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Science, Technology, and Socialist-Feminism in the Late Twentieth Century
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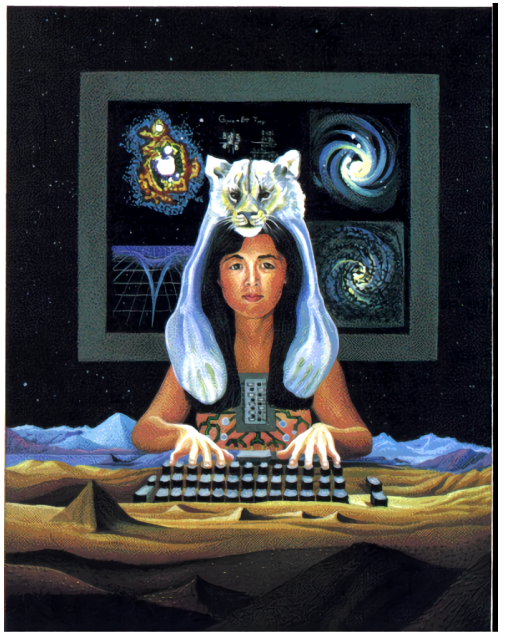
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A Cyborg Manifesto

Science, Technology, and Socialist-Feminism in the Late Twentieth Century

Donna Haraway



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An Ironic Dream of a Common Language for Women in the Integrated Circuit

This essay is an effort to build an ironic political myth faithful to feminism, socialism, and materialism. Perhaps more faithful as blasphemy is faithful, than as reverent worship and identification. Blasphemy has always seemed to require taking things very seriously. I know no better stance to adopt from within the secular-religious, evangelical traditions of United States politics, including the politics of socialist feminism. Blasphemy protects one from the moral majority within, while still insisting on the need for community. Blasphemy is not apostasy. Irony is about contradictions that do not resolve into larger wholes, even dialectically, about the tension of holding incompatible things together because both or all are necessary and true. Irony is about humour and serious play. It is also a rhetorical strategy and a political method, one I would like to see more honoured within socialist-feminism. At the centre of my ironic faith, my blasphemy, is the image of the cyborg.

A cyborg is a cybernetic organism, a hybrid of machine and organism, a creature of social reality as well as a creature of fiction. Social reality is lived social relations, our most important political construction, a world-changing fiction. The international women's movements have constructed 'women's experi-

ence', as well as uncovered or discovered this crucial collective object. This experience is a fiction and fact of the most crucial, political kind. Liberation rests on the construction of the consciousness, the imaginative apprehension, of oppression, and so of possibility. The cyborg is a matter of fiction and lived experience that changes what counts as women's experience in the late twentieth century. This is a struggle over life and death, but the boundary between science fiction and social reality is an optical illusion.

Contemporary science fiction is full of cyborgs—creatures simultaneously animal and machine, who populate worlds ambiguously natural and crafted. Modern medicine is also full of cyborgs, of couplings between organism and machine, each conceived as coded devices, in an intimacy and with a power that was not generated in the history of sexuality. Cyborg 'sex' restores some of the lovely replicative baroque of ferns and invertebrates (such nice organic prophylactics against heterosexism). Cyborg replication is uncoupled from organic reproduction. Modern production seems like a dream of cyborg colonization work, a dream that makes the nightmare of Taylorism seem idyllic. And modern war is a cyborg orgy, coded by C^3I, command-control-communication-intelligence, an $84 billion item in 1984's US defence budget. I am making an argument for the cyborg as a fiction mapping our social and bodily reality and as an imaginative resource suggesting some very fruitful couplings. Michel Foucault's biopolitics is a flaccid premonition of cyborg politics, a very open field.

By the late twentieth century, our time, a mythic time, we are all chimeras, theorized and fabricated hybrids of machine and organism; in short, we are cyborgs. This cyborg is our ontology; it gives us our politics. The cyborg is a condensed image of both imagination and material reality, the two joined centres structuring any possibility of historical transformation. In the traditions of 'Western' science and politics—the tradition of racist, male-dominant capitalism; the tradition of progress;

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the tradition of the appropriation of nature as resource for the productions of culture; the tradition of reproduction of the self from the reflections of the other—the relation between organism and machine has been a border war. The stakes in the border war have been the territories of production, reproduction, and imagination. This essay is an argument for *pleasure* in the confusion of boundaries and for *responsibility* in their construction. It is also an effort to contribute to socialist-feminist culture and theory in a postmodernist, non-naturalist mode and in the utopian tradition of imagining a world without gender, which is perhaps a world without genesis, but maybe also a world without end. The cyborg incarnation is outside salvation history. Nor does it mark time on an oedipal calendar, attempting to heal the terrible cleavages of gender in an oral symbiotic utopia or post-oedipal apocalypse. As Zoe Sofoulis argues in her unpublished manuscript on Jacques Lacan, Melanie Klein, and nuclear culture, *Lacklein*, the most terrible and perhaps the most promising monsters in cyborg worlds are embodied in non-oedipal narratives with a different logic of repression, which we need to understand for our survival.[1]

The cyborg is a creature in a post-gender world; it has no truck with bisexuality, pre-oedipal symbiosis, unalienated labour, or other seductions to organic wholeness through a final appropriation of all the powers of the parts into a higher unity. In a sense, the cyborg has no origin story in the Western sense – a 'final' irony since the cyborg is also the awful apocalyptic telos of the 'West's' escalating dominations of abstract individuation, an ultimate self—untied at last from all dependency, a man in space. An origin story in the 'Western', humanist sense depends on the myth of original unity, fullness, bliss and terror, represented by the phallic mother from whom all humans must separate, the task of individual development and of history, the twin potent myths inscribed

[1] See Zoe Sofoulis (n.d.).

most powerfully for us in psychoanalysis and Marxism. Hilary Klein has argued that both Marxism and psychoanalysis, in their concepts of labour and of individuation and gender formation, depend on the plot of original unity out of which difference must be produced and enlisted in a drama of escalating domination of woman/nature.[2] The cyborg skips the step of original unity, of identification with nature in the Western sense. This is its illegitimate promise that might lead to subversion of its teleology as Star Wars.

The cyborg is resolutely committed to partiality, irony, intimacy, and perversity. It is oppositional, utopian, and completely without innocence. No longer structured by the polarity of public and private, the cyborg defines a technological polis based partly on a revolution of social relations in the *oikos*, the household. Nature and culture are reworked; the one can no longer be the resource for appropriation or incorporation by the other. The relationships for forming wholes from parts, including those of polarity and hierarchical domination, are at issue in the cyborg world. Unlike the hopes of Frankenstein's monster, the cyborg does not expect its father to save it through a restoration of the garden; that is, through the fabrication of a heterosexual mate, through its completion in a finished whole, a city and cosmos. The cyborg does not dream of community on the model of the organic family, this time without the oedipal project. The cyborg would not recognize the Garden of Eden; it is not made of mud and cannot dream of returning to dust. Perhaps that is why I want to see if cyborgs can subvert the apocalypse of returning to nuclear dust in the manic compulsion to name the Enemy. Cyborgs are not reverent; they do not re-member the cosmos. They are wary of holism, but needy for connection—they seem to have a natural feel for united front politics, but without the vanguard party. The main trouble with cyborgs, of course, is that they are the

[2] See Hilary Klein 1989.

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illegitimate offspring of militarism and patriarchal capitalism, not to mention state socialism. But illegitimate offspring are often exceedingly unfaithful to their origins. Their fathers, after all, are inessential.

I will return to the science fiction of cyborgs at the end of this essay, but now I want to signal three crucial boundary breakdowns that make the following political-fictional (political-scientific) analysis possible. By the late twentieth century in United States scientific culture, the boundary between human and animal is thoroughly breached. The last beachheads of uniqueness have been polluted if not turned into amusement parks — language, tool use, social behaviour, mental events, nothing really convincingly settles the separation of human and animal. And many people no longer feel the need for such a separation; indeed, many branches of feminist culture affirm the pleasure of connection of human and other living creatures. Movements for animal rights are not irrational denials of human uniqueness; they are a clear-sighted recognition of connection across the discredited breach of nature and culture. Biology and evolutionary theory over the last two centuries have simultaneously produced modern organisms as objects of knowledge and reduced the line between humans and animals to a faint trace re-etched in ideological struggle or professional disputes between life and social science. Within this framework, teaching modern Christian creationism should be fought as a form of child abuse.

Biological-determinist ideology is only one position opened up in scientific culture for arguing the meanings of human animality. There is much room for radical political people to contest the meanings of the breached boundary.[3] The cyborg ap-

[3] Useful references to left and/or feminist radical science movements and theory and to biological/biotechnical issues include Bleier 1984, 1986; Harding 1986; Fausto-Sterling 1985; Gould 1981; Hubbard et al. 1979; Keller 1985; Lewontin et al. 1984. See also *Radical Science Journal* (which became

pears in myth precisely where the boundary between human and animal is transgressed. Far from signaling a walling off of people from other living beings, cyborgs signal disturbingly and pleasurably tight coupling. Bestiality has a new status in this cycle of marriage exchange.

The second leaky distinction is between animal-human (organism) and machine. Pre-cybernetic machines could be haunted; there was always the spectre of the ghost in the machine. This dualism structured the dialogue between materialism and idealism that was settled by a dialectical progeny, called spirit or history, according to taste. But basically machines were not self-moving, self-designing, autonomous. They could not achieve man's dream, only mock it. They were not man, an author to himself, but only a caricature of that masculinist reproductive dream. To think they were otherwise was paranoid. Now we are not so sure. Late twentieth-century machines have made thoroughly ambiguous the difference between natural and artificial, mind and body, self-developing and externally designed, and many other distinctions that used to apply to organisms and machines. Our machines are disturbingly lively, and we ourselves frighteningly inert.

Technological determination is only one ideological space opened up by the reconceptions of machine and organism as coded texts through which we engage in the play of writing and reading the world.[4] 'Textualization' of everything in

Science as Culture in 1987): 26 Freegrove Road, London N7 9RQ; and *Science for the People,* 897 Main Street, Cambridge, Massachusetts 02139.

[4] Starting points for left and/or feminist approaches to technology and politics include Cowan 1983, 1986; Rothschild 1983; Traweek 1988; Young and Levidow 1981, 1985; Weisenbaum 1976; Winner 1977, 1986; Zimmerman 1983; Athanasiou 1987; Cohn 1987a, 1987b; Winograd and Flores 1986; Edwards 1985. *Global Electronics Newsletter,* 867 West Dana Street, #204, Mountain View, California 94041; *Processed World,* 55 Sutter Street, San Francisco, California 94104; ISIS, Women's International Information and Communication Service, P.O. Box 50 (Cornavin), 1211 Geneva 2, Switzerland; and Via Santa Maria Dell'Anima 30, 00186 Rome, Italy. Fundamental approaches to

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poststructuralist, postmodernist theory has been damned by Marxists and socialist feminists for its utopian disregard for the lived relations of domination that ground the 'play' of arbitrary reading.[5] It is certainly true that postmodernist

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modern social studies of science that do not continue the liberal mystification that all started with Thomas Kuhn include Knorr-Cetina 1981; Knorr-Cetina and Mulkay 1983; Latour and Woolgar 1979; Young 1979. The 1984 Directory of the Network for the Ethnographic Study of Science, Technology, and Organization lists a wide range of people and projects crucial to better radical analysis, available from NESSTO, P.O. Box 11442, Stanford, California 94305.

