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# Critical Approaches to Information Technology in Librarianship

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## Foundations and Applications

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## Censorship, Critical Theory, and New Information Technologies: Foundations of Critical Scholarship in Communications

*Sue Curry Jansen*

### INTRODUCTION

This chapter will introduce some of the main sources of scholarly critique of information technology from the field of communications research. The grounding work of Marxist scholarship and its revision and extension in the work of the Frankfurt School of Critical Theory will be examined first. Second, the analysis of the culture industry and information capitalism will be explored. Current research and arguments in several areas of scholarship on gender, information, and technology will follow. I will finally turn to research which seeks to expose the hidden curricula of information technologies before offering some conclusions.

The “Dreams of Reason”<sup>1</sup> that secure the scientific outlook also vaunt the claim of technological neutrality: the idea that technology is value-free. These Cartesian dreams purport to scrub away all of the fingerprints of *homo faber*—the living, breathing, calculating, crafting, mortal technician—leaving in his or her stead pristine objects that may be used for good or evil. This move transfers virtually all of the responsibility for creating and inscribing meaning and value to technology from designers or producers to consumers.

The Siamese twins of technological autonomy and technological necessity are also children of this dream. They impute an inherent order to things: an immanent logic that has, for example, purportedly led to simultaneous inventions in vastly different cultural contexts. These tech-

Parts of this chapter are more fully developed in Sue Curry Jansen, *Censorship: The Knot that Binds Power and Knowledge* (New York: Oxford University Press, 1988).

nological imperatives, in turn, provide the auspices for theories and ideologies of technological determinism, evolution, and progress.

Karl Marx challenged the efficacy of the Cartesian dream by identifying a ghost, "a spectre," in the machine: that spectre was, of course, capitalism, the social and commodity relations that have underwritten technological development in the West.<sup>2</sup> Informed in large part by the technological determinism of the anthropologist Lewis Henry Morgan, Marx's own theoretical positioning in relationship to technology and technological evolution is also problematic. His analysis is more cogent than his diagnosis because he never entirely surrendered the Cartesian dream of a clean machine. He favored retooling the engine of history—the organization of the relations of production—to redirect its trajectory toward a more egalitarian future. In developing his blueprint for this future, however, he largely reproduced Morgan's assumptions of technological necessity and evolutionary progress.

A generation later his epigones, Max Weber and the young Georg Lukacs, were far less sanguine. Weber described the social relations of production and administration that accompanied the development of modern capitalism as "an iron cage" that deprived workers of both authenticity and emancipatory possibilities.<sup>3</sup> Lukacs saw this cage and the material and conceptual tools used to manufacture it as possessing a "phantom objectivity."<sup>4</sup>

### THE FRANKFURT SCHOOL OF CRITICAL THEORY

By the time Lukacs reached middle age, the Enlightenment's dreams of reason had been transformed into a totalitarian nightmare for much of Europe. Within the rather esoteric realm of academic social theory, the possibility of effecting a synthesis of the ideas of Marx and Freud appeared to hold some promise for making sense of the nightmare.

Friedrich Pollock, Max Horkheimer, Theodor Adorno, Walter Benjamin, Karl Mannheim, Erich Fromm, Franz Neumann, Herbert Marcuse, and others entered into a sustained collaborative effort to bring that synthesis to fruition.<sup>5</sup> In doing so, they gave birth to the Frankfurt School of Critical Theory. Their work provided the auspices for a radical rethinking of the dialectic of power and knowledge. Horkheimer, Adorno, and others persuasively demonstrated that the Cartesian dream, as embodied in the Western Enlightenment, had transformed and deformed reason into a purely instrumental process: a process that became naturalized and reified in what Benjamin called "the age of mechanical reproduction."<sup>6</sup>

The Frankfurt School is now frequently criticized or dismissed because its diagnosis of the modern condition is profoundly pessimistic.<sup>7</sup> Benjamin, himself, committed suicide. The iron cage of modern culture, described by critical theory, had sturdy bars but no doors. As a result, it supported emancipatory visions of social reality, but it could not locate any passages to their realization. In short, it offered no reliable recipes for resistance.

While such assessments are both plausible and persuasive, they nevertheless underestimate the achievements of this extraordinary and extraordinarily diverse group of thinkers. These assessments blame the messenger for the message: a message articulated during the darkest period of the twentieth century. The Nazi was literally at the door when some of the most significant works of the Frankfurt School were conceived.

Mannheim claimed that schools of thought ought to be judged by the significance of the questions they raise, not merely by the answers they provide.<sup>8</sup> The Frankfurt School identified and articulated fundamental questions about the philosophies of the Enlightenment, the constituents of rational thought, the limits of instrumental thinking, the relationship of power and knowledge, the nature of objectivity, and the ghost in the machines of modernity—questions that all serious social analysts continue to struggle with regardless of whether they call themselves critical theorists, deconstructionists, postmodernists, standpoint theorists, or, in some cases, even feminist theorists. To be sure, during the post-World War II period, Existentialism, especially the works of Heidegger and Sartre, sketched a new landscape of critical thought that later thinkers such as Foucault, Lacan, and Derrida would color. Nevertheless, the Frankfurt School framed the questions of our time in ways that remain compelling to those who seek a critical lens for analyses both of structures of knowledge and of knowledge industries.

Jurgen Habermas's inaugural address at the University of Frankfurt in 1965 is usually cited as marking the formal end of the Frankfurt School.<sup>9</sup> The heir-apparent of critical theory renounced the skepticism of his teachers, Horkheimer and Adorno, and with it, apparently, their legacy as well. Committed to "an unabridged and critique-enabling concept of reason,"<sup>10</sup> Habermas, like his mentors, has nevertheless also distinguished himself by persistently raising fundamental questions about the constituents of rational thought, ethics, democratic communication, and the positionings of technology and technological expertise in contemporary authority structures. In the quarter century that has passed since his installation at Frankfurt, he has also repeatedly displayed a strong penchant for engaging hyperbolic rhetoric to mark his distance and autonomy

from other thinkers who occupy adjacent territories (e.g., Foucault, Gadamer, etc.);<sup>11</sup> so much so that his inaugural disclaimer has lost some of its weight. In my judgment, it has become increasingly apparent that Habermas sees so far and so well because he is standing on the shoulders of giants.

