

“The Trouble With Machines Is People.” The Computer as Icon in Post-War
America: 1946-1970

by

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Introduction: The Iconic Value of Computers

The Age of Anxiety

For a few years as I commuted to work I regularly drove past a set of sculptures that occupied the driveway of an ordinary looking house on the rural western edge of Ann Arbor. The sculpture was comprised of three large, impressionistic and vaguely anthropomorphic steel and wire figures with video monitors for heads surrounding and towering over a smaller humanoid sculpture (also steel and wire) that cowered under their gaze. As the years progressed time and weather took their toll on the figures. The humanoid sculpture stooped lower and lower until its torso was supported by the addition of a strategically placed broomstick acting as a cane. By all appearances, the monitor headed figures had moved in for the kill and the humanoid figure was the victim of not only their oppression but of Michigan winters too. The message of this particular piece of folk art was immediately discernable as a quartet of metal figures illustrating a tableau of anxiety and oppression. The piece was easily read as an indictment of the relationship between people and technology, specifically the oppressive systemization that came to characterize industrial society in the 20th century. The humanoid figure, alone and isolated, was surrounded by identical technological creatures that, instead of passively performing work with the guidance and control of the human, had turned on him--

decidedly gaining the upper hand.

Sherry Turkle, writing on the subject of technological ‘spin’ or the stories we tell ourselves about our technologies contends that we are still anxious about technology spiraling out of control, distrustful of the soul of the machine and worried about the mechanization of the human mind.¹ Unfortunately, my attempts to speak to the owner of the house in order to discover if this was in fact the sentiment behind the artwork were unsuccessful. The homeowner never answered the door and ignored the letter of introduction I left in the mailbox outside the house. One day the increasingly decrepit sculptures were gone. The house was empty and for sale. I never did find out the story behind the sculptures: who made them, or how they had come to take up residence on an otherwise quiet road on the outskirts of town.

When I started looking at manifestations of technological anxiety in popular culture, I considered the project in terms of larger cultural icons in film and television. Mass, broadcast media was filled with killer robots, super computers, and armies of identical drones passionate only about taking over the world, the galaxy or even the universe. These artifacts contended that, though the computerized opponents of mankind were formidable, the fate of the world was never truly in doubt. We, as Americans could depend on our inherent tirelessness and stoic perseverance as small, loosely knit confederacies of humans-- beaten but not vanquished—fighting a guerilla war against overwhelming odds. With very few exceptions the humans would, by stories’ end, use

¹ Sherry Turkle, "'Spinning' Technology: What We Are Not Thinking About When We Are Thinking About Computers," in *Technological Visions: The Hopes and Fears That Shape New Technologies*, ed. Marita Sturken, Douglas Thomas, and Sandra J. Ball-Rokeach (Philadelphia: Temple University Press, 2004), 19-33.

intuition and dreams, folk wisdom and luck, to exploit the fatal weakness of the machines and start civilization anew—often as idealized Jeffersonian styled yeoman farmers and craftsmen. I soon realized that the films and television programs that initially drew me to this study were echoes of stories that were retold practically everywhere I looked and in myriad ways, formats, and media—the result of a Cold War reinvestment in the story of American exceptionalism. The representation of machines and human beings as antagonistic opposite poles permeates not only film and television, but popular music, children’s culture, working life, jokes, politics, and newspaper and magazine articles that, on the one hand, trumpet each technological advance while, on the other, recapitulate a sense of unease with the world we are creating.

Technology and Culture

This study focuses on the post-war era in American history from 1946 to 1970 and is an examination of the rhetoric used to describe computer systems and the relationship between computers and human beings. Primarily, this project emphasizes the rhetoric of anxiety that surrounded the deployment of computer systems not as a matter of alarmist rhetoric geared toward exacerbating anxieties and fears of an unknown future, but as a coherent narrative that sought to reassure and ameliorate readers (and viewers) with a story of American exceptionalism, and stability.²

Although not representative of current historiography pertaining to the relationship between technology and culture, Leo Marx proposes a view of technology as