[5] A provocative, comprehensive argument about the politics and theories of 'postmodernism' is made by Fredric Jameson (1984), who argues that postmodernism is not an option, a style among others, but a cultural dominant requiring radical reinvention of left politics from within; there is no longer any place from without that gives meaning to the comforting fiction of critical distance. Jameson also makes clear why one cannot be for or against postmodernism, an essentially moralist move. My position is that feminists (and others) need continuous cultural reinvention, most modernist critique, and historical materialism; only a cyborg would have a chance. The old dominations of white capitalist patriarchy seem nostalgically innocent now: they normalized heterogeneity, into man and woman, white and black, for example. 'Advanced Capitalism' and postmodernism release heterogeneity without a norm, and we are flattened, without subjectivity, which requires depth, even unfriendly and drowning depths. It is time to write *The Death of the Clinic.* The clinic's methods required bodies and works; we have texts and surfaces. Our dominations don't work by medicalization and normalization anymore; they work by networking, communications redesign, stress management. Normalization gives way to automation, utter redundancy. Michel Foucault's *Birth of the Clinic* (1963), *History of Sexuality* (1976), and *Discipline and Punish* (1975) name a form of power at its moment of implosion. The discourse of biopolitics gives way to technobabble, the language of the spliced substantive; no noun is left whole by the multinationals. These are their names, listed from one issue of *Science*: Tech-Knowledge, Genentech, Allergen, Hybritech, Compupro, Genen-cor, Syntex, Allelix, Agrigenetics Corp., Syntro, Codon, Repligen, Micro/Angelo from Scion Corp., Percom Data, Inter Systems, Cyborg Corp., Statcom Corp., Intertec. If we are imprisoned by language, then escape from that prison-house requires language poets, a kind of cultural restriction enzyme to cut the code; cyborg heteroglossia is one form of radical cultural politics. For cyborg poetry see Perloff 1984; Fraser 1984. For feminist modernist/postmodernist cyborg writing, see *HOW(ever),* 971 Corbett Avenue, San Francisco, California 94131

strategies, like my cyborg myth, subvert myriad organic wholes (for example, the poem, the primitive culture, the biological organism). In short, the certainty of what counts as nature—a source of insight and promise of innocence—is undermined, probably fatally. The transcendent authorization of interpretation is lost, and with it the ontology grounding 'Western' epistemology. But the alternative is not cynicism or faithlessness, that is, some version of abstract existence, like the accounts of technological determinism destroying 'man' by the 'machine' or 'meaningful political action' by the 'text'. Who cyborgs will be is a radical question; the answers are a matter of survival. Both chimpanzees and artefacts have politics, so why shouldn't we (de Waal, 1982; Winner, 1980)?

The third distinction is a subset of the second: the boundary between physical and non-physical is very imprecise for us. Pop physics books on the consequences of quantum theory and the indeterminacy principle are a kind of popular scientific equivalent to Harlequin romances[6] as a marker of radical change in American white heterosexuality: they get it wrong, but they are on the right subject. Modern machines are quintessentially microelectronic devices: they are everywhere and they are invisible. Modern machinery is an irreverent upstart god, mocking the Father's ubiquity and spirituality. The silicon chip is a surface for writing; it is etched in molecular scales disturbed only by atomic noise, the ultimate interference for nuclear scores. Writing, power, and technology are old partners in Western stories of the origin of civilization, but miniaturization has changed our experience of mechanism. Miniaturization has turned out to be about power; small is not so much beautiful as preeminently dangerous, as in cruise missiles. Contrast the TV sets of the 1950s or the news cameras of the 1970s with the TV wrist bands or hand-sized video cameras now advertised. Our best

[6] The U.S. equivalent of Mills and Boon.

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machines are made of sunshine; they are all light and clean because they are nothing but signals, electromagnetic waves, a section of a spectrum, and these machines are eminently portable, mobile—a matter of immense human pain in Detroit and Singapore. People are nowhere near so fluid, being both material and opaque. Cyborgs are ether, quintessence.

The ubiquity and invisibility of cyborgs is precisely why these sunshine-belt machines are so deadly. They are as hard to see politically as materially. They are about consciousness—or its simulation.[7] They are floating signifiers moving in pickup trucks across Europe, blocked more effectively by the witch-weavings of the displaced and so unnatural Greenham women, who read the cyborg webs of power so very well, than by the militant labour of older masculinist politics, whose natural constituency needs defence jobs. Ultimately the 'hardest' science is about the realm of greatest boundary confusion, the realm of pure number, pure spirit, C^3I, cryptography, and the preservation of potent secrets. The new machines are so clean and light. Their engineers are sun-worshippers mediating a new scientific revolution associated with the night dream of post-industrial society. The diseases evoked by these clean machines are 'no more' than the minuscule coding changes of an antigen in the immune system, 'no more' than the experience of stress. The nimble fingers of 'Oriental' women, the old fascination of little Anglo-Saxon Victorian girls with doll's houses, women's enforced attention to the small take on quite new dimensions in this world. There might be a cyborg Alice taking account of these new dimensions. Ironically, it might be the unnatural cyborg women making chips in Asia and spiral dancing in Santa

[7] Baudrillard 1983 and Jameson 1984 (page 66) point out that Plato's definition of the simulacrum is the copy for which there is no original, i.e., the world of advanced capitalism, of pure exchange. See *Discourse* 9 (Spring/Summer 1987) for a special issue on technology (cybernetics, ecology, and the postmodern imagination).

Rita jail[8] whose constructed unities will guide effective oppositional strategies.

So my cyborg myth is about transgressed boundaries, potent fusions, and dangerous possibilities which progressive people might explore as one part of needed political work. One of my premises is that most American socialists and feminists see deepened dualisms of mind and body, animal and machine, idealism and materialism in the social practices, symbolic formulations, and physical artefacts associated with 'high technology' and scientific culture. From *One-Dimensional-Man* (Marcuse, 1964) to *The Death of Nature* (Merchant, 1980), the analytic resources developed by progressives have insisted on the necessary domination of technics and recalled us to an imagined organic body to integrate our resistance. Another of my premises is that the need for unity of people trying to resist world-wide intensification of domination has never been more acute. But a slightly perverse shift of perspective might better enable us to contest for meanings, as well as for other forms of power and pleasure in technologically mediated societies.

From one perspective, a cyborg world is about the final imposition of a grid of control on the planet, about the final abstraction embodied in a Star Wars apocalypse waged in the name of defence, about the final appropriation of women's bodies in a masculinist orgy of war (Sofia, 1984). From another perspective, a cyborg world might be about lived social and bodily realities in which people are not afraid of their joint kinship with animals and machines, not afraid of permanently partial identities and contradictory standpoints. The political struggle is to see from both perspectives at once because each reveals both dominations and possibilities unimaginable from the other vantage point. Single vision produces worse illusions

[8] A practice at once both spiritual and political that linked guards and arrested antinuclear demonstrators in the Alameda County Jail in California in the early 1980s.

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as well as a matrix of complex dominations. Cyborg imagery can suggest a way out of the maze of dualisms in which we have explained our bodies and our tools to ourselves. This is a dream not of a common language, but of a powerful infidel heteroglossia. It is an imagination of a feminist speaking in tongues to strike fear into the circuits of the supersavers of the new right. It means both building and destroying machines, identities, categories, relationships, space stories. Though both are bound in the spiral dance, I would rather be a cyborg than a goddess.

than double vision or many-headed monsters. Cyborg unities are monstrous and illegitimate; in our present political circumstances, we could hardly hope for more potent myths for resistance and recoupling. I like to imagine LAG, the Livermore Action Group, as a kind of cyborg society, dedicated to realistically converting the laboratories that most fiercely embody and spew out the tools of technological apocalypse, and committed to building a political form that actually manages to hold together witches, engineers, elders, perverts, Christians, mothers, and Leninists long enough to disarm the state. Fission Impossible is the name of the affinity group in my town. (Affinity: related not by blood but by choice, the appeal of one chemical nuclear group for another, avidly.)[9]

[9] For ethnographic accounts and political evaluations, see Epstein1993; Sturgeon 1986. Without explicit irony, adopting the spaceship earth/whole earth logo of the planet photographed from space, set off by the slogan "Love Your Mother," the May 1987 Mothers and Others Day action at the nuclear weapons testing facility in Nevada nonetheless took account of the tragic contradictions of views of the earth. Demonstrators applied for official permits to be on the land from officers of the Western Shoshone tribe, whose territory was invaded by the U.S. government when it built the nuclear weapons test ground in the 1950s. Arrested for trespassing, the demonstrators argued that the police and weapons facility personnel, without authorization from the proper officials, were the trespassers. One affinity group at the women's action called themselves the Surrogate Others; and in solidarity with the creatures forced to tunnel in the same ground with the bomb, they enacted a cyborgian emergence from the constructed body of a large, nonheterosexual desert worm. I was a member of that affinity group.

Fractured Identities

It has become difficult to name one's feminism by a single adjective—or even to insist in every circumstance upon the noun. Consciousness of exclusion through naming is acute. Identities seem contradictory, partial, and strategic. With the hard-won recognition of their social and historical constitution, gender, race, and class cannot provide the basis for belief in 'essential' unity. There is nothing about teeing 'female' that naturally binds women. There is not even such a state as 'being' female, itself a highly complex category constructed in contested sexual scientific discourses and other social practices. Gender, race, or class consciousness is an achievement forced on us by the terrible historical experience of the contradictory social realities of patriarchy, colonialism, and capitalism. And who counts as 'us' in my own rhetoric? Which identities are available to ground such a potent political myth called 'us', and what could motivate enlistment in this collectivity? Painful fragmentation among feminists (not to mention among women) along every possible fault line has made the concept of *woman* elusive, an excuse for the matrix of women's dominations of each other. For me—and for many who share a similar historical location in white, professional middle-class, female, radical, North American, mid-adult bodies—the sources of a crisis in political identity are legion. The recent history for much of the US left and US feminism has been a response to this kind of crisis by endless splitting and searches for a new essential unity. But there has

knowing how to build things, to take them apart, to play? What about other embodiments? Cyborg gender is a local possibility taking a global vengeance. Race, gender, and capital require a cyborg theory of wholes and parts. There is no drive in cyborgs to produce total theory, but there is an intimate experience of boundaries, their construction and deconstruction. There is a myth system waiting to become a political language to ground one way of looking at science and technology and challenging the informatics of domination—in order to act potently.