In the next section, I survey some of the territory that can be seen from the shoulders of these giants, and identify some of the ways the ideas of the Frankfurt School can be used to assess new information technologies for creating, organizing, and distributing knowledge. I will then show that even giants see by not seeing. I locate and mark some of the blindspots in contemporary critical discourses about knowledge and power, and show how these blindspots can be explained and illuminated by analyzing their gendered constituents. I also suggest some of the ways feminist epistemologies can amplify the explanatory powers of critical theory and expand our conceptual resources for technology assessment. After that, I identify some of the ways new information technologies and structures of knowledge support what I call "constitutive censorship."<sup>12</sup> In the conclusion, I propose an alternative to Cartesian dreams of reason that restores the human fingerprints to technological ingenuity. This reflexive alternative encourages us to recognize fully that our classificatory systems and technologies are, in Donna Haraway's words, "clackety structures": artifacts of human craftsmanship, interests, perceptual limits, and priorities.<sup>13</sup>

### ON THE SHOULDERS OF GIANTS: THE CULTURE INDUSTRY AND INFORMATION-CAPITALISM

In *The German Ideology* (original 1846), Marx and Engels broke with the French philosophes' theory of knowledge by asserting that the abstract, formal language of philosophers that creates the impression that thought is free of practical interests is only "the distorted language of the actual world": a language that secures and is secured by the prevailing form of the social division of labor. Marx and Engels maintained that, under capitalism, even the categories that lie behind our semantic conventions and classificatory systems are homologous with property relations, so that "in language [as in life] the relations of buying and selling have been the basis of all others."<sup>14</sup>

This insight lent itself to two interpretations. The first supports a crude, mechanical form of economic reductionism. The second provides the grounds for development of sociologies of knowledge. Marx the revolutionary and coauthor of *The Communist Manifesto* forcefully asserted the first position. Marx the scholar carefully developed the second position.

The Frankfurt School took its inspiration from the scholarly Marx. As a result, the sociology of knowledge that its members articulated owes almost as much to Marx's sources, especially Hegel, as it does to Marx. Their radical rethinking of the structures of consciousness and the problem of alienation was influenced by Goethe, Schiller, Heine, von Humboldt, Grimm, Nietzsche, Dilthey, Weber, and others, as well as Marx and Freud.

In short, the Frankfurt School translated Marx's definition of critique as "the self-clarification of the struggles and wishes of the age" into practice.<sup>15</sup> In the twentieth century, this practice requires revision and extension of Marx's analyses of the commodity relations of bourgeois cultures, but it also mandates critique of Marx and of formations of power that carry his signature.

### Technological Designs as Social Designs: The Culture Industry

Current fashions in critical scholarship favor attributions to Gramsci, Foucault, Althusser, Williams, Hall, and others; however, the works of Horkheimer, Adorno, and Marcuse remain exemplars for responsible critical studies of knowledge industries. They systematically attend to the dialectical relationship that links forms of consciousness and the institutional arrangements that manufacture, package, and distribute commodified forms of consciousness. Adorno's and Horkheimer's concept of "the culture industry" effectively captures and foregrounds this dynamic focus.<sup>16</sup>

If the formulations of critical theory are over-determined (and they often are), they nevertheless manifest more responsible commitments to critique—to the pursuit of self-clarification—than most currently ascendent forms of critical theory such as Americanized versions of "cultural studies." Cultural studies approaches are frequently so eager to find "resistance" in popular forms, including tabloids, MTV, and Madonna, and their fans, that they increasingly ignore the institutional interests and arrangements of power that sponsor these forms.<sup>17</sup> We live in an age of unprecedented conglomeration, concentration, expansion, and globalization of media, entertainment, and information industries and technologies. Adorno's configuration may therefore be a better template for describing emerging formations of the culture industry than it was for mapping the system of domination that operated in his own time.

To be sure, the formulation is only suggestive: it provides a provocative metaphor for organizing theoretical dialogues that can produce informed

and "enabling" critiques of knowledge industries. Indeed, its primary heuristic value may actually be its temptation to hyperbole. This hyperbole serves as an insistent reminder of the constant importance of attending to the material and institutional arrangements of what is currently being ideologized as "the information society."

The sociology of knowledge supported by critical theory conceives of technological designs as social designs. It affirms the conclusion that cultural values, economic interests, and political decisions are as integral to the composition of these designs as mathematical calculations, motors, cams, circuits, and silicon chips. Technologies are, in the words of Dallas Smythe, "teaching machines": they invite us to do some things, and make it difficult, although not impossible, to do others.<sup>18</sup>

The ambitious historical inquiries of Horkheimer and Adorno trace the development of instrumental thinking in the dualisms of Western thought from antiquity to the twentieth century.<sup>19</sup> They show how instrumentalism promotes forms of information and information technologies that are based on design principles that incorporate values such as efficiency, hierarchy, standardization, profitability, expansibility, redundancy, and control.

### Information-Capitalism

Horkheimer and Adorno's analysis foreshadows and continues to illuminate current developments within contemporary culture industries. Thus, for example, it anticipates the current global movement toward privatization of information: the transfer of the production, control, and distribution of knowledge from public to private organizations and interests. Under the privatization of "information-capitalism," what was once regarded as a public good and cornerstone of democracy—Western culture's accumulated social knowledge or "wisdom of the ages"—is increasingly absorbed into the commodity system.<sup>20</sup> As a result, public libraries, education, broadcasting, museums, galleries, performances, and so on are increasingly brought under the discipline of the logic of profit. Under information-capitalism, then, the marketplace of ideas is no longer conceived as a public utility which serves all who seek its goods. Increasingly it becomes a private enterprise which serves only those who can afford to pay a price for the commodities it markets to consumers.<sup>21</sup>

Information-capitalism not only changes conditions of access to knowledge, it also changes the social role and structure of knowledge as well as the forms of knowledge that are produced. Under this "new world order," the production of knowledge becomes a basic industry like the production

of oil, steel, and transportation.<sup>22</sup> The transfer in economic activity from production of material goods to the production of information has, to date, occurred in three ways. The first is through automation, especially robotics and other computer-assisted forms of manufacturing which result in reorganization of the efforts of the human workforce toward research, planning, design, and development of knowledge that is applied in manufacturing material goods. This step also eliminates high-paid blue collar jobs and contributes to the so-called "feminization of labor" in electronics industries. The second is through the emergence of high-tech enterprises which specialize in the production and sale of "commodified 'producer information'" (i.e., design, software, databases, expert systems, etc.)—information resources which are used by other firms in the productive process. The third is through acceleration of the production, promotion, and marketing of consumer information goods such as computers, VCRs, videos, fax machines, and other up-scale technological commodities.<sup>23</sup>

Privatization changes the relationship of the citizen/shopper to knowledge because unlike oil, cornflakes, or automobiles, knowledge is not used up when it is consumed. It may be lost, forgotten, destroyed, or censored, but it does not deplete itself, rust, or wear out. Moreover, once it has been produced, as every college freshman knows, knowledge can be copied, pirated, or plagiarized. This, of course, creates problems for both the producers and the gatekeepers of commodified knowledge. Under the "free-market of ideas" ideology that was valorized by industrial capitalism, knowledge was, at least in theory, communal property and not private property. Hence, it could not turn a profit.