² For extensive readings of the significance of the American exceptionalist myth in contemporary media, see: Tom Engelhardt, *The End of Victory Culture: Cold War America and the Disillusioning of a Generation*, 2nd ed. (Amherst: Univ of Massachusetts Press, 1998), Richard Slotkin, *Gunfighter Nation: The Myth of the Frontier in Twentieth-Century America* (New York: Atheneum, 1992).

an alien intrusion into an otherwise natural landscape in his description of simple versus complex pastoralism; a description that has some value. For Marx, simple pastoralism connotes a willfully naïve response to nature as an Arcadian ideal that is always in danger of being sullied by technology and modernity—a pristine space (both physical and conceptual) that becomes less and less accessible as we become more embedded in the material world of technology.³ Technology is thus alienating and inserts itself between humans and the natural world. Marx contrasts this with what he terms complex pastoralism, that, while perhaps no less Romantic than simple pastoralism, concedes that our concept of nature as unsullied and pristine and our longing for an Arcadian past are possible only through technology. Our alienation from nature is a product of technology, but our understanding of this alienation is a product of technology as well. Our perception of the natural world as distinct depends on technological frames to give it meaning—a point Marx maintains is at the heart of postmodern critiques of technology and progress as meta-narratives.⁴ Marx is nothing if not deterministic in his approach to technology, but nonetheless, his definition of simple pastoralism is an accurate representation for describing the relationship between us, nature, and technology (in particular, computer technology) that was the stock position of the popular media through the 1950's and 60's.

Scholarship on the public perception of computer technology often presupposes a mode of technological anxiety that can be explained, in part, by its alienating effects.

³ Leo Marx, The Machine in the Garden : Technology and the Pastoral Ideal in America (Oxford: Oxford University Press, 1964).

⁴ Leo Marx, "The Idea Of "Technology" And Postmodern Pessimism," in Does Technology Drive History?: The Dilemma of Technological Determinism, ed. Leo Marx and Merritt Roe Smith (Cambridge, Mass: MIT Press, 1994), 238.

Shoshanna Zuboff's sociological study of modernization and automation in offices and paper mills focuses on the alienating effects of the computerized workplace and how computerization alters the relationship between the worker, management, and the nature of the work itself. Zuboff argues that the existence of computer technology acts to symbolically render activities and processes—to make what was tacitly understood into abstracted quantifiable metrics.⁵ Like Zuboff, I take the view that there is something about the symbolic value of computers that makes these reactions to advancements in technology worthy of consideration in their own right. What I propose is that by looking at artifacts from the time period that extends from the earliest introduction of computer technology to the late 1960's (the era just prior to the introduction of the first home/personal computers of the early 1970s) we encounter an era of uncertainty regarding computer technology and its meaning within a larger society. Looking beyond Paul Edwards' Closed World/Green World dichotomy, we see that representations of nature and technology as polarized utopian and dystopian zones had immediately solidified around computer technology and the computer was instead described in turn as masculine, feminine, harmlessly childlike, and sinisterly bureaucratic—as an example of the heights of human ingenuity as well as a foretaste of our replacement at the top of an evolutionary chain. It is this multiplicity of readings that has been largely ignored by scholars of technology and social history in favor of a view that relies on a single set of metaphorical relations that conform to a dogmatic view technology as either inherently alienating, or of histories that celebrate the inventors and developers of computer

⁵ Shoshana Zuboff, In the Age of the Smart Machine: The Future of Work and Power (New York: Basic Books, 1988), 186-188.

hardware, software, and systems.

Histories of computer technology have often focused on technological innovations and the people that have worked to develop ever-faster machines.⁶ In addition, sociologists have studied the effect of computers in the workplace, virtual communities, children and computers, and ethnographies of computer scientists and development laboratories.⁷ These studies detail the effects of computer technology on specific groups, communities and occupations. The status of computers as artifacts, from the early 1950s on, has shaped public and popular discourses concerning the relationship between people and computers, but the iconic value of computer technology as part of the broader historical narrative of the late 20th century has not been addressed. Computer descriptions, as reflected in newspaper and magazine articles, television and film from the 1950's and 1960's often took specific, distinct forms that reflected a sense of foreboding about the emerging technology:

- Computers as an existential threat (direct challenge to humanity)
- Computers as an economic threat (automation)

⁶ Although there are far too many titles to list here, some of the more influential include: Janet Abbate, Inventing the Internet (Cambridge, MA: MIT Press, 1999), Herman Heine Goldstine, The Computer from Pascal to Von Neumann (Princeton, N.J.: Princeton University Press, 1972), Steve Joshua Heims, The Cybernetics Group (Cambridge, Mass: MIT Press, 1991), Andrew Hodges, Alan Turing : The Enigma (New York: Simon and Schuster, 1983). Other titles of interest on the history of computing technology include: Michael Adas, Machines as the Measure of Men : Science, Technology, And, Cornell Studies in Comparative History (Ithaca: Cornell University Press, 1989), William Aspray, John Von Neumann and the Origins of Modern Computing, History of Computing (Cambridge, Mass.: MIT Press, 1990), William Aspray and Martin Campbell-Kelly, Computer: A History of the Information Machine (New York: Basic Books, 1996), Martin Davis, The Universal Computer : The Road from Leibniz to Turing, 1st ed. (New York: Norton, 2000).

⁷ See, for example Zuboff., Sherry Turkle, The Second Self: Computers and the Human Spirit (New York: Simon and Schuster, 1984)., Stefan Helmreich, Silicon Second Nature: Culturing Artificial Life in a Digital World (Berkeley, CA: University of California Press, 1998).

- Computers as a threat to human prestige (our sense of supremacy as rational, thinking creatures)

These same articles and stories metaphorically explored the following anxieties:

- Cold war apocalyptic fears
- Fear of loss of control by the middle-class: a devaluing of the middle class office worker/manager
- Fear of totalitarianism—not concretely communist, but a fear of loss of individuality and a sense that there are fewer and fewer areas that are not routinized, Taylorized, or closed to creative thinking.

All these anxieties existed independently of how computers were used and what their intended purpose was—factory automation had already, by the 1950’s swept through the working class, devaluing traditional trades and methods; mechanical warfare and specifically nuclear weapons provided a deep and tangible existential threat to humanity; and the rationalization and standardization of many areas of life by the middle of the 20th century already placed Americans in a matrix of technologies and methods that made more and more people feel like replaceable cogs in a machine that seemed to operate by its own intelligence.

Metaphors and Media: The Conflation of Post-Cold War Anxieties

The process of using metaphors to describe computer technology as akin to the human brain created parallels that could then be contradicted to make the machines less threatening. Metaphor, defined by Andrew Goatly “is not a mere reflection of a pre-

existing objective reality but a construction of reality, through a categorization entailing the selection of some features as critical and others as non-critical. [...] metaphors can be consciously used to construct [...] reality.”⁸ This use of metaphor functioned in several different ways to create an overall picture of computer technology, and our relationship to it, that served to both generate anxiety and then diminish it. The open interpretation of metaphor provided writers with a convenient disavowal of the implications of their statements as not the literal meaning of their reportage, but rather what was being read into it by anxious readers.⁹ “The metaphor, then, becomes an extension of reality—a picture of reality that, by virtue of its ready comparison to what has come before, is unproblematic and ‘naturalized’; seen as reflecting a known order and, as such, uncontested ‘common sense’.”¹⁰ The use of metaphor to describe computer systems can be broken down as occupying the following areas:

- Computer calculations as mind/Computer as thinking being
- Computer as human replacement in the field of labor/white-collar workplace
- Computer as symbol of repressive conformism

These metaphorical associations are still, in many forms, prevalent in contemporary popular culture. But the early associations of computers to known elements of the post-war world took other forms as well that will form a part of this discussion:

⁸ Andrew Goatly, The Language of Metaphors (London: Routledge, 1997), 23.

⁹ See: L. Cameron and G. Low, "Metaphor," Language Teaching 32 (1999): 77-96.

¹⁰ Veronika Koller, Metaphor and Gender in Business Media Discourse: A Critical Cognitive Study (New York: Pallgrave/MacMillan, 2004), 4.