One last image: organisms and organismic, holistic politics depend on metaphors of rebirth and invariably call on the resources of reproductive sex. I would suggest that cyborgs have more to do with regeneration and are suspicious of the reproductive matrix and of most birthing. For salamanders, regeneration after injury, such as the loss of a limb, involves regrowth of structure and restoration of function with the constant possibility of twinning or other odd topographical productions at the site of former injury. The regrown limb can be monstrous, duplicated, potent. We have all been injured, profoundly. We require regeneration, not rebirth, and the possibilities for our reconstitution include the utopian dream of the hope for a monstrous world without gender.

Cyborg imagery can help express two crucial arguments in this essay: first, the production of universal, totalizing theory is a major mistake that misses most of reality, probably always, but certainly now; and second, taking responsibility for the social relations of science and technology means refusing an anti-science metaphysics, a demonology of technology, and so means embracing the skillful task of reconstructing the boundaries of daily life, in partial connection with others, in communication with all of our parts. It is not just that science and technology are possible means of great human satisfaction,

Cyborg monsters in feminist science fiction define quite different political possibilities and limits from those proposed by the mundane fiction of Man and Woman.

There are several consequences to taking seriously the imagery of cyborgs as other than our enemies. Our bodies, ourselves; bodies are maps of power and identity. Cyborgs are no exception. A cyborg body is not innocent; it was not born in a garden; it does not seek unitary identity and so generate antagonistic dualisms without end (or until the world ends); it takes irony for granted. One is too few, and two is only one possibility. Intense pleasure in skill, machine skill, ceases to be a sin, but an aspect of embodiment. The machine is not an *it* to be animated, worshipped, and dominated. The machine is us, our processes, an aspect of our embodiment. We can be responsible for machines; *they* do not dominate or threaten us. We are responsible for boundaries; we are they. Up till now (once upon a time), female embodiment seemed to be given, organic, necessary; and female embodiment seemed to mean skill in mothering and its metaphoric extensions. Only by being out of place could we take intense pleasure in machines, and then with excuses that this was organic activity after all, appropriate to females. Cyborgs might consider more seriously the partial, fluid, sometimes aspect of sex and sexual embodiment. Gender might not be global identity after all, even if it has profound historical breadth and depth.

The ideologically charged question of what counts as daily activity, as experience, can be approached by exploiting the cyborg image. Feminists have recently claimed that women are given to dailiness, that women more than men somehow sustain daily life, and so have a privileged epistemological position potentially. There is a compelling aspect to this claim, one that makes visible unvalued female activity and names it as the ground of life. But *the* ground of life? What about all the ignorance of women, all the exclusions and failures of knowledge and skill? What about men's access to daily competence, to

also been a growing recognition of another response through coalition—affinity, not identity.[1]

Chela Sandoval (n.d., 1984), from a consideration of specific historical moments in the formation of the new political voice called women of colour, has theorized a hopeful model of political identity called 'oppositional consciousness', born of the skills for reading webs of power by those refused stable membership in the social categories of race, sex, or class. 'Women of color', a name contested at its origins by those whom it would incorporate, as well as a historical consciousness marking systematic breakdown of all the signs of Man in 'Western' traditions, constructs a kind of postmodernist identity out of otherness, difference, and specificity. This postmodernist identity is fully political, whatever might be said about other possible postmodernisms. Sandoval's oppositional consciousness is about contradictory locations and heterochronic calendars, not about relativisms and pluralisms.

Sandoval emphasizes the lack of any essential criterion for identifying who is a woman of colour. She notes that the definition of the group has been by conscious appropriation of negation. For example, a Chicana or US black woman has not been able to speak as a woman or as a black person or as a Chicano. Thus, she was at the bottom of a cascade of negative identities, left out of even the privileged oppressed authorial categories called women and blacks', who claimed to make the important revolutions. The category 'woman' negated all nonwhite women; 'black' negated all non-black people, as well as all black women. But there was also no 'she', no singularity,

[1] Powerful developments of coalition politics emerge from 'Third World' speakers, speaking from nowhere, the displaced center of the universe, earth: 'We live on the third planet from the sun'—*Sun Poem* by Jamaican writer Edward Kamau Braithwaite, review by Mackey 1984. Contributors to Smith 1983 ironically subvert naturalized identities precisely while constructing a place from which to speak called home. See especially Reagon (in Smith 1983, 356–68); Trinh T. Minh-ha 1986–87a, b.

but a sea of differences among US women who have affirmed their historical identity as US women of colour. This identity marks out a self-consciously constructed space that cannot affirm the capacity to act on the basis of natural identification, but only on the basis of conscious coalition, of affinity, of political kinship.[2] Unlike the 'woman' of some streams of the white women's movement in the United States, there is no naturalization of the matrix, or at least this is what Sandoval argues is uniquely available through the power of oppositional consciousness.

Sandoval's argument has to be seen as one potent formulation for feminists out of the world-wide development of anti-colonialist discourse; that is to say, discourse dissolving the 'West' and its highest product—the one who is not animal, barbarian, or woman; man, that is, the author of a cosmos called history. As orientalism is deconstructed politically and semiotically, the identities of the occident destabilize, including those of feminists.[3] Sandoval argues that 'women of colour' have a chance to build an effective unity that does not replicate the imperializing, totalizing revolutionary subjects of previous Marxisms and feminisms which had not faced the consequences of the disorderly polyphony emerging from decolonization.

Katie King has emphasized the limits of identification and the political/poetic mechanics of identification built into reading 'the poem', that generative core of cultural feminism. King criticizes the persistent tendency among contemporary feminists from different 'moments' or 'conversations' in feminist practice to taxonomize the women's movement to make one's

[2] See hooks 1981, 1984; Hull et al. 1982. Toni Cade Bambara (1981) wrote an extraordinary novel in which the women of color theater group the Seven Sisters explores a form of unity. See analysis by Butler-Evans 1987.

[3] On orientalism in feminist works and elsewhere, see Lowe 1986; Said 1978; Mohanty 1984; *Many Voices, One Chant: Black Feminist Perspectives* (1984).

sit at speeds exceeding that of light. Radu Dracul survives a virus-caused plague in his outerworld planet to find himself with a time sense that changes the boundaries of spatial perception for the whole species. All the characters explore the limits of language; the dream of communicating experience; and the necessity of limitation, partiality, and intimacy even in this world of protean transformation and connection. *Superluminal* stands also for the defining contradictions of a cyborg world in another sense; it embodies textually the intersection of feminist theory and colonial discourse in the science fiction I have alluded to in this essay. This is a conjunction with a long history that many 'First World' feminists have tried to repress, including myself in my readings of *Superluminal* before being called to account by Zoe Sofoulis, whose different location in the world system's informatics of domination made her acutely alert to the imperialist moment of all science fiction cultures, including women's science fiction. From an Australian feminist sensitivity, Sofoulis remembered more readily McIntyre's role as writer of the adventures of Captain Kirk and Spock in TV's *Star Trek* series than her rewriting the romance in *Superluminal*.

Monsters have always defined the limits of community in Western imaginations. The Centaurs and Amazons of ancient Greece established the limits of the centred polis of the Greek male human by their disruption of marriage and boundary pollutions of the warrior with animality and woman. Unseparated twins and hermaphrodites were the confused human material in early modern France who grounded discourse on the natural and supernatural, medical and legal, portents and diseases—all crucial to establishing modern identity.[9] The evolutionary and behavioral sciences of monkeys and apes have marked the multiple boundaries of late twentieth-century industrial identities.

[9] See Du Bois 1982; Daston and Mark n.d.; Park and Daston 1981. The noun *monster* shares its root with the verb *to demonstrate*.

an extraordinary array of post-cyborg symbioses are spawned. Octavia Butler writes of an African sorceress pitting her powers of transformation against the genetic manipulations of her rival (*Wild Seed*), of time warps that bring a modern US black woman into slavery where her actions in relation to her white master-ancestor determine the possibility of her own birth (*Kindred*), and of the illegitimate insights into identity and community of an adopted cross-species child who came to know the enemy as self (*Survivor*). In *Dawn* (1987), the first instalment of a series called *Xenogenesis*, Butler tells the story of Lilith Iyapo, whose personal name recalls Adam's first and repudiated wife and whose family name marks her status as the widow of the son of Nigerian immigrants to the US. A black woman and a mother whose child is dead, Lilith mediates the transformation of humanity through genetic exchange with extra-terrestrial lovers/rescuers/destroyers/genetic engineers, who reform earth's habitats after the nuclear holocaust and coerce surviving humans into intimate fusion with them. It is a novel that interrogates reproductive, linguistic, and nuclear politics in a mythic field structured by late twentieth-century race and gender.

Because it is particularly rich in boundary transgressions, Vonda McIntyre's *Superluminal* can close this truncated catalogue of promising and dangerous monsters who help redefine the pleasures and politics of embodiment and feminist writing. In a fiction where no character is 'simply' human, human status is highly problematic. Orca, a genetically altered diver, can speak with killer whales and survive deep ocean conditions, but she longs to explore space as a pilot, necessitating bionic implants jeopardizing her kinship with the divers and cetaceans. Transformations are effected by virus vectors carrying a new developmental code, by transplant surgery, by implants of microelectronic devices, by analogue doubles, and other means. Lacnea becomes a pilot by accepting a heart implant and a host of other alterations allowing survival in tran-

own political tendencies appear to be the *telos* of the whole. These taxonomies tend to remake feminist history so that it appears to be an ideological struggle among coherent types persisting over time, especially those typical units called radical, liberal, and socialist-feminism. Literally, all other feminisms are either incorporated or marginalized, usually by building an explicit ontology and epistemology.[4] Taxonomies of feminism produce epistemologies to police deviation from official women's experience. And of course, 'women's culture', like women of colour, is consciously created by mechanisms inducing affinity. The rituals of poetry, music, and certain forms of academic practice have been preeminent. The politics of race and culture in the US women's movements are intimately interwoven. The common achievement of King and Sandoval is learning how to craft a poetic/political unity without relying on a logic of appropriation, incorporation, and taxonomic identification.

The theoretical and practical struggle against unity-through-domination or unity-through-incorporation ironically not only undermines the justifications for patriarchy, colonialism, humanism, positivism, essentialism, scientism, and other unlamented -isms, but *all* claims for an organic or natural standpoint. I think that radical and socialist/Marxist-feminisms have also undermined their/our own epistemological strategies and that this is a crucially valuable step in imagining possible unities. It remains to be seen whether all 'epistemologies' as Western political people have known them fail us in the task to build effective affinities.

[4] Katie King (1986, 1987a) has developed a theoretically sensitive treatment of the workings of feminist taxonomies as genealogies of power in feminist ideology and polemic. King examines Jaggar's (1983) problematic example of taxonomizing feminisms to make a little machine producing the desired final position. My caricature here of socialist and radical feminism is also an example.