Knowledge can only become a profitable commodity if democratic access is restricted by removing it from the public sphere and limiting the channels available for its distribution. For this reason, librarians and educators now find themselves policing access to photocopies, computer software, and video equipment. And, more ominously, they find themselves and their institutions increasingly held accountable by the legal system for violations that occur within their venues.

### The New Enclosure Movement

Ironically, the denial of democratic access to knowledge is effected under the ideological cover of democracy, albeit a cover that makes corporations, rather than individuals, the "citizens" of a new form of "democracy" based upon free enterprise in a global marketplace. To effect the transformation of production of knowledge from a public trust to a private enterprise, a close alignment of the knowledge-producing capaci-

ties of business and government is required. The new information brokers have a vested interest in keeping information secret. For this reason, Ivan Illich has characterized the information revolution as a "new enclosure movement."<sup>24</sup>

To effect this enclosure, information industries put pressure on governments to stop giving away the goods: to stop producing and distributing information free (or at cost) through government publications, statistical services, census reports, health and educational services, and so on. U.S. government information policy has been very responsive to these pressures during the Reagan and Bush administrations. This policy has reduced government's information-related responsibilities and services in several ways: (1) through "deregulation," which has eliminated much of private industry's responsibility to report its activities to government agencies; (2) by narrowing the federal government's production and distribution of knowledge so that information that was previously gathered and analyzed by the federal government for local governments is no longer provided; (3) by restricting access to previously available information by expanding the range of information protected by government classification; (4) through sharply increasing the price of information available through the Freedom of Information Act; (5) by significantly reducing the number and volume of publications available through the Government Printing Office, and by making future government publication decisions contingent on profitability; (6) by subjecting the writings and speeches of current or former officials to prior censorship; (7) by restricting access to non-strategic scientific and technological information produced in universities under government contracts and grants; (8) by reducing the operating budget of the Library of Congress and thereby the services it can provide users; and (9) by cutting federal government aid to state and local communities, which, in turn, reduces the discretionary funds available for allocation to universities, public radio and television, libraries, and other cultural institutions.<sup>25</sup>

These pressures are exacerbated by three related developments within information-capitalism. First, the high costs of computerizing and automating library and other information resources as well as the costs of training personnel and clientele to use these resources reduces funds available for supporting traditional forms of information collection and acquisition. Second, concentrations of ownership and control in publishing and distribution networks are responsible for increases in the consumer costs and corporate profits of books and serial publications. Third, concentration has also greatly increased the redundancy factor

in the content of mass-marketed information commodities by repackaging essentially the same material for different target markets or "windows."

Privatization of information means that information that was formerly available as a part of a citizen's right to know within a democratic system is now only available if that citizen can afford to pay for it. Under information-capitalism, as Herbert Schiller has frequently pointed out, information that cannot be counted upon to bring in a profit will not be produced.<sup>26</sup> Thus, for example, privatization in Britain, and the self-interest of a conservative government, have been responsive to market forces in ways that have gradually resulted in the elimination of the collection and publication of poverty statistics.<sup>27</sup> It has also led to a kind of reverse colonization whereby the advertising logos of American corporate sponsors are now prominently displayed on the programs and promotions for special exhibits at the British Museum and The National Gallery.

### Market Censorship

Under the rule of information-capitalism, the concept and practice of censorship are also transformed. The chancery and state house are no longer the exclusive or even the primary sites of censorship. To the contrary, as Smythe points out, the act of modern censorship is essentially a decision as to what is to be mass-produced in the cultural area.<sup>28</sup> So long as current cultural production is in the hands of privately owned giant corporations, they must also make decisions as to what is to be mass-produced in the cultural area and what will not be produced. Because in monopoly capitalism, privately owned giant corporations are regarded as legal persons, we are accustomed to yield them the same privileges to which natural persons are entitled. It is as accurate therefore to refer to corporate decision making in the cultural area as being censorship as it is to refer to government decision making by that pejorative term. In their attempts to rationalize their production decisions and marketing strategies, corporate decision makers, like the censors of Rome, assume the mantle of mediators of public morals. These market censors determine what ideas will gain entry into "the marketplace of ideas" and what ideas will not. They "inspect" books, magazines, dramatic pieces, films, television programming, computer software, and so on, prior to production, to ensure that they contain nothing that will seriously challenge the tenets or the existence of the corporate system. That is, they decide what products of the culture industry are likely to

ensure a healthy profit margin. Because sensation—sex and violence—sells, market censorship is far more libertine than church or state censorship, but its discipline is, if anything, more thorough. Although the system is not totally determined, most of the time the products that survive the prior censorship of marketing research—the books, news, scripts, games, coupons, programmed learning modules, syllabi, styles, visuals, advertisements, party platforms, and so on—incorporate ideology and values that celebrate the corporate system and question the loyalty, integrity, and sometimes even the sanity of its critics.<sup>29</sup>

Market censorship also exercises its discipline at the cash register. Some would-be consumers of information and users of information technologies are barred from access by the very presence of price tags. Others have differential access based upon how much they are able or willing to pay either for the information commodities themselves or for acquisition of the skills necessary to use and appreciate them. Market segmentation exercises a particularly interesting form of discipline. On the one hand, it has a leveling effect by making some information commodities available at very low prices. On the other hand, however, it provides the more affluent and better educated both greater quality and quantities of information resources. The effect of this discipline is to create the impression of greater choice; when, in fact, for most market segments, there are simply more choices as the same relatively narrow range of material is re-packaged for delivery through different media windows. For example, one sometimes hears the cable subscriber who pays thirty dollars a month for access to thirty-plus channels complain that “there is nothing on television.”

Under information-capitalism, then, information becomes a form of capital; and restriction and control of access to information becomes a fundamental structural principle of the market system as well as a significant constituent of the social reproduction of the class structure. Socially structured gaps in the distribution of information increase the number of potential target markets for information products. Conversely, new information technologies such as desktop publishing, videotext, and computer information services like CompuServe and Prodigy dramatically reduce dependence upon economies of scale when producing information commodities for affluent market segments. With information-capitalism as with industrial capitalism, “the rich get richer and the poor get poorer.” The difference is that the “phantom” democracy of the new system makes it far more resistant to criticism than the visible structures of social inequality that were produced by industrial capitalism.