- Computers as feminine
- Computers as representative of a Soviet or Communistic worldview
- Computers as a controlling element of the state
- Computers as representative of ‘the system’

Of course, computers performed none of these functions in actuality, but the language used to define computers mapped out a space in the popular understanding of computer technology that made them iconic representations of post-war/mid-century anxieties on a number of social and economic fronts. Concerns responding to perceived threats to worker empowerment and autonomy; fear of totalitarianism; and religion and ‘traditional’ roles and values were absorbed into the discourse surrounding computers as put forth by journalists and filmmakers. As such, computers became an icon of anxiety and fear of not just the future, but of the present moment in cold-war America. This fear of technology, as represented by the media’s use of computer imagery was not a fear of technology at all, but rather an evasion of the root causes of post war and Cold War anxieties concerning class, gender, and legitimate fears of nuclear war, as well as issues surrounding the future of labor and employment.

Daniel Boorstin, writing in 1961, coined the term “pseudo-event” to describe stories released to the media as news that were not really news, but stage-managed confections designed to distract or take the place of information or events with a legitimate claim to newsworthiness. The point of the event, Boorstin suggested, was to manage the news cycle and to keep certain ideas circulating even when there was nothing much to say on the subject. Boorstin described Joseph McCarthy’s penchant for issuing

releases or holding press conferences timed to fit within reporters' deadlines, as a way to guarantee coverage with a minimum of fact-checking, as an example of this practice.

That McCarthy manipulated the media was not news in 1961, but Boorstin went further into the consequences of this manipulation and proclaimed that the pseudo-event could supplant reality by being more attractive, easier to believe and easier to digest: "We are haunted, not by reality, but by those images we have put in place of reality."¹¹ As Americans we were, Boorstin suggested, "risk[ing] being the first people in history to have been able to make their illusions so vivid, so persuasive, so 'realistic' that they can live in them. We are the most illusioned people on earth." Boorstin's critique of media culture has its current manifestation in the concept of 'truthiness' put forward by the satirist Stephen Colbert, where one's feeling about the 'truth' of an opinion outweighs any factual evidence.

Though Boorstin was writing about the interface between politics and journalism and the cynical manipulation of the public through the media, much of the same (though perhaps not quite so cynically), can be said about the relationship between computer technology and the corporations that produced it on the one hand, and media culture on the other. The reliance on the pseudo-event was a means for generating an understanding of computer technology. News of advances in computer technology did not impact readers as consumers. They were, especially in the late 1940's and early 1950's, unlikely to have any real exposure to the technologies discussed in new stories. However, the existence of the computer as an artifact allowed journalists to use a concrete piece of equipment as an icon for post-war social change. The evasion, in

¹¹ Daniel Boorstin, The Image (New York: Vintage, 1961), 8.

Boorstin's terms, was the use of the computer as an icon of modernity that portrayed technological progress as a relentless march forward. This deterministic view of technology masked the economic and social realities and questions of power and capital. Although it would be possible to contend that the use of metaphors about computer technology was a deliberate means of misdirection; a bit of legerdemain to distract the masses from understanding the true nature of their relationship with capital, this explanation is not particularly satisfying in that there is little evidence other than the effects of such a discourse to recommend it. Journalists were not engaged in a project of misinformation to keep readers in the dark, rather they proceeded with a reliance on an older narrative concerning technology that had already become embedded in American folklore. The Althusserian-style reading of interpellation as a matter of false-consciousness is inadequate here, in that it does not allow for any other awakening than that of class-consciousness or a dependence on capital as the only base upon which to erect the superstructure of the controlling apparatus of the state. Media cultures are more rich than this explanation allows and the relationship between the broadcast and print media and their respective spectators and audiences too complex. As this was also the case in the years immediately following the Second World War, what would be the impetus for this evasion? Although there is no evidence that scores of journalists and editors were complicit in changing the subject and consciously using computer technology as a way of misdirecting anxiety away from its root cause—the intrinsic uncertainty of capitalism—the fact remains that countless articles, editorials, and news stories consistently framed computer technology as competing with workers, managers, and humanity itself. I will argue that this use of computer technology as what amounted

to a scapegoat functioned, on the one hand, as a means of giving a physical presence to what was otherwise an amalgamation of trends in management, economic indicators, and general technological innovations, while on the other a means of diffusing any real cultural or social critique of the systematic exploitation in the service of capital. The computer as a shorthand symbol also functioned as an evasion by reaffirming unquestioned roles and social mores concerning gender, class, and capitalism.

