Introduction to Part One

GENDER, ARGUES SANDRA HARDING (1996), is a property of individuals, social structures and symbolic systems. Gender relations are also power relations which lead to unequal access to material resources. This is why a study of gender is more than simply an interesting intellectual endeavour; it is also a political activity. In the 1990s that activity has focused on understanding the representation and creation of gender in symbolic systems. Science is one of the most important symbolic systems in Western culture and it has been clear to feminist critics of science, technology and, in *its* more radical formulation, "technoscience", that gender is very clearly a product of this system (Bleier, 1984).

An empiricist view of Western technoscience would see its main function as producing categories and definitions with which the material world can be described and modelled, and its behaviour controlled and predicted. A poststructuralist view would challenge the importance (and even the reality, in an ontological sense) of the material world, and argue that the categories and definitions that science produces, themselves *produce* knowledge, and that power comes through this production. Whichever way it is seen, power over the material world through knowledge about it is what science has been about since Francis Bacon's "Knowledge is power". Even Fox Keller, who is a key proponent of the view that there is a "residual reality" "vastly larger than any possible representation we might construct" (1992: 74), argues that language produces meaning about this reality rather than simply reflecting it. Technoscientific knowledge contributes to the production of gender through its forms of representation, while itself being a gendered practice. Like the worm Uroborus, it constantly feeds off itself.

There is agreement that gender categories are constructed. 1970/1980s feminist theory argued that gender was a social construction based on a material-biological base: sex difference. Gender was seen as a construction used to justify social inequality. The elaboration of poststructural theory and the critical investigation of

the biology of sex difference raised questions about the role of biology as a discourse that created sex difference rather than simply justified it. Biology became another discourse in the construction of gender rather than the material base for it. This left feminist scholars and activists in the uncomfortable position of having apparently deconstructed the category "Woman"; the category which formed the basis of Second Wave feminism. Many, while agreeing that the characteristics of gender categories as we know them are a social construction, would not go so far as to say that "sex/gender" itself is simply a product of discourse. All would agree, however, that it is illuminating to uncover the ways in which Western gender categories have come to be. The deep construction of gender through the casting of male and female into oppositional and hierarchical categories in which the "female" is always the inferior – for example, objectivity/subjectivity, rationality/emotion, Culture/Nature – is evident in many cultures but is especially strong in technoscientific culture. Uncovering the particular way in which this construction has developed in technoscience, from the seventeenth century on, has been a major project of feminist historians of science (for example, Schiebinger, 1989; Tuana, 1993; Fox Keller, 1992). However, uncovering and deconstructing are only the tools of a more radical ambition, which is:

> to undermine the dichotomies themselves – to expose to radical critique a worldview that deploys categories of gender to rend the fabric of human life and thought along a multiplicity of mutually sanctioning mutually supportive, and mutually defining oppositions.
>
> (Fox Keller, 1992: 18)

But once these are undermined, and therefore unserviceable as intellectual tools, it is necessary to construct new conceptual tools to think differently with.

> It is easy enough to say, and to show, that the language of science is riddled with patriarchal imagery, but it is far more difficult to show – or even to think about, what effect a non-patriarchal discourse would have had or would now have (supposing we could learn to ungender our discourse) . . . This . . . is the real task that faces not only feminist critiques of science, but all of history, philosophy and sociology of science.
>
> (Fox Keller, 1986 [1992] p: 48)

It has been in aid of this task that Donna Haraway's 1985 version of the 1960s creature, the "Cyborg" (see reading 1.3), has become a key concept for 1990s thinking about gender, and about the nature of being human in what some have identified as a "posthuman" world (Gray *et al.*, 1995). Haraway's cyborg is not a member of the liberal humanist world. It is not concerned to differentiate itself from other forms of creature, or from machines; its identity does not rest in its individuality. Haraway's cyborg (and, as is discussed later, other versions of "cyborg", contain none of the implications of Haraway's version), like a Rosetta stone, bridges the language of material feminists working on issues of gender and technoscience, and

postmodern feminists working with cultural studies and textual deconstruction. It is a theoretical creature that has more currency, and popularity, ten years after it was described by Haraway as a "manifesto" for "socialist feminists". She intended it to be a political creature, but very few who have found it a useful metaphor would see themselves as socialist feminists. Its usefulness for cultural deconstruction of gender has become apparent, but its usefulness as a tool for material change is yet to be proved. Although Haraway famously concludes her article "I would rather be a cyborg than a goddess", the question remains: Is it better to be a cyborg than a woman?

The collection of extracts in part 1 provides a context for Haraway's cyborg by looking in particular at the power of science to create categories of similarity and difference through which we think about being human: male and female. Haraway's cyborg gives us another metaphor to replace "human", but some of the extracts question whether alone it can overcome the problems of our gendered and racialized humanity.

The first extract is taken from Londa Schiebinger's book *Nature's Body* (1993). Schiebinger is a historian of science, and her particular period of interest is the seventeenth and eighteenth centuries. In her first book, *The Mind Has No Sex* (Schiebinger, 1989), she traced the contributions women had made to science and technology before the modern era, and the way that the developing technosciences (of natural history and anatomy in particular) can be seen to be providing a justification, and prescription, for the exclusion of women from the social and intellectual practices of Western technoscience on the grounds of "natural" gender differences. In doing this, she argued, Western technoscience was entrenching unacknowledged sexism. Foucault would argue that the discourses of biology and anatomy were producing meaning through these classification systems, and that this meaning produced power inequalities, rather than simply justified them.

In *Nature's Body* Schiebinger goes more deeply into an analysis of key eighteenth-century natural history taxonomies, where the foundation for our present understanding of the relationship between ourselves as human beings and other types of living thing lies. In this work she is concerned with both gender and race as conceptual creations and material inequalities. In the extract given here she demonstrates how the basic zoological taxonomy that has been in common use for two hundred years, in which human beings are classed as mammals along with other species who suckle their young (and distinguished, for example, from birds or insects), is based on a deliberate privileging of criteria that stress the close relationship between women in particular and other mammals. In constructing his classes of animals Linnaeus deliberately chose a female characteristic as the defining property of mammals. At the same time he created the term *Homo sapiens* ("man of wisdom") to differentiate human beings from other primates. Since medieval times, notes Schiebinger, human beings (especially males) have been seen as distinct from other animals because of their rationality, a characteristic seen by medieval philosophers as particularly male, and lacking in women.

In his new terminology, Linnaeus therefore reasserted that it is a masculine characteristic (and a non-material one) that differentiates human beings from

"beasts", while it is a female, biological characteristic that provides commonality with them. This relationship is very important. For Descartes, animals were a kind of machine, made by God, with very small parts. Human beings were not machines/automata like animals because of the power of rational thought and consciousness. When women are put closer to animals they are also placed closer to machines. At its very core, then, the discourse of the discipline which in the twentieth century becomes biology, in its taxonomy of what it is to be human constructs gendered inequality.

Because taxonomies produce meaning it is important to locate the historical process by which they were created. Schiebinger argues that the eighteenth century in Europe was a time of social and political upheaval, when both citizenship and the nature of the family were being redefined. A concern with "natural" rights was also mirrored by a concern with "natural" differences. This new classificatory science provided an argument for the natural place of women as nurturers, both of their own children and of the State.

These biological taxonomies were concerned to sort species and gender into their rightful places. They had a medieval concern to find a "natural hierarchy" that would produce and justify power inequalities, and assert the natural superiority/right-to-rule of white, middle-class European men. So the creation of taxonomies was also focused on identifying and classifying racial difference. The disenfranchising of women by identifying them as closer to "beasts" also extended to the disenfranchising of members of other cultures (and classes of society) by an identification based on different biological indicators. Discussion of the characteristics of non-European women, for example the "Hottentot Venus", cast these women far beyond the defining characteristics of "human". They became seen, and treated, as "monstrous". The "Hottentot Venus" is an example of how technoscience creates monsters from those in some way seen as "outside" the category of "human".

The next reading is from an article by Nancy Leys Stepan on the use of metaphor in scientific theory to disguise the importation of racist and sexist values into apparently "value-free" knowledge. Stepan, a philosopher and historian of technoscience, has written extensively on the construction of the notion of "race" in scientific discourse (Stepan, 1982). She argues that there has been a particular problem with modern science. What technoscience claims for itself as a mirror of reality includes a notion that scientific language and theory is "exact", objective, containing nothing except the unadorned factual words of the "modest witness" (Haraway, 1997). In this positivist discourse about "truth", language is a tool which reflects material reality; theories describe the behaviour of measurable material "stuff". However, argues Stepan, metaphor and analogy are as important in the construction of meaning in technoscience as in any other discourse; the danger is that scientists have been the last to acknowledge their use.

Stepan uses examples from nineteenth-century and early twentieth-century natural history concerning racial and sexual difference that illustrate, when they are read following Schiebinger, the cumulative nature of that particular branch of knowledge. Schiebinger illustrated the eighteenth-century concern with the "chain of being" when it appeared most important to construct difference between white males and non-white males, and all females. Stepan argues that the argument takes a step

further by the nineteenth century. Non-white men and all women are no longer seen as simply inferior to white men – they are seen as having similar characteristics of inferiority, and therefore as being like each other. So, for example, skull shape and intelligence (which were understood to be closely connected if not causal) of women, non-white "races" and other primates were seen as having much in common. What becomes visible and desired in the research data is evidence of similarities between these divergent groups, because this supports a theory of some common, biological, causal explanations for inequality. Poststructuralists would argue that these facts/data are themselves constructs of the discourse, and therefore inside it, and can carry no weight of proof or disproof. In Stepan's examples, even from an empiricist position, no data could have challenged the theories proposed because causation was argued to support a metaphorical argument, when the most that could be claimed for the data was correlation. What the nineteenth-century science of race was doing was accepting unexamined metaphors of racial and sexual inequality – that women and non-white races are more like other primates than white men – into an analogical scientific theory by collecting data that supported the theory.

Stepan's reading is also important in putting forward a theory of how metaphor and analogy work. A metaphor does not bring together, through language, two things that have a material or literal similarity; it brings together two diverse ideas or images that interact to construct a meaning that produces the idea that they have something in common. These interaction metaphors, once accepted, produce further associations between aspects of the two things, so that they appear to have even more in common than was originally supposed. Stepan, like Schiebinger, is arguing that the meanings created through the metaphors of race and gender that are embedded in our science and culture have created an acceptance of inequality. Stepan does not argue against metaphors *per se*. In fact she argues that metaphor and analogy are powerful tools for technoscience, which is in the business of constructing systems of implication where they previously didn't exist, and so new metaphors are needed. Haraway's cyborg is seen as potentially one of the most important.

One of Haraway's prime arguments in "A Manifesto for Cyborgs" is for the importance of the cyborg as an ahistorical figure, and as a liberatory metaphor, as well as a description of lived reality. Theorists of gender had searched for the historical and cultural origins of gender inequality; they looked for a time or place when gender was not a basic organizational construct of culture. They tried to imagine what cultural or social changes would be necessary to produce a situation in which gender did not imply structural inequality. Most, argued Haraway, had searched for some holistic unity, some merging of Nature and Culture which might transcend the problem. But, she asserts, there is no Garden of Eden, and gods and goddesses are dead. The solution to the problems inherent in Cartesian gendered dualism is to embrace technoscience for its ability to redraw all category boundaries between human beings and the rest, rather than reject it in favour of a mythic, organic wholeness. She argues that in the late twentieth century three crucial category boundaries have been dissolved by technoscience: the boundaries between human beings and other animals, between animal/human organisms and machines, and between the physical and the non-physical. It is the dissolution of these material

boundaries that makes it possible for us to claim the positive identity of cyborg for *ourselves*.

It is questionable whether Haraway's cyborg is an ahistorical construct. She describes it herself as "the illegitimate offspring of militarism and patriarchal capitalism". The cyborg or cybernetic organism was a proposal from the 1960s (Clynes and Kline, 1960) for producing modified humans who could engage in space travel without needing to carry their own "earthly" environment with them. Clynes' cyborgs would remain human beings in a Cartesian sense, their bodies (like machines) would be modified so that their minds (which would remain unchanged) could continue the work of rational technoscience and space exploration, still human, and still gendered. Manfred Clynes makes this very clear in an interview with Chris Hables Grey:

> When he rides a bicycle he virtually has become a cyborg. Initially it's a little hard to learn to ride a bike but once you learn it you do all these things automatically and the bike becomes almost part of you. When *homo sapiens* walks he doesn't pay much attention to how he walks, it's natural. In the same way, when he is on his bicycle it feels natural to a person who knows how to ride a bike . . . But right now I'd like to say – that the cyborg, *per se* – talking now of men and women who have altered themselves in various cyborgian ways – in no way has that altered their sexuality.
>
> (Gray *et al.*, 1995: 49)

It is also the case that others have argued philosophically that the boundary between humans/animals (animate) and machines (inanimate) is a mirage. Hacking claims for Canguilhem, a French philosopher of the 1950s (Hacking, 1998), a notion found in the work of more recent philosophers of technology (Kaufman-Osborn, 1997), that tools and machines should not be seen as in a different category to bodies but as extensions of them. Artefacts and living organs are conceptually the same; machines are animate in the same way that living things are animate, because they are extensions of life. But again it has not been obvious how this challenges the dualism of gender. Only Haraway makes claims for a cyborg identity that will deconstruct and reconstruct the nature of what it is to be human. In a paraphrase of her own words, a promise of monsters (Haraway, 1992).

The final two readings in part 1 argue that Haraway's cyborg is useful, but at the same time challenge her claims for it. Jennifer González analyses images of cyborg bodies for what they say about gender and race. She challenges Haraway on two main points: that cyborgs are outside history, and that they challenge gender and race categories. She presents visual images of "cyborgs" (specifically mechanical cyborgs: techno–human amalgamations) from the eighteenth century to the twentieth century, and argues that each of them demonstrates the particular historical understanding of the nature of bodies and machines (as well as the role of women) of the time in which they were made.

The eighteenth-century *L'Horlogère* is an example of a Cartesian view of the body as mechanism, and very stereotypically, a clock. The female body is objectified

and sexual, with its breasts, narrow waist and large hips. González sees this as having a lot in common with the sexual representation of the 1990s comic cyborg Kiddy, who fills a modern male sexual fantasy of the soft sexual female outer body which contains beneath it the powerful machine. It is the same fantasy which produced the "male" cyborg in *Terminator* which exhibits a sexualized, masculine, fleshly outer body, which is revealed, bit by bit as it is damaged, to contain a mechanical skeleton beneath. The female cyborg can also be simply the image of a sexualized slave, as described in the 1993 fax advertisement. In between these González discusses "modernist" images from the 1920s, in which in photomontage and found objects are used to describe the fractured nature of experience and modernist identity. The only image González produces which is not a gendered stereotype is the Longo sculpture. This she describes as hybrid, containing both male and female sexual characteristics, rather than transcending gender. But again she sees this as a particular historical conception, an illustration of the militarized capitalist state of the late twentieth century. She finds no challenge to racial representations in any visual images of cyborgs. For González the "cyborg" body, as represented, is failing in its promise to transcend gender and race categories. At best it is a way of reflecting, at any historical time, the particular contradictions of the lived experience of relating to technoscience.

The final reading, by Nina Lykke, sees the cyborg metaphor as useful for feminist scholars. It supports the activity and validity of feminist technoscience. Lykke notes one major boundary that feminist theory has transcended, that between C. P. Snow's two cultures of the arts and the sciences. This is basically an academic embodiment of the boundary between human and non-human. Since the 1970s Women's Studies (feminist studies or gender studies) has worked as an interdisciplinary knowledge domain, refusing to acknowledge the internal authority of particular disciplines, crossing discipline boundaries as necessary and deconstructing all areas of knowledge as gendered. Women's studies/feminism could therefore be described as cyborg practice, before Haraway named it.

One of the main problems of technoscience for feminism has been to address yet another boundary: that of objectivity versus constructionism in theories of knowledge. Again, argues Lykke, this is a boundary/dichotomy that we must transcend, along with that between the artifactual and the natural, embodied as a choice between cyborg or goddess. Most feminists, she argues, have been happy to choose Haraway's cyborg over a backward-looking "goddess". However, for Lykke the metaphor of "goddess" is also about transcending the boundary between artefact and natural, and between physical and non-physical, a false boundary recognized by Haraway in her machines "made of sunshine" in the 1985 reading (1.3), and also in her own example of Gaia: "itself a cyborg, a complex auto-poietic system that terminally blurred the boundaries among the geological, the organic, and the technological – was the natural habitat, and the launching pad, of other cyborgs" (Haraway, 1995).

Gaia is here claimed by cyberfeminists as well as ecofeminists as an embodiment of the cyborg/goddess.

So, as Haraway's cyborg encourages us to engage in discourses across disciplines and philosophical and political traditions, its strengths and weaknesses as a tool for

reconceiving gender and empowering women become clearer, while its usefulness cannot be denied. In the following parts of this book it is taken into the arenas of science fiction film, reproductive technology, and information and communication technology. But the question is raised: What does it do there for "Women"?

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PART ONE

Representing gender in technoscience

Chapter 1.1

Londa Schiebinger

TAXONOMY FOR HUMAN BEINGS

> A certain Chinese encyclopedia divides animals into: (a) belonging to the Emperor, (b) embalmed, (c) tame, (d) sucking pigs, (e) sirens, (f) fabulous, (g) stray dogs, (h) included in the present classification, (i) frenzied, (j) innumerable, (k) drawn with a very fine camel's-hair brush, (l) *et cetera*, (m) having just broken the water pitcher, (n) that from a long way off look like flies.
>
> (Jorge Luis Borges, *Other Inquisitions*, 1952)

IN 1758, IN THE TENTH EDITION of his *Systema naturae*, Carolus Linnaeus introduced the term *Mammalia* into zoological taxonomy.[1] Linnaeus devised this term – meaning literally "of the breast" – to distinguish the class of animals embracing humans, apes, ungulates, sloths, sea cows, elephants, bats, and all other organisms with hair, three ear bones, and a four-chambered heart. In so doing, he idolized the female mammae as the icon of that class.

When examining the evolution of Linnaean nomenclature, historians of science have tended to confine their study to developments within the scientific community. They trace the history of classification from Aristotle through the leading naturalists of the sixteenth and seventeenth centuries, the Swiss Conrad Gesner and the English John Ray, culminating ultimately with the triumph of Linnaean systematics. Linnaeus's nomenclature is taken more or less for granted as part of his foundational work in zoology. No one has grappled with the social origins or consequences of the term *Mammalia*. Certainly, no one has questioned the gender politics informing Linnaeus's choice of this term.

It is also possible, however, to see the Linnaean coinage as a political act. The presence of milk-producing mammae is, after all, but one characteristic of mammals, as was commonly known to eighteenth-century European naturalists. Furthermore, the mammae are "functional" in only half of this group of animals (the females) and,

among those, for a relatively short period of time (during lactation) or not at all. As we shall see, Linnaeus could indeed have chosen a more gender-neutral term, such as *Aurecaviga* (the hollow-eared ones) or *Pilosa* (the hairy ones).

[. . .]

To appreciate more fully the meaning of Linnaeus's term requires a foray into the cultural history of the breast. Even though Linnaeus's term may have been new to zoology, the female breast evoked deep, wide-ranging, and often contradictory currents of meaning in Western cultures. But, as we shall see, there were also more immediate and pressing political trends that prompted Linnaeus to focus scientific attention on the mammae. Linnaeus venerated the maternal breast at a time when doctors and politicians had begun to extol the virtues of mother's milk (Linnaeus was a practicing physician and the father of seven children). Eighteenth-century middle- and upper-class women were being encouraged to give up their wet nurses; a Prussian law of 1794 went so far as to require that healthy women nurse their own babies. Linnaeus was involved in the struggle against wet-nursing, a struggle that emerged alongside and in step with political realignments undermining women's public power and attaching a new value to women's domestic roles. Understood in broadest terms, the scientific fascination with the female breast helped to buttress the sexual division of labor in European society by emphasizing how natural it was for females – both human and nonhuman – to suckle and rear their own children.

Mammalia – the genealogy of a term

It has been said that God created nature and Linnaeus gave it order; Albrecht von Haller rather mockingly called him "the second Adam."[2] [. . .] His *Systema naturae* treated the three classical kingdoms of nature – animal, vegetable, and mineral – growing from a folio of only twelve pages in 1735 to a three-volume work of 2,400 pages in the twelfth and last edition revised by Linnaeus himself in 1766. In the epoch-making tenth edition, Linnaeus gave binomial names (generic and specific) to all the animals known to him, nearly 4,400 species.

Linnaeus divided animals into six classes: *Mammalia, Aves, Amphibia, Pisces, Insecta*, and *Vermes*.[3] Although Linnaeus had based important aspects of plant taxonomy on sexual dimorphism, the term *Mammalia* was the only one of his major zoological divisions to focus on reproductive organs and the only term to highlight a character associated primarily with the female. The names of his other classes came, in many cases, from Aristotle: *Aves* simply means bird; *Amphibia* emphasizes habitat; *Insecta* refers to the segmentation of the body; *Vermes* derives from the red-brown color of the common earthworm. Scientific nomenclature was a conservative enterprise in the eighteenth century; suitable terms tended to be conserved and new terms derived by modifying traditional ones. Linnaeus, however, broke with tradition by creating the term *Mammalia*.

[. . .]

Linnaeus, in the first edition of his *Systema naturae* (1735), continued to use the traditional term, *Quadrupedia*. He did, however, raise eyebrows and ire by including

humans (rather uncomfortably) among quadrupeds. Indeed, it was the question of how to place humans in nature – which Thomas Huxley later called "the question of all questions" – more than anything else that led Linnaeus to abandon *Quadrupedia* and search for something more appropriate.[4] Linnaeus was not, of course, the first in modern times to recognize that humans are animals. In 1555 Pierre Belon had pointed to the similarities in the skeletons of a human and a bird, and in 1699 Edward Tyson had dissected a chimpanzee – his *Homo sylvestris* – revealing the "great affinity" between animal and human anatomy.[5]

[. . .]

Linnaeus's ranking of humans among quadrupeds outraged naturalists. They found repugnant his characterization of rational man as a hairy animal with four feet and four incisors. Georges-Louis Leclerc, comte de Buffon, born the same year as Linnaeus and his principal rival, made the obvious point that many of the creatures included among Linnaeus's *Quadrupedia* were not quadrupeds at all: humans have two hands and two feet; bats have two feet and no hands; apes have four hands and no feet; and manatees have only two "hands."[6] Louis Daubenton, Buffon's assistant at the Jardin du Roi, denounced Linnaeus's entire system as "false" and "inaccurate."[7] Finally, many naturalists rejected as heretical the notion that humans were essentially animals. Holy Scripture, after all, clearly taught that man was created in God's image. It should be recalled that while Aristotle had included humans among viviparous quadrupeds, in the course of the Middle Ages scholastics removed humans from nature, emphasizing instead their proximity to angels.

Natural historians before Linnaeus had struggled long and hard with these problems of classification. John Ray, often credited with developing binomial nomenclature (though he did not employ it systematically), had used the term *Vivipara* to unite whales and other aquatic mammals with terrestrial quadrupeds. Within his subcategory *Terrestria*, he suggested the term *Pilosa* (hairy animals) as more comprehensive than *Quadrupedia* and thus more suitable for joining amphibious manatees with land-dwelling quadrupeds.[8] Peter Artedi, Linnaeus's close friend and colleague, had also called attention to hair in his proposed *Trichozoologia*, or "science of the hirsute animal."[9] Linnaeus might well have chosen the more traditional adjective *Pilosa* for his new class of quadrupeds; in Linnaeus's system hair had the same diagnostic value as mammae. All mammals (including whales) have hair, and it is still today considered a distinguishing characteristic of mammals.

But Linnaeus did not draw on tradition; he devised instead a new term, *Mammalia*. In its defense, Linnaeus remarked that even if his critics did not believe that humans originally walked on all fours, surely every man born of woman must admit that he was nourished by his mother's milk.[10] Linnaeus thus called attention to the fact, commonly known since Aristotle, that hairy, viviparous females lactate. [. . .] In 1758, Linnaeus finally announced the term *Mammalia* with the words: "Mammalia, these and no other animals have mammae [mammata]." He seemed quite unconcerned that mammae were not a universal character of the class he intended to distinguish. "All females," he wrote on the following page, "have lactiferous mammae of determinate number, as do males (except for the horse)."

Mammalia resonated with the older term *animalia*, derived from *anima*, meaning the breath of life or vital spirit.[11] The new term also conformed to Linnaeus's own

rules for zoological terms: it was pleasing to the ear, easy to say and to remember, and not more than twelve letters long.[12] For the rest of his life Linnaeus fiddled with his system, moving animals from order to order, creating new categories and combinations to better capture nature's order. Yet he never rechristened mammals.

The term *Mammalia* gained almost immediate acceptance.

[. . .]

Mammalia was adopted by the English as "mammals," though "mammifers" was also occasionally used, and, as one commentator has suggested, the science treating mammals was rather awkwardly rendered as *mammalogy*, meaning literally "a study of breasts" (and not of breast-bearing animals, which would be more properly *mammology* or *mammalology*).[13] The French devised *mammifères*, or the breast-bearers (not *mammaux*, nicely analogous to *animaux*). The Germans refocused matters slightly, creating *Säugetiere*, or "suckling animals," which appropriately drew attention away from the breast and highlighted the act of suckling (though no distinction was made between a mother giving suck and a newborn taking milk). Linnaeus's term *Mammalia* was retained even after the Darwinian revolution and is today recognized by the International Code of Zoological Nomenclature.

[. . .]

How significant are the mammae?

Were there good reasons for Linnaeus to name mammals *mammals*? This question implies a logic uncharacteristic of the naming process. Names of taxa collect over time, and unless there is a technical problem – as was the case with the term *Quadrupedia* – they pass unchanged from generation to generation. Naturalists also name plants and animals for other than empirical reasons. Pleasing plants or animals are often named after a wife or colleague, while a particularly odious species might be given the name of a professional rival (for instance, *Siegesbeckia*, a small and unpleasant flowering weed that Linnaeus named after Johann Siegesbeck, a critic of his sexual system).[14]

Zoological nomenclature – like all language – is, then, to some degree arbitrary; naturalists devise convenient terms to identify groups of animals. But nomenclature is also historical, growing out of specific contexts, conflicts, and circumstances. The historian can fairly ask why a certain term was coined. In creating the term *Mammalia*, Linnaeus intended to highlight an essential trait of that class of animals. Etienne Geoffroy Saint-Hilaire and Georges Cuvier, in their article "Mammalogie" for the *Magazin encyclopédique* of 1795, summed up the practice of eighteenth-century taxonomists, stating that primary organs determine classes, while secondary organs determine orders. In 1827, Cuvier continued to argue that the mammae distinguished the class bearing their name better than any other external character.[15]

Is Cuvier's statement, in fact, true? Does the longevity of Linnaeus's term reflect the fact that he was simply right, that the mammae do represent a primary, universal, and unique characteristic of mammals (as would have been the parlance of the eighteenth century)? Yes and no. Paleontologists today identify the mammary gland as one of at least six uniquely mammalian characters. Linnaeus himself, though, was

perhaps overly exuberant in singling out the breast or teat itself – a sexually charged part of the female body – rather than its function. Indeed one could argue that the term *Lactantia* (the lactating ones, derived from Linnaeus's own description of female mammae) would have better captured the significance of the mammae; certainly Linnaeus was wrong to think that the number and position of the teats themselves were significant. But *Lactantia* still refers exclusively to females. *Lactentia* or *Sugentia* (both meaning "the sucking ones") would have better universalized the term, since male as well as female young suckle at their mothers breasts.

The fact remains that the mammae was only one among several traits that could have been highlighted. Even by eighteenth-century criteria, there was not one characteristic alone that could determine class assignment. As Buffon recognized, species – defined for sexually reproducing organisms as members of a group of individuals that can mate and produce fertile offspring – is the only taxon that exists in nature.[16] Even today, this does not mean that higher units (genera, families, orders, classes, and on up) are arbitrary; these must be consistent with evolutionary genealogy.[17] Yet, as we have seen, Linnaeus could have chosen from a number of equally valid terms, such as *Pilosa*, *Aurecaviga*, *Lactentia*, or *Sugentia*. Because Linnaeus had choices, I will argue that his focus on the breast responded to broader cultural and political trends.

Breasts and mother's milk: problematic icons

Long before Linnaeus, the female breast had been a powerful icon within Western cultures, representing both the sublime and bestial in human nature. The grotesque, withered breasts on witches and devils represented temptations of wanton lust, sins of the flesh, and humanity fallen from paradise. The firm spherical breasts of Aphrodite, the Greek ideal, represented an otherworldly beauty and virginity. In the French Revolution, the bared female breast – embodied in the strident Marianne – became a resilient symbol of freedom.[18] From the multibreasted Diana of Ephesus to the fecundbosomed Nature, the breast symbolized generation, regeneration, and renewal.

Linnaeus created his term *Mammalia* in response to the question of humans' place in nature. In his quest to find an appropriate term for (what we would call) a taxon uniting humans and beasts, Linnaeus made the breast – and specifically the full developed female breast – the icon of the highest class of animals. It might be argued that by privileging a uniquely female characteristic in this way, Linnaeus broke with long-established traditions that saw the male as the measure of all things. In the Aristotelian tradition, the female had been seen as a misbegotten male, a monster or error of nature. By honoring the mammae as sign and symbol of the highest class of animals, Linnaeus assigned a new value to the female, especially women's unique role in reproduction.

It is important to note, however, that in the same volume in which Linnaeus introduced the term *Mammalia*, he also introduced the name *Homo sapiens*. This term, man of wisdom, was used to *distinguish* humans from other primates (ape, lemurs, and bats, for example). In the language of taxonomy, *sapiens* is what is known as a "trivial" name. From a historical point of view, however, the choice of the term *sapiens* is highly significant. "Man" had traditionally been distinguished from animals by his

reason; the medieval apposition, *animal rationale*, proclaimed his uniqueness.[19] Thus, within Linnaean terminology, a female characteristic (the lactating mamma) ties humans to brutes, while a traditionally male characteristic (reason) marks our separateness.

The notion that woman – lacking male perfections of mind and body – resides nearer the beast than does man is an ancient one. Among all the organs of a woman's body, her reproductive organs were considered most animallike. For Plato, the uterus was an animal with its own sense of smell, wandering within the female body and leaving disease and destruction in its path.[20] The Greek physician Galen and even the great anatomist Andreas Vesalius (for a time) reported that the uterus had horns. Milk production of the female breast had already been seen as linking humans and animals.

[. . .]

Myths and legends also portrayed suckling as a point of intimate connection between humans and beasts, suggesting the interchangeability of human and animal breasts in this respect. A nanny goat, Amaltheia, was said to have nursed the young Zeus. A she-wolf served as the legendary nurse to Romulus and Remus, the founders of Rome. From the Middle Ages to the seventeenth and eighteenth centuries, bears and wolves were reported to have suckled abandoned children [. . .]

In rarer instances, humans were reported even to have suckled animals. [. . .] In the eighteenth century, William Godwin recorded that as Mary Wollstonecraft lay dying after childbirth, the doctor forbade the child the breast and "procured puppies to draw off the milk."[21] The practice of animals suckling at human breasts was also reported outside Europe. Voyagers related that native South Americans kept their breasts active by letting animals of all kinds feed from them.[22] In Siam women were said to have suckled apes.

Linnaeus thus followed well-established Western conceptions when he suggested that women belong to nature in ways that men do not. As Carolyn Merchant has shown, nature itself has long been conceived as female in most Western intellectual traditions.[23] For the seventeenth-century alchemist Michael Maier, the earth was literally a nourishing mother (Figure 1.1A). The identity of woman with the fecund and nurturing qualities of nature was highlighted in the influential eighteenth-century artists and engravers Hubert-François Gravelot and Charles Cochin's personification of Nature as a virgin, her breasts dripping with milk (Figure 1.1B).

It is significant that Linnaeus used the mammiferous Diana of the Ephesians, an ancient symbol of fertility, as the frontispiece to his *Fauna Svecica*, where he first defended his inclusion of humans among quadrupeds (Figure 1.1C).[24] Linnaeus's Diana, half captive in the fecund earth, emerges to display her womb, the center of life, and her nourishing breasts.[25] In this classic image, her curiously immobilized trunk is covered with symbols of both fertility (bees, acorns, bulls, crabs) and chastity (stags, lions, roses). Her pendulous breasts, heavy with milk, represent the life force of nature – mother and nurse of all living things. In ancient statues, Diana's breasts were often carved from a white stone while her head, neck, hands, and feet were made of darker stone.

For Linnaeus to suggest, then, that humans shared with animals the capacity to suckle their young was nothing new. This uniquely female feature had long been considered less than human. But it had also been considered more than human. In the

Figure 1.1A "His nurse is the earth" from Michael Maier, *Atalanta fugiens*, Oppenheim (1618)
(By permission of the Staatsbibliothek zu Berlin – Preufsischer Kulturbesitz)

Christian world, milk had been seen as providing sustenance – for both body and spirit. Throughout the Middle Ages, the faithful cherished vials of the Virgin's milk as a healing balm, a symbol of mercy, an eternal mystery. As Marina Warner has pointed out, the Virgin Mary endured none of the bodily pleasures and pains associated with childbearing (menstruation, sexual intercourse, pregnancy, or labor) except for suckling. The tender Madonna suckled the infant Jesus both as his historical mother and as the metaphysical image of the nourishing Mother Church.[26] During the twelfth century, maternal imagery – especially suckling and nurturing – extended also to church fathers. Abbots and prelates were encouraged to "mother" the souls in their charge, to expose their breasts and let their bosoms expand with the milk of consolation.[27] Even the full breasts of God the Father were said to be milked by the Holy Spirit into the cup of the Son of God.[28]

In subcurrents of religious traditions, mother's milk was thought to impart knowledge. Philosophia-Sapientia, the traditional personification of wisdom, suckled philosophers at her breasts moist with the milk of knowledge and moral virtue (Figure 1.1D). Augustine of Hippo, too, imagined himself drinking from the breasts of Sapientia.[29]

[. . .]

Figure 1.1B "The mother of all being" from Charles Cochin and Hubert-François Gravelot, *Iconologie par figures, or Traite complet des allegories, emblèmes*, &c., (Geneva, 1791, Minkoff Preprint, 1972, s.v. "Nature")
(Courtesy of the Pennsylvania State University Libraries)

Figure 1.1C "Frontispiece to Linnaeus's *Fauna Svecica*" (1746)
(By permission of the Staatsbibliothek zu Berlin – Preufsischer Kulturbesitz)

Figure 1.1D "Sapientia" from a fifteenth-century German manuscript
(Reproduced in Liselotte Moller, "Nahrmutter Weisheit", *Deutsche Vierteljahrsschrift* 24 (1950), fig. 2, facing p. 351)

In a certain sense, Linnaeus's focus on the milk-bearing breast was at odds with trends that found beauty (though not necessarily salvation) above all in the virginal breast. In both Greek and Christian traditions, the ideal breast was an unused one, small, firm, and spherical; the process of milk swelling the breast was thought to deform it. Mythical female figures – the goddesses Artemis and Aphrodite, the martial Amazons (who supposedly burned away one breast so that their bows would lie flat against their chests), and the nursing mother of Christ – were all virgins.[30] Of all the female Virtues, only Charity possessed a nonvirginal body: infants drank maternal bounty, love, and humility from her breasts.[31]

[. . .]

Ideals of the breast, however, changed over time. After roughly the 1750s, the maternal breast vied for a while with the virginal for cultural preeminence. Barbara Gelphi has traced the stunning way in which the maternal breast was eroticized in late eighteenth-century medical literature. Male physicians, including Erasmus Darwin, described in rapturous prose the sensuous pleasures experienced by nursing infants. (Darwin went so far as to attribute to the curvaceous breast filled with milk the origins of the human idea of beauty – an idea impressed on the senses of the infant.) Medical eroticization of the maternal breast paralleled changing fashions in women's clothing, which by the end of the century were designed to expose the full shape of the breast and nipple. Gelphi argues that this new fashion was as much cultivated by women as imposed upon them. While, for legislators, the breast came to guarantee women's disenfranchisement (see below), women, adopting Rousseau's vocabulary of the new domesticity, flaunted their breasts to celebrate their newfound power to nurture the future sons of the state (a power, Gelphi emphasizes, that was restricted to the confines of the home).[32]

Colonial relations also affected perceptions of the breast. Late nineteenth-century anthropologists classified breasts by beauty in the same way that they measured skulls for intelligence (Figure 1.1E). The ideal breast – for all races – was once again young and virginal. Europeans preferred the compact "hemispherical" type, found, it was said, only among whites and Asians. The much-maligned breasts of African (especially Hottentot) women were dismissed as flabby and pendulous, similar to the udders of goats. [. . .]

Thus Linnaeus's fixation on the female mammae, though new to the zoological tradition, emerged from deep cultural roots. [. . .]

Gender politics in taxonomy

Europeans' fascination with the female breast provided a receptive climate for Linnaeus's innovation. But more immediate political concerns compelled him to focus scientific attention on the mammae. His scientific vision arose alongside and in step with important political trends in the eighteenth century – the restructuring of both child care and women's lives as mothers, wives, and citizens. Despite the Enlightenment credo that all "men" were by nature equal, middle-class women were not to become fully enfranchised citizens or professionals in the state, but newly empowered mothers within the home.

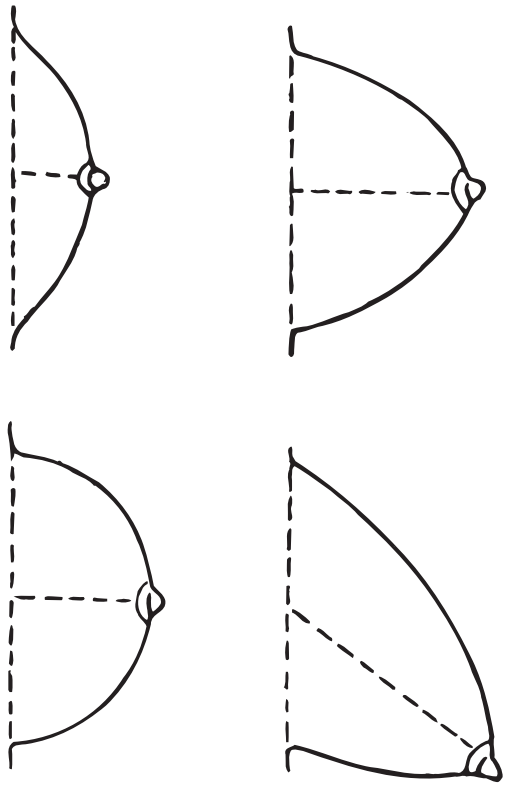

Figure 1.1E "Breast shapes among humans"
(From Hermann Ploss, Max Bartels and Paul Bartels, *Woman: An Historical Gynecological and Anthropological Compendium*, edited by Eric Dingwell, St Louis: C. V. Mosby Company, 1936, vol. 1, p. 399)

Most directly, Linnaeus joined the ongoing campaign to abolish the ancient custom of wet-nursing.[33] The eighteenth century was the heyday of wet-nursing. More Europeans than ever before – including not just aristocrats and wealthy merchants but farmers, clergy, and artisans – sent their children to the countryside to be nursed. By the 1780s, Paris and Lyon were sending up to 90 percent of their children to wet nurses.[34] Although wet-nursing had provided a solution to the problem of child-rearing for middle- and upper-class mothers and fathers, it also resulted in high infant mortality.[35] [. . .]

The preservation of family and maternal duties became important matters of state.[36] For state ministers, the simplest way to increase birth rates was to reduce infant mortality by improving the training of obstetricians, midwives, and, most important, mothers. A central element in this campaign was a series of health and conduct manuals written for women by medical doctors.

In this context, Linnaeus – himself a practicing physician – prepared a dissertation against the evils of wet-nursing in 1752, just a few years before coining the term *Mammalia* and while watching his own children suckle (his wife bore seven children between 1741 and 1757). Linnaeus's work entitled "Step Nurse" (translated into French as "La nourrice marâtre, ou Dissertation sur les suites funestes du nourrissage mercénaire") sounded the themes of the Enlightenment attack on wet-nursing.[37] First and foremost, wet-nursing violated the laws of nature. Nature – herself "a tender and provident mother" – had set the course for female reproduction; digression from her laws endangered both mother and child. [. . .]