## SEEING BY NOT SEEING: GENDER, INFORMATION, AND TECHNOLOGY

Market segmentation and target marketing of information commodities reflect and contribute to the social reproduction of inequalities and differences based upon gender, race, class, education, age, and other social traits. In this section, I examine some of the gendered constituents of information and information technologies. I focus on gender because it is the most elementary and therefore the most pervasive marker of difference. As Stuart Hall puts it, all social practices and forms of domination—including the politics of the Left—are always inscribed in and to some extent secured by sexual identity and positioning.<sup>30</sup> If we don't attend to how gendered identities are formed and transformed and how they are deployed politically, we simply do not have a language of sufficient explanatory power at our command with which to understand the institutionalization of power in our society and the secret sources of our resistances to change. To assert that information is gendered is to posit both a profound and mundane claim. To assert that certain commodities, media genres, and message systems are marketed to and sought by female consumers is to say the obvious. To assert, however, that the deep structure of information is gendered is a very provocative move.

### Blindspots in Critical Theory

I have developed this argument more fully elsewhere.<sup>31</sup> In the space available here, however, I can only offer a brief summary of my argument. Positioning my claim within the context of critical theory is a rather unfashionable move. The social theory of the Frankfurt School from Pollock to Habermas is silent about, indeed blind to, the gendered constituents of structures of knowledge.<sup>32</sup> Yet, the discourse of the Frankfurt School is itself a gendered discourse. It is what Mikhail Bakhtin calls “the word of the fathers,”<sup>33</sup> or what the new feminist epistemologies characterize as androcentric or “malestream” theory.<sup>34</sup> This is why its staying power resides primarily in the cogency it brings to the analysis of (1) instrumentalism, a Western masculinist construction and practice of rationality, and (2) culture industries, historically and still male-dominated institutions.

Critical feminism, a perspective that is both critical of and aligned with critical theory,<sup>35</sup> amplifies the conceptual powers of both feminism and critical theory. Feminist theory illuminates and partially repairs the gendered blindspots of critical theory. Conversely, critical theory provides

feminist theory with some rudimentary tools for annexing study of public sphere issues. Those issues have, until very recently, remained less analyzed and under-theorized within its critical frameworks.<sup>36</sup>

### Information: A Gendered Concept?

The most ambitious and successful demonstrations of the gendered character of information have, in my judgment, been articulated within five fairly discrete disciplinary constellations: (1) developmental psychology; (2) language, communication, and literary studies; (3) science and technology studies; (4) studies of pornography; and (5) explorations of what might be called the "collective unconscious" of Western art and knowledge structures.

*Developmental Psychology.* Carol Gilligan's contributions to developmental psychology are by now widely known and therefore require relatively little explication here. Suffice to say she has persuasively demonstrated that females and males in our culture typically attend to different aspects of moral dilemmas, make sense and reach decisions differently, and follow different developmental paths in reaching moral maturity. Her recent work attributes these differences to differential and unequal treatment of girls in the socialization process. To be sure, Gilligan's generalizations are based upon limited and biased samples. Most of her subjects are middle- and upper-class whites. Nevertheless, within this affluent population, she decisively documents the presence of gendered ways of knowing.<sup>37</sup> Others have documented gender-based differences in cognitive styles and learning patterns within less privileged groups.<sup>38</sup>

*Language, Communication, and Literary Studies.* Available studies of gendered differences in conversational styles, in writing and interpretive practices, and in reader reception are now so voluminous that it would require a fairly sizeable library to house them.<sup>39</sup> These studies demonstrate that language practices are marked by significant gender-based differences. This is so much so that some researchers claim women and men speak different languages,<sup>40</sup> while others contend women are without language and will only gain voice by constructing new languages based upon female embodiment.<sup>41</sup> For our purposes, it is sufficient to note that the differential cognitive styles identified by Gilligan and others produce and/or are produced by different ways of speaking, writing, and reading.

*Science and Technology Studies.* Studies of science and technology, informed by feminist perspectives, have brought powerful new insights to the history and sociology of science. Among the founding mothers of feminist studies of science are Ruth Hubbard, Ruth Bleier, Carolyn Merchant,

Evelyn Fox Keller, Sandra Harding, Donna Haraway, and Dorothy Smith.<sup>42</sup> Early feminist technology studies focused primarily on reproductive technologies,<sup>43</sup> but they now encompass the entire range of technologies including information technologies.<sup>44</sup> Feminist science and technology studies do not merely claim that science and technology are man-made. They maintain that the epistemologies and theories of knowledge that produced these discourses are systematically skewed by both Euro- and andro-centric interpretive and textual practices. According to these studies, then, the substantive claims of science are neither "neutral" nor "neutered."<sup>45</sup> Feminists conceive of the forms of reason valorized by scientific "objectivity" as contingent cultural artifacts: artifacts that were crafted by formalizing and codifying the "subjective" views of the men who participated in the founding conversations of modern science. Feminist studies in science and technology have identified some of the gendered practices that shaped these artifacts: they are rooted in the misogyny of Western culture;<sup>46</sup> the vision of science is secured in highly sexualized and sexist metaphors;<sup>47</sup> and the categories of science emphasize discrete boundaries, hierarchies, binary logics, and abstractions.<sup>48</sup> Feminist analyses of science and technology do not claim that the discoveries or the laws of the Sciences of Man are invalid or obsolete. Feminists do claim, however, that these sciences are not only partial, but also incomplete. Moreover, they reject all strategies for redressing this partiality that do anything less than undertake a comprehensive revision of existing categories and structures of knowledge. In contrast to the "God's-eye" perspective, feminist epistemologies maintain that all forms of knowledge are "situated knowledges": historically, culturally, and linguistically mediated, finite, and secured within, but not necessarily homologous with, a field of power relations.<sup>49</sup> This does not require embracing relativism or the "apartheid" approach to knowledge. To the contrary, it is the first move toward a "no-nonsense commitment" to the hard work necessary to provide a science that is "friendly to earthwide projects of finite freedom, adequate material abundance, modest meaning in suffering, and limited happiness."<sup>50</sup> Some feminist epistemological studies have documented differences in the ways women frame and secure arguments,<sup>51</sup> do science,<sup>52</sup> and use technology.<sup>53</sup> For purposes of advancing my argument, it will suffice to point out that existing categories, classificatory systems, and structures of knowledge bear the inscriptions of the conceptual practices of "the fathers."<sup>54</sup> The deep structure of these inscriptions appears to be located in the primitive "totemic" of gender.<sup>55</sup> Gender does not simply classify body types or prescribe norms for their representation; it "inflects an entire universe of objects and behaviors with masculine or feminine attributes, most of which remain unstated."<sup>56</sup>