It is important to note that the effort to construct revolutionary stand-points, epistemologies as achievements of people committed to changing the world, has been part of the process showing the limits of identification. The acid tools of postmodernist theory and the constructive tools of ontological discourse about revolutionary subjects might be seen as ironic allies in dissolving Western selves in the interests of survival. We are excruciatingly conscious of what it means to have a historically constituted body. But with the loss of innocence in our origin, there is no expulsion from the Garden either. Our politics lose the indulgence of guilt with the *naiveté* of innocence. But what would another political myth for socialist-feminism look like? What kind of politics could embrace partial, contradictory, permanently unclosed constructions of personal and collective selves and still be faithful, effective—and, ironically, socialist-feminist?

I do not know of any other time in history when there was greater need for political unity to confront effectively the dominations of 'race', 'gender', 'sexuality', and 'class'. I also do not know of any other time when the kind of unity we might help build could have been possible. None of 'us' have any longer the symbolic or material capability of dictating the shape of reality to any of 'them'. Or at least 'we' cannot claim innocence from practicing such dominations. White women, including socialist feminists, discovered (that is, were forced kicking and screaming to notice) the non-innocence of the category 'woman'. That consciousness changes the geography of all previous categories; it denatures them as heat denatures a fragile protein. Cyborg feminists have to argue that 'we' do not want any more natural matrix of unity and that no construction is whole. Innocence, and the corollary insistence on victimhood as the only ground for insight, has done enough damage. But the constructed revolutionary subject must give late-twentieth-century people pause as well. In the fraying of identities and in the reflexive strategies for constructing them, the possibility

development and mental capacities. Or organisms could be mechanized—reduced to body understood as resource of mind. These machine/organism relationships are obsolete, unnecessary. For us, in imagination and in other practice, machines can be prosthetic devices, intimate components, friendly selves. We don't need organic holism to give impermeable wholeness, the total woman and her feminist variants (mutants?). Let me conclude this point by a very partial reading of the logic of the cyborg monsters of my second group of texts, feminist science fiction.

The cyborgs populating feminist science fiction make very problematic the statuses of man or woman, human, artefact, member of a race, individual entity, or body. Katie King clarifies how pleasure in reading these fictions is not largely based on identification. Students facing Joanna Russ for the first time, students who have learned to take modernist writers like James Joyce or Virginia Woolf without flinching, do not know what to make of *The Adventures of Alyx* or *The Female Man*, where characters refuse the reader's search for innocent wholeness while granting the wish for heroic quests, exuberant eroticism, and serious politics. The Female Man is the story of four versions of one genotype, all of whom meet, but even taken together do not make a whole, resolve the dilemmas of violent moral action, or remove the growing scandal of gender. The feminist science fiction of Samuel R. Delany, especially *Tales of Neveyon*, mocks stories of origin by redoing the neolithic revolution, replaying the founding moves of Western civilization to subvert their plausibility. James Tiptree, Jr, an author whose fiction was regarded as particularly manly until her 'true' gender was revealed, tells tales of reproduction based on non-mammalian technologies like alternation of generations of male brood pouches and male nurturing. John Varley constructs a supreme cyborg in his arch-feminist exploration of Gaea, a mad goddess-planet-trickster-old woman-technological device on whose surface

to be other is to be multiple, without clear boundary, frayed, insubstantial. One is too few, but two are too many.

High-tech culture challenges these dualisms in intriguing ways. It is not clear who makes and who is made in the relation between human and machine. It is not clear what is mind and what body in machines that resolve into coding practices. In so far as we know ourselves in both formal discourse (for example, biology) and in daily practice (for example, the homework economy in the integrated circuit), we find ourselves to be cyborgs, hybrids, mosaics, chimeras. Biological organisms have become biotic systems, communications devices like others. There is no fundamental, ontological separation in our formal knowledge of machine and organism, of technical and organic. The replicant Rachel in the Ridley Scott film *Blade Runner* stands as the image of a cyborg culture's fear, love, and confusion.

One consequence is that our sense of connection to our tools is heightened. The trance state experienced by many computer users has become a staple of science-fiction film and cultural jokes. Perhaps paraplegics and other severely handicapped people can (and sometimes do) have the most intense experiences of complex hybridization with other communication devices.[8] Anne McCaffrey's pre-feminist *The Ship Who Sang* (1969) explored the consciousness of a cyborg, hybrid of girl's brain and complex machinery, formed after the birth of a severely handicapped child. Gender, sexuality, embodiment, skill: all were reconstituted in the story. Why should our bodies end at the skin, or include at best other beings encapsulated by skin? From the seventeenth century till now, machines could be animated—given ghostly souls to make them speak or move or to account for their orderly

[8] James Clifford (1985, 1988) argues persuasively for recognition of continuous reinvention, the stubborn nondisappearance of those 'marked' by Western imperializing practices.

opens up for weaving something other than a shroud for the day after the apocalypse that so prophetically ends salvation history.

Both Marxist/socialist-feminisms and radical feminisms have simultaneously naturalized and denatured the category 'woman' and consciousness of the social lives of 'women'. Perhaps a schematic caricature can highlight both kinds of moves. Marxian socialism is rooted in an analysis of wage labour which reveals class structure. The consequence of the wage relationship is systematic alienation, as the worker is dissociated from his (*sic*) product. Abstraction and illusion rule in knowledge, domination rules in practice. Labour is the preeminently privileged category enabling the Marxist to overcome illusion and find that point of view which is necessary for changing the world. Labour is the humanizing activity that makes man; labour is an ontological category permitting the knowledge of a subject, and so the knowledge of subjugation and alienation.

In faithful filiation, socialist-feminism advanced by allying itself with the basic analytic strategies of Marxism. The main achievement of both Marxist feminists and socialist feminists was to expand the category of labour to accommodate what (some) women did, even when the wage relation was subordinated to a more comprehensive view of labour under capitalist patriarchy. In particular, women's labour in the household and women's activity as mothers generally (that is, reproduction in the socialist-feminist sense), entered theory on the authority of analogy to the Marxian concept of labour. The unity of women here rests on an epistemology based on the ontological structure of 'labour'. Marxist/socialist-feminism does not 'naturalize' unity; it is a possible achievement based on a possible standpoint rooted in social relations. The essentializing move is in the ontological structure of labour or of its analogue,

women's activity.[5] The inheritance of Marxian humanism, with its preeminently Western self, is the difficulty for me. The contribution from these formulations has been the emphasis on the daily responsibility of real women to build unities, rather than to naturalize them.

Catherine MacKinnon's (1982, 1987) version of radical feminism is itself a caricature of the appropriating, incorporating, totalizing tendencies of Western theories of identity grounding action.[6] It is factually and politically wrong to assimilate all of the diverse 'moments' or 'conversations' in recent women's politics named radical feminism to MacKinnon's version. But the teleological logic of her theory shows how an epistemol-

[5] The central role of object relations versions of psychoanalysis and related strong universalizing moves in discussing reproduction, caring work, and mothering in many approaches to epistemology underline their authors' resistance to what I am calling postmodernism. For me, both the universalizing moves and these versions of psychoanalysis make analysis of 'women's place in the integrated circuit' difficult and lead to systematic difficulties in accounting for or even seeing major aspects of the construction of gender and gendered social life. The feminist standpoint argument has been developed by Flax 1983; Harding 1986; Harding and Hintikka 1983; Hartsock 1983a, 1983b; O'Brien 1981; H. Rose 1983; Smith 1974, 1979. For rethinking theories of feminist materialism and feminist standpoints in response to criticism, see Harding 1986, 163–96; Hartsock 1987; and S. Rose 1986.

[6] I make an argumentative category error in 'modifying' MacKinnon's positions with the qualifier 'radical,' thereby generating my own reductive critique of extremely heterogeneous writing, which does explicitly use that label, by my taxonomically interested argument about writing, which does not use the modifier and which brooks no limits and thereby adds to the various dreams of a common, in the sense of univocal, language for feminism. My category error was occasioned by an assignment to write from a particular taxonomic position that itself has a heterogeneous history, socialist-feminism, for *Socialist Review*, published in *SR* as "The Cyborg Manifesto." A critique indebted to MacKinnon, but without the reductionism and with an elegant feminist account of Foucault's paradoxical conservatism on sexual violence (rape), is de Lauretis 1985 (see also 1986, 1–19). A theoretically elegant feminist social-historical examination of family violence, which insists on women's, men's, and children's complex agency without losing sight of the material structures of male domination, race, and class, is Gordon 1988.

imaginary. It passes through women and other present-tense, illegitimate cyborgs, not of Woman born, who refuse the ideological resources of victimization so as to have a real life. These cyborgs are the people who refuse to disappear on cue, no matter how many times a 'western' commentator remarks on the sad passing of another primitive, another organic group done in by 'Western' technology, by writing.[6] These real-life cyborgs (for example, the Southeast Asian village women workers in Japanese and US electronics firms described by Aihwa Ong) are actively rewriting the texts of their bodies and societies.[7] Survival is the stakes in this play of readings.

To recapitulate, certain dualisms have been persistent in Western traditions; they have all been systemic to the logics and practices of domination of women, people of colour, nature, workers, animals—in short, domination of all constituted as others, whose task is to mirror the self. Chief among these troubling dualisms are self/other, mind/body, culture/nature, male/female, civilized/primitive, reality/appearance, whole/part, agent/resource, maker/made, active/passive, right/wrong, truth/illusion, total/partial, God/man. The self is the One who is not dominated, who knows that by the service of the other, the other is the one who holds the future, who knows that by the experience of domination, which gives the lie to the autonomy of the self. To be One is to be autonomous, to be powerful, to be God; but to be One is to be an illusion, and so to be involved in a dialectic of apocalypse with the other. Yet

[6] The convention of ideologically taming militarized high technology by publicizing its applications to speech and motion problems of the disabled/differently abled takes on a special irony in monotheistic, patriarchal, and frequently anti-Semitic culture when computer-generated speech allows a boy with no voice to chant the Haftorah at his bar mitzvah. See Sussman 1986. Making the always context-relative social definitions of 'ableness' particularly clear, military high-tech has a way of making human beings disabled by definition, a perverse aspect of much automated battlefield and Star Wars research and development. See Wilford 1986.

[7] See A. Ong 1987.

liberal politics and epistemology that imagines the reproduction of individuals before the wider replications of 'texts'.

From the perspective of cyborgs, freed of the need to ground politics in 'our' privileged position of the oppression that incorporates all other dominations, the innocence of the merely violated, the ground of those closer to nature, we can see powerful possibilities. Feminisms and Marxisms have run aground on Western epistemological imperatives to construct a revolutionary subject from the perspective of a hierarchy of oppressions and/or a latent position of moral superiority, innocence, and greater closeness to nature. With no available original dream of a common language or original symbiosis promising protection from hostile 'masculine' separation, but written into the play of a text that has no finally privileged reading or salvation history, to recognize 'oneself' as fully implicated in the world, frees us of the need to root politics in identification, vanguard parties, purity, and mothering. Stripped of identity, the bastard race teaches about the power of the margins and the importance of a mother like Malinche. Women of colour have transformed her from the evil mother of masculinist fear into the originally literate mother who teaches survival.