In this 1752 pamphlet, Linnaeus also foreshadowed his subsequent nomenclature by contrasting the barbarity of women who deprived their children of mother's milk with the gentle care of great beasts – the whale, the fearsome lioness, and fierce tigress – who willingly offer their young the breast.[38] The idea that women should follow the example of beasts was a common feature of anti-wet-nursing literature flooding Europe.

[. . .]

At the same time many of the attacks on wet-nursing also reiterated age-old myths and superstitions. Linnaeus, for example, cautioned that the character of the upper-class child could easily be corrupted by the milk of lower-class nurses. Using examples drawn from Erasmus, he blamed the bitter, wicked milk of nurses for Nero's addiction to alcohol and for Caligula's tyranny.[39]

While authors of these pamphlets showed genuine concern for the well-being of mothers and children of their own classes, they seldom considered the evils of baby farming for the "lower classes of mankind" (as one influential voice in the anti-wet-nursing movement called them).[40] Children of wet nurses were often neglected or even "disposed of" (for a small fee, no questions asked).[41]

[. . .]

For the enlightened savant, the laws of nature dictated more than the rules for reproductive regimes: they also dictated social order. Medical authority, the legal system, and popular literature worked together to create new interest in maternal breast-feeding. As prescribed in Jean-Jacques Rousseau's influential *Emile*, breast-feeding became fashionable among French upper-class women for a short period in the late eighteenth century.[42] In France and Germany, leading medical doctors advocated laws that would force healthy women to nurse their own infants. The French National Convention decreed in 1793 that only mothers who nursed their own children would be eligible for state aid (women in poor health were exempted).[43] Similar laws were put into effect in Prussia in 1794, just a few years after Frederick the Great installed a modern version of Diana of the Ephesians in his Potsdam garden.[44]

Authors of anti-wet-nursing literature – including Linnaeus, Cadogan, Rousseau, and Anel le Robours – were highly moralistic about returning women to their rightful place as loving and caring mothers. This, despite the fact that Rousseau placed his own five children in foundling homes, not even bothering to record their sex or dates of birth.[45] Women's attempts to contravene the laws of nature were seen as a matter of vanity. [. . .]

Returning to nature and its laws was seen as the surest way to end corruption and regenerate the state, morally as well as economically. [. . .] For the enlightened of Europe, the breast symbolized the synthesis of nature and society, the bond between the private and public worlds.[46]

It is remarkable that in the heady days of the French Revolution, when revolutionaries marched behind the martial and bare-breasted Liberty,[47] the maternal breast became nature's sign that women belonged only in the home. Delegates to the French National Convention used the breast as a natural sign that women should be barred from citizenship and the wielding of public power. In this case, "the breasted

ones" were to be confined to the home. In denying women political power, Pierre-Gaspard Chaumette, *procurer* of the Paris Commune, asked indignantly:

> Since when is it permitted to abandon one's sex? Since when is it decent for women to forsake the pious cares of their households and the cribs of their children, coming instead to public places, to hear speeches in the galleries and senate? Is it to men that nature confided domestic cares? Has she given us breasts to feed our children?[48]

[. . .]

The year 1793 marked the fateful repression of women's demands for active citizenship and also, as Lynn Hunt has shown, a turning point in republican images of women. When publicly represented women were no longer cast as the strident Marianne, the symbol of Liberty, but increasingly in motherly roles. Festivals featured parades of pregnant women; women in ceremonies, such as the Festival of the Supreme Being of 1794, were all wives and mothers, many pressing nurslings to their breasts.[49]

[. . .]

Linnaeus's term *Mammalia* helped legitimize the restructuring of European society by emphasizing how natural it was for females – both human and nonhuman – to suckle and rear their own children. Linnaean systematics had sought to render nature universally comprehensible, yet the categories he devised infused nature with middle-class European notions of gender. Linnaeus saw females of all species as tender mothers, a vision he (wittingly or unwittingly) projected onto Europeans understandings of nature.

[. . .]

Race, sex, and the great chain of being

One of the most powerful doctrines governing theories of race in the eighteenth century was the great chain of being. This doctrine postulated that species were immutable entities arrayed along a fixed and vertical hierarchy stretching from God above down to the lowliest sentient being. The historian Winthrop Jordan has shown that the notion of a chain of being became the darling of eighteenth-century conservatives in their attempts to stem the leveling tide of democracy and abolitionism.[50] The conservative British naturalist William Smellie, for example, taught that social hierarchies issued from natural hierarchies. "Independently of all political institutions," Smellie wrote in his 1790 *Philosophy of Natural History*, "Nature herself has formed the human species into castes and ranks."

Europe's anatomists dissected and analyzed the skeletons of animals and humans from every corner of the world in their attempts to substantiate the notion that nature shades continuously from one form to another. Of special interest were the transitional forms bridging the gap between animals and humans. Although different animals vied for a time as the "missing link" (elephants, for their intelligence, and parrots, for their ability to talk), by the eighteenth century naturalists had settled on the ape, and especially the orangutan (still commonly used as a generic name for both

chimpanzees and orangutans), as the animal most resembling humankind. What, though, was the "lowest" sort of human? Voyagers, coming into contact with Africans in the course of colonial expansion and the slave trade, had already suggested that the people of this continent resembled the apes who inhabited this same region. (Some went so far as to suggest that the black race originated from whites copulating with apes.)[51] Within this context arose a project central to eighteenth-century anatomy: investigation into the exact relationship among apes, Africans, and Europeans.

Much has been written about the racist implications of the chain of being.[52] What has not been investigated, however, is the place of females in that hierarchy. The notion of a single chain of being stretching throughout nature (and society) created a problem of where to fit women. Scientific racism and scientific sexism both taught that proper social relations between the races and the sexes existed in nature. Many theorists failed to see, however, that their notions of racial and sexual relations rested on contradictory visions of nature. Scientific racism depended on a chain of being or hierarchy of species in nature that was inherently unilinear and absolute. Scientific sexism, by contrast, depended on radical biological divergence. The theory of sexual complementarity attempted to extract males and females from competition with or hierarchy over each other by defining them as opposites, each perfect though radically different and for that reason suited to separate social spheres.[53] Thus the notion of a single chain of being worked at odds with the revolutionary view of sexual difference which postulated a radical incommensurability between the sexes (of European descent).

[. . .]

The Hottentot Venus

The fact that the male body dominated studies of race and the European body dominated studies of sex does not mean that women of color escaped the prurient eye of European anatomists. What is significant, however, is that neither the dominant theory of race nor of sex in this period applied to women of non-European descent, particularly black women. Like other females, they did not fit comfortably in the great chain of being. Like other Africans, they did not fit European gender ideals. As a recent book on contemporary black women's studies put it, all the blacks were men and all the women were white.[54]

[. . .] Certainly African males did not share the traits of heroic manhood presumed inherent in (European) males. African males were thought to be childish, primitive, and sensuous – the obverse of their colonizers. Neither did the gender ideals prescribed for European women extend to African women. Whereas in Europe, middle-class women increasingly became emblems of chaste modesty, black women, by contrast, were thought to embody sexual promiscuity.[55] This European fantasy of the sexual and fecund African woman was reinforced by colonial relations, where European male planters commonly took black and mulatto women as concubines or sold them as prostitutes.

It was therefore doubly determined that the study of black women, as Africans and as women, would focus on their sexuality. Europeans had long been obsessed with the sexuality of Africans – both male and female. [. . .]

African women shared with European women and female apes the incommodious condition of being female in a male world, and thus the scientific gaze fell upon their private parts – breasts and genitalia. As we have seen, the fresh virginal breast was greatly cherished in European culture.[. . .] The breasts of African women took on truly mythic proportions in the male European mind. Some voyagers reported that they hung like "great sacks to the waist," others that they dragged the ground. "Observers" in the colonies reported that some slave women would lay their long breasts upon the ground before lying down beside them to rest. Others imagined that when slave women stooped to work the fields, their breasts made them appear to have "six legs". The most outrageous story passing among European naturalists in the late eighteenth century was that the breasts of Hottentot women were so large that tobacco pouches were made from them and sold in great quantity on the Cape of Good Hope.[56]

[. . .]

In the nineteenth century, the pendulous breast, identified with primitives abroad, was discussed increasingly in terms of class, becoming a staple characterization of the laboring poor at home. Princeton University president Samuel Stanhope Smith traced the origin of what he considered unsightly breasts to the poverty, hardship, and exhausting toil of the lowest classes. Flaccidity increased with age, he noted, because the poor nursed their many children for prolonged periods of time.

Though naturalists had a good deal to say about breasts when considering racial characteristics among females, nothing excited these men more than the elongation of the labia minora, or inner vaginal lips, among the Hottentot. This "Hottentot apron" became the subject of countless books and articles, and much prurient popular and scientific speculation. Linnaeus was so taken with this supposed aspect of Hottentot anatomy that he (quite mistakenly) made it a characteristic of the entire "African" race. [. . .]

Originally called simply a "flap of skin," this supposed aspect of Hottentot genitalia, known for a time by the Latin *sinus pudoris* (translated variously as "loincloth," "veil of shame," or "drape of decency"), was finally domesticated as an "apron" (*tablier* in French; *Schürze* in German). Naturalists hailed the "apron" as a primitive vestige of Hottentots' animal origin. Linnaeus reported finding it also in the female *Homo troglodytes*, his second and lowest species of human. Indeed Linnaeus searched for a similar genital (de)formation in apes, but found none.[57]

From its first sightings in the seventeenth century, the so-called Hottentot apron was pronounced a deformity – a departure from the European norm. John Ovington wrote in his *Voyage to Suratt in the Year 1689* that women sporting these pieces of skin must be hermaphrodites.[58] Voltaire, in the eighteenth century, found the apron so unusual that he argued that these women must belong to a separate species of humans.[59] [. . .]

European naturalists argued amongst themselves about whether the so-called apron actually existed, much as they argued about the existence of the hymen. Few had actually seen African genitalia; much of the information filtering into European universities and academies was second- or third-hand – if not totally fabricated. Blumenbach placed "aproned" women in the same category with beardless Americans,

tailed people, centaurs, and sirens – all of which he regarded as figments of travelers' rich imaginations.[60] [. . .]

[. . .] They also wanted to know if these aprons were natural or, once again, the product of female artifice. Many naturalists, including Le Vaillant, suggested that women created these flaps of skin by pulling, pinching, twisting, and wrapping normal labia around little sticks and twigs (for the same inexplicable reasons that Hottentot men cut off their left testicles).[61] [. . .]

Le Vaillant's testimony, however, carried some weight because he produced an illustration of this appendage said to be drawn from life (Figure 1.1F). [. . .]

Elizabeth Helme, one of several English translators of Le Vaillant's work, was of a different mind about the matter. She deleted the eight-page discussion and the illustration of the nude Hottentot woman, explaining in the preface: "I have softened (if I may be allowed the expression) a few passages that possibly might be accounted mere effusions of fancy and vivacity in a French author, but which would ill accord with the delicacy of a female translator, or indeed with the temper and genius of English readers."[62] John Barrow, her compatriot, also criticized Le Vaillant's illustration as more a product of his imagination than a true image of nature.[63]

[. . .] By the early nineteenth century European interest in this aspect of Hottentot genitalia had grown into a grotesque voyeurism to which naturalists were not immune.[64] In 1815, Georges Cuvier, France's premier comparative anatomist, performed his now infamous dissection of the South African woman known as the "Hottentot Venus" to solve once and for all the mysteries of the renowned apron. "There is," he wrote in his report, "nothing more celebrated in natural history."[65] The very name given this woman – Cuvier always referred to her as *Vénus Hottentotte* – emphasized her sexuality. [. . .]

The story of this woman, whose given Dutch name was Saartjie Baartman (her original name has gone unrecorded), has been recounted many times, most recently by Percival Kirby, Stephen Jay Gould, Sander Gilman, and Anne Fausto-Sterling.[66] Baartman was in her twenties when she was transported from the British colony on the Cape of Good Hope to London in 1810 by a ship's surgeon, Alexander Dunlop, who supplemented his income by exporting museum specimens from South Africa. He apparently told her she could make a "grand fortune" by exhibiting herself to the curious in the capital cities of Europe. Upon her arrival in England she became one of the most successful shows of London, displayed (not unlike Madame Chimpanzee) "on a stage two feet high, along which she was led by her keeper, and exhibited like a wild beast; being obliged to walk, stand, or sit as he ordered her."[67] Spectators could catch a glimpse of her "brutal figure" for a mere two shillings. At this time attention focused not on her apron (she was clothed in a costume resembling her skin as nearly as possible) but on her protruding buttocks which, for an extra charge, viewers could poke and prod.

[. . .]

It was in Paris that Sarah Bartmann became the object of intense scientific investigation. In the spring of 1815 she was summoned to the Jardin du Roi by a commission of zoologists and physiologists, where she was examined for three days. Henri de Blainville, professor at the Muséum d'Histoire Naturelle in the Jardin du Roi, set out his purposes in observing her: (1) to provide a detailed comparison of

Figure 1.1F "A Hottentot woman with an 'apron' " from François Le Vaillant, *Voyage de François Le Vaillant dans l'intérieur de l'Afrique* (Paris, 1798), vol. 2, facing p. 349.
(Courtesy of the Pennsylvania State University Libraries)

this woman with the lowliest race of humans (the Negro) and the highest type of apes (the orangutan); (2) to provide the most complete possible description of the anomalies of her genitalia.[68]

This investigation required that Bartmann strip naked in the austere rooms of the museum in front of at least three formally dressed men. [. . .] According to de Blainville, the men (apart from de Blainville, Cuvier, and Geoffroy Saint-Hilaire, there is no record of who else was present) had great difficulty convincing Sarah (de Blainville adopted this familiar address) to let herself be seen nude. [. . .]

Bartmann's victory was short-lived. Upon her death from "inflammation" some nine months later at the age of about twenty-six, her body was brought to the museum for further examination. Dissection of her apron – "that extraordinary appendage which nature made a special attribute of her race" – was the first order of business. Cuvier relished this opportunity to resolve the mysteries of her apron, which during her lifetime had been "carefully hidden either between her thighs or more deeply. [. . .]

Cuvier's now notorious memoir described the Hottentot Venus in remarkably unflattering terms. At every turn he found her physique and manner bestial. [. . .] Though by his own report she was gay, had a good memory, and spoke three languages, Cuvier also remarked that while her hands were charming and feet pretty, her ears were small like those of apes. Significantly, her pelvis – the eighteenth-century measure of womanliness – resembled the female ape's. So, too, did her heart.

Like the many apes whose skeletons and skin were sold or donated to natural history museums, Bartmann's body was disassembled and, until quite recently, parts of it – her genitalia preserved in formalin in a bell jar, her skeleton, and a cast of her body – were on display in case number thirty-three in the Musée de l'Homme in Paris (they are now in the museum's storerooms). Her skin was apparently sent back to England, stuffed, and put on display.[69] In 1949, a stereoscopic photograph of her body cast was still available for purchase as a souvenir.

Cuvier's memoir of Sarah Bartmann reveals race and gender dynamics in science at the turn of the nineteenth century. His interest in the body of this South African woman focused on her sexuality; nine of his sixteen pages are devoted to Bartmann's genitalia, breasts, buttocks, and pelvis. Only one short paragraph evaluated her brain. On both accounts – of her sex and her race – Bartmann was relegated to the world of brute flesh.

Notes

1 The tenth edition of Linnaeus's *Systema naturae* and Carl Clerck's *Aranei Svecici* together form the starting point of modern zoological nomenclature. See *International Code of Zoological Nomenclature*, ed. W.D. Ride (London: British Museum, 1985), I.3. The term *Mammalia* first appeared in a student dissertation, *Natura pelagi*, in 1757 but was not published until 1760 (*Amoenitates academicae* [Erlangen, 1788], vol. 5, pp. 68–77).

2 Gunnar Broberg (ed.) (1980) *Linnaeus: Progress and Prospects in Linnaean Research* Stockholm: Almquist & Wiksell International, p. 34.

3 Carl Linnaeus (1758) *Systema naturae per regna tria naturae*, 10th ed., Stockholm.

4 Thomas Huxley, cited in Ernst Haeckel (1907) *Das Menschen-Problem und die Herrentiere von Linné*, Frankfurt: Neuer Frankfurter Verlag, p.8.

5 See Maurice Daumas (1957) *Histoire de la science*, Paris: Gallimard, p. 1352.
6 Georges-Louis Leclerc, comte de Buffon (1749–1804) *Histoire naturelle générale et particulière*, Paris, vol. l4, p. 18.
7 Cited by Jean Baptiste Bory de Saint-Vincent (1825) *Dictionnaire classique d'histoire naturelle*, Paris, vol. 8, p 270.
8 John Ray (1693) *Synopsis methodica: Animalium quadrupedum et serpentini generis*, London. "Animalium tabula generalis", p. 53. See also William Gregory (1908) "Linnaeus as an Intermediary between Ancient and Modern Zoology", *Annals of the New York Academy of Sciences* 18: 21–31, especially 25. Ray's terms were used as adjectives, not nouns – an important distinction at a time when scholastics distinguished between essence and accident. Theodor Gill (1902) "The Story of a Word – Mammal", *Popular Science Monthly* 61: 434–8.
9 Broberg (1983) "*Homo sapiens*: Linnaeus's Classification of Man", in Tore Frängsmyr (ed.) *Linnaeus: The Man and His Work*, Berkeley and Los Angeles: University of California Press, p. 175.
10 Broberg (1983) *Homo Sapiens: Studier i Carl von Linnés naturuppfattning och människolära*, Stockholm: The Swedish History of Science Society, p.176.
11 Gill, "Story of a Word", p. 435.
12 Stearn (1959) "The Background of Linnaeus's Contributions to the Nomenclature and Methods of Systematic Biology", *Systematic Zoology*, 80.
13 Gill, "Story of a Word", pp. 436–7. See also *Dictionnaire pittoresque d'histoire naturelle* (1836) 4, s.v. "Mammifères".
14 Ronald King in Robert Thornton (1799) *The Temple of Flora*, Boston: New York Graphic Society, 1981, p. 9. Linnaeus sometimes named new genera after friends and colleagues, intending to suggest a spiritual likeness between the individual and the plant or animal in question (Benjamin Jackson [1923] *Linnaeus* [London: H.F. & G. Witherby, p. 278). He also ranked his colleagues as "Officers in Flora's Army" according to his evaluation of their scientific merit. His list was headed by "General Linnaeus"; the lowliest rank was assigned to his critic, Johann Siegesbeck (Heinz Goerke [1973] *Linnaeus*, trans. Denver Lindley [New York: Charles Scribner's Sons], p. 108).
15 Cuvier (1817) *Le Règne animal*, Paris, vol. 1, p. 76.
16 Scott Atran (1990) *Cognitive Foundations of Natural History: Towards an Anthropology of Science*, Cambridge: Cambridge University Press, p. 316 nn. 23–4.
17 Stephen Jay Gould, "A Quahog is a Quahog", in *The Panda's Thumb: More Reflections in Natural History*, (New York: Norton, 1980), pp. 204–7.
18 See Lynn Hunt (1984) *Politics, Culture, and Class in the French Revolution*, Berkeley and Los Angeles: University of California Press, especially part 1: also Warner (1985) *Monuments and Maidens: The Allegory of the Female Form*, New York: Atheneum, chaps. 12, 13.
19 Linnaeus saw reason as the principal characteristic distinguishing humans from other animals. In the preface to his *Fauna Svecica* (Stockholm, 1746) he called reason "the most noble thing of all" that places humans above all others. See also H.W. Janson (1952) *Apes and Ape Lore in the Middle Ages and the Renaissance*, London: The Warburg Institute, pp. 74–5.
20 Plato, *Timaeus*, 91c. Plato seemed uncertain whether woman should be classed with brute beasts or rational beings. Ian Maclean (1980) *The Renaissance Notion of Woman: A Study in the Fortunes of Scholasticism and Medical Science in European Intellectual Life*, Cambridge: Cambridge University Press, p. 31.

21 William Godwin (1798) *Memoirs of the Author of a Vindication of the Rights of Woman*, London, p. 183.

22 Hermann Ploss, Bartels, Max and Bartels, Paul (1936) *Woman: An Historical Gynecological and Anthropological Compendium*, ed. Eric Dingwall, St. Louis: C.V. Mosby Company, vol. 3, p. 211.

23 Carolyn Merchant (1980) *The Death of Nature: Women, Ecology, and the Scientific Revolution*, San Francisco: Harper & Row.

24 Linnaeus, *Fauna Svecica*, frontispiece.

25 Neumann (1956) *Die Grosse Mutter*, Zurich: Rhein Verlag, p. 128.

26 Warner (1976) *Alone of All Her Sex: The Myth and the Cult of the Virgin Mary*, New York: Alfred A. Knopf, pp. 192, 200; Warner, *Monuments and Maidens,* p. 283. Whether the Virgin menstruated was much discussed in the Middle Ages; theologians, committed to a new emphasis on Incarnation, argued that she did. Cadden (1992) *The Meaning of Sexual Difference in the Middle Ages: Medicine, Natural Philosophy, and Culture*, Cambridge: Cambridge University Press, pp. 174–5.

27 Bynum (1982) *Jesus as Mother: Studies in the Spirituality of the High Middle Ages*, Berkeley and Los Angeles: University of California Press, p. 115.

28 Warner, *Alone of All Her Sex*, p.194.

29 The pictorial representation of *sapientia lactans* dates to the early fifteenth century. *Sapientia lactans* was incorporated into the seal of Cambridge University, which shows the naked *Alma Mater Cantabrigia* with milk streaming from her breasts (W. S. Heckscher [1946–7] "Spiritualia sub metaphoris corporalium", *University of Toronto Quarterly* 16: 212 n. 9).

30 On Amazons, see J.A Fabricius, "Dissertatio critica," cited in Thomas Bendyshe (1865) "The History of Anthropology", *Memoirs Read Before the Anthropological Society of London* 1: 415–16. Saints Agnes and Barbara were shown having their breasts cut off as a form of torture in grotesque art of the late Middle Ages (Margaret Miles [1989] *Carnal Knowing: Female Nakedness and Religious Meaning in the Christian West*, Boston: Beacon Press, p. 156).

31 Warner, *Monuments and Maidens*, p. 281.

32 Barbara Gelphi (1992) *Shelley's Goddess: Maternity, Language, Subjectivity*, New York: Oxford University Press, pp. 43–60. See also Jean Block (1984) "Women and Reform of the Nation", in Samia Spencer (ed.) *French Women and the Age of Enlightenment*, Bloomington: University of Indiana Press, pp. 3–18.

33 Dissatisfaction with wet-nursing began in the 1680s. However, the height of the campaign came in the eighteenth century. See Sharp (1671) *The Midwives Book*, London, pp. 353, 361–2; Valerie Fildes (1986) *Breasts, Bottles and Babies: A History of Infant Feeding*, Edinburgh: Edinburgh University Press; and Randolph Trumbach (1978) *The Rise of the Egalitarian Family: Aristocratic Kinship and Domestic Relations in Eighteenth-century England*, New York: Academic Press. Dry-nursing under the mother's direct supervision was also advocated but led to even higher infant mortality.

34 George Sussman (1982) *Selling Mother's Milk: The Wet-Nursing Business in France, 1715–1914*, Urbana: University of Illinois Press, p. 20; see also Nancy Senior (1983), "Aspects of Infant Feeding in Eighteenth-Century France", *Eighteenth-Century Studies* 16: 367; Mary Sheriff, "Fragonard's Erotic Mothers and the Politics of Reproduction", in L. Hunt (ed.) (1991) *Eroticism and the Body Politic*, Baltimore: Johns Hopkins University Press, pp. 14–40.

35 Figures collected by Maxime de Sarthe-Lenoir, Lieutenant Général de Police for

Paris, in the 1770s cited in Senior, "Aspects of Infant Feeding", pp. 367–8. See also George Sussman (1977) "Parisian Infants and Norman Wet-Nurses in the Early Nineteenth Century", *Journal of Interdisciplinary History* 7: 637.

36 In an attempt to curb abuses and decrease infant mortality, wet-nursing in France was regulated by law in 1715 (Sussman, *Selling Mothers' Milk*, p 38).

37 Linnaeus, "Nutrix noverca", trans. by J. E. Gilibert (1770) as "La nourrice marâtre, ou Dissertation sur les suites funestes du nourrissage mercénaire", in *Les chefs-d'oeuvres de Monsieur de Sauvages*, Lyon, vol. 2, pp. 215–44.

38 Linnaeus, "Nutrix noverca", p. 258.

39 Linnaeus, "Nutrix noverca", p. 265. Though this argument was heard less frequently, it was still prominent in the eighteenth century.

40 William Cadogan (1948) *An Essay upon Nursing and the Management of Children*, London, p. 7.

41 Fildes (1988) *Wet Nursing: A History from Antiquity to the Present*, Oxford: Basil Blackwell, p. 193.

42 Rousseau (1762) *Emile: ou De l'éducation*, pp. 254–64. See also Mary Jacobus, "Incorrupible Milk: Breast-feeding and the French Revolution", in Sara Melzer and Leslie Rabine (eds) (1992) *Rebel Daughters: Women and the French Revolution*, New York: Oxford University Press, p. 62.

43 Mary Lindemann (1981) "Love for Hire: The Regulation of the Wet-Nursing Business in Eighteenth-Century Hamburg", *Journal of Family History* 6: 391.

44 *Allgemeines Landrecht* (1794), part II, title II, art. 67, in Susan Bell and Karen Offen (eds) (1983) *Women, the Family and Freedom: The Debate in Documents 1750–1880*, Stanford: Stanford University Press, vol. 1, p. 39.

45 Jean-Jacques Rousseau (1953) *The Confessions of Jean-Jacques Rousseau*, trans. J. Cohen (1978) Harmondsworth, Middlesex: Penguin, p. 333. See also William Kessen (1978) "Rousseau's Children", *Daedalus* 107: 155; ironically, Emile was brought up by a wet nurse in the country (Senior, "Aspects of Infant Feeding", p. 385).

46 Jordanova, *Languages of Nature*, p. 97; Warner, *Monuments and Maidens*, p. 282.

47 See Hunt, *Politics, Culture, and Class in the French Revolution*, chaps. 2, 3.

48 Darline Levy, Harriet Applewhite, and Mary Johnson (eds) (1979) *Women in Revolutionary Paris 1789–1795*, Urbana: University of Illinois Press, p. 219. See also Outram (1989) *The Body and the French Revolution: Sex, Class and Political Culture*, New Haven: Yale University Press.

49 Lynn Hunt (1992) *The Family Romance of the French Revolution*, Berkeley and Los Angeles: University of California Press, pp. 151–91, especially 153–5.

50 Arthur Lovejoy (1953) *The Great Chain of Being: A Study of the History of an Idea*, Cambridge, MA: Harvard University Press, 1964. Winthrop D. Jordan (1968) *White over Black: American Attitudes toward the Negro, 1550–1812*, Chapel Hill: University of North Carolina Press, pp. 217–28.

51 Reported in Petrus Camper (1794) *The Works of the Late Professor Camper on the Connexion between the Science of Anatomy and the Arts of Drawing, Painting, Statuary, etc.*, trans. T. Cogan, London, p. 32, though this was not his opinion.

52 One of the best discussions is found in Jordan, *White over Black*, pp. 215–65.

53 See Thomas Laqueur (1990) *Making Sex: Body and Gender from the Greeks to Freud*, Cambridge, MA: Harvard University Press; and also Londa Schiebinger (1989) *The Mind Has no Sex? Women in the Origins of Modern Science*, Cambridge, MA: Harvard University Press, chaps. 7, 8.

54 See Gloria Hull, Patricia Bell Scott, and Barbara Smith (eds) (1982) *All the Women*

Are White, All the Blacks Are Men, But Some of Us Are Brave: Black Women's Studies, Old Westbury, NY: Feminist Press. One sees these assumptions expressed over and over again today (see Spelman [1988] *Inessential Woman: Problems of Exclusion in Feminist Thought*, Boston: Beacon Press, pp. 114–15).

55 Barbara Bush (1981) "White 'Ladies,' Coloured 'Favourites' and Black 'Wenches'; Some Considerations on Sex, Race and Class Factors in Social Relations in White Creole Society in the British Caribbean", *Slavery and Abolition* 2: 244–62, especially 249; Hazel Carby (1987) *Reconstructing Womanhood: The Emergence of the Afro-American Woman Novelist*, New York: Oxford University Press, pp. 20–39; and Evelyn Brooks Higginbotham (1992) "African-American Women's History and the Metalanguage of Race", *Signs: Journal of Women in Culture and Society* 17: 251–74, especially 262–6.

56 Buffon (1749–1804) *Histoire naturelle, générale et particulière*, 44 vols, Paris, vol. 3, p. 407; Blumenbach (1865) *On the Natural Varieties of Mankind*, trans. Thomas Bendyshe, New York; Bergman, 1969, p. 247 n. 5; C. P. Thunberg (1795) "An Account of the Cape of Good Hope", in John Pinkerton (1808) *A General Collection of the Best and Most Interesting Voyages and Travels in all Parts of the World*, London, vol. 16, pp. 29–30; and Samuel Stanhope Smith (1787) *An Essay on the Causes of the Variety of Complexion and Figure in the Human Species*, Cambridge, MA: Harvard University Press, 1965, p. 82.

57 Linnaeus (1758) *Systema naturae per regna tria naturae*, 10th ed., Stockholm, pp. 22, 24. Winthrop Jordan mistranslated *sinus pudoris* as: "Women's bosom a matter of modesty" (*White over Black*, p. 221); Frank Spencer (1986) also translated it incorrectly as "women without shame" (*Ecce Homo: An Annotated Bibliographic History of Physical Anthropology*, New York: Greenwood Press, p. 78); and most recently, Pieterse has it wrong – "the bosoms of women are distended" (Jan Pieterse [1992] *White on Black: Images of Africa and Blacks in Western Popular Culture*, New Haven: Yale University Press, p. 40). In his "Anthropomorpha" Linnaeus claimed that female troglodytes had these hanging folds of skin (Carl Linnaeus, "Anthropomorpha", respondent C.E. Hoppius [1760] in *Amoenitates academicae* [Erlangen, 1789], vol. 6, description of fig. 4).

58 John Ovington (1696) *A Voyage to Suratt in the Year 1689*, London, p. 497.

59 Blumenbach, *On the Natural Varieties of Mankind*, p. 250 n. 4; Voltaire (1879) *Lettres d'Amabed*, letter 4, *Oeuvres complètes de Voltaire*, Paris: Garnier Frères, vol. 21, pp. 458–9.

60 Blumenbach, *On the Natural Varieties of Mankind*, pp. 249–50; Blumenbach (1779) *Handbuch der Naturgeschichte*, Göttingen, p. 64.

61 Le Vaillant (1790) *Voyage de François Le Vaillant dans L'intérieur de l'Afrique*, Paris, 1798, vol. 2, pp. 351–3; see also Virey (1823) *De la femme*, Paris, p. 30; and Moreau de la Sarthe (1803), *Histoire naturelle de la femme*, Paris, p. 525.

62 François Le Vaillant (1790) *Travels from the Cape of Good Hope into the Interior Parts of Africa*, trans. Elizabeth Helme, London, preface.

63 Barrow (1801) *Reisen in das Innere von Südafrika in den Jahren, 1797 and 1798*, Berlin, 1802, p. 311.

64 Sander Gilman, "Black Bodies, White Bodies: Toward an Iconography of Female Sexuality in Late Nineteenth-Century Art, Medicine, and Literature", in Henry Louis Gates Jr (ed.) (1986) *"Race," Writing, and Difference*, Chicago: University of Chicago Press, pp. 223–61.

65 Cuvier (1817) "Extrait d'observations faites sur le cadavre d'une femme connue à

Paris et à Londres sous le nom de Vénus Hottentotte", *Mémoires du Muséum d'Histoire Naturelle* 3: 259–74.

66 My account of her life has been taken from Percival Kirby (1940) "The Hottenot Venus", *Africana Notes and News* 6: 55-62; and (1953) "More About the Hottentot Venus," *Africana Notes and News* 10: 124–34. See also Edwards and Walvin (1983) *Black Personalities in the Era of the Slave Trade*, Baton Rouge: Louisiana State University Press, pp. 171–82; and Stephen Jay Gould (1985) *The Flamingo's Smile: Reflections in Natural History*, New York: Norton & Company, pp. 291–305; Gilman (1985) *Difference and Pathology: Stereotypes of Sexuality, Race and Madness*, Ithaca: Cornell University Press, pp. 83–8; and Anne Fausto-Sterling, *Making a Difference: Biology and the Social/Scientific Construction of Sexuality* (in preparation).

67 Richard Altick (1978) *The Shows of London*, Cambridge, MA: Harvard University Press, pp. 268–73.

68 Henri de Blainville (1816) "Sur une femme de la race hottentote", *Bulletin des sciences, par la Société Philomatique de Paris*: 183–90, especially 183.

69 In the nineteenth century, the skins of Africans were sometimes taken after death and stuffed for display in natural history museums. The anatomist Bonn at Amsterdam was noted for his beautiful skin collection. See Hans Debrunner (1979) *Presence and Prestige: Africans in Europe*, Basel: Basler Afrika Bibliographen, p. 145.

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Chapter 1.2

Nancy Leys Stepan

RACE AND GENDER: THE ROLE OF ANALOGY IN SCIENCE

METAPHOR OCCUPIES A CENTRAL PLACE in literary theory, but the role of metaphors, and of the analogies they mediate, in scientific theory is still debated.[1] One reason for the controversy over metaphor, analogy, and models in science is the intellectually privileged status that science has traditionally enioyed as the repository of non-metaphorical, empirical, politically neutral, universal knowledge. During the scientific revolution of the seventeenth century, metaphor became associated with the imagination, poetic fancy, subjective figures, and even untruthfulness and was contrasted with truthful, unadorned, objective knowledge – that is, with science itself.[2]

[. . .]

One result of the dichotomy established between science and metaphor was that obviously metaphoric or analogical science could only be treated as 'prescientific' or 'pseudoscientific' and therefore dismissable.[3] Because science has been identified with truthfulness and empirical reality, the metaphorical nature of much modern science tended to go unrecognized. And because it went unrecognized, as Colin Turbayne has pointed out, it has been easy to mistake the model in science 'for the thing modelled' – to think, to take his example, that nature *was* mechanical, rather than to think it was, metaphorically, seen as mechanical.[4]

[. . .]

Although the role of metaphor and analogy in science is now recognized, a critical theory of scientific metaphor is only just being elaborated. The purpose of this article is to contribute to the development of such a theory by using a particular analogy in the history of the life sciences to explore a series of related questions concerning the cultural sources of scientific analogies, their role in scientific reasoning, their normative consequences, and the process by which they change.

Race and gender: a powerful scientific analogy

The analogy examined is the one linking race to gender, an analogy that occupied a strategic place in scientific theorizing about human variation in the nineteenth and twentieth centuries.

As has been well documented, from the late Enlightenment on students of human variation singled out racial differences as crucial aspects of reality, and an extensive discourse on racial inequality began to be elaborated.[5] In the nineteenth century, as attention turned increasingly to sexual and gender differences as well, gender was found to be remarkably analogous to race, such that the scientist could use racial difference to explain gender difference, and vice versa.[6]

Thus it was claimed that women's low brain weights and deficient brain structures were analogous to those of lower races, and their inferior intellectualities explained on this basis.[7] Woman, it was observed, shared with Negroes a narrow, childlike, and delicate skull, so different from the more robust and rounded heads characteristic of males of 'superior' races. Similarly, women of higher races tended to have slightly protruding jaws, analogous to, if not as exaggerated as, the apelike, jutting jaws of lower races.[8] Women and lower races were called innately impulsive, emotional, imitative rather than original, and incapable of the abstract reasoning found in white men.[9] Evolutionary biology provided yet further analogies. Woman was in evolutionary terms the 'conservative element' to the man's 'progressive' preserving the more 'primitive' traits found in lower races, while the males of higher races led the way in new biological and cultural directions.[10]

Thus when Carl Vogt, one of the leading German students of race in the middle of the nineteenth century, claimed that the female skull approached in many respects that of the infant and in still further respects that of lower races, whereas the mature male of many lower races resembled in his 'pendulous' belly a Caucasian woman who had had many children, and in his thin calves and flat thighs the ape, he was merely stating what had become almost a cliché of the science of human difference.[11]

So fundamental was the analogy between race and gender that the major modes of interpretation of racial traits were invariably evoked to explain sexual traits. For instance, just as scientists spoke of races as distinct 'species', incapable of crossing to produce viable 'hybrids', scientists analysing male–female differences sometimes spoke of females as forming a distinct 'species', individual members of which were in danger of degenerating into psychosexual hybrids when they tried to cross the boundaries proper to their sex.[12] Darwin's theory of sexual selection was applied to both racial and sexual difference, as was the neo-Lamarckian theory of the American Edward Cope.[13] A last, confirmatory example of the analogous place of gender and race in scientific theorizing is taken from the history of hormone biology. Early in the twentieth century the anatomist and student of race Sir Arthur Keith interpreted racial differences in the human species as a function of pathological disturbances of the newly discovered 'internal secretions' or hormones. At about the same time, the apostle of sexual frankness and well-known student of sexual variation Havelock Ellis used internal secretions to explain the small, but to him vital, differences in the physical and psychosexual make-up of men and women.[14]

In short, lower races represented the 'female' type of the human species, and females the 'lower race' of gender. As the example from Vogt indicates, however, the

analogies concerned more than race and gender. Through an intertwined and overlapping series of analogies, involving often quite complex comparisons, identifications, cross-references, and evoked associations, a variety of 'differences' – physical and psychical, class and national – were brought together in a biosocial science of human variation. By analogy with the so-called lower races, women, the sexually deviate, the criminal, the urban poor, and the insane were in one way or another constructed as biological 'races apart' whose differences from the white male, and likenesses to each other, 'explained' their different and lower position in the social hierarchy.[15]

It is not the aim of this article to provide a systematic history of the biosocial science of racial and sexual difference based on analogy. The aim is rather to use the race–gender analogy to analyse the nature of analogical reasoning in science itself. When and how did the analogy appear in science? From what did it derive its scientific authority? How did the analogy shape research? What did it mean when a scientist claimed that the mature male of many lower races resembled a mature Caucasian female who had had many children? No simple theory of resemblance or substitution explains such an analogy. How did the analogy help construct the very similarities and differences supposedly 'discovered' by scientists in nature? What theories of analogy and metaphor can be most effectively applied in the critical study of science?

The cultural sources of scientific metaphor

[. . .]

The origin of many of the 'root metaphors' of human difference are obscure. G. Lakoff and M. Johnson suggest that the basic values of a culture are usually compatible with 'the metaphorical structure of the most fundamental concepts in the culture'.[16] Not surprisingly, the social groups represented metaphorically as 'other' and 'inferior' in Western culture were socially 'disenfranchised' in a variety of ways, the causes of their disenfranchisement varying from group to group and from period to period. Already in ancient Greece, Aristotle likened women to the slave on the grounds of their 'natural' inferiority. Winthrop Jordan has shown that by the early Middle Ages a binary opposition between blackness and whiteness was well established in which blackness was identified with baseness, sin, the devil, and ugliness, and whiteness with virtue, purity, holiness, and beauty.[17] Over time, black people themselves were compared to apes, and their childishness, savageness, bestiality, sexuality, and lack of intellectual capacity stressed. The 'Ethiopian, the 'African', and especially the 'Hottentot' were made to stand for all that the white male was not; they provided a rich analogical source for the understanding and representation of other 'inferiorities'. In his study of the representation of insanity in Western culture, for instance, Gilman shows how the metaphor of blackness could be borrowed to explicate the madman, and vice versa. In similar analogical fashion, the labouring poor were represented as the 'savages' of Europe, and the criminal as a 'Negro'.

When scientists in the nineteenth century, then, proposed an analogy between racial and sexual differences, or between racial and class differences, and began to generate new data on the basis of such analogies, their interpretations of human

difference and similarity were widely accepted, partly because of their fundamental congruence with cultural expectations. In this particular science, the metaphors and analogies were not strikingly new but old, if unexamined and diffuse. The scientists' contribution was to elevate hitherto unconsciously held analogies into self-conscious theory, to extend the meanings attached to the analogies, to expand their range via new observations and comparisons, and to give them precision through specialized vocabularies and new technologies. Another result was that the analogies became 'naturalized' in the language of science, and their metaphorical nature disguised.