*Studies of Pornography.* Pornography occupies a crucial position in a gendered sign system because it is the site where the implicit, the “unstated,” becomes explicit.<sup>57</sup> For the purposes of my argument, this excursion into the underworld of pornography is intended to alert readers to how much our culture has been sacrificed in its pursuit of clean machines, efficient instruments, and discrete categorical structures and logics. The language, formulas, and narrative structures—the “poetics”—of pornography represent the underside of the Cartesian dreams. It is where reason goes, when, in Heinz Pagels’s eroticized Cartesian dreams, it goes out the window.<sup>58</sup> It is the graveyard and refuge heap of the subject/object, mind/body split that Baconian and Cartesian dualisms valorize. Susan Griffin proclaims that “the pornographer is a censor.”<sup>59</sup> Pornography censors men’s memories of childhood feelings, attachment, wholeness, and vulnerability. It censors the “weakness” of men who long to be more than “instruments,” more than machines, Terminators, or Robocops. Repressed and denied by the official discourses of male culture, religion, science, and civic culture, Robert Romanyshyn contends that passion and desire could only reappear in the underground world of male sexual fantasies and pornography.<sup>60</sup> The critical theory of the Frankfurt School identified, catalogued, and traced the historical genesis of these sacrifices, but its authors failed to apprehend the gendered constituents of what they called anti-humanism.<sup>61</sup>

The “*Collective Unconscious*” of *Western Art and Knowledge*. Technology is, of course, a product and enactment of the human imagination. In its primitive forms—club, hammer, pot, rope, and so on—its relationship to the human body is readily apparent. Technology is a prosthesis that extends and magnifies the power of human muscles, appendages, and senses. Modern scientific and technological knowledge, the form of knowledge that had its genesis in the Renaissance, relies heavily on visual prosthesis: lens, numbers, print. The etymology of the word “paradigm” betrays this visual bias; from the Greek, it means “to show,” to “lay side-by-side.” Romanyshyn shows how the geometrization of Western culture during the Renaissance allowed the technological imagination to take flight in both the figurative and literal sense. He locates the genesis of this move in the discovery and codification of linear perspective in Florence in the fifteenth century. Linear perspective achieves “a kind of geometrization of the world, and within that space we become observers of a world which has become an object of observation.” It transforms “the eye into a technology” and creates “a world of maps and charts, blueprints and diagrams . . . in which we are . . . silent readers of the printed word and users of the camera . . . [and] in which we have all become astronauts.”<sup>62</sup> It creates “bourgeois perception,” a kind of tunnel-vision which privileges the visual over other senses.<sup>63</sup> However, Romanyshyn’s

“we” is not a fully inclusive we. It is the collective we of elite, Western, male discourse: the “astronaut,” scientist, technologist, capitalist, “the fathers,” who distance and objectify the world and its inhabitants and then re-present this view as the “objective” and omniscient view. In short, it is the “we” of male-gendered information.

### Information Theory

Information theory represents one of the purest articulations of the Cartesian dream of a clean machine.<sup>64</sup> The Cartesian recipe maps the coordinates upon which Claude Shannon positioned his mathematical theory of information and Alan Turing devised his theory of computational numbers and conceived his “logic machine.”<sup>65</sup> Their work, in turn, provided partial blueprints for development of modern digital computers.

In relocating the sites of numbers and arithmetic operations from mind to electronic circuits, Shannon and Turing’s clean machines reduce information to the kinds of messages these circuits can accommodate [see discussion of C. A. Bowers in Carbone chapter and my chapter on censorship—Ed.]. Magoroh Maruyama labels the truncated form of information valorized by information theory as “classificatory information.” He points out that this mode of reasoning is only one of the kinds of information routinely used by human beings in the Western world to organize and analyze data. Maruyama maintains that human “information processors,” unlike their electronic surrogates, also regularly rely upon “relational,” “relevance,” and “contextual” informations in making sense, reaching decisions, constructing arguments, and communicating with one another.<sup>66</sup>

“Classificatory information” is the language of Romanyshyn’s astronaut, of Griffin’s pornographers, of the discourses of science and technology deconstructed by feminist epistemologies, and of the “morality of rules” described by Gilligan in *A Different Voice*. In short, the language or *espiteme*<sup>67</sup> of the new information technologies that are currently revolutionizing our tools for knowing, classifying, organizing, storing, and retrieving knowledge naturalizes and reifies both instrumental and gendered structures of knowledge. Not only knowledge industries but also the deep structure of what now qualifies as knowledge bears the fingerprints of “the fathers.”

### IN PRAISE OF NOISY MACHINES

The new information technologies, the prostheses, that are becoming increasingly prominent in our homes, schools, libraries, hospitals, and

offices are extraordinary tools and teaching machines. Exposing the hidden curriculum of these machines does not undermine or negate their utility. To the contrary, it re-situates them within human history, culture, priorities, and interests. It restores their human fingerprints, and opens up possibilities of approaching technological assessment and implementation reflexively. It also makes it possible to write alternative programs and to envision alternative design aesthetics for information machines.

### Democratic Technics

Luddite forms of resistance may still have some strategic uses on the shop floor and in the office;<sup>68</sup> however, critical feminism can no longer afford to leave the boys alone with their toys. "Astronauts" preparing to exit the planet with "golden parachutes" are not to be trusted to mend the hole in the ozone layer or to keep the Star Wars in the movie theaters.

Prevailing forms of "info-tech" privilege binary data structures: structures that are enhanced by the parallel processing units supported by what Pagels describes as "the new sciences of complexity."<sup>69</sup> A critical feminist aesthetic would presumably try to subvert, invert, and divert capital-intensive information systems which currently advance information-capitalism's instrumental agendas. It would challenge present commitments to what Lewis Mumford calls "authoritarian technics," system-centered, immensely powerful, but inherently unstable technologies.<sup>70</sup>

A critical feminist approach would embrace "democratic technics": social designs that incorporate human-centered, diverse, resourceful, and durable technologies. It would support development of decentralized, egalitarian, accessible, process-oriented alternatives that advance expressive as well as instrumental values.<sup>71</sup>

Democratic technics do not surrender the controls to masters: artisans, designers, producers, or technoscientific experts. They do not bury the wires or scrub away the evidence of human agency. To the contrary, they display the signatures of their makers and demand accountability. Rendering the gendered constituents of the design aesthetics of information technology visible is a first step toward accountability.

