for a universe of research practice, see Barbara R. Jasny and Daniel Koshland, Jr., eds., *Biological Systems* (1990). As the advertising for the book states, “The information presented will be especially useful to graduate students and to all researchers interested in learning the limitations and assets of biological systems currently in use,” *Science* 248 (1990), p. 1024. Like all forms of protoplasm collected in the extra-laboratory world and brought into a technoscientific niche, the organic rabbit (not to mention the simulated one) and its tissues have a probable future of a particular sort—as a commodity. Who should “own” such evolutionary products? If seed protoplasm is collected in peasants’ fields in Peru and then used to breed valuable commercial seed in a “first world” lab, does a peasant cooperative or the Peruvian state have a claim on the profits? A related problem about proprietary interest in “nature” besets the biotechnology industry’s development of cell lines and other products derived from removed human tissue, e.g., as a result of cancer surgery. The California Supreme Court recently reassured the biotechnology industry that a patient, whose cancerous spleen was the source of a product, Colony Stimulating Factor, that led to a patent that brought its scientist-developer stock in a company worth about \$3 million, did not have a right to a share of the bonanza. Property in the self, that lynchpin of liberal existence, does not seem to be the same thing as proprietary rights in one’s body or its products—like fetuses

or other cell lines in which the courts take a regulatory interest. See Marcia Barinaga (1990, p. 239).

21. Here and throughout this essay, I play on Katie King's play on Jacques Derrida's *Of Grammatology*, (1976). See King (1990), and King (in progress), where she develops her description, which is also a persuasive enabling construction, of a discursive field called "feminism and writing technologies."

22. Roland Barthes, *Mythologies* (1972a) is my guide here and elsewhere.

23. Peace-activist and scholar in science studies, Elizabeth Bird came up with the slogan and put it on a political button in 1986 in Santa Cruz, California.

24. I am indebted to another guide figure throughout this essay, Gloria Anzaldúa, *Borderlands, La Frontera: The New Mestiza* (1987) and to at least two other travelers in embodied virtual spaces, Ramona Fernandez, "Trickster Literacy: Multiculturalism and the (Re) Invention of Learning," Qualifying Essay, History of Consciousness, University of California at Santa Cruz, 1990, and Allucquère R. Stone, "Following Virtual Communities," unpublished essay, History of Consciousness, University of California at Santa Cruz. The ramifying "virtual consensual community" (Sandy Stone's term in another context) of feminist theory that incubates at UCSC densely infiltrates my writing.

25. For an extended reading of National Geographic's Jane Goodall stories, *always to be held in tension with other versions of Goodall and the chimpanzees at Gombe*, see Haraway, "Apes in Eden, Apes in Space," in *Primate Visions* (1989a, pp. 133–95). Nothing in my analysis should be taken as grounds to oppose primate conservation or to make claims about the other Jane Goodalls; those are complex matters that deserve their own careful, materially specific consideration. My point is about the semiotic and political frames within which survival work might be approached by geopolitically differentiated actors.

26. My files are replete with recent images of cross-species ape-human family romance that fail to paper over the underlying racist iconography. The most viciously racist image was shown to me by Paula Treichler: an ad directed to physicians by the HMO, Premed, in Minneapolis, from the *American Medical News*, August 7, 1987. A white-coated white man, stethoscope around his neck, is putting a wedding ring on the hand of an ugly, very black, gorilla-suited female dressed in a white wedding gown. White clothing does not mean the same thing for the different races, species, and genders! The ad proclaims, "If you've made an unholy HMO alliance, perhaps we can help." The white male physician (man) tied to the black female patient (animal) in the inner cities by HMO marketing practices in relation to medicaid policies must be freed. There is no woman in this ad; there is a hidden threat disguised as an ape female, dressed as the vampirish bride of scientific medicine (a single white tooth gleams menacingly against the black lips of the ugly bride)—another illustration, if we needed one, that black women do not have the *discursive* status of woman/human in white culture. "All across the country, physicians who once had visions of a beautiful marriage to an HMO have discovered the honeymoon is over. Instead of quality care and a fiscally sound patient-base, they end up accepting reduced fees and increased risks." The codes are transparent. Scientific medicine has been tricked into a union with vampirish poor black female patients. Which risks are borne by whom goes unexamined. The clasped hands in this ad carry a different surface message from the Gulf ad's, but their enabling semiotic structures share too much.

27. At the oral presentation of this paper at the conference on "Cultural Studies Now and in the Future," Gloria Watklins/bell hooks pointed out the painful current U.S. discourse on African—American men as "an endangered species." Built into that awful metaphor is a relentless history of animalization and political infantilization. Like other "endangered species," such people cannot speak for themselves, but must be spoken for. They must be represented. Who speaks for the African-American man as "an endangered species"? Note also how the metaphor applied to black *men* justifies anti-feminist and misogynist rhetoric about and policy toward black women. They actually become one of the forces, if not the chief threat, endangering African-American men.