In the scientific elaboration of these familiar analogies, the study of race led the way, in part because the differences between blacks and whites seemed so 'obvious', in part because the abolition movement gave political urgency to the issue of racial difference and social inequality. From the study of race came the association between inferiority and the ape. The facial angle, a measure of hierarchy in nature obtained by comparing the protrusion of the jaws in apes and man, was widely used in analogical science once it was shown that by this measure Negroes appeared to be closer to apes than the white race.[18] Established as signs of inferiority, the facial angle and blackness could then be extended analogically to explain other inferior groups and races. For instance, Francis Galton, Darwin's cousin and the founder of eugenics and statistics in Britain, used the Negro and the apish jaw to explicate the Irish: 'Visitors to Ireland after the potato famine', he commented, 'generally remarked that the Irish type of face seemed to have become more prognathous, that is, more like the negro in the protrusion of the lower jaw.'[19]

Especially significant for the analogical science of human difference and similarity were the systematic study and measurement of the human skull. The importance of the skull to students of human difference lay in the fact that it housed the brain, differences in whose shape and size were presumed to correlate with equally presumed differences in intelligence and social behaviour. It was measurements of the skull, brain weights, and brain convolutions that gave apparent precision to the analogies between anthropoid apes, lower races, women, criminal types, lower classes, and the child. It was race scientists who provided the new technologies of measurement – the callipers, cephalometers, craniometers, craniophores, craniostats, and parietal goniometers.[20] The low facial angles attributed by scientists starting in the 1840s and 1850s to women, criminals, idiots, and the degenerate, and the corresponding low brain weights, protruding jaws, and incompletely developed frontal centres where the higher intellectual faculties were presumed to be located were all taken from racial science. By 1870 Paul Topinard, the leading French anthropologist after the death of Paul Broca, could call on data on sexual and racial variations from literally hundreds of skulls and brains, collected by numerous scientists over decades, in order to draw the conclusion that Caucasian women were indeed more prognathous or apelike in their jaws than white men, and even the largest women's brains, from the 'English or Scotch' race, made them like the African male.[21] Once 'woman' had been shown to be indeed analogous to lower races by the new science of anthropometry and had become, in essence, a racialized category, the traits and qualities special to woman could in turn be used in an analogical understanding of lower races. The analogies now had the weight of empirical reality and scientific theory. The similarities between a Negro and a white woman, or between a criminal and a Negro, were realities of nature, somehow 'in' the individuals studied.

Metaphoric interactions

We have seen that metaphors and analogies played an important part in the science of human difference in the nineteenth century. The question is, what part? I want to suggest that the metaphors functioned as the science itself – that without them the science did not exist. In short, metaphors and analogies can be constituent elements of science.

It is here that I would like to introduce, as some other historians of science have done, Max Black's 'interaction' theory of metaphor, because it seems that the metaphors discussed in this essay, and the analogies they mediated, functioned like interaction metaphors, and that thinking about them in these terms clarifies their role in science.[22]

By interaction metaphors, Black means metaphors that join together and bring into cognitive and emotional relation with each other two different things, or systems of things, not normally so joined. Black follows I. A. Richards in opposing the 'substitution' theory of metaphor, in which it is supposed that the metaphor is telling us indirectly something factual about the two subjects – that the metaphor is a *literal comparison*, or is capable of a literal translation in prose. Richards proposed instead that 'when we use a metaphor, we have two thoughts of different things active together and supported by a single word or phrase, whose meaning is the resultant of their interaction.' Applying the interaction theory to the metaphor 'The poor are the negroes of Europe', Black paraphrases Richards to claim that "our thoughts about the European poor and American negroes are 'active together' and 'interact' to produce a meaning that is a resultant of that interaction."[23] In such a view, the metaphor cannot be simply reduced to literal comparisons or 'like' statements without loss of meaning or cognitive content, because meaning is a product of the interaction between the two parts of a metaphor.

[. . .]

Black's point is that by their interactions and evoked associations both parts of a metaphor are changed. Each part is seen as more like the other in some characteristic way. Black was primarily interested in ordinary metaphors of a culture and in their commonplace associations. But instead of commonplace associations, a metaphor may evoke more specially constructed systems of implications. Scientists are in the business of constructing exactly such systems of implications, through their empirical investigations into nature and through their introduction into discourse of specialized vocabularies and technologies.[24] It may be, indeed, that what makes an analogy suitable for scientific purposes is its ability to be suggestive of new systems of implications, new hypotheses, and therefore new observations.[25]

In the case of the nineteenth-century analogical science of human difference, for instance, the system of implications evoked by the analogy linking lower races and women was not just a generalized one concerning social inferiority, but the more precise and specialized one developed by years of anthropometric, medical, and biological research. When 'woman' and 'lower races' were analogically and routinely joined in the anthropological, biological, and medical literature of the 1860s and 1870s, the metaphoric interactions involved a complex system of implications about similarity and difference, often involving highly technical language (for example, in

one set of measurements of the body in different races cited by Paul Topinard in 1878 the comparisons included measures in each race of their height from the ground to the acromion, the epicondyle, the styloid process of the radius, the great trochanter, and the internal malleolus). The systems of implications evoked by the analogy included questions of comparative health and disease (blacks and women were believed to show greater degrees of insanity and neurasthenia than white men, especially under conditions of freedom), of sexual behaviour (females of 'lower races' and lower-class women of 'higher races', especially prostitutes, were believed to show similar kinds of bestiality and sexual promiscuity, as well as similar signs of pathology and degeneracy such as deformed skulls and teeth), and of 'childish' characteristics, both physical and moral.[26]

As already noted, one of the most important systems of implications about human groups developed by scientists in the nineteenth century on the basis of analogical reasoning concerned head shapes and brain sizes. It was assumed that blacks, women, the lower classes, and criminals shared low brain weights or skull capacities. Paul Broca, the founder of the Société d'Anthropologie de Paris in 1859, asserted:

> In general, the brain is larger in mature adults than in the elderly, in men than in women, in eminent men than in men of mediocre talent, in superior races than in inferior races. . . . Other things being equal, there is a remarkable relationship between the development of intelligence and the volume of the brain.[27]

Such a specialized system of implications based on the similarities between brains and skulls appeared for the first time in the phrenological literature of the 1830s. Although analogies between women and blackness had been drawn before, woman's place in nature and her bio-psychological differences from men had been discussed by scientists mainly in terms of reproductive function and sexuality, and the most important analogies concerned black females (the 'sign' of sexuality) and lower-class or 'degenerate' white women. Since males of all races had no wombs, no systematic, apparently scientifically validated grounds of comparison between males of 'lower' races and women of 'higher' races existed.

Starting in the 1820s, however, the phrenologists began to focus on differences in the shape of the skull of individuals and groups, in the belief that the skull was a sign faithfully reflecting the various organs of mind housed in the brain, and that differences in brain organs explained differences in human behaviour. And it is in the phrenological literature, for almost the first time, that we find women and lower races compared directly on the basis of their skull formations. In their 'organology', the phrenologists paid special attention to the organ of 'philoprogenitiveness', or the faculty causing 'love of offspring', which was believed to be more highly developed in women than men, as was apparent from their more highly developed upper part of the occiput. The same prominence, according to Franz Joseph Gall, was found in monkeys and was particularly well developed, he believed, in male and female Negroes.[28]

By the 1840s and 1850s the science of phrenology was on the wane, since the organs of the brain claimed by the phrenologists did not seem to correspond with

the details of brain anatomy as described by neurophysiologists. But although the specific conclusions of the phrenologists concerning the anatomical structure and functions of the brain were rejected, the principle that differences in individual and group function were products of differences in the shape and size of the head was not. This principle underlay the claim that some measure, whether of cranial capacity, the facial angle, the brain volume, or brain weight, would be found that would provide a true indicator of innate capacity, and that by such a measure women and lower races would be shown to occupy analogous places in the scale of nature (the 'scale' itself of course being a metaphorical construct).

By the 1850s the measurement of women's skulls was becoming an established part of craniometry and the science of gender joined analogically to race. Vogt's *Lectures on Man* included a long discussion of the various measures available of the skulls of men and women of different races. His data showed that women's smaller brains were analogous to the brains of lower races, the small size explaining both groups' intellectual inferiority. (Vogt also concluded that within Europe the intelligentsia and upper classes had the largest heads, and peasants the smallest.)[29] Broca shared Vogt's interest; he too believed it was the smaller brains of women and 'lower' races, compared with men of 'higher' races, that caused their lesser intellectual capacity and therefore their social inferiority.[30]

One novel conclusion to result from scientists' investigations into the different skull capacities of males and females of different races was that the gap in head size between men and women had apparently widened over historic time, being largest in the 'civilized' races such as the European, and smallest in the most savage races.[31] The growing difference between the sexes from the prehistoric period to the present was attributed to evolutionary, selective pressures, which were believed to be greater in the white races than the dark and greater in men than women. Paradoxically, therefore, the civilized European woman was less like the civilized European man than the savage man was like the savage woman. The 'discovery' that the male and female bodies and brains in the lower races were very alike allowed scientists to draw direct comparisons between a black male and white female. The male could be taken as representative of both sexes of his race and the black female could be virtually ignored in the analogical science of intelligence, if not sexuality.

Because interactive metaphors bring together a *system* of implications, other features previously associated with only one subject in the metaphor are brought to bear on the other. As the analogy between women and race gained ground in science, therefore, women were found to share other points of similarity with lower races. A good example is prognathism. Prognathism was a measure of the protrusion of the jaw and of inferiority. As women and lower races became analogically joined, data on the 'prognathism' of females were collected and women of 'advanced' races implicated in this sign of inferiority. Havelock Ellis, for instance, in the late nineteenth-century bible of male–female differences *Man and Woman*, mentioned the European woman's slightly protruding jaw as a trait, not of high evolution, but of the lower races, although he added that in white women the trait, unlike in the lower races, was 'distinctly charming'.[32]

Another set of implications brought to bear on women by analogy with lower races concerned dolichocephaly and brachycephaly, or longheadedness and round-headedness. Africans were on the whole more longheaded than Europeans and so

dolichocephaly was generally interpreted as signifying inferiority. Ellis not surprisingly found that on the whole women, criminals, the degenerate, the insane, and prehistoric races tended to share with dark races the more narrow, dolichocephalic heads representing an earlier (and by implication, more primitive) stage of brain development.[33]

Analogy and the creation of new knowledge

In the metaphors and analogies joining women and the lower races, the scientist was led to 'see' points of similarity that before had gone unnoticed. Women became more 'like' Negroes, as the statistics on brain weights and body shapes showed. The question is, what kind of 'likeness' was involved?

Here again the interaction theory of metaphor is illuminating. As Black says, the notion of similarity is ambiguous. Or as Stanley Fish puts it, 'Similarity is not something one finds but something one must establish.'[34] Metaphors are not meant to be taken literally but they do imply some structural similarity between the two things joined by the metaphor, a similarity that may be new to the readers of the metaphoric or analogical text, but that they are culturally capable of grasping.

However, there is nothing obviously similar about a white woman of England and an African man, or between a 'criminal type' and a 'savage'. (If it seems to us as though there is, that is because the metaphor has become so woven into our cultural and linguistic system as to have lost its obviously metaphorical quality and to seem a part of 'nature'.) Rather it is the metaphor that permits us to see similarities that the metaphor itself helps constitute.[35] The metaphor, Black suggests, 'selects, emphasizes, suppresses and organizes features' of reality, thereby allowing us to see new connections between the two subjects of the metaphor, to pay attention to details hitherto unnoticed, to emphasize aspects of human experience otherwise treated as unimportant, to make new features into 'signs' signifying inferiority.[36] It was the metaphor joining lower races and women, for instance, that gave significance to the supposed differences between the shape of women's jaws and those of men.

[. . .]

The metaphor, in short, served as a programme of research. Here the analogy comes close to the idea of a scientific 'paradigm' as elaborated by Kuhn in *The Structure of Scientific Revolutions*; indeed Kuhn himself sometimes writes of paradigms as though they are extended metaphors and has proposed that 'the same interactive, similarity-creating process which Black has isolated in the functioning of metaphor is vital also in the function of models in science.'[37]

The ability of an analogy in science to create new kinds of knowledge is seen clearly in the way the analogy organizes the scientists' understanding of causality. Hesse suggests that a scientific metaphor, by joining two distinct subjects, implies more than mere structural likeness. In the case of the science of human difference, the analogies implied a similar *cause* of the similarities between races and women and of the differences between both groups and white males. To the phrenologists, the cause of the large organs of philoprogenitiveness in monkeys, Negroes, and women was an innate brain structure. To the evolutionists, sexual and racial differences were

the product of slow, adaptive changes involving variation and selection, the results being the smaller brains and lower capacities of the lower races and women, and the higher intelligence and evolutionarily advanced traits in the males of higher races. Barry Barnes suggests we call the kind of 'redescription' involved in a metaphor or analogy of the kind being discussed here an 'explanation', because it forces the reader to 'understand' one aspect of reality in terms of another.[38]

Analogy and the suppression of knowledge

Especially important to the functioning of interactive metaphors in science is their ability to neglect or even suppress information about human experience of the world that does not fit the similarity implied by the metaphor. In their 'similarity-creating' capacity, metaphors involve the scientist in a selection of those aspects of reality that are compatible with the metaphor. This selection process is often quite unconscious. Stephen Jay Gould is especially telling about the ways in which anatomists and anthropologists unselfconsciously searched for and selected measures that would prove the desired scales of human superiority and inferiority and how the difficulties in achieving the desired results were surmounted.

Gould has subjected Paul Broca's work on human differences to particularly thorough scrutiny because Broca was highly regarded in scientific circles and was exemplary in the accuracy of his measurements. Gould shows that it is not Broca's measurements *per se* that can be faulted, but rather the ways in which he unconsciously manipulated them to produce the very similarities already 'contained' in the analogical science of human variation. To arrive at the conclusion of women's inferiority in brain weights, for example, meant failing to make any correction for women's smaller body weights, even though other scientists of the period were well aware that women's smaller brain weights were at least in part a function of their smaller body sizes. Broca was also able to 'save' the scale of ability based on head size by leaving out some awkward cases of large-brained but savage heads from his calculations, and by somehow accounting for the occasional small-brained 'geniuses' from higher races in his collection.[39]

[. . .]

When contrary evidence could not be ignored, it was often reinterpreted to express the fundamental valuations implicit in the metaphor. Gould provides us with the example of neoteny, or the retention in the adult of childish features such as a small face and hairlessness. A central feature of the analogical science of inferiority was that adult women and lower races were more childlike in their bodies and minds than white males. But Gould shows that by the early twentieth century it was realized that neoteny was a positive feature of the evolutionary process. 'At least one scientist, Havelock Ellis, did bow to the clear implication and admit the superiority of women, even though he wriggled out of a similar confession for blacks.' As late as the 1920s the Dutch scientist Louis Bolk, on the other hand, managed to save the basic valuation of white equals superior, blacks and women equal inferior by 'rethinking' the data and discovering after all that blacks departed more than whites from the most favourable traits of childhood.[40]

To reiterate, because a metaphor or analogy does not directly present a pre-existing nature but instead helps 'construct' that nature, the metaphor generates data that conform to it, and accommodates data that are in apparent contradiction to it, so that nature is seen via the metaphor and the metaphor becomes part of the logic of science itself.[41]

[. . .]

A brief conclusion

In this essay I have indicated only some of the issues raised by a historical consideration of a specific metaphoric or analogical science. There is no attempt at completeness or theoretical closure. My intention has been to draw attention to the ways in which metaphor and analogy can play a role in science, and to show how a particular set of metaphors and analogies shaped the scientific study of human variation. I have also tried to indicate some of the historical reasons why scientific texts have been 'read' non-metaphorically, and what some of the scientific and social consequences of this have been.

Some may argue I have begged the question of metaphor and analogy in science by treating an analogical science that was 'obviously pseudoscientific'. I maintain that it was not obviously pseudoscientific to its practitioners, and that they were far from being at the periphery of the biological and human sciences in the nineteenth and early twentieth centuries. I believe other studies will show that what was true for the analogical science of human difference may well be true also for other metaphors and analogies in science.

My intention has also been to suggest that a theory of metaphor is as critical to science as it is to the humanities. We need a critical theory of metaphor in science in order to expose the metaphors by which we learn to view the world scientifically, not because these metaphors are necessarily 'wrong', but because they are so powerful.

Notes

1 A metaphor is a figure of speech in which a name or descriptive term is transferred to some object that is different from, but analogous to, that to which is properly applicable. According to Max Black, 'every metaphor may be said to mediate an analogy or structural correspondence': see Black, 'More About Metaphor', in Andrew Ortony (ed.), *Metaphor and Thought* (Cambridge: Cambridge University Press, 1979), 19–43, on p. 31. In this article, I have used the terms *metaphor* and *analogy* interchangeably.

2 G. Lakoff and M. Johnson, *Metaphors We Live By* (Chicago/London: University of Chicago Press, 1980), 191. Scientists' attacks on metaphor as extrinsic and harmful to science predate the Scientific Revolution.

3 For this point see Jamie Kassler, 'Music as a Model in Early Science', *History of Science*, 20 (1982), 103–39.

4 Colin M. Turbayne, *The Myth of Metaphor* (Columbia: University of South Carolina Press, 1970), 24.

5 See Nancy Stepan, *The Idea of Race in Science: Great Britain, 1800–1960* (London: Macmillan, 1982), esp. ch. 1.
6 No systematic history of the race–gender analogy exists. The analogy has been remarked on, and many examples from the anthropometric, medical, and embryological sciences provided, in Stephen Jay Gould, *The Mismeasure Of Man* (New York: W. W. Norton, 1981), and in John S. Haller and Robin S. Haller, *The Physician and Sexuality in Victorian America* (Urbana: University of Illinois Press, 1974).
7 Haller and Haller, *The Physician and Sexuality*, 48–9, 54. Among the several craniometric articles cited by the Hallers, see esp. J. McGrigor Allan, 'On the Real Differences in the Minds of Men and Women', *Journal of the Anthropological Society of London*, 7 (1869), cxcv–ccviii, on p. cciv; and John Cleland, 'An Inquiry into the Variations of the Human Skull', *Philosophical Transactions, Royal Society*, 89 (1870), 117–74.
8 Havelock Ellis, *Man and Woman: A Study of Secondary Sexual Characters* (London: A. & C. Black, 6th edn. 1926), 106–7.
9 Herbert Spencer, 'The Comparative Psychology of Man', *Popular Science Monthly*, 8 (1875–6), 257–69.
10 Ellis, *Man and Woman* (cit. n. 8), 491.
11 Carl Vogt, *Lectures on Man: His Place in Creation, and in the History of the Earth* (London: Longman, Green, & Roberts, 1864), 81.
12 James Weir, 'The Effect of Female Suffrage on Posterity', *American Naturalist*, 29 (1895), 198–215.
13 Charles Darwin, *The Descent of Man, and Selection in Relation to Sex* (London: John Murray, 1871), ii, chs. 17–20; Edward Cope, 'The Developmental Significance of Human Physiognomy', *American Naturalist*, 17 (1883), 618–27.
14 Arthur Keith, 'Presidential Address: On Certain Factors in the Evolution of Human Races', *Journal of the Royal Anthropological Institute*, 64 (1916), 10–33; Ellis, *Man and Woman* (cit. n. 8), p. xii.
15 See Nancy Stepan, 'Biological Degeneration: Races and Proper Places', in J. Edward Chamberlin and Sander L. Gilman (eds.), *Degeneration: The Dark Side of Progress* (New York: Columbia University Press, 1985), 97–120, esp. 112–13. For an extended exploration of how various stereotypes of difference intertwined with each other, see Sander L. Gilman, *Difference and Pathology: Stereotypes of Sexuality, Race, and Madness* (Ithaca, NY: Cornell University Press, 1985).
16 Lakoff and Johnson, *Metaphors We Live By* (cit. n. 2), 22. The idea of root metaphors is Stephen Pepper's in *World Hypothesis* (Berkeley/Los Angeles: University of California Press, 1966), 91.
17 Winthrop D. Jordan, *White over Black: American Attitudes toward the Negro, 1550–1812* (New York: Norton, 1977), 7.
18 Stepan, *The Idea of Race in Science*, 6–10.
19 Francis Galton, 'Hereditary Improvement', *Fraser's Magazine*, 7 (1873), 116–30.
20 These instruments and measurements are described in detail in Paul Topinard, *Anthropology* (London: Chapman & Hall, 1878), pt. 2, chs. 1–4.
21 Ibid. 311.
22 Max Black, *Models and Metaphor* (Ithaca, NY: Cornell University Press, 1961), esp. chs. 3 and 13. See also Mary Hesse, *Models and Analogies in Science* (Notre Dame, Ind.: University of Notre Dame Press, 1966); Mary Hesse, 'The Explanatory Function of Metaphor', in Y. Bar-Hillel (ed.), *Logic Methodology and*

Philosophy of Science (Amsterdam: North-Holland, 1965), 249–59; and Richard Boyd, "Metaphor and Theory Change: What is 'Metaphor' a Metaphor for?", in A. Ortony (ed.), *Metaphor and Thought*, 356–408.

23 Black, *Models and Metaphor*, 38, quoting I. A. Richards, *Philosophy of Rhetoric* (Oxford: Oxford University Press, 1938), 93.

24 See Turbayne, *Myth of Metaphor* (cit. n. 4), p. 19, on this point.

25 Black himself believed scientific metaphors belonged to the pretheoretical stage of a discipline. Here I have followed Boyd, who argues in 'Metaphor and Theory Change' (cit. n. 22), p. 357, that metaphors can play a role in the development of theories in relatively mature sciences. Some philosophers would reserve the term 'model' for extended, systematic metaphors in science.

26 For an example of the analogous diseases and sexuality of 'lower' races and 'lower' women, see Eugene S. Talbot, *Degeneracy: Its Causes, Signs, and Results* (London: Walter Cott, l898), 18, 319–23.

27 Paul Broca, 'Sur le volume et la forme du cerveau suivant les individus et suivant les races', *Bulletin de la Société d' 'Anthropologie Paris*, 2 (1861), 304.

28 Franz Joseph Gall, 'The Propensity to Philoprogenitiveness', *Phrenological Journal*, 2 (1824–5), 20–33.

29 Vogt, *Lectures on Man* (cit. n. 11), 88. Vogt was quoting Broca's data.

30 Gould, *Mismeasure of Man* (cit. n. 6),103.

31 Broca's work on the cranial capacities of skulls taken from three cemeteries in Paris was the most important source for this conclusion. See his 'Sur la capacité des cranes parisiens des divers époques', *Bulletin de la Société d'Anthropologie Paris*, 3 (1862), 102–16.

32 Ellis, *Man and Woman* (cit. n. 8),106–7.

33 Alexander Sutherland, 'Woman's Brain', *Nineteenth Century*, 47 (1900), 802–10; and Ellis, *Man and Woman*, 98. Ellis was on the whole, however, cautious about the conclusions that could be drawn from skull capacities and brain weights.

34 Stanley Fish, 'Working on the Chain Gang: Interpretation in the Law and Literary Criticism' in W. J. T. Mitchell (ed.), *The Politics of Interpretation* (Chicago: University of Chicago Press, 1983), 277.

35 Max Black, as cited in Ortony, *Metaphor and Thought* (cit. n. 1), 5.

36 Black, *Models and Metaphor* (cit. n. 7), 44.

37 Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 2nd edn., 1973) esp. ch. 4; and Thomas S. Kuhn, 'Metaphor in Science', in A. Ortony (ed.) *Metaphor and Thought*, 409–19, on 415.

38 Barry Barnes, *Scientific Knowledge and Sociological Theory* (London: Routledge & Kegan Paul, 1974), 49.

39 Gould, *Mismeasure of Man* (cit. n. 6), 73–112. For another example see Stephen Jay Gould, 'Morton's Ranking of Race by Cranial Capacity', *Science*, 200 (l978), 503–9.

40 Gould, *Mismeasure of Man*, 120–1.

41 Terence Hawkes, *Metaphor* (London: Methuen 1972), 88, suggests that metaphors 'will retrench or corroborate as much as they expand our vision', thus stressing the normative, consensus-building aspects of metaphor.

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ARTICLES

A Manifesto for Cyborgs: Science, Technology, and Socialist Feminism in the 1980s

Donna Haraway

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 humor and serious play. It is also a rhetorical strategy and a political method, one I would like to see more honored within socialist feminism. At the center 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 experience', 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 of 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 U.S. 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. 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. The cyborg is our ontology; it gives us our politics. The cyborg is a condensed image of both imagination and material reality, the two joined centers 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; the tradition of the appropriation of nature as resource for the production 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 post-modernist, 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.

The cyborg is a creature in a post-gender world; it has no truck with bisexuality, pre-Oedipal symbiosis, unalienated labor, 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 most powerfully for us in psychoanalysis and Marxism. Hilary Klein has argued that both Marxism and psychoanalysis, in their concepts of labor 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. 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; i.e., 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 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 of 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 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 sciences. 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 for the meanings of the breached boundary.[1] The cyborg appears in

myth precisely where the boundary between human and animal is transgressed. Far from signalling 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 specter 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 determinism 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.[2] 'Textualization' of everything in post-structuralist, post-modernist theory has been dammed by Marxists and socialist feminists for its utopian disregard for lived relations of domination that ground the 'play' of arbitrary reading.[3]* It is certainly true that post-modernist strategies, like my cyborg myth, subvert myriad organic wholes (e.g., the poem, the primitive culture, the biological organism). In short, the certainty of what counts as nature — a source of insight and a 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, i.e., 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 artifacts have politics, so why shouldn't we?[4]

* See over.

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 the Harlequin romances 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 micro-electronic 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 pre-eminently 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 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

* A provocative, comprehensive argument about the politics and theories of 'post-modernism' is made by Frederick Jameson, who argues that post-modernism 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 post-modernism, an essentially moralist move. My position is that feminists (and others) need continuous cultural reinvention, post-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, e.g., into man and woman, white and black. 'Advanced capitalism' and post-modernism 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, History of Sexuality,* and *Discipline and Punish* 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, Genencor, 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 culture politics.

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.[5] 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 very well, than by the militant labor of older masculinist politics, whose natural constituency needs defense 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 miniscule coding changes of an antigen in the immune system, 'no more' than the experience of stress. The nimble little fingers of 'Oriental' women, the old fascination of little Anglo-Saxon Victorian girls with doll 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 Rita 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 artifacts associated with 'high technology' and scientific culture. From *One-Dimensional Man* to *The Death of Nature*,[6] 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 worldwide

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 War apocalypse waged in the name of defense, about the final appropriation of women's bodies in a masculinist orgy of war.[7] 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 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, avidity.)

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 being '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 U.S. left and U.S. feminism has been a response to this kind of crisis by endless splitting and searches for a new essential unity. But there has also been a growing recognition of another response through coalition — affinity, not identity.[8]

Chela Sandoval, from a consideration of specific historical moments in the formation of the new political voice called women of color, 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.[9] '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 post-modernist identity out of otherness and difference. This post-modernist identity is fully political, whatever might be said about other possible post-modernisms.

Sandoval emphasizes the lack of any essential criterion for identifying who is a women of color. She notes that the definition of the group has been by conscious appropriation of negation. For example, a Chicana or U.S. 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 non-white women; 'black' negated all non-black people, as well as all black women. But there was also no 'she', no singularity, but a sea of differences among U.S. women who have affirmed their historical identity as U.S. women of color. 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.[10] 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 worldwide development of anti-colonialist discourse, i.e., discourse dissolving the 'West' and its highest product — the one who is not animal, barbarian, or woman; i.e., man, the author of a cosmos called history. As orientalism is deconstructed politically and semiotically, the identities of the occident destabilize, including those of feminists.[11] Sandoval argues that 'women of color' 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 own political tendencies appear to be the *telos* of the whole. These taxonomies tend to remake feminist history to appear 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.[12] Taxonomies of feminism produce epistemologies to police deviation from official women's experience. And of course, 'women's culture', like women of color, is consciously created by mechanisms inducing affinity. The rituals of poetry, music, and certain forms of academic practice have been pre-eminent. The politics of race and culture in the U.S. 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.

It is important to note that the effort to construct revolutionary standpoints, 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 post-modernist 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 naïveté 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 (i.e., 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 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 labor 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. Labor is the pre-eminently privileged category enabling the Marxist to overcome illusion and find that point of view which is necessary for changing the world. Labor is the humanizing activity that makes man; labor 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 labor to accommodate what (some) women did, even when the wage relation was subordinated to a more comprehensive view of labor under capitalist patriarchy. In particular, women's labor in the household and women's activity as mothers generally, i.e., reproduction in the socialist feminist sense, entered theory on the authority of analogy to the Marxian concept of labor. The unity of women here rests on an epistemology based on the ontological structure of 'labor'. 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 labor or of its analogue, women's activity.[13]* The

* 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 post-modernism. For me, both the universalizing moves and the 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 construction of gender and gendered social life.

inheritance of Marxian humanism, with its pre-eminently 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 version of radical feminism is itself a caricature of the appropriating, incorporating, totalizing tendencies of Western theories of identity grounding action.[14] 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 epistemology 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 radical 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 labor, 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; i.e., the self-knowledge of a self-who-is-not.

Perversely, sexual appropriation in this radical feminism still has the epistemological status of labor, i.e., the point from which 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 laborer 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 partiarchy 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 reinscription of history, radical feminism can accommodate all the activities of women named by socialist feminists as forms of labor only if the activity can somehow be sexualized. Reproduction had different tones of meanings for the two tendencies, one rooted in labor, 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 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 labor//alienation
labor, by analogy reproduction, by extension sex, by addition
race
Radical Feminism —
structure of gender//sexual appropriation//objectification
sex, by analogy labor, by extension reproduction, by addition
race

In another context, the French theorist Julia Kristeva claimed women appeared as a historical group after World War II, along with groups like youth. 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 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.

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 worldwide 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:

Representation	Simulation
Bourgeois novel, realism	Science fiction, post-modernism
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 labor	Ergonomics/cybernetics of labor
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
Cooperation	Communications enhancement
Freud	Lacan
Sex	Genetic engineering
Labor	Robotics
Mind	Artificial Intelligence
World War II	Star Wars
White Capitalist Patriarchy	Informatics of Domination

This list suggests several interesting things.[15] 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'. In relation to objects like biotic components, one must think not in terms of essential properties, but in terms of strategies 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 the 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 underdevelopment, 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 analyzed so well. The privileged pathology affecting all kinds of components in this universe is stress — communications breakdown.[16] 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 World War II 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 (Sofoulis) 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 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, post-modern 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 worldwide. 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 — *the 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 information. 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, socio-biological evolutionary theory, and immunobiology. The organism has been translated into problems of genetic coding and read-out. Biotechnology, a writing technology, informs research broadly.[17] 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 is here 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 guardians of human purity. Gay men, Haitian immigrants, and intravenous drug users are the 'privileged' victims of an awful immune-system disease that marks (inscribes on the body) confusion of boundaries and moral pollution.

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, labor-control systems, medical constructions of our bodies, commercial pornography, the international division of labor, and religious evangelism depend intimately upon electronics. Microelectronics is the technical basis of simulacra, i.e., of copies without originals.

Microelectronics mediates the translations of *labor* 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 feeble.

I have used Rachel Grossman's 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.[18] I use 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.[19] 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.

The homework economy

The 'new industrial revolution' is producing a new worldwide working class. The extreme mobility of capital and the emerging international division of labor 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 labor 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, language.

Richard Gordon has called this new situation the homework economy.[20] 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 labor force; seen less as workers than as servers; subjected to time 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 analyzed 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 tied to the power of the new communications technologies to integrate and control labor 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, e.g., 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 wage 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 U.S. 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 post-modernism — 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 World War I; 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 worldwide 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 labor-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 worldwide. Rae Lessor Blumberg estimates that women produce about fifty per cent of the world's subsistence food.[21]* 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 labor and differential gender migration patterns.

The new technologies seem deeply involved in the forms of 'privatization' that Ros Petchesky has analyzed, in which militarization, right-wing family ideologies and policies, and intensified definitions of corporate property as private synergistically interact.[22] 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 television seem crucial to production of modern forms of 'private

* 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 labor 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 labor. 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.

life'. The culture of video games is heavily oriented 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 imagination is militarized; and the other realities of electronic and nuclear warfare are inescapable.

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.[23] 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 hand-craft 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 hunting with the camera and the deeply predatory nature of a photographic consciousness.[24] 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 color, 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.[25]

This issue is only one aspect of inquiry 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 tie women together across the scientific-technical hierarchies separating us? Might there be ways of developing feminist science/technology politics in alliance with anti-military science facility conversion action groups? Many scientific and technical workers in Silicon Valley, the high-tech cowboys included, do not want to work on military science.[26] Can these personal preferences and cultural tendencies be welded into progressive politics among this professional middle class in which women, including women of color, are coming to be fairly numerous?

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.

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 work, like SEIU's District 925, should be a high priority for all of us. These efforts are profoundly tied to technical restructuring of labor processes and reformations of working classes. These efforts also are providing understanding of a more comprehensive kind of labor 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 toward 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 worldwide in connection with the social relations of science and technology are severe. But what people are experiencing is not transparently clear, and we 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 Ph.D. in biology for an Irish Catholic girl was made

possible by Sputnik's impact on U.S. national science-education policy. I have a body and mind as much constructed by the post-World War II arms race and cold war as by the women's movements. There are more grounds for hope by focusing on the contradictory effects of politics designed to produce loyal American technocrats, which as well produced large numbers of dissidents, rather than by 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.

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 Delaney, John Varley, James Tiptree, Jr., Octavia Butler, Monique Wittig, and Vonda McIntyre.[27] 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 should be credited with helping us to consciousness about how fundamental body imagery is to world view, and so to political language.[28] 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.[29]

American radical feminists like Susan Griffin, Audre 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.[30] 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 will look briefly at two overlapping groups of texts for their insight into the construction of a potentially helpful cyborg myth: constructions of women of color and monstrous selves in feminist science fiction.

Earlier I suggested that 'women of color' might be understood as a cyborg identity, a potent subjectivity synthesized from fusions of outsider identities. There are material and cultural grids mapping this potential. Audre Lorde captures the tone in the title of her *Sister Outsider*. In my political myth, Sister Outsider is the offshore woman, whom U.S. 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, 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 color' are the preferred labor force for the science-based industries, the real women for whom the worldwide sexual market, labor 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 labor so attractive to the multinationals.

Contrary to orientalist stereotypes of the 'oral primitive', literacy is a special mark of women of color, acquired by U.S. 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 of oral and written cultures, primitive and civilized mentalities, and more recently to the erosion of that distinction in 'post-modernist' theories attacking the phallogocentrism of the West, with its worship of the monotheistic, phallic, authoritative, and singular word, the unique and perfect name.[31] 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 U.S. women of color 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 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 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 fulfillment 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 color; and stories about language have a special power in the rich contemporary writing by U.S. women of color. 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 Cortés, carry special meaning for Chicana constructions of identity. Cherrie Moraga 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.[32] Moraga's writing, her superb literacy, is presented in her poetry as the same kind of violation as Malinche's mastery of the conquerer'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 erotic, competent, potent identities of women of color. 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 color, 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 pre-eminently 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 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 color 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; i.e., 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 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.[33] These real-life cyborgs, e.g., the Southeast Asian village women workers in Japanese and U.S. electronics firms described by Aiwa Ong, are actively rewriting the texts of their bodies and societies. Survival is the stakes in this play of readings.

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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 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. Insofar as we know ourselves in both formal discourse (e.g., biology) and in daily practice (e.g., 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.

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. Anne McCaffrey's *The Ship Who Sang* 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 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.

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The cyborgs populating feminist science fiction make very problematic the statuses of man or woman, human, artifact, member of a race, individual identity, 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, nor remove the growing scandal of gender. The feminist science fiction of Samuel Delany, especially *Tales of Neveryon*, 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 or 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 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 U.S. 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*).

Because it is particularly rich in boundary transgressions, Vonda McIntyre's *Superluminal* can close this truncated catalogue of

promising 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. Laenea becomes a pilot by accepting a heart implant and a host of other alterations allowing survival in transit at speeds exceeding that of light. Radu Dracul survives a virus-caused plague on 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.

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Monsters have always defined the limits of community in Western imaginations. The Centaurs and Amazons of ancient Greece established the limits of the centered 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.[34] The evolutionary and behavioural sciences of monkeys and apes have marked the multiple boundaries of late-twentieth-century industrial identities. 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 exceptions. 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.

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 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.

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: (1) the production of universal, totalizing theory is a major mistake that misses most of reality, probably always, but certainly now; (2) 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, 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 super-savers of the new right. It means both building and destroying machines, identities, categories, relationships, spaces, stories. Though both are bound in the spiral dance, I would rather be a cyborg than a goddess.

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Parts of the paper were my contribution to a collectively developed session, Poetic Tools and Political Bodies: Feminist Approaches to High Technology Culture, 1984 California American Studies Association, with History of Consciousness graduate students Zoe Sofoulis, 'Jupiter Space'; Katie King, 'The Pleasures of Repetition and the Limits of Identification in Feminist Science Fiction: Reimaginations of the Body after the Cyborg'; and Chela Sandoval, 'The Construction of Subjectivity and Oppositional Consciousness in Feminist Film and Video'. Sandoval's theory of oppositional consciousness was published as 'Women Respond to Racism: A Report on the National Women's Studies Association Conference', Center for Third World Organizing, Oakland, California, n.d. For Sofoulis's semiotic-psychoanalytic readings of nuclear culture, see Z. Sofia, 'Exterminating Fetuses: Abortion, Disarmament and the Sexo-Semiotics of Extraterrestrialism', Nuclear Criticism issue, *Diacritics*, vol. 14, no. 2 (1984), pp. 47–59. King's manuscripts ('Questioning Tradition: Canon Formation and the Veiling of Power'; 'Gender and Genre: Reading the Science Fiction of Joanna Russ'; 'Varley's *Titan* and *Wizard*: Feminist Parodies of Nature, Culture, and Hardware') deeply inform the cyborg manifesto.

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27. Katie King, 'The Pleasure of Repetition and the Limits of Identification in Feminist Science Fiction: Reimaginations of the Body after the Cyborg', California American Studies Association, Pomona, 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 Delany, *Tales of Neveryon*; Anne McCaffrey, *The Ship Who Sang, Dinosaur Planet*, Vonda McIntyre, *Superluminal, Dreamsnake*; Joanna Russ, *Adventures of Ayx, The Female Man*; James Tiptree, Jr., *Star Songs of an Old Primate, Up the Walls of the World*; John Varley, *Titan, Wizard, Demon*.
28. Mary Douglas, *Purity and Danger* (London: Routledge & Kegan Paul, 1966), *Natural Symbols* (London: Cresset Press, 1970).

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30. But all these poets are very complex, not least in treatment of themes of lying and erotic, decentered collective and personal identities. Susan Griffin, *Women and Nature: The Roaring Inside Her* (New York: Harper & Row, 1978); Audre Lorde, *Sister Outsider* (New York: Crossing Press, 1984); Adrienne Rich, *The Dream of a Common Language* (New York: Norton, 1978).
31. Jacques Derrida, *Of Grammatology*, trans. and introd. G. C. Spivak (Baltimore: Johns Hopkins University Press, 1976), esp. part II, 'Nature, Culture, Writing'; Claude Lévi-Strauss, *Tristes Tropiques*, trans. John Russell (New York, 1961), esp. 'The Writing Lesson'.
32. Cherrie Moraga, *Loving in the War Years* (Boston: South End Press, 1983). The sharp relation of women of color to writing as theme and politics can be approached through: 'The Black Woman and the Diaspora: Hidden Connections and Extended Acknowledgments', An International Literary Conference, Michigan State University, October 1985; Mari Evans, ed., *Black Women Writers: A Critical Evaluation* (Garden City, N.Y.: Doubleday/Anchor, 1984); Dexter Fisher, ed., *The Third Woman: Minority Women Writers of the United States* (Boston: Houghton Mifflin, 1980); several issues of *Frontiers*, esp. vol. 5 (1980), 'Chicanas en el Ambiente Nacional' and vol. 7 (1983), 'Feminisms in the Non-Western World'; Maxine Hong Kingston, *China Men* (New York: Knopf, 1977); Gerda Lerner, ed., *Black Women in White America: A Documentary History* (New York: Vintage, 1973); Cherrie Moraga and Gloria Anzaldua, eds., *This Bridge Called My Back: Writings by Radical Women of Color* (Watertown, Mass.: Persephone, 1981); Robin Morgan, ed., *Sisterhood Is Global* (Garden City, N.Y.: Anchor/Doubleday, 1984). The writing of white women has had similar meanings: Sandra Gilbert and Susan Gubar, *The Madwoman in the Attic* (New Haven: Yale University Press, 1979); Joanna Russ, *How to Suppress Women's Writing* (Austin: University for Texas Press, 1983).
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Chapter 4.5

Evelynn M. Hammonds

NEW TECHNOLOGIES OF RACE

ON 18 JULY 1950 the *New York Times* announced "No Scientific Basis for Race Bias Found by World Panel of Experts." The article reported on the findings of a distinguished group of scientists, working under the auspices of the United Nations Educational, Scientific and Cultural Organization (UNESCO), who had reached a consensus that there "was no scientific justification for race discrimination."