### "Clackety Structures"

Those who would advance democratic technics need to build alliances with artisans and theorists who are exploring alternative ways of constructing and using information technology: ways that will unlock what John Wyver refers to as "the enabling potentials of the technology."<sup>72</sup> Some

examples of enabling alternatives using existing technologies follow: (1) creation of feminist computer networks and bulletin boards<sup>73</sup>—in the immediate aftermath of the 1991 Clarence Thomas–Anita Hill television hearings, these networks operated overtime organizing support for Hill and sharing data on sexual harassment; (2) the "electronic salon" facilitating an interactive conference format for feminist analyses of technoscience organized by Deborah Heath at Lewis and Clark College;<sup>74</sup> (3) using CD-I digital interactive systems, developed by SONY, to explore and advance democratic communications; (4) experiments in digital imaging and virtual reality technologies by conceptual artists advancing counter-hegemonic agendas such as David Hockney, Nancy Burson, Jill Scott, Simon Biggs, Jeffery Shaw, and Tjebbe van Tijn.<sup>75</sup> Jill Scott's installation *Machine Dreams*, for instance, presents a dystrophic vision of women's relations with the sewing machine, typewriter, and telephone switchboard.<sup>76</sup>

The counter-hegemonic efforts use existing digital technologies. They do not abandon binary logics, base-2 number systems, digital circuits, polarities, or rhetorics of antithesis; they do, however, engage these devices self-consciously, deliberately, with awareness that the "tunnel" is not the horizon. In effect, they treat them as what Haraway calls "clackety" structures.<sup>77</sup> They remind us that these sleek new technologies and conceptual practices, like the clubs, picks, steam-pumps, and oil-burners that came before them, are just prostheses; and that, in their own ways, they also whirr, chug, smoke, sputter, and spit. That is, these counter-hegemonic efforts mark the limits and display the biases as well as exploit the potentials of binary data structures. They read or, more accurately, program against as well as within the design aesthetics of information-capitalism.

To be sure, these resistant exercises and entertainments are the efforts of a very privileged, "information-rich" minority: academics, artists, and artisans who have routine access to advanced information technologies. To date, they have had little to say about or to the vast majority of workers employed in the new "electronic sweatshops."<sup>78</sup> Moreover, such efforts can provide no solace to segments of the population rendered unemployable by the new enclosure movement: the poor who are getting poorer. They need to be supplemented and surpassed by practices which, in Smythe's words, put "needs before tools."<sup>79</sup>

### CONCLUSION

We are creatures of print who have already crossed over the threshold into cyberspace. The design aesthetics of information-capitalism would

make astronauts or cyborgs of women as well as men, and pornographers of us all.

What is required to resist the new enclosure movement is nothing less than a second renaissance in the ways we conceive, create, code, theorize, and use space, technologies, gender, information, epistemology, and communications. Some potential building blocks or data structures for giving birth to embodied, planet- and species-friendly forms of life may already be emerging. Valorizations of local cultures, bio-regionalism, standpoint epistemologies, and situated knowledge can all be seen as, in part, forms of resistance to the reified fictions of the naturalized, essentialized human of humanism that has historically denied the subjectivities of women, sexual minorities, people of color, and the poor.

The astronaut is still in flight, but the damage he is doing to himself and to the planet is becoming increasingly transparent. Those who would bring him down to earth now appear to have more to contribute than he does toward "self-clarification of the struggles and wishes of the age."<sup>80</sup> The new enclosure movement is, however, rapidly shutting down the hearing spaces available for democratic communications.

## NOTES

1. Heinz Pagels, *The Dreams of Reason* (New York: Simon and Schuster, 1988).
2. Karl Marx and Frederick Engels, *Basic Writings on Politics and Philosophy*, ed. Lewis S. Feuer (Garden City, NY: Anchor Books, 1959); and Karl Marx and Frederick Engels, *The German Ideology* (New York: International Publishers, 1970).
3. Max Weber, *The Protestant Ethic and the Spirit of Capitalism* (London: Unwin, 1985).
4. Georg Lukacs, *History and Class Consciousness* (Cambridge, MA: MIT Press, 1971).
5. All of these people were not formally associated with the School. Benjamin, for instance, was part of the Frankfurt intellectual and social circles, but not part of the School itself. Moreover, not all were affiliated at the same time or shared the same intellectual visions. Although all were influenced to a greater or lesser degree by Marx, the interest in Freud's work was not universal.
6. Walter Benjamin, *Illuminations* (New York: Schocken, 1969) 217-52.
7. Jurgen Habermas, *Knowledge and Human Interests* (Boston: Beacon, 1971); Martin Jay, *Adorno* (Cambridge, MA: Harvard University Press, 1984); and Martin Jay, *The Dialectical Imagination: A History of the Frankfurt School and the Institute of Social Research, 1923-1950* (Boston: Little, Brown and Company, 1973).
8. Karl Mannheim, *From Karl Mannheim*, ed. Kurt A. Wolff (New York: Oxford University Press, 1971).
9. Habermas; Jay *Adorno*; and Jay *Dialectical*.
10. Gerhard Wagner, "Review of *The Structural Transformation of the Public Sphere* by Jurgen Habermas," *Theory, Culture, and Society* 8.4 (1991): 119.

11. David Held and John B. Thompson, eds., *Habermas: Critical Debates* (Cambridge, MA: MIT Press, 1982).
12. Sue Curry Jansen, *Censorship: The Knot that Binds Power and Knowledge* (New York: Oxford University Press, 1988).
13. Donna Haraway, Presentations and Discussions, National Endowment in the Humanities Summer Institute, "Science as Cultural Practice," Wesleyan University, Middletown, CT, June 2-Aug. 3, 1991.
14. Marx and Engels, *German* 119, 102.
15. Karl Marx, *Karl Marx: Early Writings*, ed. L. Colletti (New York: International Publishers, 1975) 209.
16. Max Horkheimer and Theodor W. Adorno, *Dialectic of Enlightenment* (New York: The Seabury Press, 1972).
17. Alan O'Connor, "The Problem of American Cultural Studies," *Critical Studies in Mass Communication* 6 (1984): 405-27; and Joel Pfister, "The Americanization of Cultural Studies," *The Yale Journal of Criticism* 4.2 (1991): 199-228.
18. Dallas Smythe, *Dependency Road: Communications, Capitalism, Consciousness, and Canada* (Norwood, NJ: Ablex, 1981).
19. Horkheimer and Adorno; and Max Horkheimer, *Critique of Instrumental Reason* (New York: Continuum Publishing, 1974).
20. Tessa Morris-Suzuki, "Capitalism in the Computer Age," *New Left Review* (November/December 1986): 81.
21. Anita R. Schiller and Herbert I. Schiller, "Who Can Own What America Knows?" *The Nation* 17 April 1982: 461-64.
22. Smythe *Dependency*.
23. Morris-Suzuki; and Jansen *Censorship*.
24. Ivan Illich, *Tools for Conviviality* (Berkeley: Heyday Books, 1973).
25. Donna Demac, *Keeping America Uninformed: Government Secrecy in the 1980s* (New York: Pilgrim Press, 1984); and Jansen *Censorship*.
26. Herbert I. Schiller, *Who Knows: Information in the Age of The Fortune 500* (Norwood, NJ: Ablex, 1981); Herbert I. Schiller, *Culture, Inc: The Corporate Takeover of Public Expression* (New York: Oxford University Press, 1989); and Schiller and Schiller.
27. Philip Elliot, "Intellectuals, the 'Information Society' and the Disappearance of the Public Sphere," *Mass Communication Review Yearbook*, vol. 4, eds. Ellen Wartella, D. Charles Whitney, and Swen Windahl (Beverly Hills: Sage, 1983).
28. Smythe, *Dependency* 235.
29. Jansen *Censorship*.
30. Stuart Hall, "Brave New World," *Marxism Today* October 1988: 29.
31. See Jansen *Censorship*; Sue Curry Jansen, "Gender and the Information Society: A Socially Structured Silence," *Journal of Communication* 39.3 (Summer 1989): 196-211; Sue Curry Jansen, *Gendered Knowledges: Information, Technology, and Public Policy* (New York: Oxford University Press, forthcoming, 1993); Sue Curry Jansen, "The Ghost in the Machine: Artificial Intelligence and Gendered Thought Patterns," *Resources in Feminist Research, RFR/DRF* (1988): 17, 4-7; Sue Curry Jansen, "Information and Gender," *Inquiry: Critical Thinking Across the Disciplines* 8.4 (December 1991): 1, 21-24; and Sue Curry Jansen, *Mind Machines: Myth, Metaphor, and Scientific Imagination*, ERIC 1990 ED 311 522.