This is not just literary deconstruction, but liminal transformation. Every, story that begins with original innocence and privileges the return to wholeness imagines the drama of life to be individuation, separation, the birth of the self, the tragedy of autonomy, the fall into writing, alienation; that is, war, tempered by imaginary respite in the bosom of the Other. These plots are ruled by a reproductive politics—rebirth without flaw, perfection, abstraction. In this plot women are imagined either better or worse off, but all agree they have less selfhood, weaker individuation, more fusion to the oral, to Mother, less at stake in masculine autonomy. But there is another route to having less at stake in masculine autonomy, a route that does not pass through Woman, Primitive, Zero, the Mirror Stage and its

ogy and ontology—including their negations—erase or police difference. Only one of the effects of MacKinnon's theory is the rewriting of the history of the polymorphous field called radical feminism. The major effect is the production of a theory of experience, of women's identity, that is a kind of apocalypse for all revolutionary standpoints. That is, the totalization built into this tale of radical feminism achieves its end—the unity of women—by enforcing the experience of and testimony to radical non-being. As for the Marxist/socialist feminist, consciousness is an achievement, not a natural fact. And MacKinnon's theory eliminates some of the difficulties built into humanist revolutionary subjects, but at the cost of radical reductionism.

MacKinnon argues that feminism necessarily adopted a different analytical strategy from Marxism, looking first not at the structure of class, but at the structure of sex/gender and its generative relationship, men's constitution and appropriation of women sexually. Ironically, MacKinnon's 'ontology' constructs a non-subject, a non-being. Another's desire, not the self's labour, is the origin of 'woman'. She therefore develops a theory of consciousness that enforces what can count as 'women's' experience—anything that names sexual violation, indeed, sex itself as far as 'women' can be concerned. Feminist practice is the construction of this form of consciousness; that is, the self-knowledge of a self-who-is-not.

Perversely, sexual appropriation in this feminism still has the epistemological status of labour; that is to say, the point from which an analysis able to contribute to changing the world must flow. But sexual objectification, not alienation, is the consequence of the structure of sex/gender. In the realm of knowledge, the result of sexual objectification is illusion and abstraction. However, a woman is not simply alienated from her product, but in a deep sense does not exist as a subject, or even potential subject, since she owes her existence as a woman to sexual appropriation. To be constituted by another's

desire is not the same thing as to be alienated in the violent separation of the labourer from his product.

MacKinnon's radical theory of experience is totalizing in the extreme; it does not so much marginalize as obliterate the authority of any other women's political speech and action. It is a totalization producing what Western patriarchy itself never succeeded in doing—feminists' consciousness of the non-existence of women, except as products of men's desire. I think MacKinnon correctly argues that no Marxian version of identity can firmly ground women's unity. But in solving the problem of the contradictions of any Western revolutionary subject for feminist purposes, she develops an even more authoritarian doctrine of experience. If my complaint about socialist/Marxian standpoints is their unintended erasure of polyvocal, unassimilable, radical difference made visible in anti-colonial discourse and practice, MacKinnon's intentional erasure of all difference through the device of the 'essential' non-existence of women is not reassuring.

In my taxonomy, which like any other taxonomy is a re-inscription of history, radical feminism can accommodate all the activities of women named by socialist feminists as forms of labour only if the activity can somehow be sexualized. Reproduction had different tones of meanings for the two tendencies, one rooted in labour, one in sex, both calling the consequences of domination and ignorance of social and personal reality 'false consciousness'.

Beyond either the difficulties or the contributions in the argument of any one author, neither Marxist nor radical feminist points of view have tended to embrace the status of a partial explanation; both were regularly constituted as totalities. Western explanation has demanded as much; how else could the 'Western' author incorporate its others? Each tried to annex other forms of domination by expanding its basic categories through analogy, simple listing, or addition. Embarrassed silence about race among white radical and socialist feminists

Moraga's writing, her superb literacy, is presented in her poetry as the same kind of violation as Malinche's mastery of the conqueror's language—a violation, an illegitimate production, that allows survival. Moraga's language is not 'whole'; it is self-consciously spliced, a chimera of English and Spanish, both conqueror's languages. But it is this chimeric monster, without claim to an original language before violation, that crafts the erode, competent, potent identities of women of colour. Sister Outsider hints at the possibility of world survival not because of her innocence, but because of her ability to live on the boundaries, to write without the founding myth of original wholeness, with its inescapable apocalypse of final return to a deathly oneness that Man has imagined to be the innocent and all-powerful Mother, freed at the End from another spiral of appropriation by her son. Writing marks Moraga's body, affirms it as the body of a woman of colour, against the possibility of passing into the unmarked category of the Anglo father or into the orientalist myth of 'original illiteracy' of a mother that never was. Malinche was mother here, not Eve before eating the forbidden fruit. Writing affirms Sister Outsider, not the Woman-before-the-Fall-into-Writing needed by the phallogocentric Family of Man.

Writing is preeminently the technology of cyborgs, etched surfaces of the late twentieth century. Cyborg politics is the struggle for language and the struggle against perfect communication, against the one code that translates all meaning perfectly, the central dogma of phallogocentrism. That is why cyborg politics insist on noise and advocate pollution, rejoicing in the illegitimate fusions of animal and machine. These are the couplings which make Man and Woman so problematic, subverting the structure of desire, the force imagined to generate language and gender, and so subverting the structure and modes of reproduction of 'Western' identity, of nature and culture, of mirror and eye, slave and master, body and mind. 'We' did not originally choose to be cyborgs, but choice grounds a

of original innocence, but on the basis of seizing the tools to mark the world that marked them as other.

The tools are often stories, retold stories, versions that reverse and displace the hierarchical dualisms of naturalized identities. In retelling origin stories, cyborg authors subvert the central myths of origin of Western culture. We have all been colonized by those origin myths, with their longing for fulfilment in apocalypse. The phallogocentric origin stories most crucial for feminist cyborgs are built into the literal technologies—technologies that write the world, biotechnology and microelectronics—that have recently textualized our bodies as code problems on the grid of C^3I. Feminist cyborg stories have the task of recoding communication and intelligence to subvert command and control.

Figuratively and literally, language politics pervade the struggles of women of colour; and stories about language have a special power in the rich contemporary writing by US women of colour. For example, retellings of the story of the indigenous woman Malinche, mother of the mestizo 'bastard' race of the new world, master of languages, and mistress of Cortes, carry special meaning for Chicana constructions of identity. Cherrie Moraga (1983) in *Loving in the War Years* explores the themes of identity when one never possessed the original language, never told the original story, never resided in the harmony of legitimate heterosexuality in the garden of culture, and so cannot base identity on a myth or a fall from innocence and right to natural names, mother's or father's.[5]

[5] The sharp relation of women of color to writing as theme and politics can be approached through the program for "The Black Woman and the Diaspora: Hidden Connections and Extended Acknowledgments," An International Literary Conference, Michigan State University, October 1985; Evans 1984; Christian 1985; Carby 1987; Fisher 1980; *Frontiers* 1980, 1983; Kingston 1976; Lerner 1973; Giddings 1985; Moraga and Anzaldúa 1981; Morgan 1984. Anglophone European and Euro-American women have also crafted special relations to their writing as a potent sign: Gilbert and Gubar 1979; Russ 1983.

was one major, devastating political consequence. History and polyvocality disappear into political taxonomies that try to establish genealogies. There was no structural room for race (or for much else) in theory claiming to reveal the construction of the category woman and social group women as a unified or totalizable whole. The structure of my caricature looks like this:

- *socialist-feminism* –
  - structure of class // wage labour // alienation
  - labour, by analogy reproduction, by extension sex, by addition race
- *radical feminism* –
  - structure of gender // sexual appropriation // objectification
  - sex, by analogy labour, by extension reproduction, by addition race

In another context, the French theorist, Julia Kristeva, claimed women appeared as a historical group after the Second World War, along with groups like youth.[7] Her dates are doubtful; but we are now accustomed to remembering that as objects of knowledge and as historical actors, 'race' did not always exist, 'class' has a historical genesis, and 'homosexuals' are quite junior. It is no accident that the symbolic system of the family of man—and so the essence of woman—breaks up at the same moment that networks of connection among people on the planet are unprecedentedly multiple, pregnant, and complex. 'Advanced capitalism' is inadequate to convey the structure of this historical moment. In the 'Western' sense, the end of man is at stake. It is no accident that woman disintegrates into women in our time. Perhaps socialist feminists

[7] See Kristeva 1984.

were not substantially guilty of producing essentialist theory that suppressed women's particularity and contradictory interests. I think we have been, at least through unreflective participation in the logics, languages, and practices of white humanism and through searching for a single ground of domination to secure our revolutionary voice. Now we have less excuse. But in the consciousness of our failures, we risk lapsing into boundless difference and giving up on the confusing task of making partial, real connection. Some differences are playful; some are poles of world historical systems of domination. 'Epistemology' is about knowing the difference.

Sister Outsider is a potential amidst the races and ethnic identities of women manipulated for division, competition, and exploitation in the same industries. 'Women of colour' are the preferred labour force for the science-based industries, the real women for whom the world-wide sexual market, labour market, and politics of reproduction kaleidoscope into daily life. Young Korean women hired in the sex industry and in electronics assembly are recruited from high schools, educated for the integrated circuit. Literacy, especially in English, distinguishes the 'cheap' female labour so attractive to the multinationals.

Contrary to orientalist stereotypes of the 'oral primitive', literacy is a special mark of women of colour, acquired by US black women as well as men through a history of risking death to learn and to teach reading and writing. Writing has a special significance for all colonized groups. Writing has been crucial to the Western myth of the distinction between oral and written cultures, primitive and civilized mentalities, and more recently to the erosion of that distinction in 'postmodernist' theories attacking the phallogocentrism of the West, with its worship of the monotheistic, phallic, authoritative, and singular work, the unique and perfect name.[4] Contests for the meanings of writing are a major form of contemporary political struggle. Releasing the play of writing is deadly serious. The poetry and stories of US women of colour are repeatedly about writing, about access to the power to signify; but this time that power must be neither phallic nor innocent. Cyborg writing must not be about the Fall, the imagination of a once-upon-a-time wholeness before language, before writing, before Man. Cyborg writing is about the power to survive, not on the basis

[4] See Derrida 1976 (especially part II); Lévi-Strauss 1973 (especially "The Writing Lesson"); Gates 1985; Kahn and Neumaier 1985; Ong 1982; Kramarae and Treichler 1985.