> The Statement presented four premises: that mental capacities of all races are similar; that no evidence for biological deterioration as a result of hybridization existed; that there was no correlation between national or religious groups and any race; and fourth, that race was less a biological fact than a social myth.[1]

The UNESCO document was a highly politicized statement as both Elazar Barkan and Donna Haraway have shown.[2] In many respects it reflected the desire of some scientists to redress the excesses of Nazism where biological notions of racial difference and racial inferiority had been used to justify the extermination of Jews and homosexuals, rather than offering a balanced account of the contemporary scientific debates over the role of environment, heredity and culture in the observed differences between the races.

Several historians of science have argued that the publication of the UNESCO document signaled the end of mainstream scientific support for racial science. The division of the human species into biological races which had been of cardinal significance to scientists for over a hundred years was no longer viable as a research topic. Race, which in the pre-1950s period had been used to explain individual character and temperament, the structure of social communities, and the fate of human societies, was no longer central to the work of anthropologists or biologists. Even if one does not entirely accept this assessment, and it is debatable whether most scientists did, it is argued that, at the very least, the belief in the fixity, reality and

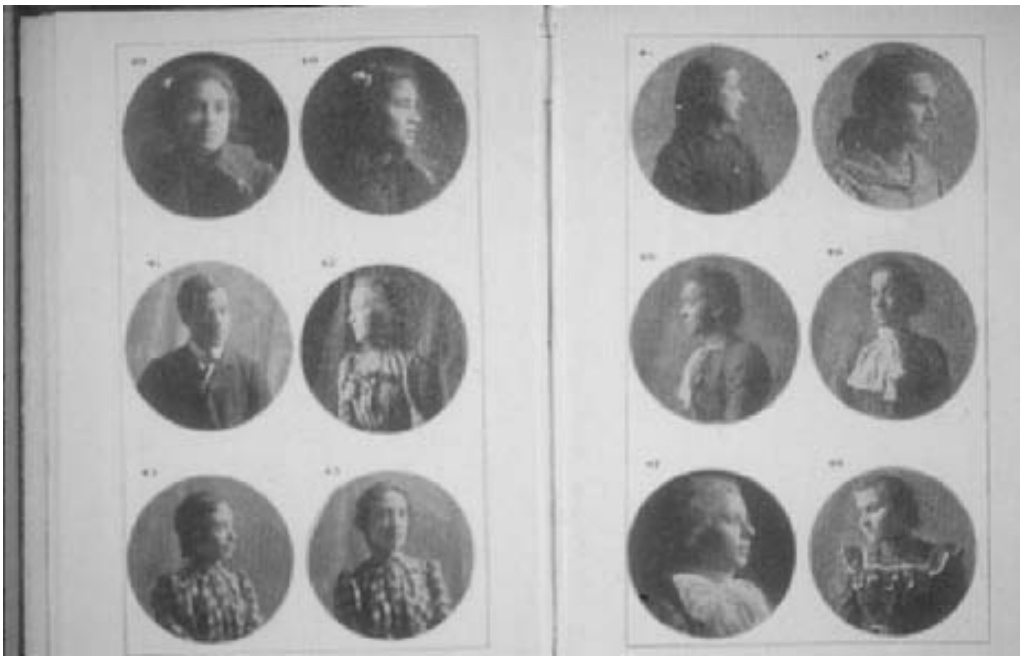
hierarchy of human races – in the chain of superior and inferior human types – which had shaped the activities of scientists for most of the twentieth century had ceased to be a central feature of biological and anthropological research. Gone were the detailed cranial measurements, the tables of racial comparisons, the construction of racial typologies, and the reconstruction of racial histories in mainstream scientific journals. Instead, as Nancy Stepan argues, in their place we find discussions of populations, gene frequencies, selection and adaptation. The biological study of human diversity is now permeated with the language of genetics and evolution. "Race," Stepan asserts, "lost its reality and naturalness, to such an extent that probably the majority of scientists even go so far as to consider the very word 'race' unnecessary for purposes of biological inquiry."[3]

I suggest that these scientists and historians of science have misread the observed shift in biology and anthropology from studies of gross morphological studies of racial difference to studies of populations and gene frequencies. In the US race has always been dependent upon the visual. I argue that the notion of race – both as a social and scientific concept – is still deeply embedded in morphology, but it is the meaning given to morphological differences that has been transformed. Race, defined biologically in terms of morphological differences between certain pure types: white, African, Asian, etc., and in particular the mixing of these pure racial types, has been re-inscribed in the new computer technology of "morphing" and, as such, separated from its previous antecedents in the history of anti-miscegenation, and racial oppression.[4] "Morphing," a computer software term for "making one thing appear to turn into another," denotes shape changing while carrying along with it a change in identity. In this technology persons of different races are not produced as a result of sexual intercourse between persons of two different races but by a computer-generated simulation of the mixing of genetic characteristics that are presumed to be determinants of morphological differences between pure racial types. Morphing is not simply, as Emily Martin notes, "a car transformed into a tiger or Arnold Schwarzenegger turning into a pool of liquid metal in *Terminator 2*," but it is also the technological production of new racial types as in Michael Jackson's *Black or White* video where whites turn into aborigines as easily as he himself morphs into a black panther. Miscegenation then becomes an instance of border crossing between the human and the "other." The "other" includes the non-human and also the more familiar "other," non-white humans. In such a case technological artistry masks the imbrication of power, which is never articulated, in such transformations of white into non-white, and the non-white into animal. These transformations serve as late twentieth-century versions of the Great Chain of Being. Morphing, with its facile device of shape-changing, interchangeability, equivalency, and feigned horizontality in superficial ways elides its similarity with older hierarchical theories of human variation. However, as I will discuss, the new technology of race, morphing, is at the center of an old debate about miscegenation and citizenship in the United States.

W. E. B. DuBois and the amalgamation of the races

In 1897, the Harvard-educated W. E. B. DuBois inaugurated a series of sociological studies of African Americans at Atlanta University. These studies were designed to

provide objective scientific sociological data on the questions concerning the conditions of African Americans in the United States. His goal was to produce "an increasing body of scientifically ascertained fact, instead of the vague mass of the so-called Negro problems." Through the studies DuBois assaulted the prejudiced generalizations made by whites, who sometimes based their "facts" about African Americans on evidence as flimsy as observations made through train windows while traveling through the South. In 1906 he published *The Health and Physique of the Negro American*, in which he addressed one of the most intractable questions in the discourse about race – the "fixity" of the concept of race.[5] He argued against the assumption that of all the races, the Negro race, by reason of its pronounced physical characteristics, was easiest to distinguish. The human species, he noted, "so shade and mingle with each other that not only, indeed, was it impossible to draw a color line between black and other races, but in all physical characteristics the Negro race cannot be set off by itself as absolutely different."[6] DuBois wanted his scientific facts to prove the lie that African Americans were inherently different from whites by pointing out the fact that "All the great peoples of the world are the result of a mixture of races."[7] Race mixing at the turn of the century posed a problem for those whites who believed in the purity of racial types. The progeny of such mixtures were alternately viewed as superior intellectually and physically to the pure Africans, or inferior to them. DuBois wanted to demonstrate both the extent of race mixing in the United States and to dispel the notion that these mixed people were inferior. Race mixing was not an innocent act in this period. There were laws against it in many states. Southern laws against marriage between the races in effect sanctioned the rape of Black women and made all progeny of even consensual unions between whites and blacks illegitimate. The progeny of such unions were designated as Negro despite their mixed ancestry. Given this situation DuBois argued that an African American should not "stoop to mingle his blood with those who despise him."[8] The existence of mixed bodies – the miscegenated – while an "open secret," was denied by whites because the admission of such would implicitly acknowledge the humanity of African Americans and the denial of citizenship to them. Miscegenation, and the bars against it, as DuBois rightfully identified, were about belief in a hierarchy of racial types which was explicitly used to deny the status of citizenship to all those who carried any evident physical signs of African heritage. Along with sociological data DuBois used the then new technology, photography, to make visible the evidence of race mixing that white society denied. DuBois' photographic evidence, rendered in the style of turn-of-the-century ethnographic studies of race, was deployed to show that race mixing was a fact of American life and that the dependence upon visual evidence to determine who was "black" or "white" was specious at best. These photographs of male and female African Americans were largely head shots – frontal and profile, displaying skin tones ranging from very dark to very light visually indistinguishable from whites (see Figures 4.5A and 4.5B) The photographs were accompanied by text describing each person's lineage. In particular DuBois emphasized that talent and educational achievement were not associated with one skin color or ancestral heritage. Through the critical deployment of the photographs and the vast sociological data he gathered, DuBois' work undermined biological conceptions of race and emphasized its social construction.



Figures 4.5A "DuBois' photographs of Negro Americans"

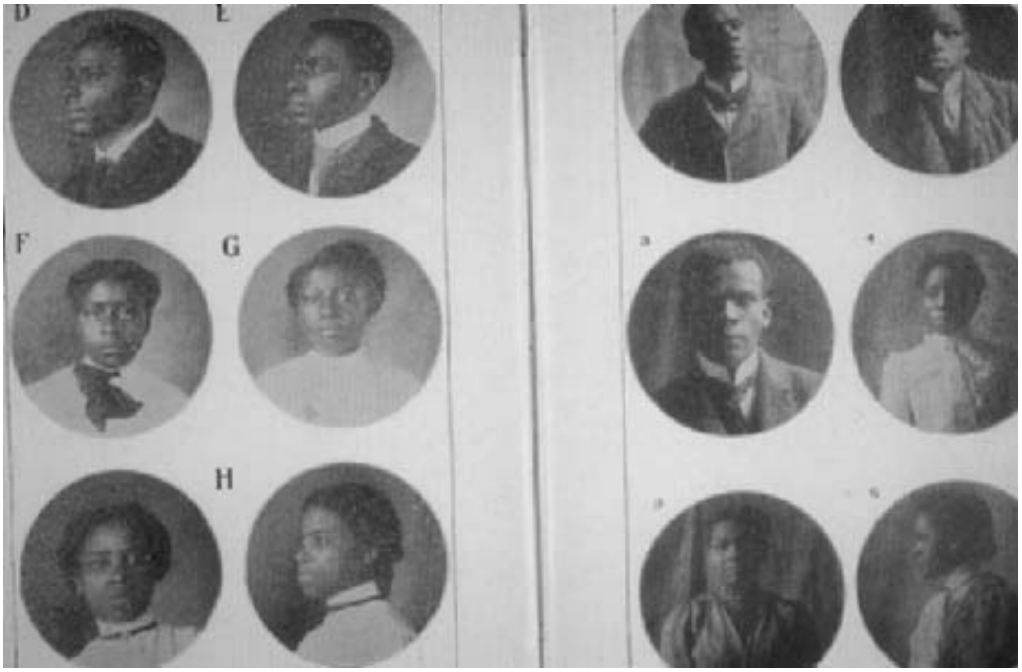


Figure 4.5B "DuBois' photographs of Negro Americans"

What color is Black?

The 13 February 1995 cover story of *Newsweek* magazine, was entitled "What Color is Black? Science, Politics and Racial Identity." Interestingly, inside, the title of the lead article changed slightly to "What Color is Black? What Color is White?" The cover displayed a short description of the article:

> The answers aren't simple. Immigration is changing the hue of America. Intermarriage has spawned a generation proud of its background, eager for its place at the American table. As always, race drives American domestic policy on issues from legislative districts to census counts. And path-breaking scientists insist that three racial categories are woefully inadequate for the myriad variations of our species.[9]

Immigration followed by intermarriage are said to be the driving forces behind this "new" aspect of race relations in America. The article appeared twenty-eight years after the last state anti-miscegenation law was struck down.[10] It appeared forty-five years after the UNESCO document on race, yet it asserted on the one hand that race is a biological concept – "race is a notoriously slippery concept that eludes any serious attempt at definition: it refers mostly to observable differences in skin color, hair texture and the shape of one's eyes or nose" – while also pointing out that most scientists argue that race is a mere social construct.[11] After reporting the current scientific data about racial differences for several pages, the authors conclude:

> Changing our thinking about race will require a revolution in thought as profound and profoundly unsettling, as anything science has ever demanded. What these researchers are talking about is changing the way in which we see the world – and each other. But before that can happen, we must do more than understand the biologist's suspicion about race. We must ask science, why is it that we are so intent on sorting humanity into so few groups – us and Other – in the first place.[12]

But *Newsweek*'s cover offered a representation of race – pictures of people of color of various shades in photographs cropped to emphasize shape of head, nose and lips – at odds with its text which emphasized that science was unable to provide a definitive or rather comfortable answer about the social meaning of racial difference (see Figure 4.5C). Here we see the visual display of a variety of people of color which made race seem "real," while the scientists' commentary emphasized that the reliance upon categories based on groupings of physical types had no meaning for the scientific study of race and, by implication, the socio-political debates as well. Interestingly, in *Newsweek*'s typology the persons who are raced are those who are not white. No photographs depicting differences among whites or between whites and people of color are displayed, suggesting that the differences among those classified as Black (or African American) is what is at issue.

Newsweek took a decidedly conventional approach to the "newly" defined problem of race in America. It concentrated on the divergence between biological and social meanings of race as represented by the differences among people of color. The text

SOCIETY

WHAT COLOR IS BLACK?

And what color is white? The markers of racial identity are every conceivable hue—and suddenly matters of ideology and attitude as much as pigmentation.

BY TOM MORGANTHAU

NEARLY 400 YEARS AFTER THE FIRST AFRICAN CAME ASHORE at Jamestown—and 40 years after Rosa Parks launched the Montgomery bus boycott—Americans are still preoccupied with race. Race divides us, defines us and in a curious way unites us—if only because we still think it matters. Race-based thinking permeates our law and policy, and the sense of racial grievance, voiced by blacks and whites alike, infects our politics. Blacks cleave to their role as history's victims; whites grumble about reverse discrimination. The national mood on race, as measured by NEWSWEEK's latest poll, is bleak: 75 percent of whites—and 86 percent of blacks—say race relations are "only fair" or "poor."

But the world is changing anyway. By two other measures in the same NEWSWEEK Poll—acceptance of interracial marriage and the willingness to reside in mixed-race neighborhoods—tolerance has never been higher. The nation's racial dialogue, meanwhile, is changing so rapidly that the familiar din of black-white antagonism seems increasingly out of date. Partly because of immigration—and partly because diversity is suddenly hip—America is beginning to revise its two-way definition of race. Though this process will surely take years, it is already blurring our sense that racial identity is fixed,

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Figure 4.5C "What color is Black?"
(*Newsweek*, 13 February 1995)

implied that morphological differences of skin color, for example, were no longer stable markers of race. However, unlike DuBois' use of visual markers to emphasize the link between whites and Africans that produced racially mixed African Americans, *Newsweek*'s use of the visual was employed to deny such a link. Propelled by demographic changes due to immigration and the increase in interracial marriages

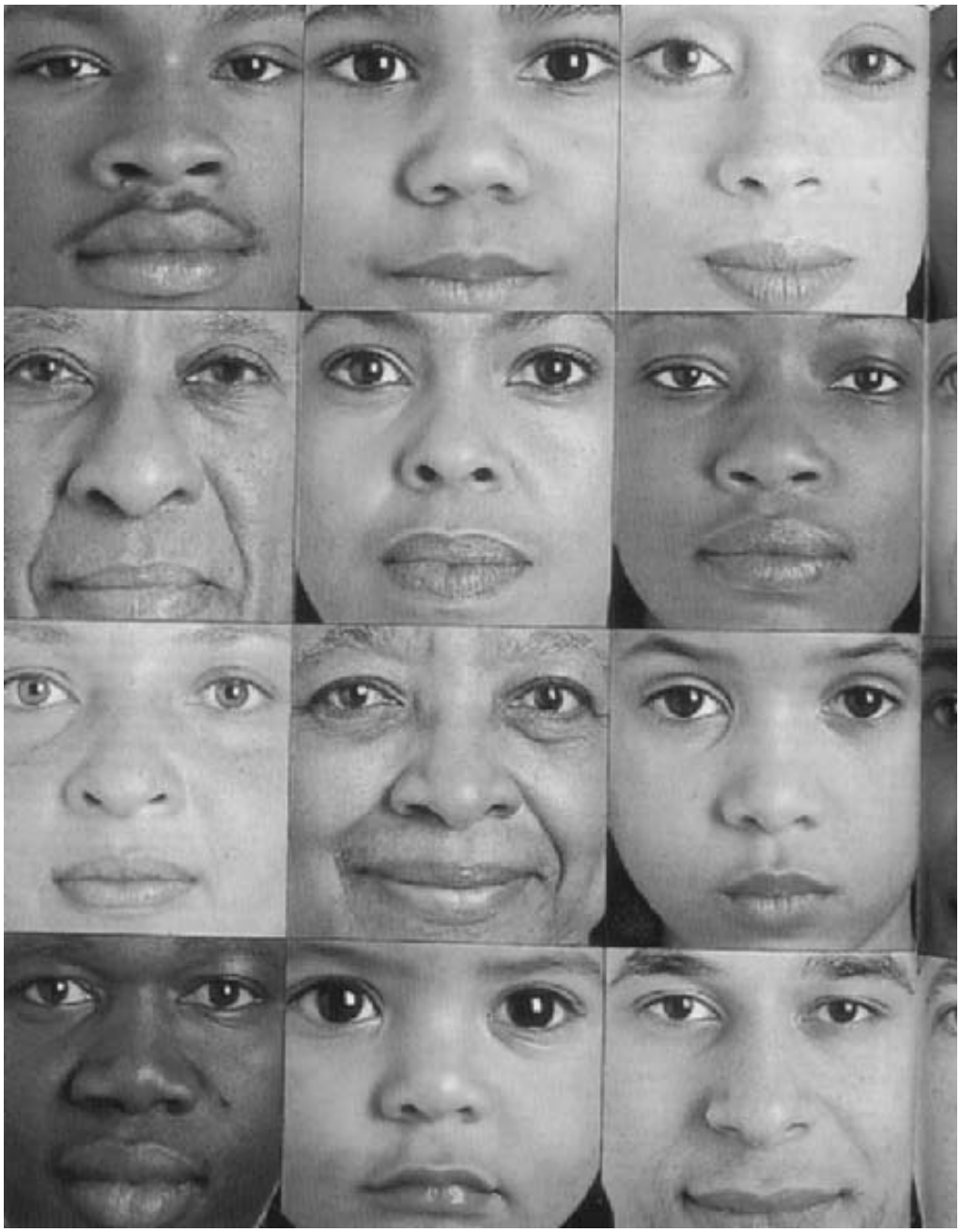


Figure 4.5C "What color is Black?"
(*Newsweek*, 13 February 1995)

within the US, the major theme of the issue concerned the upcoming census of the year 2000 and the categories by which United States' citizenship will be defined. The difference between DuBois' day and our own is that today racially mixed people are increasingly refusing to be relegated to a subordinate social status based on presumed biological differences.

Newsweek followed on the heels of a much more novel approach to the topic, where biology was supplanted by computer technology in the representation of racial difference – *Time* magazine's special issue in the Fall of 1993, "The New Face of America: How Immigrants Are Shaping the World's First Multicultural Society." The cover featured a slightly tanned woman, with brown straight hair, somewhat almond-shaped eyes and slightly full lips (see Figure 4.5D). The side bar read, "Take a good look at this woman. She was created by a computer from a mix of several races. What you see is a remarkable preview of . . . The New Face of America."[13] The introduction to the issue by managing editor, Jim Gaines, revealed the true identity of the cover girl.

> The woman on the cover of this special issue of *Time* does not exist – except metaphysically. Her beguiling if mysterious visage is the product of a computer process called morphing – as in metamorphosis, a striking alteration in structure or appearance. When the editors were looking for a way to dramatize the impact of inter ethnic marriage, which has increased dramatically in the U.S. during the last wave of immigration, they turned to morphing to create the kind of offspring that might result from seven men and seven women of various ethnic and racial backgrounds.[14]

The picture was generated by an Asian American computer specialist, dubbed a cybergeneticist, whose efforts are described as "in the spirit of fun and experiment." This covergirl, Eve, whom Donna Haraway has dubbed "SimEve," has an interesting lineage: she is 15 per cent Anglo-Saxon, 17.5 per cent Middle Eastern, 17.5 per cent African, 7.5 per cent Asian, 35 per cent Southern European and 7.5 per cent Hispanic. This breakdown of her racial heritage would be familiar to DuBois and any other early twentieth-century biologist or anthropologist. Eve was produced with the same software package. Morph 2.0, used in *Terminator 2* and the Michael Jackson video. *Time*'s cybergeneticist also produced a chart showing forty-nine different combinations of the progeny from seven males and seven females (see Figure 4.5E). Most of the images or "morphies" on the chart are a straight 50–50 combination of the physical characteristics of their progenitors, though the editors note that an entirely different image could be produced by using different combinations of features. Interestingly, after eyes, the most important parental feature is the neck, which they found often determined the gender of the offspring. The volume of specific features is also important. For example, if an African man has more hair than a Vietnamese woman, his hair will dominate. Of course, such manipulations of features produced some truly unexpected results as well. One of their "tentative unions" produced a distinctly feminine face – sitting atop a muscular neck and hairy chest. "Back to the mouse on that one," the editors wrote. In this case the implicit norms governing morphing appear to forbid any monstrous combinations paralleling late nineteenth-century rhetoric against the progeny of interracial unions which claimed that such hybrid persons were unnatural. With the *Time* cover we wind up not with a true composite, but a preferred or filtered composite of mixed figures with no discussion of the assumptions or implications underlying the choices.

The flippant, lighthearted tone of the essay about the "morphies" was used to deflect attention from the seriousness of the issues these images were supposed to

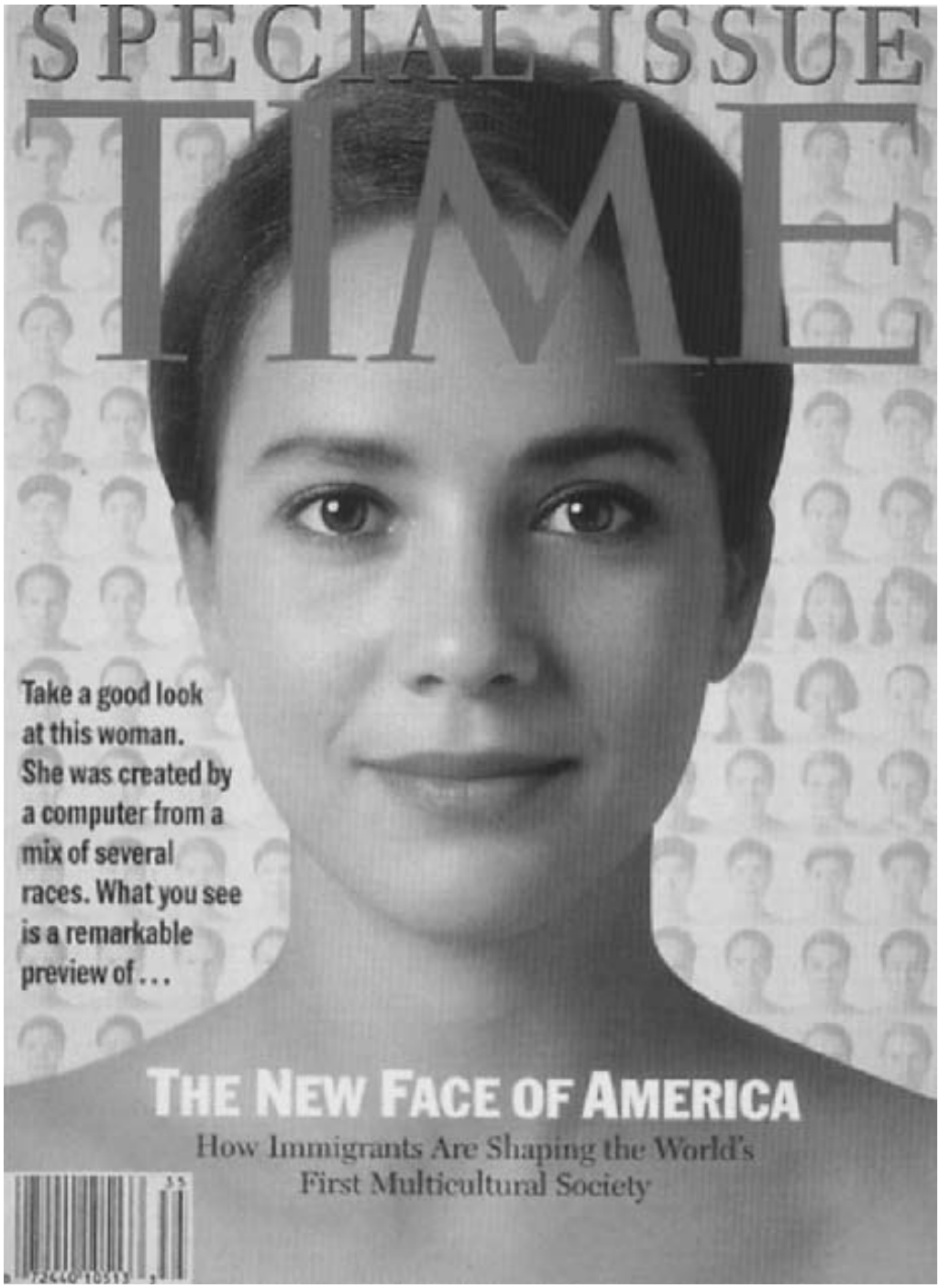


Figure 4.5D "The new face of America"
(*Time*, Fall 1993)

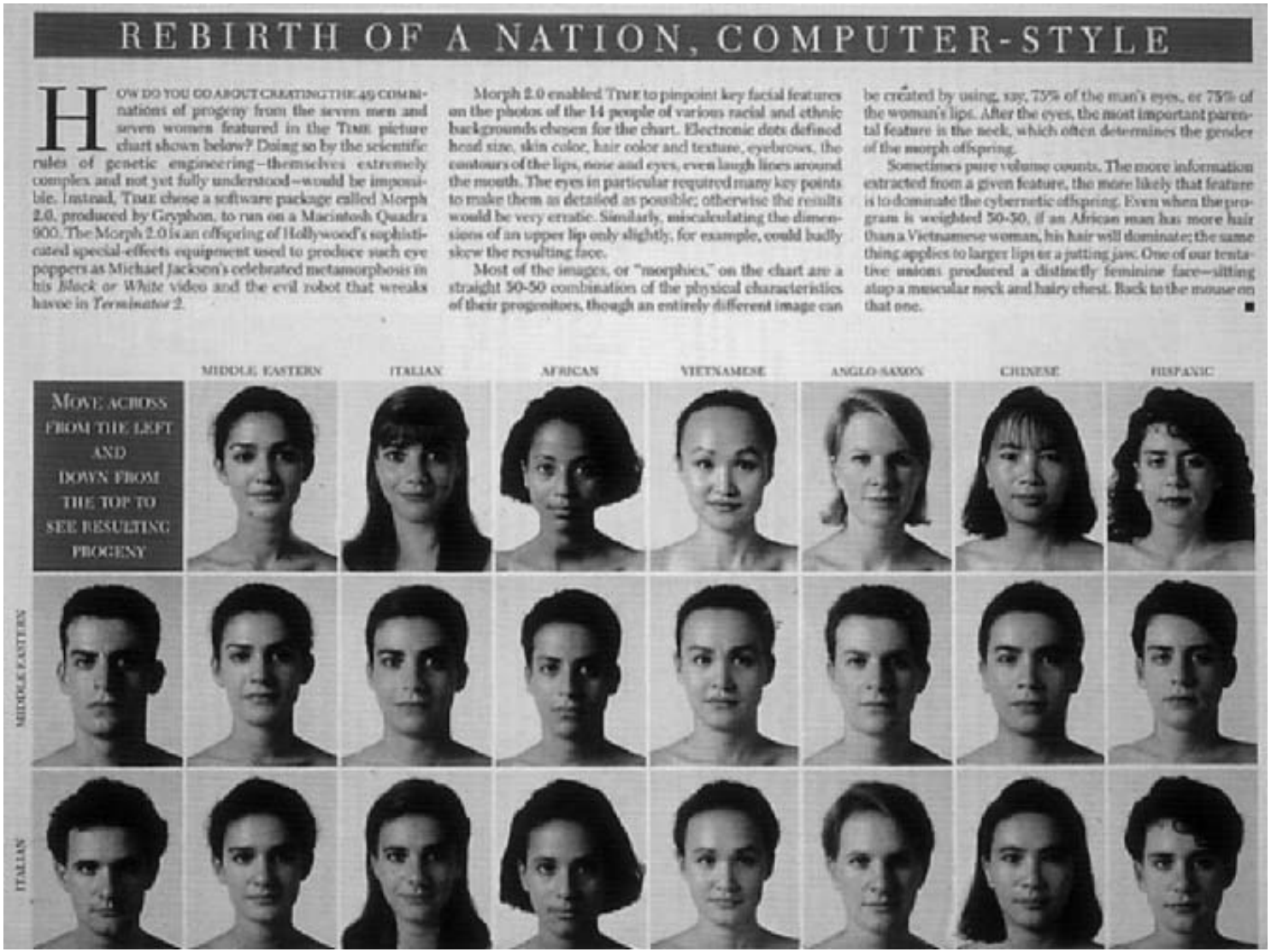
Figure 4.5E "*Time*s morphies' "

represent. Indeed, its very title, "Rebirth of a Nation, Computer-Style," invokes yet displaces the more complicated and feared history depicted in D. W. Griffith's *Birth of A Nation* onto the field of computer games (see Figure 4.5F). This special issue was, after all, about immigration – or more specifically about how citizenship will be determined in the United States in the next century. No need to trot in scientists to provide the now familiar caveats that gross morphological differences are of little use in categorizing humans and that races don't exist. *Time* showed that despite such assertions, to most Americans, race is embodied and, even with racial mixing, the existence of primary races is as obvious as the existence of primary colors in the Crayola crayon palette. There was no need to even explain the choice of categories used to produce the "morphies." We all know that "Anglo-Saxons" are different from "Italians" and so on. The computer allowed *Time* to uncritically take the three so-called basic races – white, black, Asian – and extend it to seven groups: Middle Eastern, Italian, African, Vietnamese, Anglo-Saxon, Chinese, and Hispanic. The resulting "morphies" are surprisingly similar in their physical features, yet the text makes no mention of this point. This silence on the issue of the morphological similarity of these racially mixed figures is interesting. The simultaneous recognition of greater diversity, on the one hand, and morphological similarity, on the other, suggests a strange logic of equivalence. A nose is a nose is a nose, no matter what your race is. Or is it? Is the reader to interpret this move as suggesting that morphological equivalence is an answer to the political conflict over race and citizenship that the upcoming census will surely engender? Is there a link between this logic and a political rhetoric of citizenship that assumes an interchangeability of characteristics that we all have in common but that are expressed slightly differently? *E pluribus unum?* What kind of citizenship is being imagined or configured in the logic of equivalences that morphing graphically enacts? Given the assumption of sameness with respect to power and privilege that the "morphies" inadvertently imply, will inequalities in the future be explained in terms of lack of ambition, intelligence, will, or ingenuity? Has morphological difference been supplanted by an implicit nod to behavioral and cultural differences? Or behavioral and cultural sameness? As the *Time* writers note: "Those who intermarry have perhaps the strongest sense of what it will take to return America to an unhyphenated whole. 'It's American culture that we all share'"[15]

Despite their tone and the explicit efforts to separate the resulting morphed images from the conflicted meanings they represent, the editors of *Time* came up against their own desires:

> Little did we know what we had wrought. As onlookers watched the image of our new Eve begin to appear on the computer screen, several staff members promptly fell in love. Said one: "It really breaks my heart that she doesn't exist . . ." We sympathized with our lovelorn colleagues, but even technology has its limits. This is a love that must forever remain unrequited.[16]

This is truly the drama of miscegenation in cyberspace. The history of white men crossing racial boundaries to have sexual relations with African, Asian, Mexican and Native-American women – and then refusing to acknowledge their offspring in order to reserve the right to determine how whiteness would be defined as a characteristic



REBIRTH OF A NATION, COMPUTER-STYLE

HOW DO YOU GO ABOUT CREATING THE 49 combinations of progeny from the seven men and seven women featured in the TIME picture chart shown below? Doing so by the scientific rules of genetic engineering—themselves extremely complex and not yet fully understood—would be impossible. Instead, TIME chose a software package called Morph 2.0, produced by Gryphon, to run on a Macintosh Quadra 900. The Morph 2.0 is an offspring of Hollywood's sophisticated special-effects equipment used to produce such eye poppers as Michael Jackson's celebrated metamorphosis in his *Black or White* video and the evil robot that wreaks havoc in *Terminator 2*.

Morph 2.0 enabled TIME to pinpoint key facial features on the photos of the 14 people of various racial and ethnic backgrounds chosen for the chart. Electronic dots defined head size, skin color, hair color and texture, eyebrows, the contours of the lips, nose and eyes, even laugh lines around the mouth. The eyes in particular required many key points to make them as detailed as possible; otherwise the results would be very erratic. Similarly, miscalculating the dimensions of an upper lip only slightly, for example, could badly skew the resulting face.

Most of the images, or "morphics," on the chart are a straight 50-50 combination of the physical characteristics of their progenitors, though an entirely different image can be created by using, say, 75% of the man's eyes, or 75% of the woman's lips. After the eyes, the most important parental feature is the neck, which often determines the gender of the morph offspring.

Sometimes pure volume counts. The more information extracted from a given feature, the more likely that feature is to dominate the cybernetic offspring. Even when the program is weighted 50-50, if an African man has more hair than a Vietnamese woman, his hair will dominate; the same thing applies to larger lips or a jutting jaw. One of our tentative unions produced a distinctly feminine face—sitting atop a muscular neck and hairy chest. Back to the mouse on that one. ■

MOVE ACROSS FROM THE LEFT AND DOWN FROM THE TOP TO SEE RESULTING PROGENY

MIDDLE EASTERN | ITALIAN | AFRICAN | VIETNAMESE | ANGLO-SAXON | CHINESE | HISPANIC

MIDDLE EASTERN

ITALIAN

Figure 4.5F "Rebirth of a nation, computer-style"

of citizenship – is simultaneously implied and disavowed. Race mixing in its newest form shapes our future not the past; bits and bytes replace the flesh and blood that provoked the guilt, hatred and violence of our country's history of racial domination. Hierarchies of domination have not disappeared as female reproduction is replaced by a masculine technophilic reproduction because stereotypical racial typologies remain in place.[17] I say this because no woman of color has ever symbolized citizenship in United States history, only the denial of citizenship. Women of color were among the last groups to achieve the right to vote and all the attendant rights of citizenship that flow from it. Donna Haraway argues that SimEve forever excites a desire that cannot be fulfilled and as such is an example of the dream of technological transcendence of the body. But I think SimEve carries a different meaning in the light of the history of miscegenation – because she is a cyber – she is the representation of the desire to deny kinship and retain masculine power based on the maintenance of racial difference.

Acknowledgement

I want to thank Jennifer Terry for her insightful comments on this chapter.

Notes

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2 Ibid., pp. 341–3; and Donna Haraway. *Primate Visions: Gender, Race and Nation in the World of Modern Science* (New York: Routledge, 1989), pp. 197–203.
3 Nancy Stepan, *The Idea of Race in Science* (Hamden, CT: Archon Press, 1982), p. 171.
4 These pure racial types are defined in terms of morphological differences such as hair texture, skin color, shape of eyes corresponding to geographical origin e.g. white Anglo-Saxon, African, etc.
5 W. E. B. DuBois (ed.), *The Health and Physique of the Negro American* (Atlanta: Atlanta University Press, 1906), p. 11.
6 Ibid., p. 16.
7 Ibid., p. 37.
8 Ibid., p. 39.
9 "What Color is Black? What Color is White?" *Newsweek*, 13 February 1995, p. 3.
10 In 1967, the US Supreme Court struck down the final existing anti-miscegenation laws in *Loving* v. *Virginia*.
11 *Newsweek*, 13 February 1995, p. 64.
12 Ibid., p. 69.
13 "The New Face of America," *Time* magazine, Special Issue, Fall 1993.
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15 Ibid., p. 65.
16 Ibid., p. 2.
17 Donna Haraway, "Universal Donors in a Vampire Culture: It's All in the Family.

Biological Kinship Categories in the Twentieth-Century United States," in William Cronon (ed.) *Uncommon Ground: Toward Reinventing Nature* (New York: Norton, 1995).

5 The Cyborg and the Crip

Critical Encounters

> Who cyborgs will be is a radical question; the answers are a matter of survival.
>
> —Donna Haraway, *Simians, Cyborgs, and Women*

Controversy came quickly to the cyborg. In 1983, *Socialist Review* invited several feminist theorists, among them Donna Haraway, "to write about the future of socialist feminism in the context of the early Reagan era."[1] Haraway responded with "A Manifesto for Cyborgs," framing the cyborg as a figure of feminist critique.[2] Her cyborg was a radical border-crosser, blurring the boundaries between human and animal, machine and organism, physical and non-physical.[3] Such a cyborg, she argued, could "guide us to a more livable place," an "elsewhere," in which "people are not afraid of their joint kinship with animals and machines, not afraid of permanently partial identities and contradictory standpoints."[4] This potential arose from the cyborg's hybridity, its transgression of boundaries and categories; because it does not, or cannot, privilege unity or sameness, it offers "a way out of the maze of dualisms" that characterize Western thought.[5]

Haraway positioned her cyborg as an intervention not only in Western dualism but especially in Western feminism, and her critique was focused along two fronts: first, feminist dismissals of science and technology, and second, feminist reliance on "universal, totalizing theory."[6] She argued that the cyborg's non-innocence—its origins in a militarized and colonizing technoscience—was precisely what made it a potentially productive tool for feminist analysis. It could lead to "the final imposition of a grid of control on the planet" or to a feminist politics in which we take pleasure and responsibility in technology; the key is to recognize this risky dual capacity as opening new possibilities for resistance.[7] The fragmented cyborg pushes us to see from

multiple perspectives at the same time, stressing that every perspective "reveals both dominations and possibilities unimaginable from the other vantage point."[8] Capable of "holding incompatible things together because both or all are necessary and true," the cyborg rejects binary logic and embraces contradiction.[9]

Nowhere is its contradictory stance more apparent than in terms of science and technology. As Haraway describes it in an interview, the manifesto is "neither technophobic, nor technophilic, but about trying to inquire critically" into the assumptions, uses, and implications of technoscience; it urges feminists to engage in and take responsibility for "the social relations of science and technology."[10] Thus, she warns against feminist approaches that serve only to heighten the dualism between science and nature by rejecting technology outright. Her manifesto is an alternative to those feminisms that "have insisted on the necessary domination of technics and recalled us to an imagined organic body."[11] The feminist task, then, is not to plot some escape from technology, or to map our return to a preindustrial Eden, but rather to contest for other meanings of, or other relations with, technoscience. The cyborg serves as a theoretical framework for such contestations.