32. Nancy Fraser, *Unruly Practices: Power, Discourse and Gender in Contemporary Social Theory* (Minneapolis: University of Minnesota Press, 1989); and Jansen "Gender."
33. Mikhail Bakhtin, *The Dialogic Imagination* (Austin: University of Texas Press, 1981) 242.
34. Sandra Harding, *The Science Question in Feminism* (Ithaca, NY: Cornell University Press, 1986); and Cheris Kramarae, ed., *Technology and Women's Voices: Keeping in Touch* (New York: Routledge and Kegan Paul, 1988).
35. Donald S. Sabo and Sue Curry Jansen, "Men, Sports, and the Media," *Men, Masculinity, and the Media*, ed. Steve Craig (Newbury Park, CA: Sage, 1992).
36. Kathy E. Ferguson, *The Feminist Case Against Bureaucracy* (Philadelphia: Temple University Press, 1984); Nancy Hartsock, *Money, Sex, and Power* (Boston: Northeastern University Press, 1985); Dorothy E. Smith, *The Conceptual Practices of Power: A Feminist Sociology of Knowledge* (Boston: Northeastern University Press, 1990); and Dorothy E. Smith, *The Everyday World as Problematic: A Feminist Sociology* (London: Open University/Milton Keynes, 1988).
37. Carol Gilligan, *In a Different Voice* (Cambridge, MA: Harvard University Press, 1982); Carol Gilligan, Nora P. Lyons, and Trudy J. Hanmer, eds., *Making Connections* (Cambridge, MA: Harvard University Press, 1990); Carol Gilligan, Janie Victoria Ward, and Jill McLean Taylor with Betty Bardige, eds., *Mapping the Moral Domain* (Cambridge, MA: Center for the Study of Gender, Education, and Human Development and Harvard University Press, 1988).
38. Mary Field Belenky, Blythe McVicker Clinchy, Nancy Rule Goldberger, and Jill Mattuck Tarule, *Women's Ways of Knowing: The Development of Self, Voice, and Mind* (New York: Basic Books, Inc., 1986); see also Combahee River Collective, "A Black Feminist Statement," *All the Women are White, All the Blacks are Men, But Some of Us are Brave: Black Women's Studies*, eds. Gloria T. Hull, Patricia Bell Scott, and Barbara Smith (New York: The Feminist Press, 1982) 13-22.
39. Robin Lakoff, *Language and Woman's Place* (New York: Colophon Books, 1975); Dale Spender, *Man Made Language* (London: Routledge and Kegan Paul, 1980); and Barrie Thorne and Nancy Henley, eds., *Language and Sex* (Rowley, MA: Newbury House, 1975).
40. Deborah Tannen, *You Just Don't Understand* (New York: Morrow, 1990); and Lakoff.
41. Helene Cixous, "The Laugh of the Medusa," *New French Feminisms*, eds. Elaine Marks and Isabelle de Courtivron (New York: Schocken, 1981) 134-264; and Helene Cixous and Catherine Clement, *The Newly Born Woman* (Minneapolis: University of Minnesota Press, 1986).
42. Ruth Hubbard, *The Politics of Woman's Biology* (New Brunswick, NJ: Rutgers University Press, 1990); Ruth Hubbard, M. S. Henefin, and B. Fried, eds., *Biological Woman: The Convenient Myth* (Cambridge, MA: Schenkman, 1982); Ruth Bleier, ed., *Feminist Approaches to Science* (New York: Pergamon Press, 1986); Carolyn Merchant, *The Death of Nature: Women, Ecology and the Scientific Revolution* (New York: Harper and Row, 1980); Evelyn Fox Keller, *A Feeling for the Organism: The Life and Work of Barbara McClintock* (New York: Freeman, 1983); Evelyn Fox Keller, *Reflections on Gender and Science* (New Haven, CT: Yale University Press, 1985); Harding *Question*; Sandra Harding, *Whose Science? Whose Knowledge? Thinking from Women's Lives* (Ithaca, NY: Cornell University Press, 1991); Sandra Harding and Merrill Hintikka, eds., *Discovering*