Lorde, and Adrienne Rich have profoundly affected our political imaginations—and perhaps restricted too much what we allow as a friendly body and political language.[3] They insist on the organic, opposing it to the technological. But their symbolic systems and the related positions of ecofeminism and feminist paganism, replete with organicisms, can only be understood in Sandoval's terms as oppositional ideologies fitting the late twentieth century. They would simply bewilder anyone not preoccupied with the machines and consciousness of late capitalism. In that sense they are part of the cyborg world. But there are also great riches for feminists in explicitly embracing the possibilities inherent in the breakdown of clean distinctions between organism and machine and similar distinctions structuring the Western self. It is the simultaneity of breakdowns that cracks the matrices of domination and opens geometric possibilities. What might be learned from personal and political 'technological' pollution? I look briefly at two overlapping groups of texts for their insight into the construction of a potentially helpful cyborg myth: constructions of women of colour and monstrous selves in feminist science fiction.

Earlier I suggested that 'women of colour' might be understood as a cyborg identity, a potent subjectivity synthesized from fusions of outsider identities, sedimented in the complex political-historical layerings of Audre Lorde's 'biomythography', *Zami* (Lorde, 1982; King, 1987a, 1987b). There are material and cultural grids mapping this potential. Lorde (1984) captures the tone in the title of her *Sister Outsider*. In my political myth, Sister Outsider is the offshore woman, whom US workers, female and feminized, are supposed to regard as the enemy preventing their solidarity, threatening their security. Onshore, inside the boundary of the United States,

[3] But all these poets are very complex, not least in their treatment of themes of lying and erotic, decentered collective and personal identities: Griffin 1978; Lorde 1984; Rich 1978.

The Informatics of Domination

In this attempt at an epistemological and political position, I would like to sketch a picture of possible unity, a picture indebted to socialist and feminist principles of design. The frame for my sketch is set by the extent and importance of rearrangements in world-wide social relations tied to science and technology. I argue for a politics rooted in claims about fundamental changes in the nature of class, race, and gender in an emerging system of world order analogous in its novelty and scope to that created by industrial capitalism; we are living through a movement from an organic, industrial society to a polymorphous, information system—from all work to all play, a deadly game. Simultaneously material and ideological, the dichotomies may be expressed in the following chart of transitions from the comfortable old hierarchical dominations to the scary new networks I have called the informatics of domination:

This list suggests several interesting things.[1] First, the objects on the right-hand side cannot be coded as 'natural', a realization that subverts naturalistic coding for the left-hand side as well. We cannot go back ideologically or materially. It's not just that 'god' is dead; so is the 'goddess'. Or both are revivified

[1] This chart was published in 1985 in the "Cyborg Manifesto." My previous efforts to understand biology as a cybernetic command-control discourse and organisms as 'natural-technical objects of knowledge' were Haraway 1979, 1983, 1984. A later version, with a shifted argument, appears in Haraway 1989.

Organics of Domination	Informatics of Domination
Representation	Simulation
Bourgeois novel, realism	Science fiction, postmodernism
Organism	Biotic Component
Depth, integrity	Surface, boundary
Heat	Noise
Biology as clinical practice	Biology as inscription
Physiology	Communications engineering
Small group	Subsystem
Perfection	Optimization
Eugenics	Population Control
Decadence, *Magic Mountain*	Obsolescence, *Future Shock*
Hygiene	Stress Management
Microbiology, tuberculosis	Immunology, AIDS
Organic division of labour	Ergonomics/cybernetics of labour
Functional specialization	Modular construction
Reproduction	Replication
Organic sex role specialization	Optimal genetic strategies
Biological determinism	Evolutionary inertia, constraints
Community ecology	Ecosystem
Racial chain of being	Neo-imperialism, United Nations humanism
Scientific management in home/factory	Global factory/Electronic cottage
Family/Market/Factory	Women in the Integrated Circuit
Family wage	Comparable worth
Public/Private	Cyborg citizenship
Nature/Culture	fields of difference
Co-operation	Communications enhancement
Freud	Lacan
Sex	Genetic engineering
Labour	Robotics
Mind	Artificial Intelligence
Second World War	Star Wars

Cyborgs: A Myth of Political Identity

I want to conclude with a myth about identity and boundaries which might inform late twentieth-century political imaginations. I am indebted in this story to writers like Joanna Russ, Samuel R. Delany, John Varley, James Tiptree Jr., Octavia Butler, Monique Wittig, and Vonda Mclntyre.[1] These are our storytellers exploring what it means to be embodied in high-tech worlds. They are theorists for cyborgs. Exploring conceptions of bodily boundaries and social order, the anthropologist Mary Douglas (1966, 1970) should be credited with helping us to consciousness about how fundamental body imagery is to world view, and so to political language. French feminists like Luce Irigaray and Monique Wittig, for all their differences, know how to write the body; how to weave eroticism, cosmology, and politics from imagery of embodiment, and especially for Wittig, from imagery of fragmentation and reconstitution of bodies.[2] American radical feminists like Susan Griffnn, Audre

[1] See King 1984. An abbreviated list of feminist science fiction underlying themes of this essay: Octavia Butler, *Wild Seed, Mind of My Mind, Kindred, Survivor*; Suzy McKee Charnas, *Motherlines*; Samuel R. Delany, the Nevèrÿon series; Anne McCaffery, *The Ship Who Sang, Dinosaur Planet*; Vonda McIntyre, *Superluminal, Dreamsnake*; Joanna Russ, *Adventures of Alix, The Female Man*; James Tiptree Jr., *Star Songs of an Old Primate, Up the Walls of the World*; John Varley, *Titan, Wizard, Demon.*

[2] French feminisms contribute to cyborg heteroglossia: Burke 1981; Irigaray 1977, 1979; Marks and de Courtivron 1980; *Signs: Journal of Women in Culture and Society* 1981 (Autumn); Wittig 1973; Duchen 1986. For English translation of some currents of Francophone feminism, see *Feminist Issues: A Journal of Feminist Social and Political Theory* (1980).

lack sufficiently subtle connections for collectively building effective theories of experience. Present efforts—Marxist, psychoanalytic, feminist, anthropological—to clarify even 'our' experience are rudimentary.

I am conscious of the odd perspective provided by my historical position—a PhD in biology for an Irish Catholic girl was made possible by Sputnik's impact on US national science-education policy. I have a body and mind as much constructed by the post-Second World War arms race and cold war as by the women's movements. There are more grounds for hope in focusing on the contradictory effects of politics designed to produce loyal American technocrats, which also produced large numbers of dissidents, than in focusing on the present defeats.

The permanent partiality of feminist points of view has consequences for our expectations of forms of political organization and participation. We do not need a totality in order to work well. The feminist dream of a common language, like all dreams for a perfectly true language, of perfectly faithful naming of experience, is a totalizing and imperialist one. In that sense, dialectics too is a dream language, longing to resolve contradiction. Perhaps, ironically, we can learn from our fusions with animals and machines how not to be Man, the embodiment of Western logos. From the point of view of pleasure in these potent and taboo fusions, made inevitable by the social relations of science and technology, there might indeed be a feminist science.

in the worlds charged with microelectronic and biotechnological politics. In relation to objects like biotic components, one must not think in terms of essential properties, but in terms of design, boundary constraints, rates of flows, systems logics, costs of lowering constraints. Sexual reproduction is one kind of reproductive strategy among many, with costs and benefits as a function of the system environment. Ideologies of sexual reproduction can no longer reasonably call on notions of sex and sex role as organic aspects in natural objects like organisms and families. Such reasoning will be unmasked as irrational, and ironically corporate executives reading *Playboy* and anti-porn radical feminists will make strange bedfellows in jointly unmasking the irrationalism.

Likewise for race, ideologies about human diversity have to be formulated in terms of frequencies of parameters, like blood groups or intelligence scores. It is 'irrational' to invoke concepts like primitive and civilized. For liberals and radicals, the search for integrated social systems gives way to a new practice called 'experimental ethnography' in which an organic object dissipates in attention to the play of writing. At the level of ideology, we see translations of racism and colonialism into languages of development and under-development, rates and constraints of modernization. Any objects or persons can be reasonably thought of in terms of disassembly and reassembly; no 'natural' architectures constrain system design. The financial districts in all the world's cities, as well as the export-processing and free-trade zones, proclaim this elementary fact of 'late capitalism'. The entire universe of objects that can be known scientifically must be formulated as problems in communications engineering (for the managers) or theories of the text (for those who would resist). Both are cyborg semiologies.

One should expect control strategies to concentrate on boundary conditions and interfaces, on rates of flow across boundaries—and not on the integrity of natural objects. 'Integrity' or 'sincerity' of the Western self gives way to decision

procedures and expert systems. For example, control strategies applied to women's capacities to give birth to new human beings will be developed in the languages of population control and maximization of goal achievement for individual decision-makers. Control strategies will be formulated in terms of rates, costs of constraints, degrees of freedom. Human beings, like any other component or subsystem, must be localized in a system architecture whose basic modes of operation are probabilistic, statistical. No objects, spaces, or bodies are sacred in themselves; any component can be interfaced with any other if the proper standard, the proper code, can be constructed for processing signals in a common language. Exchange in this world transcends the universal translation effected by capitalist markets that Marx analysed so well. The privileged pathology affecting all kinds of components in this universe is stress—communications breakdown (Hogness, 1983). The cyborg is not subject to Foucault's biopolitics; the cyborg simulates politics, a much more potent field of operations.

This kind of analysis of scientific and cultural objects of knowledge which have appeared historically since the Second World War prepares us to notice some important inadequacies in feminist analysis which has proceeded as if the organic, hierarchical dualisms ordering discourse in 'the West' since Aristotle still ruled. They have been cannibalized, or as Zoe Sofia (1984) might put it, they have been 'techno-digested'. The dichotomies between mind and body, animal and human, organism and machine, public and private, nature and culture, men and women, primitive and civilized are all in question ideologically. The actual situation of women is their integration/exploitation into a world system of production/reproduction and communication called the informatics of domination. The home, workplace, market, public arena, the body itself—all can be dispersed and interfaced in nearly infinite, polymorphous ways, with large consequences for women and others—consequences

work, like SEIU's District 925,[1] should be a high priority for all of us. These efforts are profoundly deaf to technical restructuring of labour processes and reformations of working classes. These efforts also are providing understanding of a more comprehensive kind of labour organization, involving community, sexuality, and family issues never privileged in the largely white male industrial unions.

The structural rearrangements related to the social relations of science and technology evoke strong ambivalence. But it is not necessary to be ultimately depressed by the implications of late twentieth-century women's relation to all aspects of work, culture, production of knowledge, sexuality, and reproduction. For excellent reasons, most Marxisms see domination best and have trouble understanding what can only look like false consciousness and people's complicity in their own domination in late capitalism. It is crucial to remember that what is lost, perhaps especially from women's points of view, is often virulent forms of oppression, nostalgically naturalized in the face of current violation. Ambivalence towards the disrupted unities mediated by high-tech culture requires not sorting consciousness into categories of 'clear-sighted critique grounding a solid political epistemology' versus 'manipulated false consciousness', but subtle understanding of emerging pleasures, experiences, and powers with serious potential for changing the rules of the game.