Haraway describes her project as a challenge to "versions of Euro-American feminist humanism" that assume "master narratives deeply indebted to racism and colonialism."[12] The valorization of nature and the desire on the part of some feminists to cast all technology as phallocentric is one such master narrative; another is the development of a universalizing feminist theory dependent on monolithic ideas of "woman," articulations that prioritize gender over race and class. Haraway's second intervention, then, was in "some streams of the white women's movement in the United States" that naturalize "woman."[13] For Haraway, the boundary-crossing cyborg could be a productive intervention in such debates, shifting the terrain of feminist thought and practice from monolithic identities to shifting affinities. Drawing on Chela Sandoval's work on women of color and "oppositional consciousness," Haraway pushes for a feminism not "on the basis of natural identification, but . . . on the basis of conscious coalition, of affinity, of political kinship."[14] Through her cyborg figure, she suggests that "the future of socialist feminism" requires a politics open to the possibility that "[g]ender might not be a global identity after all, even if it has profound historical breadth and depth."[15]

Although Haraway explicitly positioned both the cyborg and its manifesto as feminist, not all readers shared that interpretation. Reflecting on the history of the manifesto, Haraway recalls that the *Socialist Review*'s East Coast Collective found the essay politically unsuitable, antifeminist, and devoid of critique; like many readers since then, they found the piece a naïve embrace of technology and urged that it not be published. The Berkeley Collective disagreed, ushering the piece into publication.[16] But the questions raged: Was the cyborg figure emancipatory or reactionary? Was the manifesto based in critique or was it an undertheorized celebration of technology? Could the cyborg figure point to a socialist feminist future? Were we all cyborgs, as Haraway claimed?[17]

These questions linger over twenty-five years later. Ecofeminists, queer theorists, and historians of new reproductive technologies, among others, continue to debate whether the cyborg figure provides a potentially emancipatory vision for the future.[18] Even theorists who dismiss the cyborg as passé engage in versions of this question; their challenge to the cyborg's continued relevance is only the latest iteration of the questions that have faced the figure from the beginning.[19] It is this question of the cyborg's efficacy in imagining different futures that leads me to take up the figure: Can the cyborg offer an effective model for disability theory and politics? Is it a useful figure for analysis? Is its usefulness tied to its status as metaphor, or should we approach it more literally? In other words, are disabled people cyborgs, and, if so, what can be gained through such an identification? What, finally, is the relationship between disability and the cyborg?

Haraway herself initiated a focus on disability. In the manifesto, she suggested that "[p]erhaps paraplegics and other severely handicapped people can (and sometimes do) have the most intense experiences of complex hybridization" because of their reliance on machines and prosthetics.[20] Other theorists quickly followed Haraway's lead, using disability and disabled bodies as illustrations or examples of cyborgism in their own articulations of cyborg theory.[21] Disability studies scholars joined the conversation as well, exploring the possibility that the cyborg as boundary-blurring hybrid could be a useful model for conceptualizing disabled bodies and theorizing disability.[22]

Even with all this attention given to the cyborg, however, there are few disability studies pieces that focus exclusively on the figure; the cyborg appears in passing as part of a larger exploration of disability and postmodern body theory, contemporary performance, or technological advances. The article-length analyses that do exist tend to focus on a specific cyborg technology, such as cochlear implants, or on a specific cultural representation, such as the Bionic Woman, rather than on the manifesto itself or on the cyborg as a political figure.[23] As a result, the cyborg's feminist histories are downplayed or ignored; the cyborg as a critical intervention in feminist theory is often not the cyborg that appears in disability studies.[24] Yet it is this cyborg we most need. Consider this chapter, then, an intervention in disability studies, one that recognizes key texts and terms in feminist theory, such as feminist commentary on the cyborg, as part of the archive of disability studies.

Of course, cyborg theory requires an intervention as well, for, far too often, disability functions in cyborg theory—including Haraway's manifesto—solely as an illustration of the cyborg condition. Markedly absent is any kind of critical engagement with disability, any analysis of the material realities of disabled people's interactions with technology. Disabled bodies are simply presented as exemplary, and self-evident, cyborgs, requiring neither analysis nor critique. If, as Haraway insists, cyborg bodies are not innocent, but are "maps of power and identity," then a close crip reading of the cyborg is long overdue.[25]

The cyborg figure certainly holds much promise for a disability politics; from its suspicion of essentialist identities to its insistence on coalition work to its interrogation

of ideologies of wholeness, the cyborg offers productive insights for developing a feminist disability vision of the future. Its disinterest in and refusal of temporalities ruled by "salvation history," "oedipal calendar[s]," and "rebirth without flaw" suggest the possibility of crip futurities, futurities grounded in something other than the compulsory reproduction of able-bodiedness/able-mindedness.[26] Moreover, Haraway's desire for a politics based on political affinity rather than biological identity can be a useful resource for disability studies scholars and activists crafting a movement among people with different impairments. A cyborg politics would not require an amputee, a blind person, and a psychiatric survivor to present their identities and experiences as the same, or even all amputees' experiences as the same, but rather would encourage the formation of flexible coalitions to achieve shared goals. Finally, Haraway's manifesto marks one of the first moments that disability and disabled people appear in feminist critical theory, and although that appearance leaves much to be desired, it serves as a vital opening into feminist and queer thought.

Rather than abandon the cyborg because of its ableist rhetoric and manifestations, I argue for a continued struggle with the figure, using it to stage our own blasphemous interventions in feminist theory. This struggle entails not only reimagining the cyborg from a critical crip position but also engaging seriously with existing critiques of the figure. In other words, what might disability studies learn from criticisms of the cyborg by women of color, by antiracist scholars, or by activists working to contest globalization? How can we use the figure of the cyborg not only to imagine disability differently but to imagine a cripped coalition politics? Thus, this chapter has two goals: first, to trace in detail the ways in which cyborg discourses universalize the experience of disability, removing it from the realm of the political; and second, to explore the possibility of a cripped cyborg politics, one that draws on the practices of feminist and queer disability activists and theorists. To twist Haraway's iconic, ironic prose: "Crip the Cyborg for Earthly Survival!"[27]

"Rise of the Cyborgs"

The cyborgs of popular culture bear little resemblance to the cyborgs of Haraway's manifesto. Robocops and Terminators, they are more likely to engage in spectacular acts of violent hypermasculinity than in feminist theory and practice; their enhanced bodies seem to reify gender differences rather than critique them. Indeed, feminist critics from Anne Balsamo to Claudia Springer warn that such cyborgs will do little to transform existing gender relations, and their exaggerated able-bodiedness suggests that they offer few resources to disability theory or politics.[28] My focus, then, is not on these cyborgs, but on the cyborgs of critical theory; I leave the disability critique of science fiction to others.[29] Jennifer Gonzalez argues, however, that cyborgs "function as evidence" of "differences, histories, stories, bodies, [and] places,"[30] making it important to mark the multiple articulations of the cyborg/disability relation. Before turning to Haraway and other cyborg theorists, then, I want to briefly engage the disabled

cyborg as it figures in the mainstream news media. Articles in the popular press frequently draw on the image of the cyborg in their coverage of disability and technology, suggesting a seamless link between "cyborg" and "disabled person" thanks to adaptive technology. This assumption of identification is one that runs throughout academic approaches to the cyborg.

"The immediate future is filled with hope for the disabled," exclaims Sherry Baker in her article "Rise of the Cyborgs" in *Discover*. Thanks to new developments in medical technology, we are "soon" going to be living in an era when "brainpower will let the paralyzed walk, [and] allow the mute to speak." Enabling "the paralyzed" to walk is one of the most common expectations for these technologies. A similar article in *Forbes*—also, and not coincidentally, called "Rise of the Cyborg"—showcases a hybrid assisted limb that "one day . . . may even let recovering stroke victims and paraplegics walk again." That story was followed a year later by "Cyborg Waiting List," which described disabled consumers' enthusiasm for the still-under-development device.[31]

The term "cyborg" in these stories, associated with the forward-looking "rise," operates as evocative shorthand for adaptive technology, associating such technology with a promising future for "the disabled." It quickly becomes clear, even after only a cursory reading of these kinds of cyborg stories, that "cyborg" and "physically disabled person" are seen as synonymous. Or, rather, that "person with physical disabilities" is a self-evident, commonsense category of cyborgism. The reporters do not explain what they mean by "cyborg" or what leads them to describe disabled people in cyborgian terms. They assume that their readers will easily and uncritically understand disabled people as cyborgs and link their future to one of medical technology; no explanation or definition is apparently required.

Representing the cyborg/disabled person relationship as both seamless and self-evident obscures the facts of these very technologies. In a context in which most disabled people in the United States are un- or underemployed, and in which almost a third of disabled people live below the poverty line, many of these cyborg technologies remain out of reach of the people for whom they are imagined.[32] The "cyborg-style iLimb Hand" heralded in the UK *Register*, for example, costs eighteen thousand dollars, and the price tag leaps higher if we include not only the device itself but the training and maintenance it likely requires.[33] The ability to become cyborg is too often economically determined.[34]

Presenting the cyborg/disability connection in a purely positive light also ignores the fact that, for many people, adaptive technologies can be painful; the same brace that makes it easier to walk may cause skin breakdown or other difficulties. Yet these news stories tend to focus only on the advantages brought by these technologies, describing the latest inventions in the language of healing and restoration. Tobin Siebers explains that such accounts presume that "[p]rostheses always increase the cyborg's abilities; they are a source only of new powers, never of problems."[35] As a result, these celebratory news stories present high-tech technology as solving the "problem" of disability;

pity and discrimination are rendered irrelevant here. So, too, are issues of adaptation and negotiation: as Siebers suggests, these cyborgian tales assume an easy melding of body and machine. The relationship between disability and technology is discussed only in terms of the devices' ability to normalize the body and/or to restore its previous function; there is nothing else to discuss, apparently, and the devices' value is assumed.

Many of these articles position cyborg technology as affecting only disabled people; nondisabled people may eventually use these devices, but they are not currently cyborgs in the same way as disabled folks. Baker predicts that, "[w]hile the immediate future is filled with hope for the disabled, cyborg technology may soon spread, giving ordinary people extraordinary skills."[36] On the one hand, Baker's claim can be seen as erasing the disabled/nondisabled divide in assuming that everyone can benefit from these technologies. On the other hand, however, her "soon" reminds us that disabled people are the only immediate cyborgs; "ordinary" people will have to wait.[37] For the time being, then, "cyborg" is linked more directly to disabled bodies than to able-bodied ones.

This distinction between disabled people and "ordinary" people surfaces in the raft of news stories covering Oscar Pistorius's attempt to compete alongside nondisabled runners in the 2008 summer Olympics (rather than in the Paralympics). With his gleaming high-tech prosthetics, Pistorius perfectly embodied the cultural understanding of a cyborg; he was one with his machine. The fact that his prosthetics, coupled with his training and athleticism, enabled him to run at breathtaking speeds only strengthened this description. Leslie Swartz and Brian Watermeyer discuss the ways in which the responses of the International Association of Athletics Federations reveal a profound anxiety about disabled athletes;[38] what I want to highlight here is the way in which news writers presented Pistorius as a definitive cyborg and, therefore, almost of a different species than his fellow runners. Anna Salleh, writing for an Australian news outlet, described the Pistorius case as one involving "the competing rights of cyborgs and non-cyborgs."[39] Bloggers from both sports and technology sites described the case in terms of the arrival of the "cyborg athlete," an arrival that would change everything about how we understand athletics. Not only was Pistorius's cyborgization taken for granted in these stories, but so, too—and relatedly—was his difference. As Swartz and Watermeyer note, doping can also be seen as cyborg technology, but athletes accused of doping are not described in those terms; physical disability and its attendant technologies render one cyborgian in a way nothing else can.[40]

The cyborg/noncyborg distinction points to a problematic assumption underlying popular conceptions of the cyborg. Although Haraway intended the figure to critique dualistic understandings of nature and culture or of human and machine, too often it serves only to reify such binary logic. In these news stories, "cyborg" represents the melding of pure body and pure machine; there is an original purity that, thanks to assistive technology, has only now been mixed, hybridized, blurred. To return to the Pistorius case, the athlete is simply a body; when it gets mixed with the prosthetic

machine, it becomes impure, mixed, cyborg. A nondisabled runner, in other words, is natural, unmixed, unadulterated; it is only the presence of the prosthetic that makes one impure, or no longer purely natural.[41] The "cyborg" concept thus serves to perpetuate binaries of pure/impure, natural/unnatural, and natural/technological; rather than breaking down boundaries, it buttresses them.

Heroic "Cyborg Citizens"

Science studies scholar Chris Hables Gray adheres to this binary logic—cyborg/not-cyborg, disabled/not-disabled—when casting quadriplegics as definitive cyborgs; their dependence on high-tech equipment obviously, in Gray's view, renders them true cyborgs. While he argues that "[a]lmost all of us are cyborged in some way," he repeatedly lifts up disabled people as particularly cyborgian.[42] Indeed, he opens his book *Cyborg Citizen* not with cyborgs from science fiction or computer wizards who describe themselves in cyborgian terms but with Christopher Reeve.[43] Under the title "The Crippling of Superman," Gray writes, "In 1995, Christopher Reeve, the actor famous for portraying Superman in the movies, fell from his horse Buck and became a quadriplegic. A sad story? Yes, certainly, but also a heroic cyborg tale."[44] Although I can find no instance of Reeve referring to himself as a cyborg, he apparently struck Gray as the most effective way to introduce the cyborg figure to his readers. As Gray explains in an earlier article (coauthored with Steven Mentor), "[T]he quadriplegic patient totally dependent on a vast array of high-tech equipment" is one of the best examples of a true cyborg.[45]

Gray frequently uses words like "invalid" and "patient" to refer to quadriplegics, terms that assume spinal cord injury to encompass the whole of one's identity. Right after introducing Reeve as the hero of a cyborg tale, Gray describes him as "a barely mobile creature, dependent on and intertwined with machines, a cybernetic organism trapped in power beds and wheelchairs."[46] This kind of language is directly related to Gray's depiction of quadriplegics as definitive cyborgs: if disability is all that is needed to render one cyborg, and disability is the sum of one's identity, then cyborg becomes one's identity. Quadriplegics, like Reeve, simply are cyborgs.[47]

This reduction of disabled people to their impairments, and their subsequent classification as cyborg, leads Gray to present disability politics in terms very different from those he uses in describing other political movements. Drawing on Haraway, Gray articulates the "cyborg citizen" as someone who recognizes the importance of crafting contingent alliances and engaging in dissent. Yet he praises Reeve for mobilizing a "united front of invalid cyborgs," describing how the late actor "catalyzed the unification" of disabled people in his quest for a cure.[48] This description is troubling for many reasons, perhaps most obviously for its implication that prior to Reeve's accident, people with mobility impairments were aimless, unconnected, and politically inactive, unable to participate in society. Gray's rhetoric suggests that not only is Reeve's quest for the cure the only appropriate response to disability, it is

also a quest that is shared by all disabled people.[49] What I want to highlight, though, is that Gray discusses politics as a process of unification and universal agreement *only* in terms of disability; elsewhere in his book he describes cyborg politics as contentious, diverse, and complicated, where one achieves or participates in "cyborg citizenship" through one's political acts. He primarily describes Reeve and his fellow "invalid cyborgs," however, in terms of their bodies, not their contentious acts, and repeatedly highlights their "unification." Thus, disability activists in general and Reeve in particular disappear when Gray moves on to articulate his politics of shifting and contingent alliances. This disappearance suggests that Gray is concerned with disability only insofar as he can use the disabled body as an illustration of human-machine interactions; disability as a complicated lived experience, and disabled people as a diverse group encompassing a range of opinions, are apparently not political, not in the realm of cyborg politics.

I focus on Gray because he offers such a clear example of the deployment of the disabled body in cyborg theory, but he is not alone in drawing this cyborg–disabled person connection, or in using Reeve as the exemplary cyborg. Cultural studies scholar Annie Potts, for example, begins her "taxonomy of cyborgs" by including Christopher Reeve alongside a list of science-fiction characters. Even though she goes on to list a range of cyborg criteria—most of them, I should note, medical or diagnostic—Reeve is the only human cyborg she mentions by name in her taxonomy.[50] By grouping him with fictional characters, she implies that his disability has rendered him less than human, or at least more cyborg than human. Journalists have followed suit, also using Reeve to describe cyborg technologies or to illustrate cyborgism.[51] This pattern is likely due in part to Reeve's celebrity; most readers are familiar with Reeve, making him an ideal case for explaining specific medical developments. But it is also due to the fact that the imagined figure of the quadriplegic—someone who uses a power wheelchair and ventilator—seems the perfect embodiment of popular understandings of the cyborg.[52] "Obviously," here is someone who transgresses boundaries between machine and organism, someone whose body doesn't end at the skin, someone who is, indisputably, a cyborg.

Thus the term "cyborg," rather than entailing a critique of existing categories and ideologies, is used to perpetuate distinctions between "normal" and "abnormal" bodies, distinctions that have material consequences involving discrimination, economic inequalities, and restricted access. If nondisabled people are persuaded by the assertion that disabled people are real-life cyborgs, then cyborg status signals a distinction between nondisabled people and disabled people. Cyborg qualities become markers of difference, suggesting an essential difference between disabled people and nondisabled people. Any potential transgressive tendencies in the term are lost when these labels become locked to certain bodies. "Cyborg" itself becomes reified, reduced to a particular kind of body.

"Paraplegics and Other Severely Handicapped" Cyborgs

It doesn't take long to realize that Haraway is someone who loves words.[53] Puns, alliterations, and unexpected pairings appear throughout her writing, and she frequently invents and combines words to illustrate her arguments. She plays extensively with language, and she does so consciously, explicitly; she is always quick to remind us of the multiple meanings of the words at hand. This play is integral to her politics: "If we are imprisoned by language, then escape from that prison-house requires language poets," she asserts, and "cyborg heteroglossia is one form of radical cultural politics."[54] Given the importance Haraway attributes to words, language, and stories, I want to pay close attention to the exact way in which she names disabled people in the cyborg manifesto. In the essay's final section, she writes, "Perhaps paraplegics and other severely handicapped people can (and sometimes do) have the most intense experiences of complex hybridization."[55] With that parenthetical "sometimes," Haraway leaves open the possibility that some disabled people might not achieve cyborgian hybridization, but states that those who do reach it experience "the most intense" versions of it. In noting that intensity, Haraway positions disability as one of the best means of achieving cyborgian boundary-blurring, suggesting that people with disabilities are exemplary cyborgs. Indeed, disabled people are one of the few types of "real-life cyborgs" hailed in the text.

When Haraway names "paraplegics and other severely handicapped people," she draws on the outdated (at least in the United States) language of "handicap."[56] At first glance, this terminology might be seen as a symptom of its time. First published in 1985, five years before the passage of the Americans with Disabilities Act, the manifesto could simply bear the traces of a time before the disability rights movement became more mainstream. Although many disability rights activists began calling for "people-first" language in the 1970s ("people with disabilities" as opposed to "disabled people") and referring to "disability" rather than "handicap," we might assume that Haraway, like many Americans, was unaware of such shifts in 1983, when she began the piece.[57] Legislation passed in the 1970s, for example, employed the language of "handicap," while later laws used "disability."[58] Yet, in the footnote attached to that sentence, Haraway uses the language of "the disabled/differently abled" and makes a quick reference to "the always context-relative social definitions of 'ableness.'"[59]

Why the difference? If Haraway were aware of the usage of "disabled," why did she deploy "severely handicapped" in the text, and not once but twice? My suspicion is that she needed to evoke in her readers an image of a person completely dependent on technology, an image of a body that could not possibly exist without a technological intervention. "Severe" plays in to exactly this notion, suggesting the most disabled bodies, the bodies most in need of rehabilitation and intervention.[60] "Handicapped" serves a similar purpose. Unlike "disabled," which potentially has more political overtones, or even "differently abled," which can be seen as a (naïve and unsuccessful) attempt to break down able-bodied/disabled binaries, "handicapped" is thoroughly immersed in

individual, medical, and charity models of disability. It is a label that makes it easier to see all disabled people as monolithically bound to their adaptive equipment and, relatedly, makes it harder to notice the lack of attention to the experiences or perspectives of disabled people.

It is useful here to note that the one example Haraway gives of such "severely handicapped people" is not a real person but a fictional character from Anne McCaffrey's *The Ship Who Sang*: a "severely handicapped child" who was so physically disabled that her only hope of survival was to have her brain removed from her body and placed inside a machine (the spaceship of the title). While Haraway celebrates the story for its challenge to assumptions about "[g]ender, sexuality, and embodiment," it certainly echoes longstanding ableist assumptions about the uselessness of physically disabled bodies and the necessity of the technological fix, even—or especially—one that destroys the disabled body altogether. But Haraway needed just such a figure to make her argument about the cyborg; she was relying on her readers having an idea of what "severe handicap" looks like, an idea as fictional as the one in the story. In other words, she needed the stereotyped assumption that "severe handicap" means "total dependence" in order to convince her readers of the existence of bodies that don't "end at the skin, or include at best other beings encapsulated by skin," the passage that immediately follows the reference to disability.[61]

Haraway's reference to disabled bodies serves as the bridge between her discussion of two groups of texts, the work of US women of color and feminist science fiction.[62] Although the disability passage makes reference to McCaffrey's fiction, it occurs before Haraway explicitly moves into her "very partial reading of the logic of the cyborg monsters" in feminist science fiction.[63] The "severely handicapped" girl in McCaffrey's story thus serves as the segue into that reading, but structurally, she remains apart from it. It is hard, then, to read disability or disabled bodies as active participants in the cyborg politics Haraway articulates. Disabled people serve neither as the creators of cyborg writing (they are not included in "women of color" or the authors of science fiction) nor as the subjects of feminist literary criticism. Nor, for that matter, as the active subjects in their own narratives: while Haraway uses the passive tense to describe the cyborg political work of *The Ship Who Sang* ("Gender, sexuality, embodiment, skill: all were reconstituted in the story"), she employs the active tense to describe the work of the characters in stories that do not hinge on the character's disabilities.[64] In other words, although Haraway recognizes the potential insights to be derived from the experience of living with disability technology, casting disability as a challenge to "organic holism," she presents disability in remarkably monolithic terms, as a single, universal experience. Moreover, it is one that can best be described by referencing a text of science fiction, one that presents disability as the site of spectacular technological fixing. Several paragraphs later, she mentions "[u]nseparated twins and hermaphrodites," other sites of disability, but only as the monsters of early modern France.[65] The disabled body, then, is figured within the manifesto as the creature of

futuristic fiction or the monstrous past; disabled bodies are, once again, cast as out of time. Disability may be a site of "complex hybridization," and disabled bodies may exemplify the cyborg, but their cyborgization appears as a type apart from the rest of the cyborg politics discussed here.

Haraway's naming practices are one of the most troubling aspects of the manifesto, and not only in terms of disability. Looking carefully at which kinds of bodies, or which identities, get positioned as cyborg makes clear the universalizing assumptions that operate within the text. Early in the essay, Haraway pairs two groups of women as cyborgs: "Ironically, it might be the unnatural cyborg women making chips in Asia and spiral dancing in Santa Rita jail whose constructed unities will guide effective oppositional strategies."[66] (Spiral dancing, she explains in a note at the bottom of the page, is "a practice at once both spiritual and political that linked guards and arrested anti-nuclear demonstrators at the Alameda County jail in the early 1980s.") While Haraway does not explicitly explain her reasons for this naming, she does hint at the processes making these women cyborgs. The Asian factory workers can be called cyborg because of their place in globalized capitalism. It is through their work in the assembly line, and their location in a region where multinational corporations can cut labor and safety costs, that they participate in the global economy. Their "nimble fingers," a description indebted to colonialist and racist stereotypes, link their bodies to the machines they are building. Based on Haraway's stated preference for affinity politics, it can be inferred that the Santa Rita protestors are cyborg because their anti-nuclear activism is based on coalition politics and affinity groups. Haraway may also position the protestors as cyborgs to stress that there is no position outside of technology; even as they protest certain manifestations of the technological age, they are simultaneously implicated in those same technologies.

Haraway gestures toward the reasons behind this naming, but she does not provide them, and it is that lack I want to highlight. Why is the act of Asian women making chips seen as self-explanatory, while the spiral dance requires definition? Spiral dancing may not be common knowledge, but neither are the reasons why assembling computer chips makes one "cyborg." Moreover, are there not differences between the kinds of activities and subjectivities Haraway links here—protestor and worker, jail and factory, Asia and the United States—that need exploring? Or what about the layers of history and assumption that lead to the differences in scale in Haraway's parallel, a single jail in a town in California versus the much more general, and generalizable, "Asia"?[67] In the next paragraph, Haraway goes on to praise "transgressed boundaries, potent fusions, and dangerous possibilities," and it is exciting to imagine what progressive work might be made possible by drawing links between such seemingly disparate groups and situations. At the same time, I'm left to wonder about the different effects of naming such groups "cyborg," questioning the consequences of making a global generalization based on a concept that developed in a particular historical moment.

I am not alone in these questions. Malini Johar Schueller, for example, argues that simply pairing these groups of women, linking them with an undertheorized "and," fails to attend to the differences in their location. While an alliance between these two groups of women could be "energizing and powerful," Schueller argues that "it cannot be articulated without an acknowledgment of the spatio-political difference of the demonstrators that positions them, in however weak a fashion, as beneficiaries of globalization and with different interests than Asian women laborers who, in the interests of feeding their families, might not always join the protestors against multinationals."[68] Joan Walloch Scott worries that Haraway's naming of women of color as cyborg adheres to an all-too-familiar pattern of white women idealizing, and thus otherizing, women of color as repositories of wisdom; "What," she asks, "is the difference between Haraway's looking to these groups for the politics of the future and . . . the romantic attribution by white liberal or socialist women to minority or working-class women of the appropriate (if not authentic) socialist or feminist politics?"[69]

Haraway herself acknowledges this problem during an interview with Constance Penley and Andrew Ross, who also question her choice to illustrate cyborgism in these terms. Haraway agrees that her "narrative partly ends up further imperializing, say, the Malaysian factory worker," noting that if she were to rewrite the manifesto, she would be much more cautious about attributing cyborgism to others. She goes on to speak of the need for a whole range of boundary creatures, in the hopes that expanding the kind of figures in her imaginary would reduce the imperialist effects of the cyborg; "Could there be," she hopes, "a family of figures who would populate our imagination of these postcolonial, postmodern worlds that would not be quite as imperializing in terms of a single figuration of identity?"[70]

Many other theorists join Penley and Ross in challenging Haraway's assertion that "we" are all cyborgs, echoing Haraway's later remarks about the ways in which the manifesto romanticizes and imperializes Asian factory workers. From Scott (who still finds the manifesto compelling) to Schueller (who does not), a range of feminist theorists have challenged Haraway's use of these women to illustrate her theory. None of them, however, question Haraway's connection between disabled people and cyborgs, none see parallels between the use of "third world women" as illustrations in first-world theory and the use of disabled people.[71] This lack of recognition, in my view, is the result of the depoliticization of disability and disabled bodies. Many feminist theorists have the tools and the training to recognize the imperializing move behind Haraway's description of the cyborged factory workers (or at least have the tools to recognize it once it has been pointed out to them) but lack the familiarity with disability studies to recognize these characterizations of disability as equally problematic, equally contentious. And this positioning, this generalization about (and, indeed, construction of) a particular group of people is seen as unremarkable, as benign and disinterested statement of fact rather than partial and contested interpretation.

Thus, in stark contrast to the controversy generated by Haraway's assertion that Asian women factory workers are real-life cyborgs, identifying disabled people with cyborgs is widely accepted without question. Labeling disabled people "cyborgs" is apparently without troubling implications or effects; such a move, even by nondisabled theorists, is not seen to require any self-examination or critical analysis. In making this contrast, I do not mean to suggest that race has already been adequately addressed in cyborg theory, or that we have solved the "problem" of race. As the editors of *Race in Cyberspace* note, references to the gendered cyborg abound, but texts exploring the race of the cyborg are fewer and farther between.[72] Rather, I am simply drawing attention to the fact that even as the cyborg continues to be bandied about in feminist, queer, and disability theory, we as cultural critics have still to reckon with its unspoken assumptions about bodies and physical difference.

What stands out in Haraway's analysis, then, is its reliance on narrow understandings of disability. She offers disabled people as exemplary hybrids, but without any examination of what such hybridization might feel like or entail. Disability may be an excellent site for witnessing the blurring of human and technology, but not, apparently, for exploring actual experiences of such blurring. Indeed, such experiences are collapsed under the category of "paraplegics and other severely handicapped people," a category which is itself presented as coherent and monolithic. Moreover, moving beyond the human/machine interface seems to require leaving disability behind: once Haraway moves into discussions about political identification, or shifting affinities, or future formations, disability and the disabled figure drop away altogether. Disability and disabled people are decontextualized, removed from the realm of the political, and presumed to play no active role in the category breakdowns that animate both the cyborg and the manifesto.

Cyborg Attachments

Given all these problems with the cyborg figure, perhaps it is time to move on. Not only do some scholars find the figure "somewhat tired and tiresome from academic overuse," but even Haraway herself has turned her attention elsewhere.[73] The concept of "companion species" has become her focus of late, particularly the co-constitutiveness of dogs and humans. Although the cyborg continues to surface in her work, it serves more often as a contrast to the dog or dogs; as she puts it, cyborgs "no longer do the work of a proper herding dog to gather up the threads needed for critical inquiry."[74]

Although I share Haraway's enthusiasm for the possibilities of companion species, and think that disability studies has much to offer those conversations, "A Cyborg Manifesto" and the cyborg figure continue to entice. Calls for replacement or successor figures and tropes (e.g., Ingrid Bartsch, Carolyn DiPalma, and Laura Sells discuss the vampire, and Sara Cohen Shabot recommends the grotesque) seem to bring their own problems for disability studies; the work of Margrit Shildrick demonstrates that, at the very least, the monstrous and the grotesque require their own careful readings and

cannot be simple substitutes.[75] Moreover, Haraway's recent focus on dog agility practices, a competition that insists on the able-bodiedness of its dogs if not its humans, leaves me looking back longingly at the cyborg.[76]

And this longing is not despite its gaps and oversights, but because of them. In other words, one of the things that most appeals to me about the cyborg figure is its multiple, and often contradictory, deployments. Its very unpredictability is precisely what makes it such an important and potentially useful concept; its fluidity and permeability make it difficult to lock it permanently in to any one set of meanings. As Christina Crosby argues, it is "dynamic, mobile, [and] programmable, which makes the cyborg incalculably dangerous in the form of a cruise missile, but also offers opportunities that haven't yet been calculated for forming new alliances, new affinity groups, new coalitions."[77]

What I find most promising about Haraway's cyborg figure is its history—and present—in feminist activism and scholarship. As Zoë Sofoulis maps, the manifesto has played an integral role not only in the development of feminist science and technology studies but also in theories of architecture, anthropology, and literary criticism.[78] The pervasiveness of the manifesto makes clear its continued influence on critical theory; for example, Susan Stryker and Stephen Whittle chose to include the piece in their *Transgender Studies Reader*, even though the manifesto never explicitly takes up trans identities, because of its examination of how "marginalized embodied positions" are "politically charged sites of struggle."[79] In its ubiquity, the manifesto, and the cyborg as figured in it, can serve as a resource for vital cross-movement work. It is easy to imagine the potent fusions and fruitful couplings that can result from a meeting of disability studies and transgender studies, for example, including examinations of how scholars in both fields have used and challenged the cyborg. It is exactly this kind of cross-pollination that I want disability studies to nurture and extend, and the manifesto facilitates such work because cross-pollination was key to its inception. Haraway derived the figure, at least in part, from her readings of women of color, and from their attempts to forge multi-issue coalitions and communities. Fiction writer Octavia Butler, essayist Cherríe Moraga, theorist Chela Sandoval: each influenced Haraway's articulation of the cyborg, offering insights into a feminist politics based on fluid identities, border crossings, and partialities.

As disability studies continues to wrestle with the figure, we have over two decades' worth of queer, feminist, and women of color criticism to draw on and learn from. Not only can we return to the manifesto itself, mining it for nuggets of antiracist feminism or coalition politics, but we can, and should, examine the wealth of feminist theory that has similarly pushed and extended the cyborg and its manifesto. For the remainder of this section, I want to offer a brief overview of some of these critiques, partly to acknowledge the ways in which my own thinking is indebted to them, partly to insist on their centrality to cyborg theory, and partly to recognize them as relevant and integral to disability studies.

Chela Sandoval traces this heritage in her own work, reminding Haraway's audience that the cyborg figure is a direct descendant of what Sandoval refers to as "US third world feminism." Cyborg conceptions of the fluidity between self and other, of the importance of transgressing boundaries and borders, are "analogous to that called for in contemporary indigenous writings where tribes or lineages are identified out of those who share, not blood lines, but rather lines of affinity. Such lines of affinity occur through attraction, combination, and relation carved out of and in spite of difference, and they are what comprise the notion of mestizaje in the writings of people of color." Too many cyborg theorists, Sandoval laments, ignore this aspect of the manifesto's genealogy, attributing the notion of "affinity-through-difference" to Haraway alone.[80]

While Sandoval addresses the ways in which the cyborg has been taken up by others, Malini Johar Schueller and Mariana Ortega focus their critiques directly on Haraway and her manifesto. For both authors, Haraway's treatment of the writings of women of color is troubling; although Haraway repeatedly lifts up "women of color" as a political position achieved through struggle not natural identity, they argue that she simultaneously homogenizes the writings of women of color. In their readings, Haraway is far too quick to assume that all chicanas feel the same way about *La Malinche* or engage in the same struggles over language and identity.[81]

By including these critiques alongside my disability reading, I am aware that I run the risk of presenting the critiques as analogical: disability functions "like race" in cyborg theory, or "just as" women of color have been marginalized within the manifesto, "so too" have disabled people. These kinds of analogical moves are all too common in disability studies (and beyond), and they unfortunately have the result of obfuscating the relationships between disability and race rather than illuminating them. But it is my hope that exploring these critiques together—the disability critique and the race critique (labels that are themselves part of the problem)—will enrich and extend existing readings of both disability studies and "A Cyborg Manifesto." As Abby Wilkerson explains, the manifesto raises questions about what it means to be an ally, questions that arise partly out of the manifesto's explicit framing, and partly out of the manifesto's unacknowledged gaps and erasures.[82] One of my goals in this chapter, then, is to use both the manifesto and its critics to think through how to do cross-movement work within disability studies and, relatedly, how to draw on the critiques of women-of-color theorists without merely analogizing race and disability or universalizing the experiences and categories of race and disability.

Continuing a crip engagement with the cyborg—a *critical* crip engagement—is a way for disability studies to participate in these discussions. Decades after its original publication, the manifesto remains a site of provocative, rich, creative feminist scholarship, work that can enrich disability studies in unexpected ways. Using the cyborg in disability studies, then, means not only reading Haraway and the manifesto but delving into the many critiques and retellings of the manifesto, not all of which are faithful to their origins.

Pushing the Cyborg: Cripping Cyborg Politics

Donna Haraway insists that the cyborg is about both pleasure and responsibility; she positions her manifesto as "an argument for *pleasure* in the confusion of boundaries and for *responsibility* in their construction."[83] Thinking through what it means to approach the cyborg from a disability studies or crip theory perspective requires this kind of dual move, this simultaneous holding of pleasure and responsibility. In her book-length interview with Donna Haraway, *How Like a Leaf*, Thyrza Nichols Goodeve asks Haraway if the pervasiveness of the cyborg figure disturbs her, if she feels it has been distorted by its many appropriations, gaps, and uses. Haraway responds,

> I think the cyborg still has so much potential. Part of how I work is not to walk away when a term gets dirty and is used in all these appropriate and inappropriate ways because of its celebrity. Instead such uses just make me want to push the reality of the cyborg harder. . . . So instead of giving it up because it has become too famous let's keep pushing it and filling it.[84]

Following Haraway, then, this section "pushes and fills" the cyborg in order to imagine feminist queer crip futures.

"Pushing" the figure from a disability perspective entails bringing a disability consciousness to the cyborg, attending to the specific benefits and dangers it harbors for disabled people. This shift requires an acknowledgment that human/machine interfaces are not always beneficial or pleasurable; an awareness that many disabled people lack access to the cybertechnologies so highly praised in cyborg writing; an accounting for the ways in which cybertechnologies rely on disabling labor practices across the globe; and a realization that not all disabled people are interested in technological cures or fixes. Each of these elements takes cyborgology away from its traditional use of disability as metaphor, and toward an understanding of disability in political and social context. In so doing, they also—and ironically—bring cyborg theory closer to the promise of Haraway's manifesto, a promise of a fully situated cyborg that refuses easy celebrations of human/technology connections.

A non-ableist cyborg politics refuses to isolate those of us cyborged through illness or disability from other cyborgs. Disabled people, in other words, can no longer be cast as modeling a cyborged existence that nondisabled people have yet to achieve. Such a move only strengthens the abled/disabled binary, suggesting that disabled people are fundamentally and essentially different from nondisabled people. If, as Haraway and others argue, technoculture is pervasive, then disabled people are not alone in the cyborgian realm. Cyborg theory could then turn itself to interrogations, for example, of why the very same technology is alternately described as "assistive" or "time-saving" depending on whether a disabled or nondisabled person is using it.[85] In this framework, "cyborg" becomes an opportunity for exploring or interrogating the abled/disabled binary.

We can still discuss medical cyborgs, but why not do so in a way that actually engages with the insights and experiences of such cyborgs? We could explore what such identifications or characterizations might mean to them, or how they might themselves frame cyborg discourse. These kinds of discussions can enrich our understandings of cyborg technology and, in turn, extend our theoretical framings of the cyborg. Tobin Siebers's reflections on the ways in which a leg brace increases both function and pain, for example, might serve to deepen our understanding of the cyborg's ambivalent relation to technology. A cripped cyborg theory would then warn against easy celebrations of the technological fix; it would require a more complex and ambivalent relationship with technology.

Or Nirmala Erevelles's insistence on attending to the material realities of those seen as cyborg can be a way of revisiting the figure's effectiveness for class analysis.[86] Gill Kirkup, one of the editors of *The Gendered Cyborg*, argues that few scholars have used the cyborg to address socialist feminism or engage in materialist analyses, even though the manifesto was explicitly written in the interest of both.[87] How might disability prompt a reexamination of the cyborg's ability to imagine a socialist-feminism in the early twenty-first century or to convince feminists (and disability studies scholars) of the need to attend more to issues of class in our work? Rather than simply repeat the "people with disabilities = cyborgs" equation, we might revisit Haraway's interrogation of the homework economy and the integrated circuit, using her critical frameworks to examine the ways in which disabled people are positioned in terms of efficiency, productivity, and ability to work, or lack thereof.

Or, to take yet another example, a disability studies approach can facilitate renewed attention to the cyborg as human-animal or human-human hybrid. To date, cyborg theorists have focused their energies almost entirely on technology, ignoring the possibilities of boundary transgression between human and organism, even though the latter was an integral part of Haraway's manifesto.[88] (It is this focus on the human-machine hybrid that prompted the fixation on disabled bodies.) A cyborged disability politics can provide astute theoretical insights into the boundary blurring that occurs between disabled people and our attendants, or between disabled people and our service animals, or among disabled people in community with each other and our allies: all experiences that point to a cyborgian understanding of interdependence, mutuality, and relationship.

Sociologist Rod Michalko writes about understanding the nature of blindness more fully through his relationship with his guide dog Smokie; he details how the boundaries of his body, of his awareness, shifted when working with Smokie, experiences that certainly could be productively mined by cyborg scholars.[89] Michalko describes a relationship not of straightforward instrumentalism or utility, but of integration and co-constitutiveness. Smokie is not mere tool but an opening into a new way or new understanding of "being in the world." As Cary Wolfe explains, the human–service dog relation is "neither *homo sapiens* nor *canis familiaris*, neither 'disabled'

nor 'normal,' but something else altogether, a shared trans-species being-in-the-world constituted by complex relations of trust, respect, dependence, and communication."[90] Examining the nature of such relations can not only extend theoretical framings of the cyborg but enrich emerging analyses of animality and the human.