- Reality: Feminist Perspectives on Epistemology, Metaphysics, Methodology and Philosophy of Science* (Dordrecht, Germany: Reidel, 1983); Donna Haraway, "A Manifesto for Cyborgs: Science, Technology, and Socialist Feminism in the 1980s," *Socialist Review* 15.2 (1985): 65-108; Donna Haraway, "Situated Knowledge: The Science Question in Feminism and the Privilege of Partial Perspective," *Feminist Studies* 14.3 (1988): 575-99; Smith *Conceptual*; and Smith *Everyday*.
43. Gena Corea, *The Mother Machine* (New York: Harper and Row, 1985); Mary Daly, *Gyn/Ecology* (Boston: Beacon, 1978); Barbara Ehrenreich and Deidre English, *Complaints and Disorders: The Sexual Politics of Sickness* (Old Westbury, NY: The Feminist Press, 1973); and Barbara Ehrenreich and Deidre English, *Witches, Midwives and Nurses: A History of Women Healers* (Old Westbury, NY: The Feminist Press, 1973).
44. Cynthia Cockburn, *Machinery of Dominance: Women, Men, and Technological Know-How* (Boston: Northeastern University Press, 1988); Ruth Schwartz Cowan, *More Work for Mother* (New York: Basic Books, 1983); Cynthia Enloe, *Bananas, Beaches, and Bases* (Berkeley: University of California Press, 1990); Barbara Garson, *The Electronic Sweatshop* (New York: Simon and Schuster, 1988); Sally Hacker, "Doing it the Hard Way": Investigations of Gender and Technology (Boston: Unwin Hyman, 1990); Sally Hacker, *Pleasure, Power and Technology: Some Tales of Gender Engineering and the Cooperative Workplace* (Winchester, MA: Unwin Hyman, 1989); Jansen *Censorship*; Jansen "Gender"; Kramarae; Maureen McNeil, *Gender and Expertise* (London: Free Association Books, 1987); Lana Rakow, "Women and the Telephone: The Gendering of Communications Technology," *Technology and Women's Voices: Keeping in Touch*, ed. Cheris Kramarae (New York: Routledge and Kegan Paul, 1988) 207-88; Joan Rothschild, ed., *Machina Ex Dea: Feminist Perspectives on Technology* (New York: Pergamon Press, 1983); Judy Smith and Ellen Balka, "Chatting on a Feminist Computer Network," *Technology and Women's Voices: Keeping in Touch*, ed. Cheris Kramarae (New York: Routledge and Kegan Paul, 1988) 82-97; Judy Wajcman, *Feminism Confronts Technology* (University Park, PA: The Pennsylvania State University Press, 1991); and Jan Zimmerman, *The Technological Woman: Interfacing with Tomorrow* (New York: Praeger, 1983).
45. Catherine MacKinnon, "Feminism, Marxism, Method and the State: An Agenda for Theory," *Signs* 7.3 (Spring 1982): 515-44.
46. H. R. Trevor-Roper, *The European Witch-Craze of the Sixteenth and Seventeenth Centuries* (New York: Harper and Row, 1969); Merchant; Brian Easlea, *Fathering the Unthinkable: Masculinity, Science and the Nuclear Arms Race* (London: Pluto Press, 1983); and Heinrich Kramer and Jacob Sprenger, "Malleus Maleficarum," *Witchcraft in Europe 1100-1700: A Documentary History*, eds. Alan C. Kors and Edward Peters (Philadelphia: University of Pennsylvania Press, 1972).
47. Merchant; and Keller *Reflections*.
48. Hilary Rose, "Hand, Brain and Heart: A Feminist Epistemology for the Natural Sciences," *Signs* 9.1 (1983): 73-90; Keller *Reflections*; and Susan Bordo, *The Flight to Objectivity: Essays on Cartesianism and Culture* (Albany, NY: State University of New York Press, 1987).
49. Haraway "Situated."
50. Haraway, "Situated" 584; T. Minh-ha Trinh, *The Native Other* (Bloomington, IN: Indiana University Press, 1989).
51. Alison Jagger, *Feminist Politics and Human Nature* (Totowa, NJ: Rowman and Allanheld, 1983); Karlyn Kohrs Campbell, *Man Cannot Speak for Her: A Critical Study*

of *Early Feminist Rhetoric* (New York: Praeger, 1989); and Phyllis Rooney, "Gendered Reason: Sex Metaphor and Conceptions of Reason," *Hypatia* 6.2 (Summer 1991): 77-103.

52. Keller *Feeling*; Keller *Reflections*; and Bleier.

53. Rakow; Smith and Balka.

54. Smith *Conceptual*; Smith *Everyday*.

55. Harding, *Question* 104.

56. Nancy Armstrong, "The Gender Bind: Women and the Disciplines," *Genders* 3 (Fall 1988): 2.

57. Susan G. Cole, *Pornography and the Sex Crisis* (Toronto: Amanita Enterprises, 1989) 9.

58. Pagels uses the following quotation as a header to the first chapter (p. 19) of his widely praised book, *The Dreams of Reason*: "When the penis goes up, reason goes out the window" (from Robert M. Hutchins's film, *Zuckermandel*).

59. Susan Griffin, *Pornography and Silence: Culture's Revenge Against Nature* (New York: Harper and Row, 1981).

60. Robert D. Romanyshyn, *Technology as Symptom and Dream* (London: Routledge, 1989) 209.

61. Indeed Horkheimer seems to know this without knowing that he knows it. In *The Eclipse of Reason* (New York: Seabury, 1974) 176, he maintains, "The disease of reason is that reason was born from man's urge to dominate nature, and the 'recovery' depends on insights into the nature of the original disease, not a cure of the latest symptom." Also cited, in a similar conjunction, by Easlea.

62. Romanyshyn 33.

63. Donald M. Lowe, *History of Bourgeois Perception* (Chicago: University of Chicago Press, 1983).

64. Jansen "Gender."

65. Claude Shannon, "The Mathematical Theory of Communication," *The Mathematical Theory of Communication*, eds. Claude Shannon and Warren Weaver (Urbana: University of Illinois Press, 1964); Jansen "Gender"; and David Bolton, *Turing's Man: Western Culture in the Computer Age* (Chapel Hill: University of North Carolina Press, 1984).

66. Magorah Maruyama, "Information and Communication in Poly-Epistemological Systems," *The Myths of Information*, ed. Kathleen Woodward (Milwaukee: University of Wisconsin Press, 1990) 28-40.

67. Michel Foucault, *The Order of Things: An Archaeology of the Human Sciences* (New York: Vintage, 1970).

68. Barbara Ehrenreich and Annette Fuentes, "Life on the Global Assembly Line," *Crisis in American Institutions*, 5th edition, eds. Jerome H. Skolnick and Elliott Currie (Boston: Little, Brown, 1976).

69. Pagels.

70. Lewis A. Mumford, "Authoritarian and Democratic Technics," *Technology and Culture* 5.1 (Winter 1964): 1-8.

71. Cockburn; Ferguson; Jansen "Gender"; McNeil; Merchant; and Rose.

72. John Wyver, "Altered Sight," *Marxism Today* April 1991: 42.

73. Smith and Balka.

74. Deborah Heath, "Technoscience I," Eleventh Annual Gender Symposium, Lewis and Clark College, Portland, OR, April 12-15, 1990.

75. Wyver.

76. Wyver 43.

77. Haraway 1991.

78. Garson.

79. Dallas Smythe, "Needs Before Tools? The Illusions of Electronic Democracy," paper presented to the International Communication Association, Honolulu, May 1985. Most of these thinkers are sensitive to this problem and seeing ways of democratizing their efforts; indeed, Smith and Balka explore it in some detail.

80. Marx 209.