There are grounds for hope in the emerging bases for new kinds of unity across race, gender, and class, as these elementary units of socialist-feminist analysis themselves suffer protean transformations. Intensifications of hardship experienced world-wide in connection with the social relations of science and technology are severe. But what people are experiencing is not transparently clear, and we

[1] The Service Employees International Union's office workers' organization in the United States.

and biotechnology-dependent companies); highly educated, numerous elites in a progressively bimodal society.

Clinic-hospital: Intensified machine-body relations; renegotiations of public metaphors which channel personal experience of the body, particularly in relation to reproduction, immune system functions, and 'stress' phenomena; intensification of reproductive politics in response to world historical implications of women's unrealized, potential control of their relation to reproduction; emergence of new, historically specific diseases; struggles over meanings and means of health in environments pervaded by high technology products and processes; continuing feminization of health work; intensified struggle over state responsibility for health; continued ideological role of popular health movements as a major form of American politics.

Church: Electronic fundamentalist 'super-saver' preachers solemnizing the union of electronic capital and automated fetish gods; intensified importance of churches in resisting the militarized state; central struggle over women's meanings and authority in religion; continued relevance of spirituality, intertwined with sex and health, in political struggle.

The only way to characterize the informatics of domination is as a massive intensification of insecurity and cultural impoverishment, with common failure of subsistence networks for the most vulnerable. Since much of this picture interweaves with the social relations of science and technology, the urgency of a socialist-feminist politics addressed to science and technology is plain. There is much now being done, and the grounds for political work are rich. For example, the efforts to develop forms of collective struggle for women in paid

that themselves are very different for different people and which make potent oppositional international movements difficult to imagine and essential for survival. One important route for reconstructing socialist-feminist politics is through theory and practice addressed to the social relations of science and technology, including crucially the systems of myth and meanings structuring our imaginations. The cyborg is a kind of disassembled and reassembled, postmodern collective and personal self. This is the self feminists must code.

Communications technologies and biotechnologies are the crucial tools recrafting our bodies. These tools embody and enforce new social relations for women world-wide. Technologies and scientific discourses can be partially understood as formalizations, i.e., as frozen moments, of the fluid social interactions constituting them, but they should also be viewed as instruments for enforcing meanings. The boundary is permeable between tool and myth, instrument and concept, historical systems of social relations and historical anatomies of possible bodies, including objects of knowledge. Indeed, myth and tool mutually constitute each other.

Furthermore, communications sciences and modern biologies are constructed by a common move—th*e translation of the world into a problem of coding*, a search for a common language in which all resistance to instrumental control disappears and all heterogeneity can be submitted to disassembly, reassembly, investment, and exchange.

In communications sciences, the translation of the world into a problem in coding can be illustrated by looking at cybernetic (feedback-controlled) systems theories applied to telephone technology, computer design, weapons deployment, or data base construction and maintenance. In each case, solution to the key questions rests on a theory of language and control; the key operation is determining the rates, directions, and probabilities of flow of a quantity called information. The world is subdivided by boundaries differentially permeable to informa-

tion. Information is just that kind of quantifiable element (unit, basis of unity) which allows universal translation, and so unhindered instrumental power (called effective communication). The biggest threat to such power is interruption of communication. Any system breakdown is a function of stress. The fundamentals of this technology can be condensed into the metaphor C^3I, command-control communication-intelligence, the military's symbol for its operations theory.

In modern biologies, the translation of the world into a problem in coding can be illustrated by molecular genetics, ecology, sociobiological evolutionary theory, and immunobiology. The organism has been translated into problems of genetic coding and read-out. Biotechnology, a writing technology, informs research broadly.[2] In a sense, organisms have ceased to exist as objects of knowledge, giving way to biotic components, i.e., special kinds of information-processing devices. The analogous moves in ecology could be examined by probing the history and utility of the concept of the ecosystem. Immunobiology and associated medical practices are rich exemplars of the privilege of coding and recognition systems as objects of knowledge, as constructions of bodily reality for us. Biology here is a kind of cryptography. Research is necessarily a kind of intelligence activity. Ironies abound. A stressed system goes awry; its communication processes break down; it fails to recognize the difference between self and other. Human babies with baboon hearts evoke national ethical perplexity—for animal rights activists at least as much as for the guardians of human purity. In the US gay men and intravenous drug users are the 'privileged' victims of an awful

[2] For progressive analyses and action on the biotechnology debates,see *GeneWatch, a Bulletin of the Committee for Responsible Genetics,* 5 Doane St., 4th Floor, Boston, Massachusetts 02109; Genetic Screening Study Group (formerly the Sociobiology Study Group of Science for the People), Cambridge, Massachusetts; Wright 1982, 1986; Yoxen 1983.

in privileged occupational categories for many white women and people of colour; impact of new technologies on women's work in clerical, service, manufacturing (especially textiles), agriculture, electronics; international restructuring of the working classes; development of new time arrangements to facilitate the homework economy (flex time, part time, over time, no time); homework and out work; increased pressures for two-tiered wage structures; significant numbers of people in cash-dependent populations world-wide with no experience or no further hope of stable employment; most labour 'marginal' or 'feminized'.

State: Continued erosion of the welfare state; decentralizations with increased surveillance and control; citizenship by telematics; imperialism and political power broadly in the form of information rich/information poor differentiation; increased high-tech militarization increasingly opposed by many social groups; reduction of civil service jobs as a result of the growing capital intensification of office work, with implications for occupational mobility for women of colour; growing privatization of material and ideological life and culture; close integration of privatization and militarization, the high-tech forms of bourgeois capitalist personal and public life; invisibility of different social groups to each other, linked to psychological mechanisms of belief in abstract enemies.

School: Deepening coupling of high-tech capital needs and public education at all levels, differentiated by race, class, and gender; managerial classes involved in educational reform and refunding at the cost of remaining progressive educational democratic structures for children and teachers; education for mass ignorance and repression in technocratic and militarized culture; growing and-science mystery cults in dissenting and radical political movements; continued relative scientific illiteracy among white women and people of colour; growing industrial direction of education (especially higher education) by science-based multinationals (particularly in electronics-

tical work. However, there is no 'place' for women in these networks, only geometries of difference and contradiction crucial to women's cyborg identities. If we learn how to read these webs of power and social life, we might learn new couplings, new coalitions. There is no way to read the following list from a standpoint of 'identification', of a unitary self. The issue is dispersion. The task is to survive in the diaspora.

Home: Women-headed households, serial monogamy, flight of men, old women alone, technology of domestic work, paid homework, re-emergence of home sweat-shops, home-based businesses and telecommuting, electronic cottage, urban homelessness, migration, module architecture, reinforced (simulated) nuclear family, intense domestic violence.

Market: Women's continuing consumption work, newly targeted to buy the profusion of new production from the new technologies (especially as the competitive race among industrialized and industrializing nations to avoid dangerous mass unemployment necessitates finding ever bigger new markets for ever less clearly needed commodities); bimodal buying power, coupled with advertising targeting of the numerous affluent groups and neglect of the previous mass markets; growing importance of informal markets in labour and commodities parallel to high-tech, affluent market structures; surveillance systems through electronic funds transfer; intensified market abstraction (commodification) of experience, resulting in ineffective utopian or equivalent cynical theories of community; extreme mobility (abstraction) of marketing/financing systems; inter-penetration of sexual and labour markets; intensified sexualization of abstracted and alienated consumption.

Paid Work Place: Continued intense sexual and racial division of labour, but considerable growth of membership

immune system disease that marks (inscribes on the body) confusion of boundaries and moral pollution (Treichler, 1987).

But these excursions into communications sciences and biology have been at a rarefied level; there is a mundane, largely economic reality to support my claim that these sciences and technologies indicate fundamental transformations in the structure of the world for us. Communications technologies depend on electronics. Modern states, multinational corporations, military power, welfare state apparatuses, satellite systems, political processes, fabrication of our imaginations, labour-control systems, medical constructions of our bodies, commercial pornography, the international division of labour, and religious evangelism depend intimately upon electronics. Micro-electronics is the technical basis of simulacra; that is, of copies without originals.

Microelectronics mediates the translations of labour into robotics and word processing, sex into genetic engineering and reproductive technologies, and mind into artificial intelligence and decision procedures. The new biotechnologies concern more than human reproduction. Biology as a powerful engineering science for redesigning materials and processes has revolutionary implications for industry, perhaps most obvious today in areas of fermentation, agriculture, and energy. Communications sciences and biology are constructions of natural-technical objects of knowledge in which the difference between machine and organism is thoroughly blurred; mind, body, and tool are on very intimate terms. The 'multinational' material organization of the production and reproduction of daily life and the symbolic organization of the production and reproduction of culture and imagination seem equally implicated. The boundary-maintaining images of base and superstructure, public and private, or material and ideal never seemed more feasible.

I have used Rachel Grossman's (1980) image of women in the integrated circuit to name the situation of women in a

world so intimately restructured through the social relations of science and technology.[3] I used the odd circumlocution, *the social relations of science and technology*, to indicate that we are not dealing with a technological determinism, but with a historical system depending upon structured relations among people. But the phrase should also indicate that science and technology provide fresh sources of power, that we need fresh sources of analysis and political action (Latour, 1984). Some of the rearrangements of race, sex, and class rooted in high-tech-facilitated social relations can make socialist-feminism more relevant to effective progressive politics.

[3] Starting references for 'women in the integrated circuit': D'Onofrio-Flores and Pfafflin 1982; Fernandez-Kelly 1983; Fuentes and Ehrenreich 1983; Grossman 1980; Nash and Fernandez-Kelly 1983; A. Ong 1987; Science Policy Research Unit 1982.

Women in The Integrated Circuit

Let me summarize the picture of women's historical locations in advanced industrial societies, as these positions have been restructured partly through the social relations of science and technology. If it was ever possible ideologically to characterize women's lives by the distinction of public and private domains—suggested by images of the division of working-class life into factory and home, of bourgeois life into market and home, and of gender existence into personal and political realms—it is now a totally misleading ideology, even to show how both terms of these dichotomies construct each other in practice and in theory. I prefer a network ideological image, suggesting the profusion of spaces and identities and the permeability of boundaries in the personal body and in the body politic. 'Networking' is both a feminist practice and a multinational corporate strategy—weaving is for oppositional cyborgs.

So let me return to the earlier image of the informatics of domination and trace one vision of women's 'place' in the integrated circuit, touching only a few idealized social locations seen primarily from the point of view of advanced capitalist societies: Home, Market, Paid Work Place, State, School, Clinic-Hospital, and Church. Each of these idealized spaces is logically and practically implied in every other locus, perhaps analogous to a holographic photograph. I want to suggest the impact of the social relations mediated and enforced by the new technologies in order to help formulate needed analysis and prac-

Many scientific and technical workers in Silicon Valley, the high-tech cowboys included, do not want to work on military science.[7] Can these personal preferences and cultural tendencies be welded into progressive politics among this professional middle class in which women, including women of colour, are coming to be fairly numerous?