28. Committing only a neo-imperialist venial sin in a footnote, I yield to voyeuristic temptation just a little: in *Discover* the videocam and the "native" have a relation symmetrical to that of Goodall's and the chimpanzee's hands. Each photo represents a touch across time and space,

and across politics and history, to tell a story of salvation, of saving man and nature. In this version of cyborg narrative, the touch that joins portable high technology and “primitive” human parallels the touch that joins animal and “civilized” human.

29. It is, however, important to note that the present man in charge of environmental affairs in the Amazon in the Brazilian government has taken strong, progressive stands on conservation, human rights, destruction of indigenous peoples, and the links of ecology and justice. Further, current proposals and policies, like the government’s plan called *Nossa Natureza* and some international aid and conservations organizations’ activities and ecologists’ understandings, have much to recommend them. In addition, unless arrogance exceeds all bounds, I can hardly claim to adjudicate these complex matters. The point of my argument is not that whatever comes from Brasilia or Washington is bad and whatever from the forest residents is good—a patently untrue position. Nor is it my point that nobody who doesn’t come from a family that has lived in the forest for generations has any place in the “collectives, human and unhuman,” crucial to the survival of lives and ways of life in Amazonia and elsewhere. Rather, the point is about the self-constitution of the indigenous peoples as *principal* actors and agents, with whom others must interact—in coalition and in conflict—not the reverse.

30. For the story of Mendes’s life work and his murder by opponents of an extractive reserve off limits to logging, see Andrew Revkin (1990).

31. Further references are parenthetical in the text.

32. Similar issues confront Amazonians in countries other than Brazil. For example, there are national parks in Colombia from which native peoples are banned from their historical territory, but to which loggers and oil companies have access under park multi-use policy. This should sound very familiar to North Americans, as well.

33. Revising and displacing his statements, I am again in conversation with Bruno Latour here, who has insisted on the social status of both human and non-human actors. “We use actor to mean anything that is made by some other actor the source of an action. It is in no way limited to humans. It does not imply will, voice, self-consciousness or desire.” Latour makes the crucial point that “figuring” (in words or in other matter) non-human actors as if they were like people is a semiotic operation; non-figural characterizations are quite possible. The likeness or unlikeness of actors is an interesting problem opened up by placing them firmly in the shared domain of social interaction. Bruno Latour (forthcoming, b).

34. Kane’s review appeared in the *Voice Literary Supplement*, February 1990, and Hecht and Cockburn replied under the title “Getting Historical,” *Voice Literary Supplement*, March 1990, p. 26.

35. My discussion of the politics of representation of the fetus depends on twenty years of feminist discourse about the location of responsibility in pregnancy and about reproductive freedom and constraint generally. For particularly crucial arguments for this essay, see Jennifer Terry (1989); Valerie Hartouni (1991); and Rosalind Pollock Petchesky (1987).

36. *The Eighteenth Brumaire of Louis Bonaparte*. Quoted in Edward Said (1978, p. xiii), as his opening epigraph.

37. Marilyn Strathern describes Melanesian notions of a child as the “finished repository of the actions of multiple others,” and not, as among Westerners, a resource to be constructed into a fully human being through socialization by others. Marilyn Strathern, “Between Things: A Melanesianist’s Comment on Deconstructive Feminism,” unpublished manuscript. Western feminists have been struggling to articulate a phenomenology of pregnancy that rejects the dominant cultural framework of productionism/reproductionism, with its logic of passive resource and active technologist. In these efforts the woman-fetus nexus is refigured as a knot of relationality within a wider web, where liberal individuals are not the actors, but where complex collectives, including non-liberal social persons (singular and plural), are. Similar refigurings appear in eco-feminist discourse.

38. See the fall 1990 newsletter of the Society for the Social Study of Science, *Technoscience* 3, no. 3, pp. 20, 22, for language about “going back to nature.” A session of the 4S October meetings is titled “Back to Nature.” Malcolm Ashmore’s abstract, “With a Reflexive Sociology of Actants, There Is No Going Back,” offers “fully comprehensive insurance against going back,” instead of other competitors’ less good “ways of not going back to Nature (or Society or Self).”

All of this occurs in the context of a crisis of confidence among many 4S scholars that their very fruitful research programs of the last 10 years are running into dead ends. They are. I will refrain from commenting on the blatant misogyny in the Western scholar's textualized terror of "going back" to a phantastic nature (figured by science critics as "objective" nature. Literary academicians figure the same terrible dangers slightly differently; for both groups such a nature is definitively pre-social, monstrously not-human, and a threat to their careers). Mother nature always waits, in these adolescent boys' narratives, to smother the newly individuated hero. He forgets this weird mother is his creation; the forgetting, or the inversion, is basic to ideologies of scientific objectivity and of nature as "eden under glass." It also plays a yet-to-be-examined role in some of the best (most reflexive) science studies. A theoretical gender analysis is indispensable to the reflexive task.