Laura Hershey and Loree Erickson openly discuss their negotiations with personal attendants—an openness Erickson describes as being "out as a body"—and their work could similarly enrich existing understandings of the cyborg.[91] Erickson draws on phenomenology, for example, to articulate her relationship with attendants: "[M]y personal attendant and I, and our bodies," she writes, "are functioning as a self and as a unit," thereby breaking down the "dualism of singular self/combined unit."[92] Erickson is both singular and plural, neither fully "she" nor "they." The cyborg figure can offer a "theoretical prototype" for recognizing the ways in which such relationships push our notions of self and other, of body and boundary, of agency and interdependency.[93]

In other words, it is high time to explore how best to discuss the relationship between disability and cyborgism without facile references to disabled bodies as self-evident cyborgs simply by virtue of their use of "assistive" or "adaptive" technologies. Doing so will benefit not only disability studies but also cyborg theory and feminist critical theory more broadly. What I want to do for the remainder of this chapter, then, is sketch out alternative approaches to the cyborg, ones that crip the cyborg while still recognizing its frequently ableist deployments, ones that push disability studies in more feminist and queer directions.

Cripping the cyborg, developing a non-ableist cyborg politics, requires understanding disabled people as cyborgs not because of our *bodies* (e.g., our use of prosthetics, ventilators, or attendants), but because of our *political practices*. In this framing, Erickson can be understood in terms of cyborgism not because she has a disability that requires her to utilize attendant care, but because she critically thinks through what such uses might mean. In her short film *Want*, for example, Erickson explains that she has collaborated with her friends, lovers, and community members to craft a network of attendants that operates outside of the larger health care system. In so doing, she offers a radical reinterpretation of what community can mean, of what living with a disability can mean. In both her film and her writings, Erickson seamlessly weaves together images of sex acts with other "activities of daily life," such as her attendants lifting her on and off the toilet; we move from scenes of Erickson sitting on the toilet to scenes of her having sex with her lover to scenes of her confronting inaccessible buildings. Again, her cyborgism is not so much about the fact that she needs attendants or uses a power wheelchair but rather that she uses her experiences with both technologies to force people—disabled and nondisabled—to confront our ableist assumptions about disability and sexuality.

Cripping the cyborg, in other words, means recognizing that our bodies are not separate from our political practices; neither assistive technologies nor our uses of them are ahistorical or apolitical. As anthropologist Steven Kurzman explains,

> I see cyborg more as a subject position than an identity, and believe it is more descriptive of my position vis-à-vis the relationships of production, delivery, and use surrounding my prosthesis than my actual physical interface with it. In other words, if I am to be interpellated as a cyborg, it is because my leg cost $11,000 and my HMO paid for it; because I had to get a job to get the health insurance; because I stand and walk with the irony that the materials and design of my leg are based in the same military technology which has blown the limbs off so many other young men; because the shock absorber in my foot was manufactured by a company which makes shock absorbers for bicycles and motorcycles, and can be read as a product of the post–Cold War explosion of increasingly engineered sports equipment and prostheses; and because the man who built my leg struggles to hold onto his small business in a field rapidly becoming vertically integrated and corporatized. I am not a cyborg simply because I wear an artificial limb.[94]

In tracing this prosthetic history, Kurzman recognizes his leg and the cyborg figure as political; his relationship to both, the prosthetic and the cyborg, is a political relationship, one embedded in larger histories, rhetorics, and economies.

Take, for example, the exoskeletons developed by Berkeley Bionics for both military and medical purposes; their products and promotional videos make clear the link between disability and the militarized cyborg. eLEGS is an exoskeleton that enables some paralyzed people to walk under certain conditions; according to Eythor Bender, the company's CEO, eLEGS are "built on the platform, or the legacy, of HULC (Human Universal Load Carrier)," a military application they licensed to Lockheed Martin.[95] The video touting HULC features multiple scenes of a man in fatigues wearing a HULC while he carries heavy loads over mountainous terrain. Jim Ni, the HULC program manager, explains that HULC was designed to facilitate soldiers carrying heavy weapons (one frame shows the soldier attaching a bomb to the front of the exoskeleton), thereby preventing back injuries and other repetitive-stress injuries associated with contemporary warfare. The same technology that enables a paraplegic to walk allows a soldier to kill more efficiently and ergonomically; cyborg ironies, indeed.[96]

Extending Kurzman's analysis, and reading it alongside the work of Erevelles, Siebers, and other crip theorists grappling critically with the cyborg, I want to provide a reading of the cyborg that places it within the realm of the political, moving it away from more essentialist readings that reduce it to particular kinds of (medicalized) bodies. Disability activists, communities, and movements often embody the kind of ironic, even blasphemous, politics that Haraway cast as necessary characteristics of the feminist cyborg. As Judy Rohrer argues, "Irony can help build the future-oriented, multiple-identity politics" we need, and disability politics offers a rich archive of ironic approaches to illness, disability, and the body.[97]

Haraway peppers her manifesto with ironic political slogans from her feminist nonukes work, sharing the slogans of others as well as inventing her own: "Cyborgs for Earthly Survival!" and perhaps the most (in)famous, "I would rather be a cyborg than a goddess."[98] Her use of these phrases grounds her high theory in grassroots activism,

making clear that she is invested in the practical implications of her theoretical travels, and highlights her adherence to an ironic politics of blasphemy. In that spirit, I want to add another grassroots saying, one that does this same kind of ironic, blasphemous work: "Trached dykes eat pussy without coming up for air." Connie Panzarino, a longtime disability activist and out lesbian, would attach this sign to her wheelchair during Pride marches in Boston in the early 1990s. Shockingly explicit, her sign refuses to cast technology as cold, distancing, or disembodied/disembodying, presenting it instead as a source and site of embodied pleasure.

"Trach" is an abbreviation of tracheotomy, a medical procedure in which a breathing tube is inserted directly into the trachea, bypassing the mouth and nose. Someone with a trach, then, can, in effect, breathe through her throat, freeing her mouth for other activities (another version of this sign is "Trached dykes french kiss without coming up for air"). From a cyborgian perspective, this sign is brilliantly provocative and productive. It draws on the pervasive idea that adaptive technologies grant superior abilities, not merely replacing a lost capacity but enhancing it, yet it does so in a highly subversive way. The message here isn't about blending in, about passing as normal or hypernormal, but about publicly announcing the viability of a queer disabled location. It's disnormalizing, adamantly refusing compulsory heterosexuality, compulsory able-bodiedness, and homonormativity. As Corbett O'Toole argues, it challenges the perceived passivity of disabled women, presenting them as actively pleasuring their partners, thereby graphically refuting stereotypes linking physical disability with nonsexuality.[99]

The context of the sign is as important as its content. In sharp contrast to the disabled people in cyborg texts, who are presented as isolated individuals communing only with their technology, the woman with the sign is in public, participating in a political and social community. She is actively involved in shaping that community, extending the notion of "pride" to apply not only to her sexuality but also to her disability; indeed, she presents the two as erotically and productively inseparable. Appearing in such a public context, the sign can be read as an aggressive rebuke of the discourses of charity, pity, and tragedy that circulate around disabled bodies; in a direct challenge to the infantilization of "Jerry's kids," this woman proclaims herself a sexually active and actively consenting adult.

And she does so with a blasphemous humor born of community. For those unfamiliar with queer crip culture, Panzarino's sign might fly under the radar; those unaware of the workings of a tracheotomy might not understand the sexual promise of such a procedure. For queer crips, however, the sign is a revelation, a locating of pleasure not only in the body-technology interface but in the disabled body itself. In a culture in which technological and medical advances are constantly being touted for their ability to eliminate disability, to reduce the numbers of disabled bodies in the future, Panzarino asserts the value of those bodies, of her body.

Similarly, Laura Hershey becomes a cyborg not simply because of her use of a power chair or a ventilator, but because of her commitment to coalition politics and

transformative social practices. A poet, essayist, and longtime activist, Hershey served as a "poster child" for the Muscular Dystrophy Association (MDA) in 1973–74, appearing on posters and other promotional material encouraging (nondisabled) donors to contribute to the organization. The MDA's stated goal is to "conquer neuromuscular disease," and its primary means of meeting this goal is through the selection of poster children and an annual Labor Day telethon, long associated with Jerry Lewis. Hershey's body, and the bodies of other children like her, was used to advocate for a "cure," although "cure" is code here for a combination of prenatal testing, selective abortion, and/or prenatal therapy. Hershey, in other words, was expected to raise money for research into how to prevent children like her from ever being born. In a blasphemous irony befitting cyborg politics, Hershey has since become one of the leaders in the anti-telethon movement, condemning the poster-child rhetoric to which she was subjected as a child. Working with a network of ex–poster children, disability rights activists, and nondisabled allies, Hershey is a fierce and vocal opponent of Jerry Lewis's annual MDA telethon, lambasting Lewis and the organization for their ableist attitudes toward disabled people; when Lewis remarked in a 2001 interview that "cripple[s] in wheelchairs" should "stay in [their] house" if they want to avoid pity, Hershey and her comrades took to the streets, highlighting Lewis's remarks as indicative of the tragic model of disability that permeates charity organizations.[100] In 2009, when Jerry Lewis won the Jean Hersholt Humanitarian Award from the Academy of Motion Pictures Arts and Sciences, a group of activists, including Hershey, organized a protest of the Oscar ceremonies.[101]

From a cyborg perspective, I am enticed by Hershey's provocative relationship to medical technologies. On the one hand, her very survival relies on this technology, a technology made possible by the medical industrial complex that supports and is supported by organizations like the MDA. On the other hand, she uses this technology to make her activism possible, activism that is often committed to interrogating the very system that she relies on. Hershey, in other words, is well-positioned to recognize the complexities of technology and biomedicine. As Haraway made clear in the manifesto, simple technophilia or technophobia is untenable; what we need to do is to take responsibility for the social relations of science and technology.[102] By tracing the effects of cure ideologies and pity narratives, by highlighting the economic assumptions and mechanisms of the telethon, Hershey and her comrades push for exactly this kind of responsibility without naively abandoning such technology altogether. Yet if Hershey were to be described in cyborg terms, most theorists would ignore these savvy negotiations, focusing only on her position in a wheelchair. Reducing Hershey to a cyborg because of her wheelchair or breathing tube ignores her cyborg political practices, thereby perpetuating the depoliticization of disability and disabled people.

In common parlance, Hershey and Panzarino could be considered "severely disabled" (Haraway's "severely handicapped"). They rely on power wheelchairs; they employ personal attendants to assist them in their daily activities; and their chronic

impairments occasionally lead to medical crises, particularly respiratory ones. For most cyborg theorists, the story would stop there, serving as a perfect illustration of the ways in which (certain) bodies don't end at the skin. Indeed, in this framework, the more severely disabled one is, the more cyborgian, because the more likely to be using high-tech medical equipment and adaptive technologies. A cripped cyborg politics, however, refuses to stop with this kind of recitation of diagnosis or condition. Following Robert McRuer, "severe" can be read as defiance, fierceness, critique; the "severity" of these women's impairments is due not to their perceived failures to adhere to normative expectations of movement, flexibility, or appearance, but to their public "call[ing] out [of] the inadequacies of compulsory able-bodiedness."[103] Rather than reduce these activists' experiences to the details of their impairment, let us focus instead on their complex and contradictory negotiations with technology, or on the ways in which such negotiations lead to questions about community, responsibility, pleasure, and complicity.[104]

Bradley Lewis draws on Haraway's cyborg theory for precisely these reasons, arguing that the cyborg can help us better understand Prozac and the domination of psychopharmacology. Critical science studies and, in particular, cyborg theory make it possible for us to recognize the stories we tell about Prozac *as* stories, as narratives, and thereby deserving of an attentive read. Cyborg theory, argues Lewis, enables us to ask "local political questions of *consequences* and *inclusion*."[105] The cyborg, in demanding responsibility and critique, pushes progressives to engage with technoscience, to inquire into the effects and assumptions of emerging technologies. Lewis urges attention to Haraway's mode of critique, her ability to challenge the simplistic binaries and dualisms that prevent a taking of responsibility. Prozac, he argues, "is not clearly oppressive or liberatory. It is a contradictory mixture of both—sometimes one more than another, but always both. This makes the problem not Prozac itself but the politics of representation surrounding the production and circulation of Prozac discourse."[106]

Michelle O'Brien echoes this contradictory approach, arguing for greater attention to the politics of prescription drugs. Just as Kurzman sees his prosthetic leg as a nexus of overlapping biomedical, military, and economic discourses, O'Brien positions her use of prescription medications as a practice demanding contextualization within a wider political economy.[107] She traces the manufacturer of each medication, discusses where she obtains the syringes she needs for injections (leading to a brief rumination on HIV/AIDS, the war on drugs, and needle-exchange programs in Philadelphia), and describes the politics of health care that lead her to purchase these medications out of pocket, online, and away from a "proper" provider. As a trans woman, she is "invisible" to her health insurance company yet dependent on her medications, and it is this contradictory stance that leads her to the cyborg.[108] Inspired by Haraway's manifesto, she describes her position within biomedicine as contradictory, ironic, subversive. She may be interfacing with corporate medicine, but she does so "improperly."[109] The cyborg, O'Brien argues, offers a way to approach the medical industrial complex that

does not privilege "isolation, purity, or refusal" but recognizes the potential to interact unfaithfully with the medical system. As she puts it, "If your survival depends on substantially accessing global pharmaceutical industries, a politics of purity and nonparticipation just doesn't get you that far."[110]

Like O'Brien, Dean Spade recognizes that many trans people's reliance on medical institutions necessitates a contradictory politics. He explains that some transgender advocates have turned to state disability laws as a potential site of relief from gender discrimination; filing such claims, however, requires that transgendered people be diagnosed with and identify as having gender identity disorder, or GID.[111] GID is controversial within trans communities, with many activists wary of its identification of gender difference as pathology. As Spade writes, "I do not want to make trans rights dependent upon GID diagnoses, because such diagnoses are not accessible to many low-income people; because I believe that the diagnostic and treatment processes for GID are regulatory and promote a regime of coercive binary gender; and because I believe that GID is still being misused by some mental health practitioners as a basis for involuntary psychiatric treatment for gender transgressive people."[112] At the same time, because "many trans people's lives are entangled with medical establishments," their best hope is a medical diagnosis and the recognition and access to services it entails.[113] In describing the strategic use of medical models of difference, Spade carefully maps the implications of such uses, challenging ableism within trans communities while detailing the risks of disability identification. Reading Lewis, O'Brien, and Spade together reveals that neither medical technologies nor diagnoses can be characterized as purely oppressive or politically neutral. As Haraway's cyborg insists, cyborg bodies are "maps of power," requiring ironic, doubled, contradictory responses.

"Cyborg" is not the only way to describe activists such as Hershey or Panzarino, nor is it the only way to frame their political practices and activist alliances. Indeed, it is highly unlikely that they would use it to identify themselves, finding other ways to characterize coalition politics or permeable identities. I want to be clear that I am not arguing that these activists are "real" cyborgs, or that "cyborg" is the best mode for conceptualizing their activist strategies and theoretical standpoints. We can describe the fluid nature of disability or articulate a disability politics that embraces contradiction and ambiguity without referencing Haraway or deploying the figure of the cyborg. Moreover, the cyborg figure may be more useful in examining some disabilities than others; it might be less effective in explorations of blindness than deafness, for example, or Down syndrome than amputation. At the risk of undercutting my argument, I want to acknowledge that cyborg theory is not necessary.

It may not be necessary, but, at the same time, it can help us do necessary work. Cyborg theory remains one of the few places that disabled people, and particularly disabled bodies, are present in contemporary critical theory, and I think it is essential for disability studies scholars to attend to the specificities of those appearances. Moreover,

rather than simply allow these representations to talk about us, we can intervene directly in them, adhering to the tradition of critical intervention of Haraway's original manifesto. How can we, by intervening in cyborg theory, wage our own multiple, often contradictory, critical interventions in feminist theory, in queer politics, in radical reimaginings of the future?

As I have suggested here, for the cyborg to guide us elsewhere, to lead us toward a more livable space, we must look to the cyborg as a guide for political practice, not strictly as a description of our physical bodies. Pushing the cyborg into an anti-ableist politics means refusing its reduction to the disabled body, refusing to use the figure to shore up binaries of normate/other or abled/disabled. It means recognizing the transgressive political practices of activists such as Hershey, Panzarino, and Spade, recognizing their work in forging coalitions and actions.

Cyborg Histories, Cyborg Futures

Although many analyses of the cyborg begin with Haraway, she was not the first researcher to use the figure in imagining a desired future. In a 1960 issue of *Astronautics*, scientists Manfred E. Clynes and Nathan S. Kline offered up the cyborg, or "cybernetic organism," as a way to imagine human flourishing in space.[114] The two had been invited by NASA to address potential medical problems related to human space travel, and they explored the possibilities of biochemically, electronically, and physiologically modifying the human body.[115] They described their solutions as a mixture of "presently available knowledge and techniques" and "projections into the future."[116] What they imagined, based on experiments with rats, was the ability to implant humans with osmotic pumps that would permit "continuous injections of chemicals at a controlled slow rate."[117] The pumps would be implanted subcutaneously and programmed so as to require no effort or attention from the astronaut. They could then be stocked with medications appropriate for space travel; pumps might carry drugs preventing radiation sickness or fatigue, for example. One of Clynes and Kline's "future projections" involved the "strong possibility" that astronauts would experience psychotic episodes but be incapable of recognizing that anything was awry; what was needed, they argued, was the ability to "[trigger] administration of the medication remotely from earth or by a companion," medication that could include "high-potency phenothiazines together with reserpine."[118]

As this last scenario might suggest, Clynes and Kline both worked in psychiatric research; their work with NASA supplemented their jobs as researchers at Rockland State Hospital, in Orangeburg, New York. Kline founded a psychiatric research center at the hospital in 1952, and he spent most of his career building the center into a major site for drug research, development, and clinical trials. He hired Clynes to work in the hospital's Dynamic Simulation Laboratory in 1955, where the latter worked on physiological instrumentation and data-processing systems. Although Clynes eventually left Rockland, Kline remained there until his death in 1982, and the research facility now

bears his name (the Nathan S. Kline Institute for Psychiatric Research). According to the institute's website, Kline is "best known for his pioneering work with psychopharmacologic drugs," particularly his success with tranquilizers and antidepressants.[119] Inspired by these successes, and eager to spread the word about the efficacy of psychopharmacology, Kline wrote a mass-market paperback titled *From Sad to Glad*; first published in 1974, the 1989 edition featured the tagline, "Depression: You can conquer it without analysis." Kline's faith in drugs is evident in the article he coauthored with Clynes, "Cyborgs and Space," in which their imagined osmotic pumps deliver medicine that cures everything from radiation sickness to fatigue to psychosis.

It is this last condition, psychosis, that brings me up short. In their article, Clynes and Kline suggest that astronauts are unlikely to recognize when they have had a psychotic break (explaining that delusion and denial are common symptoms of psychosis) and will need to be involuntarily medicated by remote control. I do not know enough about the mental or emotional effects of space travel to evaluate their concern, but I cannot read their recommendation without being reminded of the two scientists' location in a state mental institution, one where many, if not most, of the patients were placed indefinitely and heavily medicated. Moreover, some of them likely served as research subjects for Kline's drug trials, trials that appear to have been grueling for the patients. In his early research on reserpine as a treatment for schizophrenia, Kline noted that for the first two to three weeks of treatment,

> patients are frightened by the feeling that they have "no control" over their impulses. Some feel that they "do not know what they are going to do next," and in point of fact may begin screaming and throw themselves to the floor. . . . Delusions and hallucinations increase and behavior not infrequently becomes more disturbed than prior to the beginning of treatment.[120]

As the treatment continued, Kline apparently thought that the patients eventually showed improvement, but it is hard to read this description without questioning the ethics of drug trials on institutionalized patients.

Rockland was infamous for its poor and negligent behavior toward patients. Overcrowding was rampant in the 1940s and 1950s, and the institution was repeatedly charged with contributing to, if not causing, the deaths of numerous patients by giving them lethal amounts of tranquilizers—to keep patients "under control"—or prescribing drugs that, in combination, are fatal. Accusations of rape and malnourishment were also lodged against workers and group homes affiliated with Rockland.[121] Although state commissions and investigations consistently rejected these charges, the frequency of such claims gives me pause.

Indeed, this connection to the warehousing of people with mental illnesses and intellectual disabilities in state institutions—and all that entails, from medical negligence to medical experimentation to physical and sexual abuse—should be enough to give any cyborg theorist, especially one identified with disability studies, pause. Haraway makes clear from the start that the cyborg is dangerous, non-innocent, and

complicit; the only way to approach the figure is in the spirit of ironic blasphemy, turning the figure against its very origins. And Bradley Lewis's use of the figure to critique the same psychopharmaceutical industry that originally birthed the cyborg seems the perfect illustration of such blasphemy. We need more such disability studies perspectives. Yet part of that work must include a reckoning, an acknowledgement, of the cyborg's history in institutionalization and abuse. Otherwise the irony, the blasphemy, the critique, is lost.

I close with this story to insist, alongside both Haraway and her critics, that the cyborg is not innocent. Our metaphors, our tropes, our analogies: all have histories, all have consequences. As Hiram Perez argues, part of the work of the critic is to explore the effects texts and images have on people's lives.[122] The blurring of boundaries, the permeability of bodies, the porousness of skin—all take on different meanings depending on whether they are viewed through the prism of institutionalization or as part of a strategy of feminist analysis. Arguing for the breakdown between self and other, body and machine, takes on a different hue in the context of coercive medical experimentation and confinement. The cyborg, in other words, can be used to map many futures, not all of them feminist, crip, or queer.

Haraway herself acknowledges this fact, warning us from the beginning of the cyborg's complicity in militarization, colonization, and control. Yet it remains a figure of feminist possibility, pointing toward a feminist futurity or, in Haraway's framing, "an elsewhere, not as a utopian fantasy or relativist escape, but an elsewhere born out of the hard (and sometimes joyful) work of getting on together."[123] To return to the epigraph that begins this chapter, "who cyborgs will be is a radical question; the answers are a matter of survival."[124] This question has political, ethical, and epistemic dimensions, and answering it will require grappling with the histories and futures described here. It is a question I urge us to ask. If, as Haraway claims, "cyborgs are the people who refuse to disappear on cue," then the cyborg may very well be a perfect figure for refusing the erasure of disability from our presents and futures.[125] But in the spirit, if not the practice, of Haraway's manifesto, I argue for responsibility in making such claims.

The Girl Who Was Plugged in

James Tiptree, Jr.

1974

Listen, zombie. Believe me. What I could tell you—you with your silly hands leaking sweat on your growth-stocks portfolio. One-ten lousy hacks of AT&T on twenty-point margin and you think you're Evel Knievel. AT&T? You doubleknit dummy, how I'd love to show you something.

Look, dead daddy, I'd say. See for instance that rotten girl?

In the crowd over there, that one gaping at her gods. One rotten girl in the city of the future. (That's what I said.) Watch.

She's jammed among bodies, craning and peering with her soul yearning out of her eyeballs. Love! Oo-ooh, love them! Her gods are coming out of a store called Body East. Three young-bloods, larking along loverly. Dressed like simple street-people but... smashing. See their great eyes swivel above their nose-filters, their hands lift shyly, their inhumanly tender lips melt? The crowd moans. Love! This whole boiling megacity, this whole fun future world loves its gods.

You don't believe gods, dad? Wait. Whatever turns you on, there's a god in the future for you, custom-made. Listen to this mob. "I touched his foot. Ow-oow, I TOUCHED Him!"

Even the people in the GTX tower up there love the gods—in their own way and for their own reasons.

The funky girl on the street, she just loves. Grooving on their beautiful lives, their mysterioso problems. No one ever told her about mortals who love a god and end up as a tree or a sighing sound. In a million years it'd never occur to her that her gods might love her back.

She's squashed against the wall now as the godlings come by.

They move in a clear space. A holocam bobs above but its shadow never falls on them. The store display screens are magically clear of bodies as the gods glance in and a beggar underfoot is suddenly alone. They give him a token. "Aaaaah!" goes the crowd.

Now one of them flashes some wild new kind of timer and they all trot to catch a shuttle, just like people. The shuttle stops for them—more magic. The crowd sighs, closing back. The gods are gone.

(In a room far from—but not unconnected to—the GTX tower a molecular flipflop closes too, and three account tapes spin.)

Our girl is still stuck by the wall while guards and holocam equipment pull away. The adoration's fading from her face. That's good, because now you can see she's the ugly of the world. A tall monument to pituitary dystrophy. No surgeon would touch her. When she smiles, her jaw—it's half purple—almost bites her left eye out. She's also quite young, but who could care?

The crowd is pushing her along now, treating you to glimpses of her jumbled torso, her mismatched legs. At the corner she strains to send one last fond spasm after the godlings' shuttle. Then her face reverts to its usual expression of dim pain and she lurches onto the moving walkway, stumbling into people. The walkway junctions with another. She crosses, trips and collides with the casualty rail. Finally she comes out into a little place called a park. The sportshow is working, a basketball game in 3-di is going on right overhead. But all she does is squeeze onto a bench and huddle there while a ghostly free-throw goes by her ear.

After that nothing at all happens except a few furtive hand-mouth gestures which don't even interest her benchmates.

But you're curious about the city? So ordinary after all, in the FUTURE?

Ah, there's plenty to swing with here—and it's not all that far in the future, dad. But pass up the sci-fi stuff for now, like for instance the holovision technology that's put TV and radio in museums. Or the worldwide carrier field bouncing down from satellites, controlling communication and transport systems all over the globe. That was a spin-off from asteroid mining, pass it by. We're watching that girl.

I'll give you just one goodie. Maybe you noticed on the sportshow or the streets? No commercials. No ads.

That's right. NO ADS. An eyeballer for you.

Look around. Not a billboard, sign, slogan, jingle, skywrite, blurb, sublimflash, in this whole fun world. Brand names? Only in those ticky little peep-screens on the stores and you could hardly call that advertising. How does that finger you?

Think about it. That girl is still sitting there.

She's parked right under the base of the GTX tower as a matter of fact. Look way up and you can see the sparkles from the bubble on top, up there among the domes of godland. Inside that bubble is a boardroom. Neat bronze shield on the door: Global Transmissions Corporation—not that that means anything.

I happen to know there's six people in that room. Five of them technically male, and the sixth isn't easily thought of as a mother. They are absolutely unremarkable.

Those faces were seen once at their nuptials and will show again in their obituaries and impress nobody either time. If you're looking for the secret Big Blue Meanies of the world, forget it. I know. Zen, do I know! Flesh? Power? Glory? You'd horrify them.

What they do like up there is to have things orderly, especially their communications. You could say they've dedicated their lives to that, to freeing the world from garble. Their nightmares are about hemorrhages of information: channels screwed up, plans misimplemented, garble creeping in. Their gigantic wealth only worries them, it keeps opening new vistas of disorder. Luxury? They wear what their tailors put on them, eat what their cooks serve them. See that old boy there—his name is Isham—he's sipping water and frowning as he listens to a databall. The water was prescribed by his medistaff. It tastes awful. The databall also contains a disquieting message about his son, Paul.

But it's time to go back down, far below to our girl. Look!

She's toppled over sprawling on the ground.

A tepid commotion ensues among the bystanders. The consensus is she's dead, which she disproves by bubbling a little. And presently she's taken away by one of the superb ambulances of the future, which are a real improvement over ours when one happens to be around.

At the local bellevue the usual things are done by the usual team of clowns aided by a saintly mop-pusher. Our girl revives enough to answer the questionnaire without which you can't die, even in the future. Finally she's cast up, a pumped-out hulk on a cot in the long, dim ward.

Again nothing happens for a while except that her eyes leak a little from the understandable disappointment of finding herself still alive.

But somewhere one GTX computer has been tickling another, and toward midnight something does happen. First comes an attendant who pulls screens around her. Then a man in a business doublet comes daintily down the ward. He motions the attendant to strip off the sheet and go.

The groggy girl-brute heaves up, big hands clutching at bodyparts you'd pay not to see.

"Burke? P. Burke, is that your name?"

"Y-yes." Croak. "Are you... policeman?"

"No. They'll be along shortly, I expect. Public suicide's a felony."

"... I'm sorry."

He has a 'corder in his hand. "No family, right?"

"No."

"You're seventeen. One year city college. What did you study?"

"La-languages."

"H'm. Say something."

Unintelligible rasp.

He studies her. Seen close, he's not so elegant. Errand-boy type.

"Why did you try to kill yourself?"

She stares at him with dead-rat dignity, hauling up the gray sheet. Give him a point, he doesn't ask twice.

"Tell me, did you see Breath this afternoon?"

Dead as she nearly is, that ghastly love-look wells up. Breath is the three young gods, a loser's cult. Give the man another point, he interprets her expression.

"How would you like to meet them?"

The girl's eyes bug out grotesquely.

"I have a job for someone like you. It's hard work. If you did well you'd be meeting Breath and stars like that all the time."

Is he insane? She's deciding she really did die.

"But it means you never see anybody you know again. Never, ever. You will be legally dead. Even the police won't know. Do you want to try?"

It all has to be repeated while her great jaw slowly sets. Show me the fire I walk through. Finally P. Burke's prints are in his 'corder, the man holding up the rancid girl-body without a sign of distaste. It makes you wonder what else he does.

And then—THE MAGIC. Sudden silent trot of litterbearers tucking P. Burke into something quite different from a bellevue stretcher, the oiled slide into the daddy of all luxury ambulances —real flowers in that holder!—and the long jarless rush to nowhere. Nowhere is warm and gleaming and kind with nurses. (Where did you hear that money can't buy genuine kindness?) And clean clouds folding P. Burke into bewildered sleep.

... Sleep which merges into feedings and washings and more sleeps, into drowsy moments of afternoon where midnight should be, and gentle businesslike voices and friendly (but very few) faces, and endless painless hyposprays and peculiar numbnesses. And later comes the steadying rhythm of days and nights, and a quickening which P. Burke doesn't identify as health, but only knows that the fungus place in her armpit is gone. And then she's up and following those few new faces with growing trust, first tottering, then walking strongly, all better now, clumping down the short hall to the tests, tests, tests, and the other things.

And here is our girl, looking—

If possible, worse than before. (You thought this was Cinderella transistorized?)

The disimprovement in her looks comes from the electrode jacks peeping out of her sparse hair, and there are other meldings of flesh and metal. On the other hand, that collar and spinal plate are really an asset; you won't miss seeing that neck.

P. Burke is ready for training in her new job.

The training takes place in her suite, and is exactly what you'd call a charm course. How to walk, sit, eat, speak, blow her nose, how to stumble, to urinate, to hiccup—DELICIOUSLY. How to make each nose-blow or shrug delightfully, subtly different from any ever spooled before. As the man said, it's hard work.

But P. Burke proves apt. Somewhere in that horrible body is a gazelle, a houri who would have been buried forever without this crazy chance. See the ugly duckling go!

Only it isn't precisely P. Burke who's stepping, laughing, shaking out her shining hair. How could it be? P. Burke is doing it all right, but she's doing it through something. The something is to all appearances a live girl. (You were warned, this is the FUTURE.)

When they first open the big cryocase and show her her new body she says just one word. Staring, gulping, "How?"

Simple, really. Watch P. Burke in her sack and scuffs stump down the hall beside Joe, the man who supervises the technical part of her training. Joe doesn't mind P. Burke's looks, he hasn't noticed them. To Joe, system matrices are beautiful.

They go into a dim room containing a huge cabinet like a one-man sauna and a console for Joe. The room has a glass wall that's all dark now. And just for your information, the whole shebang is five hundred feet underground near what used to be Carbondale, Pa.

Joe opens the sauna-cabinet like a big clamshell standing on end with a lot of funny business inside. Our girl shucks her shift and walks into it bare, totally unembarrassed. Eager. She settles in face-forward, butting jacks into sockets. Joe closes it carefully onto her humpback. Clunk. She can't see in there or hear or move. She hates this minute. But how she loves what comes next!

Joe's at his console and the lights on the other side of the glass wall come up. A room is on the other side, all fluff and kicky bits, a girly bedroom. In the bed is a small mound of silk with a rope of yellow hair hanging out.

The sheets stirs and gets whammed back flat.

Sitting up in the bed is the darlingest girl child you've EVER seen. She quivers—porno for angels. She sticks both her little arms straight up, flips her hair, looks around full of sleepy pazazz. Then she can't resist rubbing her hands down over her minibreasts and belly. Because, you see, it's the godawful P. Burke who is sitting there hugging her perfect girl-body, looking at you out of delighted eyes.

Then the kitten hops out of bed and crashes flat on the floor.

From the sauna in the dim room comes a strangled noise. P. Burke, trying to rub her wired-up elbow is suddenly smothered in two bodies, electrodes jerking in her flesh. Joe juggles inputs, crooning into his mike. The flurry passes; it's all right.

In the lighted room the elf gets up, casts a cute glare at the glass wall and goes into a transparent cubicle. A bathroom, what else? She's a live girl, and live girls have

to go to the bathroom after a night's sleep even if their brains are in a sauna-cabinet in the next room. And P. Burke isn't in that cabinet, she's in the bathroom. Perfectly simple, if you have the glue for that closed training circuit that's letting her run her neural system by remote control.

Now let's get one thing clear. P. Burke does not feel her brain is in the sauna room, she feels she's in that sweet little body. When you wash your hands, do you feel the water is running on your brain? Of course not. You feel the water on your hand, although the "feeling" is actually a potential-pattern flickering over the electrochemical jelly between your ears. And it's delivered there via the long circuits from your hands. Just so, P. Burke's brain in the cabinet feels the water on her hands in the bathroom. The fact that the signals have jumped across space on the way in makes no difference at all. If you want the jargon, it's known as eccentric projection or sensory reference and you've done it all your life. Clear?

Time to leave the honey-pot to her toilet training—she's made a booboo with the toothbrush, because P. Burke can't get used to what she sees in the mirror. But wait, you say. Where did that girl-body come from?

P. Burke asks that too, dragging out the words.

"They grow 'em," Joe tells her. He couldn't care less about the flesh department. "PDs. Placental decanters. Modified embryos, see? Fit the control implants in later. Without a Remote Operator it's just a vegetable. Look at the feet—no callus at all." (He knows because they told him.)

"Oh ... oh, she's incredible ..."

"Yeah, a neat job. Want to try walking-talking mode today? You're coming on fast."

And she is. Joe's reports and the reports from the nurse and the doctor and style man go to a bushy man upstairs who is some kind of medical cybertech but mostly a project administrator. His reports in turn go—to the GTX boardroom? Certainly not, did you think this is a big thing? His reports just go up. The point is, they're green, very green. P. Burke promises well.

So the bushy man—Doctor Tesla—has procedures to initiate. The little kitten's dossier in the Central Data Bank, for instance. Purely routine. And the phase-in schedule which will put her on the scene. This is simple: a small exposure in an off-network holoshow.

Next he has to line out the event which will fund and target her. That takes budget meetings, clearances, coordinations. The Burke project begins to recruit and grow. And there's the messy business of the name, which always gives Doctor Tesla an acute pain in the bush.

The name comes out weird, when it's suddenly discovered that Burke's "P." stands for "Philadelphia," Philadelphia? The astrologer grooves on it. Joe thinks it would help

identification. The semantics girl references brotherly love, Liberty-Bell, main-line, low teratogenesis, blah-blah. Nicknames Philly? Pala? Pooty? Delphi? Is it good, bad? Finally "Delphi" is gingerly declared goodo. ("Burke" is replaced by something nobody remembers.)

Coming along now. We're at the official checkout down in the underground suite, which is as far as the training circuits reach. The bushy Doctor Tesla is there, braced by two budgetary types and a quiet fatherly man whom he handles like hot plasma.

Joe swings the door wide and she steps shyly in.

Their little Delphi, fifteen and flawless.

Tesla introduces her around. She's child-solemn, a beautiful baby to whom something so wonderful has happened you can feel the tingles. She doesn't smile, she... brims. That brimming joy is all that shows of P. Burke, the forgotten hulk in the sauna next door. But P. Burke doesn't know she's alive—it's Delphi who lives, every warm inch of her.

One of the budget types lets go a libidinous snuffle and freezes. The fatherly man, whose name is Mr. Cantle, clears his throat.

"Well, young lady, are you ready to go to work?"

"Yes sir," gravely from the elf.

"We'll see. Has anybody told you what you're going to do for us?"

"No, sir." Joe and Tesla exhale quietly.

"Good." He eyes her, probing for the blind brain in the room next door.

"Do you know what advertising is?"

He's talking dirty, hitting to shock. Delphi's eyes widen and her little chin goes up. Joe is in ecstasy at the complex expressions P. Burke is getting through. Mr. Cantle waits.

"It's, well, it's when they used to tell people to buy things." She swallows. "It's not allowed."

"That's right." Mr. Cantle leans back, grave. "Advertising as it used to be is against the law. A display other than the legitimate use of the product, intended to promote its sale. In former times every manufacturer was free to tout his wares any way, place or time he could afford. All the media and most of the landscape was taken up with extravagant competing displays. The thing became uneconomic. The public rebelled. Since the so-called Huckster Act, sellers have been restrained to, I quote, displays in or on the product itself, visible during its legitimate use or in on-premise sales." Mr. Cantle leans forward. "Now tell me, Delphi, why do people buy one product rather than another?"

"Well ..." Enchanting puzzlement from Delphi. "They, um, they see them and like them, or they hear about them from somebody?" (Touch of P. Burke there; she didn't say, from a friend.)

"Partly. Why did you buy your particular body-lift?"

"I never had a body-lift, sir."

Mr. Cantle frowns; what gutters do they drag for these Remotes?

"Well, what brand of water do you drink?"

"Just what was in the faucet, sir," says Delphi humbly. "I—I did try to boil it—"

"Good God." He scowls; Tesla stiffens. "Well, what did you boil it in? A cooker?"

The shining yellow head nods.

"What brand of cooker did you buy?"

"I didn't buy it, sir," says frightened P. Burke through Delphi's lips. "But—I know the best kind! Ananga has a Burnbabi, I saw the name when she—"

"Exactly!" Cantle's fatherly beam comes back strong; the Burnbabi account is a strong one, too. "You saw Ananga using one so you thought it must be good, eh? And it is good or a great human being like Ananga wouldn't be using it. Absolutely right. And now, Delphi, you know what you're going to be doing for us. You're going to show some products. Doesn't sound very hard, does it?"

"Oh, no, sir ..." Baffled child's stare; Joe gloats.

"And you must never, never tell anyone what you're doing." Cantle's eyes bore for the brain behind this seductive child.

"You're wondering why we ask you to do this, naturally. There's a very serious reason. All those products people use, foods and healthaids and cookers and cleaners and clothes and car—they're all made by people. Somebody put in years of hard work designing and making them. A man comes up with a fine new idea for a better product. He has to get a factory and machinery, and hire workmen. Now. What happens if people have no way of hearing about his product? Word-of-mouth is far too slow and unreliable. Nobody might ever stumble onto his new product or find out how good it was, right? And then he and all the people who worked for him—they'd go bankrupt, right? So, Delphi, there has to be some way that large numbers of people can get a look at a good new product, right? How? By letting people see you using it. You're giving that man a chance."

Delphi's little head is nodding in happy relief.

"Yes, sir, I do see now—but sir, it seems so sensible, why don't they let you—"

Cantle smiles sadly.

"It's an overreaction, my dear. History goes by swings. People overreact and pass harsh unrealistic laws which attempt to stamp out an essential social process. When this happens, the people who understand have to carry on as best they can until the pendulum swings back." He sighs. "The Huckster Laws are bad, inhuman laws, Delphi, despite their good intent. If they were strictly observed they would wreak havoc. Our economy, our society would be cruelly destroyed. We'd be back in caves!"

His inner fire is showing; if the Huckster Laws were strictly enforced he'd be back punching a databank.

"It's our duty, Delphi. Our solemn social duty. We are not breaking the law. You will be using the product. But people wouldn't understand, if they knew. They would become upset, just as you did. So you must be very, very careful not to mention any of this to anybody."

(And somebody will be very, very carefully monitoring Delphi's speech circuits.)

"Now we're all straight, aren't we? Little Delphi here"— He is speaking to the invisible creature next door— "Little Delphi is going to live a wonderful, exciting life. She's going to be a girl people watch. And she's going to be using fine products people will be glad to know about and helping the good people who make them. Yours will be a genuine social contribution." He keys up his pitch; the creature in there must be older.

Delphi digests this with ravishing gravity.

"But sir, how do I—?"