[7] See Markoff and Siegel 1983. High Technology Professionals for Peace and Computer Professionals for Social Responsibility are promising organizations.

The 'Homework Economy' Outside 'The Home'

The 'New Industrial Revolution' is producing a new world-wide working class, as well as new sexualities and ethnicities. The extreme mobility of capital and the emerging international division of labour are intertwined with the emergence of new collectivities, and the weakening of familiar groupings. These developments are neither gender- nor race-neutral. White men in advanced industrial societies have become newly vulnerable to permanent job loss, and women are not disappearing from the job rolls at the same rates as men. It is not simply that women in Third World countries are the preferred labour force for the science-based multinationals in the export-processing sectors, particularly in electronics. The picture is more systematic and involves reproduction, sexuality, culture, consumption, and production. In the prototypical Silicon Valley, many women's lives have been structured around employment in electronics-dependent jobs, and their intimate realities include serial heterosexual monogamy, negotiating childcare, distance from extended kin or most other forms of traditional community, a high likelihood of loneliness and extreme economic vulnerability as they age. The ethnic and racial diversity of women in Silicon Valley structures a microcosm of conflicting differences in culture, family, religion, education, and language.

Richard Gordon has called this new situation the 'homework economy'.[1] Although he includes the phenomenon of literal homework emerging in connection with electronics assembly, Gordon intends 'homework economy' to name a restructuring of work that broadly has the characteristics formerly ascribed to female jobs, jobs literally done only by women. Work is being redefined as both literally female and feminized, whether performed by men or women. To be feminized means to be made extremely vulnerable; able to be disassembled, reassembled, exploited as a reserve labour force; seen less as workers than as servers; subjected to some arrangements on and off the paid job that make a mockery of a limited work day; leading an existence that always borders on being obscene, out of place, and reducible to sex. Deskilling is an old strategy newly applicable to formerly privileged workers. However, the homework economy does not refer only to large-scale deskilling, nor does it deny that new areas of high skill are emerging, even for women and men previously excluded from skilled employment. Rather, the concept indicates that factory, home, and market are integrated on a new scale and that the places of women are crucial—and need to be analysed for differences among women and for meanings for relations between men and women in various situations.

The homework economy as a world capitalist organizational structure is made possible by (not caused by) the new technologies. The success of the attack on relatively privileged, mostly white, men's unionized jobs is deaf to the power of the new communications technologies to integrate and control

[1] For the 'homework economy outside the home' and related arguments, see Gordon 1983; Gordon and Kimball 1985; Stacey 1987; Reskin and Hartmann 1986; *Women and Poverty* 1984; S. Rose 1986; Collins 1982; Burr 1982; Gregory and Nussbaum 1982; Piven and Coward 1982; Microelectronics Group 1980; Stallard et al. 1983, which includes a useful organization and resource list.

graphic consciousness.[5] Sex, sexuality, and reproduction are central actors in high-tech myth systems structuring our imaginations of personal and social possibility.

Another critical aspect of the social relations of the new technologies is the reformulation of expectations, culture, work, and reproduction for the large scientific and technical work-force. A major social and political danger is the formation of a strongly bimodal social structure, with the masses of women and men of all ethnic groups, but especially people of colour, confined to a homework economy, illiteracy of several varieties, and general redundancy and impotence, controlled by high-tech repressive apparatuses ranging from entertainment to surveillance and disappearance. An adequate socialist-feminist politics should address women in the privileged occupational categories, and particularly in the production of science and technology that constructs scientific-technical discourses, processes, and objects.[6]

This issue is only one aspect of enquiry into the possibility of a feminist science, but it is important. What kind of constitutive role in the production of knowledge, imagination, and practice can new groups doing science have? How can these groups be allied with progressive social and political movements? What kind of political accountability can be constructed to the women together across the scientific-technical hierarchies separating us? Might there be ways of developing feminist science/technology politics in alliance with and-military science facility conversion action groups?

[5] For the moment of transition of hunting with guns to hunting with cameras in the construction of popular meanings of nature for an American urban immigrant public, see Haraway 1984–85, 1989; Nash 1979; Sontag 1977; Preston 1984.

[6] For guidance for thinking about the political/cultural/racial implications of the history of women doing science in the United States, see Haas and Perucci 1984; Hacker 1981; Keller 1983; National Science Foundation 1988; Rossiter 1982; Schiebinger 1987; Haraway 1989.

cial to production of modern forms of 'private life'. The culture of video games is heavily orientated to individual competition and extraterrestrial warfare. High-tech, gendered imaginations are produced here, imaginations that can contemplate destruction of the planet and a sci-fi escape from its consequences. More than our imaginations is militarized; and the other realities of electronic and nuclear warfare are inescapable. These are the technologies that promise ultimate mobility and perfect exchange—and incidentally enable tourism, that perfect practice of mobility and exchange, to emerge as one of the world's largest single industries.

The new technologies affect the social relations of both sexuality and of reproduction, and not always in the same ways. The close ties of sexuality and instrumentality, of views of the body as a kind of private satisfaction- and utility-maximizing machine, are described nicely in sociobiological origin stories that stress a genetic calculus and explain the inevitable dialectic of domination of male and female gender roles.[4] These sociobiological stories depend on a high-tech view of the body as a biotic component or cybernetic communications system. Among the many transformations of reproductive situations is the medical one, where women's bodies have boundaries newly permeable to both 'visualization' and 'intervention'. Of course, who controls the interpretation of bodily boundaries in medical hermeneutics is a major feminist issue. The speculum served as an icon of women's claiming their bodies in the 1970S; that handcraft tool is inadequate to express our needed body politics in the negotiation of reality in the practices of cyborg reproduction. Self-help is not enough. The technologies of visualization recall the important cultural practice of handing with the camera and the deeply predatory nature of a photo-

[4] For a feminist version of this logic, see Hrdy 1981. For an analysis of scientific women's storytelling practices, especially in relation to sociobiology in evolutionary debates around child abuse and infanticide, see Haraway 1989.

labour despite extensive dispersion and decentralization. The consequences of the new technologies are felt by women both in the loss of the family (male) wage (if they ever had access to this white privilege) and in the character of their own jobs, which are becoming capital-intensive; for example, office work and nursing.

The new economic and technological arrangements are also related to the collapsing welfare state and the ensuing intensification of demands on women to sustain daily life for themselves as well as for men, children, and old people. The feminization of poverty—generated by dismantling the welfare state, by the homework economy where stable jobs become the exception, and sustained by the expectation that women's wages will not be matched by a male income for the support of children—has become an urgent focus. The causes of various women-headed households are a function of race, class, or sexuality; but their increasing generality is a ground for coalitions of women on many issues. That women regularly sustain daily life partly as a function of their enforced status as mothers is hardly new; the kind of integration with the overall capitalist and progressively war-based economy is new. The particular pressure, for example, on US black women, who have achieved an escape from (barely) paid domestic service and who now hold clerical and similar jobs in large numbers, has large implications for continued enforced black poverty *with* employment. Teenage women in industrializing areas of the Third World increasingly find themselves the sole or major source of a cash wage for their families, while access to land is ever more problematic. These developments must have major consequences in the psychodynamics and politics of gender and race.

Within the framework of three major stages of capitalism (commercial/early industrial, monopoly, multinational)—tied to nationalism, imperialism, and multinationalism, and related to Jameson's three dominant aesthetic periods of realism,

modernism, and postmodernism—I would argue that specific forms of families dialectically relate to forms of capital and to its political and cultural concomitants. Although lived problematically and unequally, ideal forms of these families might be schematized as (1) the patriarchal nuclear family, structured by the dichotomy between public and private and accompanied by the white bourgeois ideology of separate spheres and nineteenth-century Anglo-American bourgeois feminism; (2) the modern family mediated (or enforced) by the welfare state and institutions like the family wage, with a flowering of a-feminist heterosexual ideologies, including their radical versions represented in Greenwich Village around the First World War; and (3) the 'family' of the homework economy with its oxymoronic structure of women-headed households and its explosion of feminisms and the paradoxical intensification and erosion of gender itself.

This is the context in which the projections for world-wide structural unemployment stemming from the new technologies are part of the picture of the homework economy. As robotics and related technologies put men out of work in 'developed' countries and exacerbate failure to generate male jobs in Third World 'development', and as the automated office becomes the rule even in labour-surplus countries, the feminization of work intensifies. Black women in the United States have long known what it looks like to face the structural underemployment ('feminization') of black men, as well as their own highly vulnerable position in the wage economy. It is no longer a secret that sexuality, reproduction, family, and community life are interwoven with this economic structure in myriad ways which have also differentiated the situations of white and black women. Many more women and men will contend with similar situations, which will make cross-gender and race alliances on issues of basic life support (with or without jobs) necessary, not just nice.

The new technologies also have a profound effect on hunger and on food production for subsistence world-wide. Rae Lessor Blumberg (1983) estimates that women produce about 50 per cent of the world's subsistence food.[2] Women are excluded generally from benefiting from the increased high-tech commodification of food and energy crops, their days are made more arduous because their responsibilities to provide food do not diminish, and their reproductive situations are made more complex. Green Revolution technologies interact with other high-tech industrial production to alter gender divisions of labour and differential gender migration patterns.

The new technologies seem deeply involved in the forms of 'privatization' that Ros Petchesky (1981) has analysed, in which militarization, right-wing family ideologies and policies, and intensified definitions of corporate (and state) property as private synergistically interact.[3] The new communications technologies are fundamental to the eradication of 'public life' for everyone. This facilitates the mushrooming of a permanent high-tech military establishment at the cultural and economic expense of most people, but especially of women. Technologies like video games and highly miniaturized televisions seem cru-

[2] The conjunction of the Green Revolution's social relations with biotechnologies like plant genetic engineering makes the pressures on land in the Third World increasingly intense. AID's estimates (New York Times, 14 October 1984) used at the 1984 World Food Day are that in Africa, women produce about 90 per cent of rural food supplies, about 60–80 per cent in Asia, and provide 40 per cent of agricultural labour in the Near East and Latin America. Blumberg charges that world organizations' agricultural politics, as well as those of multinationals and national governments in the Third World, generally ignore fundamental issues in the sexual division of labour. The present tragedy of famine in Africa might owe as much to male supremacy as to capitalism, colonialism, and rain patterns. More accurately, capitalism and racism are usually structurally male dominant. See also Blumberg (1981); Hacker (1984); Hacker and Bovit (1981); Busch and Lacy (1983); Wilfred (1982); Sachs (1983); International Fund for Agricultural Development (1985); Bird (1984).

[3] See also Enloe 1983a, 1983b.