39. *Time*, February 10, 1961, p. 58. The caption under HAM's photograph read "from Chop Chop Chang to No. 65 to a pioneering role." For HAM's flight and the Holloman chimps' training see Weaver (1961) and *Life Magazine*, February 10, 1961. *Life* headlined, "From Jungles to the Lab: The Astrochimps." All were captured from Africa; that means many other chimps died in the "harvest" of babies. The astrochimps were chosen over other chimps for, among other things, "high IQ." Good scientists all.

40. *Time*, December 8, 1961, p. 50; *Newsweek*, March 5, 1962, p. 19.

41. *Time*, December 8, 1961, p. 50.

42. See also Chris Gray, "Postmodern War," Qualifying Exam, History of Consciousness, UCSC, 1988.

43. For indispensable theoretical and participant-observation writings on eco-feminism, social movements, and non-violent direct action, see Barbara Epstein (1991).

44. For a fuller discussion of the immune system, see Haraway, "The Biopolitics of Post-modern Bodies," in *Simians, Cyborgs, and Women* (1991).

45. Recall that Nilsson shot the famous and discourse-changing photographs of fetuses (really abortuses) as glowing back-lit universes floating free of the "maternal environment." Nilsson (1977).

46. Advertising copy for the Met Life Pavilion. The exhibit is sponsored by the Metropolitan Life and Affiliated Companies. In the campground resort at Florida's Walt Disney World, we may also view the "endangered species island," in order to learn the conventions for "speaking for the jaguar" in an eden under glass.

47. Ramona Fernandez, "Trickster Literacy," Qualifying Exam, History of Consciousness, UCSC, 1990, wrote extensively on Walt Disney World and the multiple cultural literacies required and taught on-site for successfully traveling there. Her essay described the visualizing technology and medical school collaboration in its development and use. See the *Journal of the American Medical Association* 260, no. 18 (November 18, 1988), pp. 2776-83.

48. Building an unexpected collective, Jerne (1985) drew directly from Noam Chomsky's theories of structural linguistics. The "textualized" semiotic body is not news by the late twentieth century, but what kind of textuality is put into play still matters!

49. See, for example, the recent merger of Project Inform with the Community Research Alliance to speed the community-based testing of promising drugs—and the NIH's efforts to deal with these developments: *PI Perspective*, May 1990. Note also the differences between President Bush's Secretary of Health and Human Services, Lewis Sullivan, and Director of the National Institute of Allergy and Infectious Diseases, Anthony Fauci, on dealing with activists and PWAs. After ACT UP demonstrations against his and Bush's policies during the secretary's speech at the AIDS conference in San Francisco in June 1990, Sullivan said he would have no more to do with ACT UP and instructed government officials to limit their contacts. (Bush had been invited to address the international San Francisco conference, but his schedule did not permit it. He was in North Carolina raising money for the ultra-reactionary senator Jesse Helms at the time of the conference.) In July 1990, at the ninth meeting of the AIDS Clinical Trials Group (ACTG), at which patient activists participated for the first time, Fauci said that he would work to include the AIDS constituency at every level of the NIAID process of clinical trials. He urged scientists to develop the skills to discuss freely in those contexts ("Fauci," 1990). Why is constructing this kind of scientific articulation "softer"? I leave the answer to readers' imaginations informed by decades of feminist theory.

50. This quadrant of the semiotic square is dedicated to A. E. Van Vogt's *Players of Null-A* (1974), for their non-Aristotelian adventures. An earlier version of "The Promises of Monsters" had the imagination, not SF, in virtual space. I am indebted to a questioner who insisted that the imagination was a nineteenth-century faculty that is in political and epistemological opposition to the arguments I am trying to formulate. As I am trying vainly to skirt psychoanalysis, I must also skirt the slough of the romantic imagination.

51. Allucquère R. Stone, "Following Virtual Communities," unpublished manuscript, *History of Consciousness*, UCSC, 1990.

52. Thanks to Barbara Ige, graduate student in the Literature Board, UCSC, for conversations about our stakes in the figure of Lisa Foo.

53. Oil on canvas, 36" by 28", photo by D. Caras. In conversation with the 1985 essay "A Manifesto for Cyborgs" (in Haraway, 1991), Randolph painted her *Cyborg* while at the Bunting Institute and exhibited it there in a spring 1990 solo exhibition, titled "A Return to Alien Roots." The show incorporated, from many sources, "traditional religious imagery with a postmodern secularized context." Randolph paints "images that empower women, magnify dreams, and cross racial, class, gender, and age barriers" (exhibition brochure). Living and painting in Texas, Randolph was an organizer of the Houston Area Artists' Call Against U.S. Intervention in Central America. The human model for *Cyborg* was Grace Li, from Beijing, who was at the Bunting Institute in the fateful year of 1989.

54. I borrow this use of "conversation" and the notion of transnational feminist literacy from Katie King's (in progress) concept of women and writing technologies.