"Don't worry about a thing. You'll have people behind you whose job it is to select the most worthy products for you to use. Your job is just to do as they say. They'll show you what outfits to wear to parties, what suncars and viewers to buy and so on. That's all you have to do."

Parties—clothes—suncars! Delphi's pink mouth opens. In P. Burke's starved seventeen-year-old head the ethics of product sponsorship float far away.

"Now tell me in your own words what your job is, Delphi."

"Yes sir. I—I'm to go to parties and buy things and use them as they tell me, to help the people who work in factories."

"And what did I say was so important?"

"Oh—I shouldn't let anybody know, about the things."

"Right." Mr. Cantle has another paragraph he uses when the subject shows, well, immaturity. But he can sense only eagerness here. Good. He doesn't really enjoy the other speech.

"It's a lucky girl who can have all the fun she wants while doing good for others, isn't it?" He beams around. There's a prompt shuffling of chairs. Clearly this one is go.

Joe leads her out, grinning. The poor fool thinks they're admiring her coordination.

It's out into the world for Delphi now, and at this point the up-channels get used. On the administrative side account schedules are opened, subprojects activated. On the technical side the reserved bandwidth is cleared. (That carrier field, remember?) A new name is waiting for Delphi, a name she'll never hear. It's a long string of binaries

which have been quietly cycling in a GTX tank ever since a certain Beautiful Person didn't wake up.

The name winks out of cycle, dances from pulses into modulations of modulations, whizzes through phasing, and shoots into a giga-band beam racing up to a synchronous satellite poised over Guatemala. From there the beam pours twenty thousand miles back to earth again, forming an all-pervasive field of structured energies supplying tuned demand-points all over the CanAm quadrant.

With that field, if you have the right credit rating you can sit at a GTX console and operate a tuned ore-extractor in Brazil. Or —if you have some simple credentials like being able to walk on water—you could shoot a spool into the network holocam shows running day and night in every home and dorm and rec. site. Or you could create a continent-wide traffic jam. Is it any wonder GTX guards those inputs like a sacred trust?

Delphi's "name" appears as a tiny analyzable nonredundancy in the flux, and she'd be very proud if she knew about it. It would strike P. Burke as magic; P. Burke never even understood robotcars. But Delphi is in no sense a robot. Call her a waldo if you must. The fact is she's just a girl, a real live girl with her brain in an unusual place. A simple real-time on-line system with plenty of bit-rate—even as you and you.

The point of all this hardware, which isn't very much hardware in this society, is so Delphi can walk out of that underground suite, a mobile demand-point draining an omnipresent fieldform. And she does—eighty-nine pounds of tender girl flesh and blood with a few metallic components, stepping out into the sunlight to be taken to her new life. A girl with everything going for her including a meditech escort. Walking lovely, stopping to widen her eyes at the big antennae system overhead.

The mere fact that something called P. Burke is left behind down underground has no bearing at all. P. Burke is totally un-self aware and happy as a clam in its shell. (Her bed has been moved into the waldo cabinet room now.) And P. Burke isn't in the cabinet; P. Burke is climbing out of an airvan in a fabulous Colorado beef preserve and her name is Delphi. Delphi is looking at live Charolais steers and live cottonwoods and aspens gold against the blue smog and stepping over live grass to be welcomed by the reserve super's wife.

The super's wife is looking forward to a visit from Delphi and her friends and by a happy coincidence there's a holocam outfit here doing a piece for the nature nuts.

You could write the script yourself now, while Delphi learns a few rules about structural interferences and how to handle the tiny time lag which results from the new forty-thousand-mile parenthesis in her nervous system. That's right—the people with the leased holocam rig naturally find the gold aspen shadows look a lot better on Delphi's flank than they do on a steer. And Delphi's face improves the mountains too, when you can see them. But the nature freaks aren't quite as joyful as you'd expect.

"See you in Barcelona, kitten," the head man says sourly as they pack up.

"Barcelona?" echoes Delphi with that charming little subliminal lag. She sees where his hand is and steps back.

"Cool, it's not her fault," another man says wearily. He knocks back his grizzled hair. "Maybe they'll leave in some of the gut."

Delphi watches them go off to load the spools on the GTX transport for processing. Her hand roves over the breast the man had touched. Back under Carbondale, P. Burke has discovered something new about her Delphi-body.

About the difference between Delphi and her own grim carcass.

She's always known Delphi has almost no sense of taste or smell. They explained about that: only so much bandwidth. You don't have to taste a suncar, do you? And the slight overall dimness of Delphi's sense of touch—she's familiar with that, too. Fabrics that would prickle P. Burke's own hide feel like a cool plastic film to Delphi.

But the blank spots. It took her a while to notice them. Delphi doesn't have much privacy; investments of her size don't. So she's slow about discovering there's certain definite places where her beastly P. Burke body feels things that Delphi's dainty flesh does not. H'mm! Channel space again, she thinks—and forgets it in the pure bliss of being Delphi.

You ask how a girl could forget a thing like that? Look. P. Burke is about as far as you can get from the concept girl. She's a female, yes—but for her, sex is a four-letter word spelled P-A-I-N. She isn't quite a virgin. You don't want the details; she'd been about twelve and the freak-lovers were bombed blind. When they came down they threw her out with a small hole in her anatomy and a mortal one elsewhere. She dragged off to buy her first and last shot and she can still hear the clerk's incredulous guffaws.

Do you see why Delphi grins, stretching her delicious little numb body in the sun she faintly feels? Beams, saying, "Please, I'm ready now."

Ready for what? For Barcelona like the sour man said, where his nature-thing is now making it strong in the amateur section of the Festival. A winner! Like he also said, a lot of strip-mines and dead fish have been scrubbed but who cares with Delphi's darling face so visible?

So it's time for Delphi's face and her other delectabilities to show on Barcelona's Playa Neuva. Which means switching her channel to the EurAf synchsat.

They ship her at night so the nanosecond transfer isn't even noticed by that insignificant part of Delphi that lives five hundred feet under Carbondale, so excited the nurse has to make sure she eats. The circuit switches while Delphi "sleeps," that is, while P. Burke is out of the waldo cabinet. The next time she plugs in to open Delphi's eyes it's no different—do you notice which relay boards your phone calls go through?

And now for the event that turns the sugarcube from Colorado into the PRINCESS.

Literally true, he's a prince, or rather an Infante of an old Spanish line that got shined up in the Neomonarchy. He's also eighty-one, with a passion for birds—the kind you see in zoos. Now it suddenly turns out that he isn't poor at all. Quite the reverse; his old sister laughs in their tax lawyer's face and starts restoring the family hacienda while the Infante totters out to court Delphi. And little Delphi begins to live the life of the gods.

What do gods do? Well, everything beautiful. But (remember Mr. Cantle?) the main point is Things. Ever see a god empty-handed? You can't be a god without at least a magic girdle or an eight-legged horse. But in the old days some stone tablets or winged sandals or a chariot drawn by virgins would do a god for life. No more! Gods make it on novelty now. By Delphi's time the hunt for new god-gear is turning the earth and seas inside-out and sending frantic fingers to the stars. And what gods have, mortals desire.

So Delphi starts on a Euromarket shopping spree squired by her old Infante, thereby doing her bit to stave off social collapse.

Social what? Didn't you get it, when Mr. Cantle talked about a world where advertising is banned and fifteen billion consumers are glued to their holocam shows? One capricious self-powered god can wreck you.

Take the nose-filter massacre. Years, the industry sweated years to achieve an almost invisible enzymatic filter. So one day a couple of pop-gods show up wearing nose-filters like big purple bats. By the end of the week the world market is screaming for purple bats. Then it switched to bird-heads and skulls, but by the time the industry retooled the crazies had dropped bird-heads and gone to injection globes. Blood!

Multiply that by a million consumer industries and you can see why it's economic to have a few controllable goods. Especially with the beautiful hunk of space R&D the Peace Department laid out for, and which the taxpayers are only too glad to have taken off their hands by an outfit like GTX which everybody knows is almost a public trust.

And so you—or rather, GTX—find a creature like P. Burke and give her Delphi. And Delphi helps keep things orderly, she does what you tell her to. Why? That's right, Mr. Cantle never finished his speech.

But here come the tests of Delphi's button-nose twinkling in the torrent of news and entertainment. And she's noticed. The feedback shows a flock of viewers turning up the amps when this country baby gets tangled in her new colloidal body-jewels. She registers at a couple of major scenes, too, and when the Infante gives her a suncar, little Delphi trying out suncars is a tiger. There's a solid response in high-credit country.

Mr. Cantle is humming his happy tune as he cancels a Benelux subnet option to guest her on a nude cook-show called Work Venus.

And now for the superposh old-world wedding! The hacienda has Moorish baths and six-foot silver candelabra and real black horses and the Spanish Vatican blesses them. The final event is a grand gaucho ball with the old prince and his little Infanta on a bowered balcony. She's a spectacular doll of silver lace, wildly launching toy doves at her new friends whirling by below.

The Infante beams, twitches his old nose to the scent of her sweet excitement. His doctor has been very helpful. Surely now, after he has been so patient with the suncars and all the nonsense—

The child looks up at him, saying something incomprehensible about "breath." He makes out that she's complaining about the three singers she had begged for.

"They've changed!" she marvels. "Haven't they changed? They're so dreary. I'm so happy now!"

And Delphi falls fainting against a gothic vargueno.

Her American duenna rushes up, calls help. Delphi's eyes are open, but Delphi isn't there. The duenna pokes among Delphi's hair, slaps her. The old prince grimaces. He has no idea what she is beyond an excellent solution to his tax problems, but he had been a falconer in his youth. There comes to his mind the small pinioned birds which were flung up to stimulate the hawks. He pockets the veined claw to which he had promised certain indulgences and departs to design his new aviary.

And Delphi also departs with her retinue to the Infante's newly discovered yacht. The trouble isn't serious. It's only that five thousand miles away and five hundred feet down P. Burke has been doing it too well.

They've always known she has terrific aptitude. Joe says he never saw a Remote take over so fast. No disorientations, no rejections. The psychomed talks about self-alienation. She's going into Delphi like a salmon to the sea.

She isn't eating or sleeping, they can't keep her out of the body-cabinet to get her blood moving, there are necroses under her grisly sit-down. Crisis!

So Delphi gets a long "sleep" on the yacht and P. Burke gets it pounded through her perforated head that she's endangering Delphi. (Nurse Fleming thinks of that, thus alienating the psychomed.)

They rig a pool down there (Nurse Fleming again) and chase P. Burke back and forth. And she loves it. So naturally when they let her plug in again Delphi loves it too. Every noon beside the yacht's hydrofoils darling Delphi clips along in the blue sea they've warned her not to drink. And every night around the shoulder of the world an ill-shaped thing in a dark burrow beats its way across a sterile pool.

So presently the yacht stands up on its foils and carries Delphi to the program Mr. Cantle has waiting. It's long-range; she's scheduled for at least two decades' product

life. Phase One calls for her to connect with a flock of young ultra-riches who are romping loose between Brioni and Djakarta where a competitor named PEV could pick them off.

A routine luxgear op, see; no politics, no policy angles, and the main budget items are the title and the yacht which was idle anyway. The storyline is that Delphi goes to accept some rare birds for her prince—who cares? The point is that the Haiti area is no longer radioactive and look!—the gods are there. And so are several new Carib West Happy Isles which can afford GTX rates, in fact two of them are GTX subsids.

But you don't want to get the idea that all these newsworthy people are wired-up robbies, for pity's sake. You don't need many if they're placed right. Delphi asks Joe about that when he comes down to Baranquilla to check her over. (P. Burke's own mouth hasn't said much for a while.)

"Are there many like me?"

"Nobody's like you, buttons. Look, are you still getting that Van Allen warble?"

"I mean, like Davy. Is he a Remote?"

(Davy is the lad who is helping her collect the birds. A sincere redhead who needs a little more exposure.)

"Davy? He's one of Mart's boys, some psychojob. They haven't any channel."

"What about the real ones? Djuma van O, or Ali, or Jim Ten?"

"Djuma was born with a pile of GTX basic where her brain should be, she's nothing but a pain. Jimsy does what his astrologer tells him. Look, peanut, where do you get the idea you aren't real? You're the reallest. Aren't you having joy?"

"Oh, Joe!" Flinging her little arms around him and his analyzer grids. "Oh, me gusto mucho, muchissimo!"

"Hey, hey." He pets her yellow head, folding the analyzer.

Three thousand miles north and five hundred feet down a forgotten hulk in a body-waldo glows.

And is she having joy. To waken out of the nightmare of being P. Burke and find herself a peri, a star-girl? On a yacht in paradise with no more to do than adorn herself and play with toys and attend revels and greet her friends—her, P. Burke, having friends!—and turn the right way for the holocams? Joy!

And it shows. One look at Delphi and the viewers know: DREAMS CAN COME TRUE.

Look at her riding pillions on Davy's sea-bike, carrying an apoplectic macaw in a silver hoop. Oh, Morton, let's go there this winter! Or learning the Japanese chin-chona from that Kobe group, in a dress that looks like a blowtorch rising from one knee, and which should sell big in Texas. Morton, is that real fire? Happy, happy little girl!

And Davy. He's her pet and her baby and she loves to help him fix his red-gold hair. (P. Burke marveling, running Delphi's fingers through the curls.) Of course Davy is one of Matt's boys —not impotent exactly, but very very low drive. (Nobody knows exactly what Matt does with his bitty budget but the boys are useful and one or two have made names.) He's perfect for Delphi; in fact the psychomed lets her take him to bed, two kittens in a basket. Davy doesn't mind the fact that Delphi "sleeps" like the dead. That's when P. Burke is out of the body-waldo up at Carbondale, attending to her own depressing needs.

A funny thing about that. Most of her sleepy-time Delphi's just a gently ticking lush little vegetable waiting for P. Burke to get back on the controls. But now and again Delphi all by herself smiles a bit or stirs in her "sleep." Once she breathed a sound: "Yes."

Under Carbondale, P. Burke knows nothing. She's asleep too, dreaming of Delphi, what else? But if the bushy Dr. Tesla had heard that single syllable his bush would have turned snow-white. Because Delphi is TURNED OFF.

He doesn't. Davy is too dim to notice and Delphi's staff boss, Hopkins wasn't monitoring.

And they've all got something else to think about now, because the cold-fire dress sells half a million copies, and not only in Texas. The GTX computers already know it. When they correlate a minor demand for macaws in Alaska the problem comes to human attention: Delphi is something special.

It's a problem, see, because Delphi is targeted on a limited consumer bracket. Now it turns out she has mass-pop potential—those macaws in Fairbanks, man!—it's like trying to shoot mice with an ABM. A whole new ball game. Dr. Tesla and the fatherly Mr. Cantle start going around in headquarters circles and buddy-lunching together when they can get away from a seventh-level weasel boy who scares them both.

In the end it's decided to ship Delphi down to the GTX holocam enclave in Chile to try a spot on one of the mainstream shows. (Never mind why an Infanta takes up acting.) The holocam complex occupies a couple of mountains where an observatory once used the clear air. Holocam total-environment shells are very expensive and electronically super-stable. Inside them actors can move freely without going off-register and the whole scene or any selected part will show up in the viewer's home in complete 3-di, so real you can look up their noses and much denser than you get from mobile rigs. You can blow a tit ten feet tall when there's no molecular skiffle around.

The enclave looks—well, take everything you know about Hollywood-Burbank and throw it away. What Delphi sees coming down is a neat giant mushroom-farm, domes of all sizes up to monsters for the big games and stuff. It's orderly. The idea that art thrives on creative flamboyance has long been torpedoed by proof that what art needs is computers. Because this showbiz has something TV and Hollywood never

had—automated inbuilt viewer feedback. Samples, ratings, critics, polls? Forget it. With that carrier field you can get real-time response-sensor readouts from every receiver in the world, served up at your console. That started as a thingie to give the public more influence on content.

Yes.

Try it, man. You're at the console. Slice to the sex-age-educ-econ-ethno-cetera audience of your choice and start. You can't miss. Where the feedback warms up, give 'em more of that. Warm—warmer—hot! You've hit it—the secret itch under those hides, the dream in those hearts. You don't need to know its name. With your hand controlling all the input and your eye reading all the response you can make them a god ... and somebody'll do the same for you.

But Delphi just sees rainbows, when she gets through the degaussing ports and the field relay and takes her first look at the insides of those shells. The next thing she sees is a team of shapers and technicians descending on her, and millisecond timers everywhere. The tropical leisure is finished. She's in gigabuck mainstream now, at the funnel maw of the unceasing hose that's pumping the sight and sound and flesh and blood and sobs and laughs and dreams of reality into the world's happy head. Little Delphi is going plonk into a zillion homes in prime time and nothing is left to chance. Work!

And again Delphi proves apt. Of course it's really P. Burke down under Carbondale who's doing it, but who remembers that carcass? Certainly not P. Burke, she hasn't spoken through her own mouth for months. Delphi doesn't even recall dreaming of her when she wakes up.

As for the show itself, don't bother. It's gone on so long no living soul could unscramble the plotline. Delphi's trial spot has something to do with a widow and her dead husband's brother's amnesia.

The flap comes after Delphi's spots begin to flash out along the world-hose and the feedback appears. You've guessed it, of course. Sensational! As you'd say, they IDENTIFY.

The report actually says something like InsldnEmp with a string of percentages meaning that Delphi not only has it for anybody with a Y-chromosome, but also for women and every thing in between. It's the sweet supernatural jackpot, the million-to-one.

Remember your Harlow? A sexpot, sure. But why did bitter hausfraus in Gary and Memphis know that the vanilla-ice-cream goddess with the white hair and crazy eyebrows was their baby girl? And write loving letters to Jean warning her that their husbands weren't good enough for her? Why? The GTX analysts don't know either, but they know what to do with it when it happens.

(Back in his bird sanctuary the old Infante spots it without benefit of computers and gazes thoughtfully at his bride in widow's weeds. It might, he feels, be well to accelerate the completion of his studies.)

The excitement reaches down to the burrow under Carbondale where P. Burke gets two medical exams in a week and a chronically inflamed electrode is replaced. Nurse Fleming also gets an assistant who doesn't do much nursing but is very interested in access doors and identity tabs.

And in Chile little Delphi is promoted to a new home up among the stars' residential spreads and a private jitney to carry her to work. For Hopkins there's a new computer terminal and a full-time schedule man. What is the schedule crowded with?

Things.

And here begins the trouble. You probably saw that coming too.

"What does she think she is, a goddam consumer rep?" Mr. Cantle's fatherly face in Carbondale contorts.

"The girl's upset," Miss Fleming says stubbornly. "She believes that, what you told her about helping people and good new products."

"They are good products," Mr. Cantle snaps automatically, but his anger is under control. He hasn't got where he is by irrelevant reactions.

"She says the plastic gave her a rash and the glo-pills made her dizzy."

"Good god, she shouldn't swallow them," Doctor Tesla puts in agitatedly.

"You told her she'd use them," persists Miss Fleming. Mr. Cantle is busy figuring how to ease this problem to the weasel-faced young man. What, was it a goose that lays golden eggs?

Whatever he says to level Seven, down in Chile the offending products vanish. And a symbol goes into Delphi's tank matrix, one that means roughly Balance unit resistance against PR index. This means that Delphi's complaints will be endured as long as her Pop Response stays above a certain level. (What happens when it sinks need not concern us.) And to compensate, the price of her exposure-time rises again. She's a regular on the show now and response is still climbing.

See her under the sizzling lasers, in a holocam shell set up as a walkway accident. (The show is guesting an acupuncture school expert.)

"I don't think this new body-lift is safe," Delphi's saying. "It's made a funny blue spot on me—look, Mr. Vere."

She wiggles to show where the mini-gray pak that imparts a delicious sense of weightlessness is attached.

"So don't leave it on, Dee. With your meat—watch that deck-spot, it's starting to synch."

"But if I don't wear it it isn't honest. They should insulate it more or something, don't you see?"

The show's beloved old father, who is the casualty, gives a senile snigger.

"I'll tell them," Mr. Vere mutters. "Look now, as you step back bend like this so it just shows, see? And hold two beats."

Obediently Delphi turns, and through the dazzle her eyes connect with a pair of strange dark ones. She squints. A quite young man is lounging alone by the port, apparently waiting to use the chamber.

Delphi's used by now to young men looking at her with many peculiar expressions, but she isn't used to what she gets here. A jolt of something somber and knowing. Secrets.

"Eyes! Eyes, Dee!"

She moves through the routine, stealing peeks at the stranger. He stares back. He knows something.

When they let her go she comes shyly to him.

"Living wild, kitten." Cool voice, hot underneath.

"What do you mean?"

"Dumping on the product. You trying to get dead?"

"But it isn't right," she tells him. "They don't know, but I do, I've been wearing it."

His cool is jolted.

"You're out of your head."

"Oh, they'll see I'm right when they check it," she explains. "They're just so busy. When I tell them—"

He is staring down at little flower-face. His mouth opens, closes. "What are you doing in this sewer anyway? Who are you?"

Bewilderedly she says, "I'm Delphi."

"Holy Zen."

"What's wrong. Who are you, please?"

Her people are moving her out now, nodding at him.

"Sorry we, ran over, Mister Uhunh," the script girl says.

He mutters something but it's lost as her convoy bustles her toward the flower-decked jitney.

(Hear the click of an invisible ignition-train being armed?)

"Who was he?" Delphi asks her hair man.

The hair man is bending up and down from his knees as he works.

"Paul. Isham. Three," he says and puts a comb in his mouth.

"Who's that? I can't see."

He mumbles around the comb, meaning "Are you jiving?" Because she has to be, in the middle of the GTX enclave.

Next day there's a darkly smoldering face under a turban-towel when Delphi and the show's paraplegic go to use the carbonated pool.

She looks.

He looks.

And the next day, too.

(Hear that automatic sequencer cutting in? The system couples, the fuels begin to travel.)

Poor old Isham senior. You have to feel sorry for a man who values order: when he begets young, genetic information is still transmitted in the old ape way. One minute it's a happy midget with a rubber duck—look around and here's this huge healthy stranger, opaquely emotional, running with God knows who. Questions are heard where there's nothing to question, and eruptions claiming to be moral outrage. When this is called to Papa's attention—it may take time, in that boardroom—Papa does what he can, but without immortality-juice the problem is worrisome.

And young Paul Isham is a bear. He's bright and articulate and tender-souled and incessantly active and he and his friends are choking with appallment at the world their fathers made. And it hasn't taken Paul long to discover that his father's house has many mansions and even the GTX computers can't relate everything to everything else. He noses out a decaying project which adds up to something like Sponsoring Marginal Creativity (the free-lance team that "discovered" Delphi was one such grantee). And from there it turns out that an agile lad named Isham can get his hands on a viable packet of GTX holocam facilities.

So here he is with his little band, way down the mushroom-farm mountain, busily spooling a show which has no relation to Delphi's. It's built on bizarre techniques and unsettling distortions pregnant with social protest. An underground expression to you.

All this isn't unknown to his father, of course, but so far it has done nothing more than deepen Isham senior's apprehensive frown.

Until Paul connects with Delphi.

And by the time Papa learns this, those invisible hypergolics have exploded, the energy-shells are rushing out. For Paul, you see, is the genuine article. He's serious. He dreams. He even reads—for example, Green Mansions—and he wept fiercely when those fiends burned Rima alive.

When he hears that some new GTX pussy is making it big he sneers and forgets it. He's busy. He never connects the name with this little girl making her idiotic, doomed protest in the holocam chamber. This strangely simple little girl.

And she comes and looks up at him and he sees Rima, lost Rima the enchanted bird girl, and his unwired human heart goes twang.

And Rima turns out to be Delphi.

Do you need a map? The angry puzzlement. The rejection of the dissonance Rima-hustling-for-GTX-My-Father. Garbage, cannot be. The loitering around the pool to confirm the swindle ... dark eyes hitting on blue wonder, jerky words exchanged in a peculiar stillness ... the dreadful reorganization of the image into Rima-Delphi in my Fathers tentacles—

You don't need a map.

Nor for Delphi either, the girl who loved her gods. She's seen their divine flesh close now, heard their unamplified voices call her name. She's played their god-games, worn their garlands. She's even become a goddess herself, though she doesn't believe it. She's not disenchanted, don't think that. She's still full of love. It's just that some crazy kind of hope hasn't—

Really you can skip all this, when the loving little girl on the yellow-brick road meets a Man. A real human male burning with angry compassion and grandly concerned with human justice, who reaches for her with real male arms and—boom! She loves him back with all her heart.

A happy trip, see?

Except.

Except that it's really P. Burke five thousand miles away who loves Paul. P. Burke the monster, down in a dungeon, smelling of electrode-paste. A caricature of a woman burning, melting, obsessed with true love. Trying over twenty-double-thousand miles of hard vacuum to reach her beloved through the girl-flesh numbed by an invisible film. Feeling his arms around the body he thinks is hers, fighting through shadows to give herself to him. Trying to taste and smell him through beautiful dead nostrils, to love him back with a body that goes dead in the heart of the fire.

Perhaps you get P. Burke's state of mind?

She has phases. The trying, first. And the shame. The SHAME. I am not what thou lovest. And the fiercer trying. And the realization that there is no, no way, none. Never. Never. ... A bit delayed, isn't it, her understanding that the bargain she made was forever? P. Burke should have noticed those stories about mortals who end up as grasshoppers.

You see the outcome—the funneling of all this agony into one dumb protoplasmic drive to fuse with Delphi. To leave, to close out the beast she is chained to. To become Delphi.

Of course it's impossible.

However her torments have an effect on Paul. Delphi-as-Rima is a potent enough love object, and liberating Delphi's mind requires hours of deeply satisfying instruction in the rottenness of it all. Add in Delphi's body worshipping his flesh, burning in the fire of P. Burke's savage heart—do you wonder Paul is involved?

That's not all.

By now they're spending every spare moment together and some that aren't so spare.

"Mister Isham, would you mind staying out of this sports sequence? The script calls for Davy here."

(Davy's still around, the exposure did him good.)

"What's the difference?" Paul yawns. "It's just an ad. I'm not blocking that thing."

Shocked silence at his two-letter word. The script girl swallows bravely.

"I'm sorry, sir, our directive is to do the social sequence exactly as scripted. We're having to respool the segments we did last week, Mister Hopkins is very angry with me."

"Who the hell is Hopkins? Where is he?"

"Oh, please, Paul. Please."

Paul unwraps himself, saunters back. The holocam crew nervously check their angles. The GTX boardroom has a foible about having things pointed at them and theirs. Cold shivers, when the image of an Isham nearly went onto the world beam beside that Dialadinner.

Worse yet. Paul has no respect for the sacred schedules which are now a full-time job for ferret boy up at headquarters. Paul keeps forgetting to bring her back on time and poor Hopkins can't cope.

So pretty soon the boardroom data-ball has an urgent personal action-tab for Mr. Isham senior. They do it the gentle way, at first.

"I can't today, Paul."

"Why not?"

"They say I have to, it's very important."

He strokes the faint gold down on her narrow back. Under Carbondale, Pa., a blind mole-woman shivers.

"Important. Their importance. Making more gold. Can't you see? To them you're just a thing to get scratch with. A huckster. Are you going to let them screw you, Dee? Are you?"

"Oh, Paul—"

He doesn't know it but he's seeing a weirdie; Remotes aren't hooked up to flow tears.

"Just say no, Dee. No. Integrity. You have to."

"But they say, it's my job—"

"You won't believe I can take care of you, Dee, baby, baby, you're letting them rip us. You have to choose. Tell them, no."

"Paul...I w-will..."

And she does. Brave little Delphi (insane P. Burke). Saying "No, please, I promised, Paul."

They try some more, still gently.

"Paul, Mr. Hopkins told me the reason they don't want us to be together so much. It's because of who you are, your father."

She thinks her father is like Mr. Cantle, maybe.

"Oh great. Hopkins. I'll fix him. Listen, I can't think about Hopkins now. Ken came back today, he found out something."

They are lying on the high Andes meadow watching his friends dive their singing kites.

"Would you believe, on the coast the police have electrodes in their heads?"

She stiffens in his arms.

"Yeah, weird. I thought they only used PPs on criminals and the army. Don't you see, Dee—something has to be going on. Some movement. Maybe somebody's organizing. How can we find out?" He pounds the ground behind her. "We should make contact! If we could only find out."

"The, the news?" she asks distractedly.

"The news." He laughs. "There's nothing in the news except what they want people to know. Half the country could burn up and nobody would know it if they didn't want. Dee, can't you take what I'm explaining to you? They've got the whole world programmed! Total control of communication. They've got everybody's minds wired in to think what they show them and want what, they give them and they give them what they're programmed to want—you can't break in or out of it, you can't get hold of it anywhere. I don't think they even have a plan except to keep things going round and round—and God knows what's happening to the people or the earth or the other planets, maybe. One great big vortex of lies and garbage pouring round and round getting bigger and bigger and nothing can ever change. If people don't wake up soon we're through!"

He pounds her stomach, softly.

"You have to break out, Dee."

"I'll try, Paul, I will—"

"You're mine. They can't have you."

And he goes to see Hopkins, who is indeed cowed.

But that night up under Carbondale the fatherly Mr. Cantle goes to see P. Burke.

P. Burke? On a cot in a utility robe like a dead camel in a tent, she cannot at first comprehend that he is telling her to break it off with Paul. P. Burke has never seen Paul. Delphi sees Paul. The fact is, P. Burke can no longer clearly recall that she exists apart from Delphi.

Mr. Cantle can scarcely believe it either but he tries.

He points out the futility, the potential embarrassment for Paul. That gets a dim stare from the bulk on the bed. Then he goes into her duty to GTX, her job, isn't she grateful for the opportunity, etcetera. He's very persuasive.

The cobwebby mouth of P. Burke opens and croaks.

"No."

Nothing more seems to be forthcoming.

Mr. Cantle isn't dense, he knows an immovable obstacle when he bumps one. He also knows an irresistible force: GTX. The simple solution is to lock the waldo-cabinet until Paul gets tired of waiting for Delphi to wake up. But the cost, the schedules! And there's something odd here ... he eyes the corporate asset hulking on the bed and his hunch-sense prickles.

You see, Remotes don't love. They don't have real sex, the circuits designed that out from the start. So it's been assumed that it's Paul who is diverting himself or something with the pretty little body in Chile. P. Burke can only be doing what comes natural to any ambitious gutter-meat. It hasn't occurred to anyone that they're dealing with the real hairy thing whose shadow is blasting out of every holoshow on earth.

Love?

Mr. Cantle frowns. The idea is grotesque. But his instinct for the fuzzy line is strong; he will recommend flexibility.

And so, in Chile:

"Darling, I don't have to work tonight! And Friday too—isn't that right, Mr. Hopkins?"

"Oh, great. When does she come up for parole?"

"Mr. Isham, please be reasonable. Our schedule—surely your own production people must be needing you?"

This happens to be true. Paul goes away. Hopkins stares after him wondering distastefully why an Isham wants to ball a waldo. (How sound are those boardroom belly-fears—garble creeps, creeps in!) It never occurs to Hopkins that an Isham might not know what Delphi is.

Especially with Davy crying because Paul has kicked him out of Delphi's bed.

Delphi's bed is under a real window.

"Stars," Paul says sleepily. He rolls over, pulling Delphi on top. "Are you aware that this is one of the last places on earth where people can see the stars? Tibet, too, maybe."

"Paul..."

"Go to sleep. I want to see you sleep."

"Paul, I... I sleep so hard, I mean, it's a joke how hard I am to wake up. Do you mind?"

"Yes."

But finally, fearfully, she must let go. So that five thousand miles north a crazy spent creature can crawl out to gulp concentrates and fall on her cot. But not for long. It's pink dawn when Delphi's eyes open to find Paul's arms around her, his voice saying rude, tender things. He's been kept awake. The nerveless little statue that was her Delphi-body nuzzled him in the night.

Insane hope rises, is fed a couple of nights later when he tells her she called his name in her sleep.

And that day Paul's arms keep her from work and Hopkins' wails go up to headquarters where the sharp-faced lad is working his sharp tailbone off packing Delphi's program. Mr. Cantle refuses that one. But next week it happens again, to a major client. And ferret-face has connections on the technical side.

Now you can see that when you have a field of complexly heterodyned energy modulations tuned to a demand-point like Delphi there are many problems of standwaves and lashback and skiffle of all sorts which are normally balanced out with ease by the technology of the future. By the same token they can be delicately unbalanced too, in ways that feed back into the waldo operator with striking results.

"Darling—what the hell! What's wrong? DELPHI!"

Helpless shrieks, writhings. Then the Rima-bird is lying wet and limp in his arms, her eyes enormous.

"I ...I wasn't supposed to ..." she gasps faintly. "They told me not to ..."

"Oh my god—Delphi."

And his hard fingers are digging in her thick yellow hair. Electronically knowledgeable fingers. They freeze.

"You're a doll! You're one of those. PP implants. They control you. I should have known. Oh God, I should have known."

"No, Paul," she's sobbing. "No, no, no—"

"Damn them. Damn them, what they've done—you're not your—"

He's shaking her, crouching over her in the bed and jerking her back and forth, glaring at the pitiful beauty.

"No!" She pleads (it's not true, that dark bad dream back there)."I'm Delphi!"

"My father. Filth, pigs—damn them, damn them, damn them."

"No, no," she babbles. "They were good to me—" P. Burke underground mouthing, "They were good to me—AAH-AAAAH!"

Another agony skewers her. Up north the sharp young man wants to make sure this so-tiny interference works. Paul can scarcely hang onto her, he's crying too. "I'll kill them."

His Dephi, a wired-up slave! Spikes in her brain, electronic shackles in his bird's heart. Remember when those savages burned Rima alive?

"I'll kill the man that's doing this to you."

He's still saying it afterward but she doesn't hear. She's sure he hates her now, all she wants is to die. When she finally understands that the fierceness is tenderness she thinks it's a miracle. He knows—and he still loves!

How can she guess that he's got it a little bit wrong?

You can't blame Paul. Give him credit that he's even heard about pleasure-pain implants and snoops, which by their nature aren't mentioned much by those who know them most intimately. That's what he thinks is being used on Delphi, something to control her. And to listen—he burns at the unknown ears in their bed.

Of waldo-bodies and objects like P. Burke he has heard nothing.

So it never crosses his mind as he looks down at his violated bird, sick with fury and love, that he isn't holding all of her. Do you need to be told the mad resolve jelling in him now?

To free Delphi.

How? Well, he is after all Paul Isham III. And he even has an idea where the GTX neurolab is. In Carbondale.

But first things have to be done for Delphi, and for his own stomach. So he gives her back to Hopkins and departs in a restrained and discreet way. And the Chile staff is grateful and do not understand that his teeth don't normally show so much.

And a week passes in which Delphi is a very good, docile little ghost. They let her have the load of wildflowers Paul sends and the bland loving notes. (He's playing it coolly.) And up in headquarters weasel boy feels that his destiny has clicked a notch onward and floats the word up that he's handy with little problems.

And no one knows what P. Burke thinks in any way whatever, except that Miss Fleming catches her flushing her food down the can and next night she faints in the pool. They haul her out and stick her with IVs. Miss Fleming frets, she's seen expressions like that before. But she wasn't around when crazies who called themselves Followers of the Fish looked through flames to life everlasting. P. Burke is seeing Heaven on the far side of death, too. Heaven is spelled P-a-u-l, but the idea's the same. I will die and be born again in Delphi.

Garbage, electronically speaking. No way.

Another week and Paul's madness has become a plan. (Remember, he does have friends.) He smolders, watching his love paraded by her masters. He turns out a scorching sequence for his own show. And finally, politely, he requests from Hopkins a morsel of his bird's free time, which duly arrives.

"I thought you didn't want me any more," she's repeating as they wing over mountain flanks in Paul's suncar. "Now you know—"

"Look at me!"

His hand covers her mouth and he's showing her a lettered card.

DON'T TALK THEY CAN HEAR EVERYTHING WE SAY.

I'M TAKING YOU AWAY NOW.

She kisses his hand. He nods urgently, flipping the card.

DON'T BE AFRAID. I CAN STOP THE PAIN IF THEY TRY TO HURT YOU.

With his free hand he shakes out a silvery scrambler-mesh on a power pack. She is dumfounded.

THIS WILL CUT THE SIGNALS AND PROTECT YOU DARLING.

She's staring at him, her head going vaguely from side to side, No.

"Yes!" He grins triumphantly. "Yes!"

For a moment she wonders. That powered mesh will cut off the field, all right. It will also cut off Delphi. But he is Paul. Paul is kissing her, she can only seek him hungrily as he sweeps the suncar through a pass.

Ahead is an old jet ramp with a shiny bullet waiting to go. (Paul also has credits and a Name.) The little GTX patrol courier is built for nothing but speed. Paul and Delphi wedge in behind the pilot's extra fuel tank and there's no more talking when the torches start to scream.

They're screaming high over Quito before Hopkins starts to worry. He wastes another hour tracking the beeper on Paul's suncar. The suncar is sailing a pattern out to sea. By the time they're sure it's empty and Hopkins gets on the hot flue to headquarters the fugitives are a sourceless howl about Carib West.

Up at headquarters weasel boy gets the squeal. His first impulse is to repeat his previous play but then his brain snaps to. This one is too hot. Because, see, although in the long run they can make P. Burke do anything at all except maybe live, instant emergencies can be tricky. And—Paul Isham III.

"Can't you order her back?"

They're all in the GTX tower monitor station, Mr. Cantle and ferret-face and Joe and a very neat man who is Mr. Isham senior's personal eyes and ears.

"No sir," Joe says doggedly. "We can read channels, particularly speech, but we can't interpolate organized patterns. It takes the waldo op to send one-to-one—"

"What are they saying?"

"Nothing at the moment, sir." The console jockey's eyes are closed. "I believe they are, ah, embracing."

"They're not answering," a traffic monitor says. "Still heading zero zero three zero—due north, sir."

"You're certain Kennedy is alerted not to fire on them?" the neat man asks anxiously.

"Yes sir."

"Can't you just turn her off?" The sharp-faced lad is angry. "Pull that pig out of the controls!"

"If you cut the transmission cold you'll kill the Remote," Joe explains for the third time. "Withdrawal has to be phased right, you have to fade over to the Remote's own autonomies. Heart, breathing, cerebellum would go blooey. If you pull Burke out you'll probably finish her too. It's a fantastic cybersystem, you don't want to do that."

"The investment." Mr. Cantle shudders.

Weasel boy puts his hand on the console jock's shoulder, it's the contact who arranged the No-no effect for him.

"We can at least give them a warning signal, sir." He licks his lips, gives the neat man his sweet ferret smile. "We know that does no damage."

Joe frowns, Mr. Cantle sighs. The neat man is murmuring into his wrist. He looks up. "I am authorized," he says reverently, "I am authorized to, ah, direct a signal. If this is the only course. But minimal, minimal."

Sharp-face squeezes his man's shoulder.

In the silver bullet shrieking over Charleston Paul feels Delphi arch in his arms. He reaches for the mesh, hot for action. She thrashes, pushing at his hands, her eyes roll. She's afraid of that mesh despite the agony. (And she's right.) Frantically Paul fights her in the cramped space, gets it over her head. As he turns the power up she burrows free under his arm and the spasm fades.

"They're calling you again, Mister Isham!" the pilot yells.

"Don't answer. Darling, keep this over your head damn it how can I—"

An AX90 barrels over their nose, there's a flash.

"Mister Isham! Those are Air Force jets!"

"Forget it," Paul shouts back. "They won't fire. Darling, don't be afraid."

Another AX90 rocks them.

"Would you mind pointing your pistol at my head where they can see it, sir?" the pilot howls.

Paul does so. The AX90s take up escort formation around them. The pilot goes back to figuring how he can collect from GTX too, and after Goldsboro AB the escort peels away.

"Holding the same course," Traffic is reporting to the group around the monitor. "Apparently they've taken on enough fuel to bring them to towerport here."

"In that case it's just a question of waiting for them to dock." Mr. Cantle's fatherly manner revives a bit.

"Why can't they cut off that damn freak's life-support," the sharp young man fumes. "It's ridiculous."

"They're working on it," Cantle assures him.

What they're doing, down under Carbondale, is arguing.

Miss Fleming's watchdog has summoned the bushy man to the waldo room.

"Miss Fleming, you will obey orders."

"You'll kill her if you try that, sir. I can't believe you meant it, that's why I didn't. We've already fed her enough sedative to affect heart action; if you cut any more oxygen she'll die in there."

The bushy man grimaces. "Get Doctor Quine here fast."

They wait, staring at the cabinet in which a drugged, ugly madwoman fights for consciousness, fights to hold Delphi's eyes open.

High over Richmond the silver pod starts a turn. Delphi is sagged into Paul's arm, her eyes swim up to him.

"Starting down now, baby. It'll be over soon, all you have to do is stay alive, Dee."

"... Stay alive..."

The traffic monitor has caught them. "Sir! They've turned off for Carbondale—Control has contact—"

"Let's go."

But the headquarters posse is too late to intercept the courier wailing into Carbondale. And Paul's friends have come through again. The fugitives are out through the freight dock and into the neurolab admin port before the guard gets organized. At the elevator Paul's face plus his handgun get them in.

"I want Doctor—what's his name, Dee? Dee!"

"... Tesla ..." She's reeling on her feet.

"Doctor Tesla. Take me down to Tesla, fast."

Intercoms are squalling around them as they whoosh down, Paul's pistol in the guard's back. When the door slides open the bushy man is there.

"I'm Tesla."

"I'm Paul Isham. Isham. You're going to take your flaming implants out of this girl—now. Move!"

"What?"

"You heard me. Where's your operating room? Go!"

"But—"

"Move! Do I have to burn somebody?"

Paul waves the weapon at Dr. Quine, who has just appeared.

"No, no," says Tesla hurriedly. "But I can't, you know. It's impossible, there'll be nothing left."

"You screaming well can, right now. You mess up and I'll kill you," says Paul murderously. "Where is it, there? And wipe the feke that's on her circuits now."

He's backing them down the hall, Delphi heavy on his arm.

"Is this the place, baby? Where they did it to you?"

"Yes," she whispers, bunking at a door. "Yes ..."

Because it is, see. Behind that door is the very suite where she was born.

Paul herds them through it into a gleaming hall. An inner door opens and a nurse and a gray man rush out. And freeze.

Paul sees there's something special about that inner door. He crowds them past it and pushes it open and looks in.

Inside is a big mean-looking cabinet with its front door panels ajar.

And inside that cabinet is a poisoned carcass to whom something wonderful, unspeakable, is happening. Inside is P. Burke the real living woman who knows that HE is there, coming closer —Paul whom she had fought to reach through forty thousand miles of ice—PAUL is here!—is yanking at the waldo doors—

The doors tear open and a monster rises up.

"Paul darling!" croaks the voice of love and the arms of love reach for him.

And he responds.

Wouldn't you, if a gaunt she-golem flab-naked and spouting wires and blood came at you clawing with metal studded paws—

"Get away!" He knocks wires.

It doesn't much matter which wires, P. Burke has so to speak her nervous system hanging out. Imagine somebody jerking a handful of your medulla—

She crashes onto the floor at his feet, flopping and roaring "PAUL-PAUL-PAUL" in rictus.

It's doubtful he recognizes his name or sees her life coming out of her eyes at him. And at the last it doesn't go to him. The eyes find Delphi, fainting by the doorway, and die.

Now of course Delphi is dead, too.

There's total silence as Paul steps away from the thing by his foot.

"You killed her," Tesla says. "That was her."

"Your control." Paul is furious, the thought of that monster fastened into little Delphi's brain nauseates him. He sees her crumpling and holds out his arms. Not knowing she is dead.

And Delphi comes to him.

One foot before the other, not moving very well—but moving. Her darling face turns up. Paul is distracted by the terrible quiet, and when he looks down he sees only her tender little neck.

"Now you get the implants out," he warns them. Nobody moves.

"But, she's dead," Miss Fleming whispers wildly.

Paul feels Delphi's life under his hand, they're talking about their monster. He aims his pistol at the gray man.

"You. If we aren't in your surgery when I count three I'm burning off this man's leg."

"Mr. Isham," Tesla says desperately, "you have just killed the person who animated the body you call Delphi. Delphi herself is dead. If you release your arm you'll see what I say is true."

The tone gets through. Slowly Paul opens his arm, looks down.

"Delphi?"

She totters, sways, stays upright. Her face comes slowly up.

"Paul..." Tiny voice.

"Your crotty tricks," Paul snarls at them. "Move!"

"Look at her eyes," Dr. Quine croaks.

They look. One of Delphi's pupils fills the iris, her lips writhe weirdly.

"Shock." Paul grabs her to him. "Fix her!" He yells at them, aiming at Tesla.

"For God's sake ... bring it in the lab." Tesla quavers.

"Goodbye-bye," says Delphi clearly. They lurch down the hall, Paul carrying her, and meet a wave of people.

Headquarters has arrived.

Joe takes one look and dives for the waldo room, running into Paul's gun.

"Oh no, you don't."

Everybody is yelling. The little thing in his arm stirs, says plaintively, "I'm Delphi."

And all through the ensuing jabber and ranting she hangs on, keeps it up, the ghost of P. Burke or whatever whispering crazily, "Paul... Paul... Please, I'm Delphi... Paul?"

"I'm here, darling, I'm here." He's holding her in the nursing bed. Tesla talks, talks, talks unheard.

"Paul... don't sleep ..." the ghost-voice whispers. Paul is in agony, he will not accept, WILL NOT believe.

Tesla runs down.

And then near midnight Delphi says roughly, "Ag-ag-ag—" and slips onto the floor, making a rough noise like a seal.

Paul screams. There's more of the ag-ag business and more gruesome convulsive disintegrations, until by two in the morning Delphi is nothing but a warm little bundle of vegetative functions hitched to some expensive hardware—the same that sustained her before her Life began. Joe has finally persuaded Paul to let him at the waldo-cabinet. Paul stays by her long enough to see her face change in a dreadfully alien and coldly convincing way, and then he stumbles out bleakly through the group in Tesla's office.

Behind him Joe is working wet-faced, sweating to reintegrate the fantastic complex of circulation, respiration, endocrines, mid-brain homeostases, the patterned flux that was a human being-it's like saving an orchestra abandoned in midair. Joe is also crying

a little; he alone had truly loved P. Burke. P. Burke, now a dead pile on a table, was the greatest cybersystem he has ever known, and he never forgets her.

The end, really.

You're curious?

Sure, Delphi lives again. Next year she's back on the yacht getting sympathy for her tragic breakdown. But there's a different chick in Chile, because while Delphi's new operator is competent, you don't get two P. Burkes in a row—for which GTX is duly grateful.

The real belly-bomb of course is Paul. He was young, see. Fighting abstract wrong. Now life has clawed into him and he goes through gut rage and grief and grows in human wisdom and resolve. So much so that you won't be surprised, some time later, to find him—where?

In the GTX boardroom, dummy. Using the advantage of his birth to radicalize the system. You'd call it "boring from within."

That's how he put it, and his friends couldn't agree more. It gives them a warm, confident feeling to know that Paul is up there. Sometimes one of them who's still around runs into him and gets a big hello.

And the sharp-faced lad?

Oh, he matures too. He learns fast, believe it. For instance, he's the first to learn that an obscure GTX research unit is actually getting something with their loopy temporal anomalizer project. True, he doesn't have a physics background, and he's bugged quite a few people. But he doesn't really learn about that until the day he stands where somebody points him during a test run—and wakes up lying on a newspaper headlined NIXON UNVEILS PHASE TWO.

Lucky he's a fast learner.

Believe it, zombie. When I say growth I mean growth. Capital appreciation. You can stop sweating. There's a great future there.

6
THE SHIP WHO SANG

Anne McCaffrey

She was born a thing and as such would be condemned if she failed to pass the encephalograph test required of all newborn babies. There was always the possibility that though the limbs were twisted, the mind was not, that though the ears would hear only dimly, the eyes see vaguely, the mind behind them was receptive and alert.

The electroencephalogram was entirely favorable, unexpectedly so, and the news was brought to the waiting, grieving parents. There was the final, harsh decision: to give their child euthanasia or permit it to become an encapsulated "brain," a guiding mechanism in any one of a number of curious professions. As such, their offspring would suffer no pain, live a comfortable existence in a metal shell for several centuries, performing unusual service to Central Worlds.

She lived and was given a name, Helva. For her first three vegetable months she waved her crabbed claws, kicked weakly with her clubbed feet and enjoyed the usual routine of the infant. She was not alone, for there were three other such children in the big city's special nursery. Soon they all were removed to Central Laboratory School, where their delicate transformation began.

One of the babies died in the initial transferral, but of Helva's "class," seventeen thrived in the metal shells. Instead of kicking feet, Helva's neural responses started her wheels; instead of grabbing with hands, she manipulated mechanical extensions. As she matured, more and more neural synapses would be adjusted to operate other mechanisms that went into the maintenance and running of a spaceship. For Helva was destined to be the "brain" half of a scout ship, partnered with a man or a woman, whichever she chose, as the mobile half. She would be among the elite of her kind. Her initial intelligence tests registered above normal and her adaptation index was unusually high. As long as her development within her shell lived up to expectations, and there were no side-effects from the pituitary tinkering, Helva would live a rewarding, rich, and unusual life, a far cry from what she would have faced as an ordinary, "normal" being.

However, no diagram of her brain patterns, no early IQ tests recorded certain essential facts about Helva that Central must eventually learn. They would have to bide their official time and see, trusting that the massive doses of shell-psychology would suffice her, too, as the necessary bulwark against her unusual confinement and the pressures of her profession. A ship run by a human brain could not run rogue or insane with the power and resources Central had to build into their scout ships. Brain ships were, of course, long past the experimental stages. Most babies survived the perfected techniques of pituitary manipulation that kept their bodies small, eliminating the necessity of transfers from smaller to larger shells. And very, very few were lost when the final connection was made to the control panels of ship or industrial combine. Shell-people resembled mature dwarfs in size whatever their natal deformities were, but the well-oriented brain would not have changed places with the most perfect body in the Universe.

So, for happy years, Helva scooted around in her shell with her classmates, playing such games as Stall, Power-Seek, studying her lessons in trajectory, propulsion techniques, computation, logistics, mental hygiene, basic alien psychology, philology, space history, law, traffic, codes: all the et ceteras that eventually became compounded into a reasoning, logical, informed citizen. Not so obvious to her, but of more importance to her teachers, Helva ingested the precepts of her conditioning as easily as she absorbed her nutrient fluid. She would one day be grateful to the patient drone of the subconscious-level instruction.

Helva's civilization was not without busy, do-good associations, exploring possible inhumanities to terrestrial as well as extraterrestrial citizens. One such group—Society for the Preservation of the Rights of Intelligent Minorities—got all incensed over shelled "children" when Helva was just turning fourteen. When they were forced to, Central Worlds shrugged its shoulders, arranged a tour of the Laboratory Schools, and set the tour off to a big start by showing the members case histories, complete with photographs. Very few committees ever looked past the first few photos. Most of their original objections about "shells" were overridden by the relief that these hideous (to them) bodies *were* mercifully concealed.

Helva's class was doing fine arts, a selective subject in her crowded program. She had activated one of her microscopic tools, which she would later use for minute repairs to various parts of her control panel. Her subject was large—a copy of *The Last Supper*—*and* her canvas, small—the head of a tiny screw. She had tuned her sight to the proper degree. As she worked she absentmindedly crooned, producing a curious sound. Shell-people used their own vocal cords and diaphragms, but sound issued through microphones rather than mouths. Helva's hum, then, had a curious vibrancy, a warm, dulcet quality even in its aimless chromatic wanderings.

"Why, what a lovely voice you have," said one of the female visitors.

Helva "looked" up and caught a fascinating panorama of regular, dirty craters on a flaky pink surface. Her hum became a gurgle of surprise. She instinctively regulated her "sight" until the skin lost its cratered look and the pores assumed normal proportions.

"Yes, we have quite a few years of voice training, madam," remarked Helva calmly. "Vocal peculiarities often become excessively irritating during prolonged interstellar distances and must be eliminated. I enjoyed my lessons."

Although this was the first time that Helva had seen unshelled people, she took this experience calmly. Any other reaction would have been reported instantly.

"I meant that you have a nice singing voice . . . dear," the lady said.

"Thank you. Would you like to see my work?" Helva asked politely. She instinctively sheered away from personal discussions, but she filed the comment away for further meditation.

"Work?" asked the lady.

"I am currently reproducing *The Last Supper* on the head of a screw."

"Oh, I say," the lady twittered.

Helva turned her vision back to magnification and surveyed her copy critically. "Of course, some of my color values do not match the old Master's and the perspective is faulty, but I believe it to be a fair copy."

The lady's eyes, unmagnified, bugged out.

"Oh, I forget," and Helva's voice was really contrite. If she could have blushed, she would have. "You people don't have adjustable vision."

The monitor of this discourse grinned with pride and amusement as Helva's tone indicated pity for the unfortunate.

"Here, this will help," said Helva, substituting a magnifying device in one extension and holding it over the picture.

In a kind of shock, the ladies and gentlemen of the committee bent to observe the incredibly copied and brilliantly executed *Last Supper* on the head of a screw.

"Well," remarked one gentleman who had been forced to accompany his wife, "the good Lord can eat where angels fear to tread."

"Are you referring, sir," asked Helva politely, "to the Dark Age discussions of the number of angels who could stand on the head of a pin?"

"I had that in mind."

"If you substitute 'atom' for 'angel,' the problem is not insoluble, given the metallic content of the pin in question."

"Which you are programmed to compute?"

"Of course."

"Did they remember to program a sense of humor, as well, young lady?"

"We are directed to develop a sense of proportion, sir, which contributes the same effect."

The good man chortled appreciatively and decided the trip was worth his time.

If the investigation committee spent months digesting the thoughtful food served them at the Laboratory School, they left Helva with a morsel as well.

"Singing" as applicable to herself required research. She had, of course, been exposed to and enjoyed a music-appreciation course that had included the better-known classical works, such as *Tristan und Isolde*, *Candide*, *Oklahoma!*, and *Le nozze di Figaro*, along with the atomic-age singers, Birgit Nilsson, Bob Dylan, and Geraldine Todd, as well as the curious rhythmic progressions of the Venusians, Capellan visual chromatics, the sonic concerti of the Altairians and Reticulan croons. But "singing" for any shell-person posed considerable technical difficulties. Shell-people were schooled to examine every aspect of a problem or situation before making a prognosis. Balanced properly between optimism and practicality, the nondefeatist attitude of the shell-people led them to extricate themselves, their ships, and personnel, from bizarre situations. Therefore to Helva, the problem that she couldn't open her mouth to sing, among other restrictions, did not bother her. She would work out a method, bypassing her limitations, whereby she could sing.

She approached the problem by investigating the methods of sound reproduction through the centuries, human and instrumental. Her own sound-production equipment was essentially more instrumental than vocal. Breath control and the proper enunciation of vowel sounds within the oral cavity appeared to require the most development and practice. Shell-people did not, strictly speaking, breathe. For their purposes, oxygen and other gases were not drawn from the surrounding atmosphere through the medium of lungs but sustained artificially by solution in their shells. After experimentation, Helva discovered that she could manipulate her diaphragmic unit to sustain tone. By relaxing the throat muscles and expanding the oral cavity well into the frontal sinuses, she could direct the vowel sounds into the most felicitous position for proper reproduction through her throat microphone. She compared the results with tape recordings of modern singers and was not unpleased, although her own tapes had a peculiar quality about them, not at all unharmonious, merely unique. Acquiring a repertoire from the Laboratory library was no problem to one trained to perfect recall. She found herself able to sing any role and any song which struck her fancy. It would not have occurred to her that it was curious for a female to sing bass, baritone, tenor, mezzo, soprano, and coloratura as she pleased. It was, to Helva, only a matter of the correct reproduction and diaphragmatic control required by the music attempted.

If the authorities remarked on her curious avocation, they did so among themselves. Shell-people were encouraged to develop a hobby so long as they maintained proficiency in their technical work.

On the anniversary of her sixteenth year, Helva was unconditionally graduated and installed in her ship, the XH-834. Her permanent titanium shell was recessed behind an even more indestructible barrier in the central shaft of the scout ship. The neural, audio, visual, and sensory connections were made and sealed. Her extendibles were diverted, connected, or augmented, and the final, delicate-beyond-description brain taps were completed while Helva remained anesthetically unaware of the proceedings. When she woke, she *was* the ship. Her brain and intelligence controlled every function from navigation to such loading as a scout ship of her class needed. She could take care of herself and her ambulatory half in any situation already recorded in the annals of Central Worlds and any situation its most fertile minds could imagine.

Her first actual flight, for she and her kind had made mock flights on dummy panels since she was eight, showed her to be a complete master of the techniques of her profession. She was ready for her great adventures and the arrival of her mobile partner.

There were nine qualified scouts sitting around collecting base pay the day Helva reported for active duty. There were several missions that demanded instant attention, but Helva had been of interest to several department heads in Central for some time and each bureau chief was determined to have her assigned to *his* section. No one had remembered to introduce Helva to the prospective partners. The ship always chose its own partner. Had there been another "brain" ship at the base at the moment, Helva would have been guided to make the first move. As it was, while Central wrangled among itself, Robert Tanner sneaked out of the pilots' barracks, out to the field, and over to Helva's slim metal hull.

"Hello, anyone at home?" Tanner said.

"Of course," replied Helva, activating her outside scanners. "Are you my partner?" she asked hopefully, as she recognized the Scout Service uniform.

"All you have to do is ask," he retorted in a wistful tone.

"No one has come. I thought perhaps there were no partners available and I've had no directives from Central."

Even to herself Helva sounded a little self-pitying, but the truth was she was lonely, sitting on the darkened field. She had always had the company of other shells and more recently, technicians by the score. The sudden solitude had lost its momentary charm and become oppressive.

"No directives from Central is scarcely a cause for regret, but there happen to be eight other guys biting their fingernails to the quick just waiting for an invitation to board you, you beautiful thing."

Tanner was inside the central cabin as he said this, running appreciative fingers over her panel, the scout's gravity-chair, poking his head into the cabins, the galley, the head, the pressured-storage compartments.

"Now, if you want to goose Central and do *us* a favor all in one, call up the barracks and let's have a ship-warming partner-picking party. Hmmmm?"

Helva chuckled to herself. He was so completely different from the occasional visitors or the various Laboratory technicians she had encountered. He was so gay, so assured, and she was delighted by his suggestion of a partner-picking party. Certainly it was not against anything in her understanding of regulations.

"Cencom, this is XH-834. Connect me with Pilot Barracks."

"Visual?"

"Please."

A picture of lounging men in various attitudes of boredom came on her screen.

"This is XH-834. Would the unassigned scouts do me the favor of coming aboard?"

Eight figures were galvanized into action, grabbing pieces of wearing apparel, disengaging tape mechanisms, disentangling themselves from bedsheets and towels.

Helva dissolved the connection while Tanner chuckled gleefully and settled down to await their arrival.

Helva was engulfed in an unshell-like flurry of anticipation. No actress on her opening night could have been more apprehensive, fearful, or breathless. Unlike the actress, she could throw no hysterics, china objets d'art, or greasepaint to relieve her tension. She could, of course, check her stores for edibles and drinks, which she did, serving Tanner from the virgin selection of her commissary.

Scouts were colloquially known as "brawns" as opposed to their ship "brains." They had to pass as rigorous a training program as the brains and only the top 1 percent of each contributory world's highest scholars were admitted to Central Worlds Scout Training Program. Consequently the eight young men who came pounding up the gantry into Helva's hospitable lock were unusually fine-looking, intelligent, well-coordinated, and well-adjusted young men, looking forward to a slightly drunken evening, Helva permitting, and all quite willing to do each other dirt to get possession of her.

Such a human invasion left Helva mentally breathless, a luxury she thoroughly enjoyed for the brief time she felt she should permit it.

She sorted out the young men. Tanner's opportunism amused but did not specifically attract her; the blond Nordsen seemed too simple; dark-haired Alatpay had a kind

of obstinacy for which she felt no compassion; Mir-Ahnin's bitterness hinted an inner darkness she did not wish to lighten, although he made the biggest outward play for her attention. Hers was a curious courtship—this would be only the first of several marriages for her, for brawns retired after seventy-five years of service, or earlier if they were unlucky. Brains, their bodies safe from any deterioration, were indestructible. In theory, once a shell-person had paid off the massive debt of early care, surgical adaptation, and maintenance charges, he or she was free to seek employment elsewhere. In practice, shell-people remained in the Service until they chose to self-destruct or died in line of duty. Helva had actually spoken to one shell-person 322 years old. She had been so awed by the contact she hadn't presumed to ask the personal questions she had wanted to.

Her choice of a brawn did not stand out from the others until Tanner started to sing a scout ditty recounting the misadventures of the bold, dense, painfully inept Billy Brawn. An attempt at harmony resulted in cacophony and Tanner wagged his arms wildly for silence.

"What we need is a roaring good lead tenor. Jennan, besides palming aces, what do you sing?"

"Sharp," Jennan replied with easy good humor.

"If a tenor is absolutely necessary, I'll attempt it," Helva volunteered.

"My good *woman*," Tanner protested.

"Sound your A," said Jennan, laughing.

Into the stunned silence that followed the rich, clear, high A, Jennan remarked quietly, "Such an A Caruso would have given the rest of his notes to sing."

It did not take them long to discover her full range.

"All Tanner asked for was one roaring good lead tenor," Jennan said jokingly, "and our sweet mistress supplied us an entire repertory company. The boy who gets this ship will go far, far, far."

"To the Horsehead Nebula?" asked Nordsen, quoting an old Central saying.

"To the Horsehead Nebula and back, we shall make beautiful music," said Helva, chuckling.

"Together," Jennan said. "Only you'd better make the music and, with my voice, I'd better listen."

"I rather imagined it would be I who listened," suggested Helva.

Jennan executed a stately bow with an intricate flourish of his crush-brimmed hat. He directed his bow toward the central control pillar where Helva *was*. Her own personal preference crystallized at that precise moment and for that particular reason: Jennan, alone of the men, had addressed his remarks directly at her physical presence,

regardless of the fact that he knew she could pick up his image wherever he was in the ship and regardless of the fact that her body was behind massive metal walls. Throughout their partnership, Jennan never failed to turn his head in her direction no matter where he was in relation to her. In response to this personalization, Helva at that moment and from then on always spoke to Jennan only through her central mike, even though that was not always the most efficient method.

Helva didn't know that she fell in love with Jennan that evening. As she had never been exposed to love or affection, only the drier cousins, respect and admiration, she could scarcely have recognized her reaction to the warmth of his personality and thoughtfulness. As a shell-person, she considered herself remote from emotions largely connected with physical desires.

"Well, Helva, it's been swell meeting you," said Tanner suddenly as she and Jennan were arguing about the baroque quality of "Come All Ye Sons of Art." "See you in space sometime, you lucky dog, Jennan. Thanks for the party, Helva."

"You don't have to go so soon?" asked Helva, realizing belatedly that she and Jennan had been excluding the others from this discussion.

"Best man won," Tanner said wryly. "Guess I'd better go get a tape on love ditties. Might need 'em for the next ship, if there're any more at home like you."

Helva and Jennan watched them leave, both a little confused.

"Perhaps Tanner's jumping to conclusions?" Jennan asked.

Helva regarded him as he slouched against the console, facing her shell directly. His arms were crossed on his chest and the glass he held had been empty for some time. He was handsome—they all were—but his watchful eyes were unwary, his mouth assumed a smile easily, his voice (to which Helva was particularly drawn) was resonant, deep, and without unpleasant overtones or accent.

"Sleep on it, at any rate, Helva. Call me in the morning if it's your opt."

She called him at breakfast, after she had checked her choice through Central. Jennan moved his things aboard, received their joint commission, had his personality and experience file locked into her reviewer, gave her the coordinates of their first mission. The XH-834 officially became the JH-834.

Their first mission was a dull but necessary crash priority (Medical got Helva), rushing a vaccine to a distant system plagued with a virulent spore disease. They had only to get to Spica as fast as possible.

After the initial, thrilling forward surge at her maximum speed, Helva realized her muscles were to be given less of a workout than her brawn on this tedious mission. But they did have plenty of time for exploring each other's personalities. Jennan, of course,

knew what Helva was capable of as a ship and partner, just as she knew what she could expect from him. But these were only facts, and Helva looked forward eagerly to learning that human side of her partner which could not be reduced to a series of symbols. Nor could the give-and-take of two personalities be learned from a book. It had to be experienced.

"My father was a scout, too, or is that programmed?" began Jennan their third day out.

"Naturally."

"Unfair, you know. You've got all my family history and I don't know one blamed thing about yours."

"I've never known either," Helva said. "Until I read yours, it hadn't occurred to me I must have one, too, someplace in Central's files."

Jennan snorted. "Shell psychology!"

Helva laughed. "Yes, and I'm even programmed against curiosity about it. You'd better be, too."

Jennan ordered a drink, slouched into the gravity couch opposite her, put his feet on the bumpers, turning himself idly from side to side on the gimbals.

"Helva—a made-up name . . ."

"With a Scandinavian sound."

"You aren't blond," Jennan said positively.

"Well, then, there're dark Swedes."

"And blond Turks and this one's harem is limited to one."

"Your woman in purdah, yes, but you can comb the pleasure houses—" Helva found herself aghast at the edge to her carefully trained voice.

"You know," Jennan interrupted her, deep in some thought of his own, "my father gave me the impression he was a lot more married to his ship, the Silvia, than to my mother. I know I used to think Silvia was my grandmother. She was a low number, so she must have been a great-great-grandmother at least. I used to talk to her for hours."

"Her registry?" asked Helva, unwittingly jealous of everyone and anyone who had shared his hours.

"422. I think she's TS now. I ran into Tom Burgess once."

Jennan's father had died of a planetary disease, the vaccine for which his ship had used up in curing the local citizens.

"Tom said she'd got mighty tough and salty. You lose your sweetness and I'll come back and haunt you, girl," Jennan threatened.

Helva laughed. He startled her by stamping up to the column panel, touching it with light, tender fingers.

"I *wonder* what you look like," he said softly, wistfully.

Helva had been briefed about this natural curiosity of scouts. She didn't know anything about herself and neither of them ever would or could.

"Pick any form, shape, and shade and I'll be yours obliging," she countered, as training suggested.

"Iron Maiden, I fancy blondes with long tresses," and Jennan pantomimed Lady Godiva–like tresses. "Since you're immolated in titanium, I'll call you Brunehilde, my dear," and he made his bow.

With a chortle, Helva launched into the appropriate aria just as Spica made contact.

"What'n'ell's that yelling about? Who are you? And unless you're Central Worlds Medical, go away. We've got a plague. No visiting privileges."

"My ship is singing, we're the JH-834 of Worlds, and we've got your vaccine. What are our landing coordinates?"

"Your *ship* is singing?"

"The greatest SATB in organized space. Any request?"

The JH-834 delivered the vaccine but no more arias and received immediate orders to proceed to Leviticus IV. By the time they got there, Jennan found a reputation awaiting him and was forced to defend the 834's virgin honor.

"I'll stop singing," murmured Helva contritely as she ordered up poultices for his third black eye in a week.

"You will not," Jennan said through gritted teeth. "If I have to black eyes from here to the Horsehead to keep the snicker out of the title, we'll be the ship who sings."

After the "ship who sings" tangled with a minor but vicious narcotic ring in the Lesser Magellanics, the title became definitely respectful. Central was aware of each episode and punched out a "special interest" key on JH-834's file. A first-rate team was shaking down well.

Jennan and Helva considered themselves a first-rate team, too, after their tidy arrest.

"Of all the vices in the universe, I *hate* drug addiction," Jennan remarked as they headed back to Central Base. "People can go to hell quick enough without that kind of help."

"Is that why you volunteered for Scout Service? To redirect traffic?"

"I'll bet my official answer's on your review."

"In far too flowery wording. 'Carrying on the traditions of my family, which has been proud of four generations in Service,' if I may quote you your own words."

Jennan groaned. "I was *very* young when I wrote that. I certainly hadn't been through Final Training. And once I was in Final Training, my pride wouldn't let me fail . . .

"As I mentioned, I used to visit Dad on board the Silvia and I've a very good idea she might have had her eye on me as a replacement for my father because I had had massive doses of scout-oriented propaganda. It took. From the time I was seven, I was going to be a scout or else." He shrugged as if deprecating a youthful determination that had taken a great deal of mature application to bring to fruition.

"Ah, so? Scout Sahir Silan on the JS-422 penetrating into the Horse-head Nebula?"

Jennan chose to ignore her sarcasm.

"With *you*, I may even get that far. But even with Silvia's nudging *I* never daydreamed myself *that* kind of glory in my wildest flights of fancy. I'll leave the whoppers to your agile brain henceforth. I have in mind a smaller contribution to space history."

"So modest?"

"No. Practical. We also serve, et cetera." He placed a dramatic hand on his heart.

"Glory hound!" scoffed Helva.

"Look who's talking, my Nebula-bound friend. At least I'm not greedy. There'll only be one hero like my dad at Parsaea, but I *would* like to be remembered for some kudos. Everyone does. Why else do or die?"

"Your father died on his way back from Parsaea, if I may point out a few cogent facts. So he could never have known he was a hero for damming the flood with his ship. Which kept the Parsaean colony from being abandoned. Which gave them a chance to discover the antiparalytic qualities of Parsaea. Which *he* never knew."

"I know," said Jennan softly.

Helva was immediately sorry for the tone of her rebuttal. She knew very well how deep Jennan's attachment to his father had been. On his review a note was made that he had rationalized his father's loss with the unexpected and welcome outcome of the Affair at Parsaea.

"Facts are not human, Helva. My father was and so am I. And *basically*, so are you. Check over your dial, 834. Amid all the wires attached to you is a heart, an underdeveloped human heart. Obviously!"

"I apologize, Jennan," she said.

Jennan hesitated a moment, threw out his hands in acceptance, and then tapped her shell affectionately.

"If they ever take us off the milk runs, we'll make a stab at the Nebula, huh?"

As so frequently happened in the Scout Service, within the next hour they had orders to change course, not to the Nebula, but to a recently colonized system with two habitable planets, one tropical, one glacial. The sun, named Ravel, had become unstable; the spectrum was that of a rapidly expanding shell, with absorption lines rapidly displacing toward violet. The augmented heat of the primary had already forced

evacuation of the nearer world, Daphnis. The pattern of spectral emissions gave indication that the sun would sear Chloe as well. All ships in the immediate spatial vicinity were to report to Disaster Headquarters on Chloe to effect removal of the remaining colonists.

The JH-834 obediently presented itself and was sent to outlying areas on Chloe to pick up scattered settlers who did not appear to appreciate the urgency of the situation. Chloe, indeed, was enjoying the first temperatures above freezing since it had been flung out of its parent. Since many of the colonists were religious fanatics who had settled on rigorous Chloe to fit themselves for a life of pious reflection, Chloe's abrupt thaw was attributed to sources other than a rampaging sun.

Jennan had to spend so much time countering specious arguments that he and Helva were behind schedule on their way to the fourth and last settlement.

Helva jumped over the high range of jagged peaks that surrounded and sheltered the valley from the former raging snows as well as the present heat. The violent sun with its flaring corona was just beginning to brighten the deep valley as Helva dropped down to a landing.

"They'd better grab their toothbrushes and hop aboard," Helva said. "HQ says speed it up."

"All women," remarked Jennan in surprise as he walked down to meet them. "Unless the men on Chloe wear furred skirts."

"Charm 'em but pare the routine to the bare essentials. And turn on your two-way private."

Jennan advanced smiling, but his explanation of his mission was met with absolute incredulity and considerable doubt as to his authenticity. He groaned inwardly as the matriarch paraphrased previous explanations of the warming sun.

"Revered mother, there's been an overload on that prayer circuit and the sun is blowing itself up in one obliging burst. I'm here to take you to the spaceport at Rosary—"

"That Sodom?" The worthy woman glowered and shuddered disdainfully at his suggestion. "We thank you for your warning but we have no wish to leave our cloister for the rude world. We must go about our morning meditation, which has been interrupted—"

"It'll be permanently interrupted when that sun starts broiling you. You must come now," Jennan said firmly.

"Madame," said Helva, realizing that perhaps a female voice might carry more weight in this instance than Jennan's very masculine charm.

"Who spoke?" cried the nun, startled by the bodiless voice.

"I, Helva, the ship. Under my protection you and your sisters-in-faith may enter safely and be unprofaned by association with a male. I will guard you and take you safely to a place prepared for you."

The matriarch peered cautiously into the ship's open port. "Since only Central Worlds is permitted the use of such ships, I acknowledge that you are not trifling with us, young man. However, we are in no danger here."

"The temperature at Rosary is now ninety-nine degrees," said Helva. "As soon as the sun's rays penetrate directly into this valley, it will also be ninety-nine degrees, and it is due to climb to approximately one hundred eighty degrees today. I notice your buildings are made of wood with moss chinking. Dry moss. It should fire around noontime."

The sunlight was beginning to slant into the valley through the peaks, and the fierce rays warmed the restless group behind the matriarch. Several opened the throats of their furry parkas.

"Jennan," said Helva privately to him, "our time is very short."

"I can't leave them, Helva. Some of those girls are barely out of their teens."

"Pretty, too. No wonder the matriarch doesn't want to get in."

"Helva."

"It will be the Lord's will," said the matriarch stoutly and turned her back squarely on rescue.

"To burn to death?" shouted Jennan as she threaded her way through her murmuring disciples.

"They want to be martyrs? Their opt, Jennan," said Helva dispassionately. "We must leave and that is no longer a matter of option."

"How can I leave, Helva?"

"Parsaea?" Helva asked tauntingly as he stepped forward to grab one of the women. "You can't drag them *all* aboard and we don't have time to fight it out. Get on board, Jennan, or I'll have you on report."

"They'll die," muttered Jennan dejectedly as he reluctantly turned to climb on board.

"You can risk only so much." Helva said sympathetically. "As it is we'll just have time to make a rendezvous. Lab reports a critical speedup in spectral evolution."

Jennan was already in the air lock when one of the younger women, screaming, rushed to squeeze in the closing port. Her action set off the others. They stampeded through the narrow opening. Even crammed back to breast, there was not enough room inside for all the women. Jennan broke out space suits for the three who would have to

remain with him in the air lock. He wasted valuable time explaining to the matriarch that she must put on the suit because the air lock had no independent oxygen or cooling units.

"We'll be caught," said Helva in a grim tone to Jennan on their private connection. "We've lost eighteen minutes in this last-minute rush. I am now overloaded for maximum speed and I must attain maximum speed to outrun the heat wave."

"Can you lift? We're suited."

"Lift? Yes," she said, doing so. "Run? I stagger."

Jennan, bracing himself and the women, could feel her sluggishness as she blasted upward. Heartlessly, Helva applied thrust as long as she could, despite the fact that the gravitational force mashed her cabin passengers brutally and crushed two fatally. It was a question of saving as many as possible. The only one for whom she had any concern was Jennan and she was in desperate terror about his safety. Airless and uncooled, protected by only one layer of metal, not three, the air lock was not going to be safe for the four trapped there, despite their space suits. These were only the standard models, not built to withstand the excessive heat to which the ship would be subjected.

Helva ran as fast as she could but the incredible wave of heat from the explosive sun caught them halfway to cold safety.

She paid no heed to the cries, moans, pleas, and prayers in her cabin. She listened only to Jennan's tortured breathing, to the missing throb in his suit's purifying system and the sucking of the overloaded cooling unit. Helpless, she heard the hysterical screams of his three companions as they writhed in the awful heat. Vainly, Jennan tried to calm them, tried to explain they would soon be safe and cool if they could be still and endure the heat. Undisciplined by their terror and torment, they tried to strike out at him despite the close quarters. One flailing arm became entangled in the leads to his power pack and the damage was quickly done. A connection, weakened by heat and the dead weight of the arm, broke.

For all the power at her disposal, Helva was helpless. She watched as Jennan fought for his breath, as he turned his head beseechingly toward *her,* and died.

Only the iron conditioning of her training prevented Helva from swinging around and plunging back into the cleansing heart of the exploding sun. Numbly she made rendezvous with the refugee convoy. She obediently transferred her burned, heat-prostrated passengers to the assigned transport.

"I will retain the body of my scout and proceed to the nearest base for burial," she informed Central dully.

"You will be provided escort," was the reply.

"I have no need of escort."

"Escort is provided, XH-834," she was told curtly. The shock of hearing Jennan's initial severed from her call number cut off her half-formed protest. Stunned, she waited by the transport until her screens showed the arrival of two other slim brain ships. The cortege proceeded homeward at unfunereal speeds.

"834? The ship who sings?"

"I have no more songs."

"Your scout was Jennan."

"I do not wish to communicate."

"I'm 422."

"Silvia?"

"Silvia died a long time ago. I'm 422. Currently MS," the ship rejoined curtly. "AH-640 is our other friend, but Henry's not listening in. Just as well—he wouldn't understand it if you wanted to turn rogue. But I'd stop *him* if he tried to deter you."

"Rogue?" The term snapped Helva out of her apathy.

"Sure. You're young. You've got power for years. Skip. Others have done it. 732 went rogue twenty years ago after she lost her scout on a mission to that white dwarf. Hasn't been seen since."

"I never heard about rogues."

"As it's exactly the thing we're conditioned against, you sure wouldn't hear about it in school, my dear," 422 said.

"Break conditioning?" cried Helva, anguished, thinking longingly of the white, white furious hot heart of the sun she had just left.

"For you I don't think it would be hard at the moment," 422 said quietly, her voice devoid of her earlier cynicism. "The stars are out there, winking."

"Alone?" cried Helva from her heart.

"Alone!" 422 confirmed bleakly.

Alone with all of space and time. Even the Horsehead Nebula would not be far enough away to daunt her. Alone with a hundred years to live with her memories and nothing . . . nothing more.

"Was Parsaea worth it?" she asked 422 softly.

"Parsaea?" 422 repeated, surprised. "With his father? Yes. We were there, at Parsaea when we were needed. Just as you . . . and his son . . . were at Chloe. When you were needed. The crime is not knowing where need is and not being there."

"But *I* need *him*. Who will supply my need?" said Helva bitterly.

"834," said 422 after a day's silent speeding, "Central wishes your report. A replacement awaits your opt at Regulus Base. Change course accordingly."

"A replacement?" That was certainly not what she needed, a reminder inadequately filling the void Jennan left. Why, her hull was barely cool of Chloe's heat. Atavistically, Helva wanted time to mourn Jennan.

"Oh, none of them are impossible if *you're* a good ship," 422 remarked philosophically. "And it is just what you need. The sooner the better."

"You told them I wouldn't go rogue, didn't you?" Helva said.

"The moment passed you even as it passed me after Parsaea, and before that, after Glen Arthur, and Betelgeuse."

"We're conditioned to go on, aren't we? We *can't* go rogue. You were testing."

"Had to. Orders. Not even Psych knows why a rogue occurs. Central's very worried, and so, daughter, are your sister ships. I asked to be your escort. I . . . don't want to lose you both."

In her emotional nadir, Helva could feel a flood of gratitude for Silvia's rough sympathy.

"We've all known this grief, Helva. It's no consolation, but if we couldn't feel with our scouts, we'd only be machines wired for sound."

Helva looked at Jennan's still form stretched before her in its shroud and heard the echo of his rich voice in the quiet cabin.

"Silvia! I *couldn't* help him," she cried from her soul.

"Yes, dear, I know," 422 murmured gently and then was quiet.

The three ships sped on, wordless, to the great Central Worlds base at Regulus. Helva broke silence to acknowledge landing instructions and the officially tendered regrets.

The three ships set down simultaneously at the wooded edge where Regulus's gigantic blue trees stood sentinel over the sleeping dead in the small Service cemetery. The entire Base complement approached with measured step and formed an aisle from Helva to the burial ground. The honor detail, out of step, walked slowly into her cabin. Reverently they placed the body of her dead love on the wheeled bier, covered it honorably with the deep-blue, star-splashed flag of the Service. She watched as it was driven slowly down the living aisle, which closed in behind the bier in last escort.

Then, as the simple words of interment were spoken, as the atmosphere planes dipped in tribute over the open grave, Helva found voice for her lonely farewell.

Softly, barely audible at first, the strains of the ancient song of evening and requiem swelled to the final poignant measure until black space itself echoed back the sound of the song the ship sang.