Like the attacks on rock and roll in the 1950's and 1960's, computer technology acted as a proxy for other issues, anxieties, and concerns. Representing rock and roll as destructive to the moral fiber of American youth, corrupting, and encouraging promiscuity and deviant social behavior can be seen as double-speak for a thinly veiled racism directed at the ascendancy of post-war African-American popular culture with American youth. Openly suggestive songs, dances, and rhythms were represented as retrograde, primitive, and uncivilized. But rock and roll was only a symptom, not a cause of youthful exuberance, and the hand wringing and anxiety concerning the future of America's children masked a deeper anxiety concerning race and American culture. The call of rock and roll was not only a seduction towards but also a seduction away from a particular post-war logic of segregation, repression, and social conservatism. For example, segregationists protesting a rock and roll concert in Alabama carried placards stating that "Jungle Music Promotes Integration," to which, reportedly, a young girl shouted out, "then bring me my grapevine!"¹²

However, it is easy to overstate the tendency toward social conservatism in

¹² "Alabama Pickets Rock-Roll Troupe," Chicago Daily Defender, May 21 1956, 10.

American culture in the 1950's, just as it is easy to overstate the radicalism of the 1960's. The issue of music in the 1950's as a symptom of youth rebellion is less the point than the perception of music in the mainstream media as driving American youth toward rebelliousness and degeneracy. What is worth looking at is the use of rock and roll as a nexus of anxieties that can be read as containing much more than just what one critic called "the melodic equivalent of a square-wheeled switch engine."¹³ Rock and Roll music, by virtue of its association with black American popular culture, was reviled as a low entertainment designed for a lower class. The inherent racism of early criticism of rock and roll music suggests that the issue of the music was not its aesthetic merit, but rather its marker as a racially charged art form, and its resonance within the racially charged America of the mid-1950's.

Critics of the music were reluctant to represent their misgivings about the music as carrying the weight of their larger anxieties concerning the questions of segregation, civil rights, and the larger economy of race as practiced in mid-century America. Race was intended to remain invisible within the more pointed critique of youth culture. Instead, youth music was offered up as a stand in for the larger social problems for which it was not responsible.¹⁴ By redirecting social criticism toward a musical form, and the white children who were excited by it, cultural critics (and worried parents) were able to focus their energies in a direction over which they might have some control, and avoid the harder racial issues that the music, and their reaction to it, implied. After all, the critique of rock and roll as a degenerate musical form was not part of the mainstream

¹³ "Rock 'N' Roll Stage Show Frantic, Noisy," *Los Angeles Times*, November 4 1955, B9.

¹⁴ See also, David Hajdu, *The Ten-Cent Plague: The Great Comic-Book Scare and How It Changed America* (New York: Farrar, Straus and Giroux 2008).

until the music began to affect white teenagers—the harmful effects of the music (previously called Rhythm and Blues) was seemingly not a cause for concern as long as it only infected African Americans. As Frank Sinatra testified to the United States Congress in 1958, rock ‘n’ roll was “the most brutal, ugly, desperate, vicious form of expression it has been my misfortune to hear. [...] It manages to be the martial music for every sideburned delinquent on the face of the earth.”¹⁵

The nature of this reaction is what parallels the reaction to computer systems as they began to find their way into popular discourse. It may be that the expression of anxiety by reporters and writers concerning the technological advancements they witnessed were a response to the philosophical currents of the time. Authors like Marcuse, Reisman, Whyte, and Mills wrote of technology as inherently dehumanizing and, as public intellectuals expressed the ideas with a certain weight to their opinions. Weiner, an expert in the field of cybernetics, enthusiastically voiced opinions on the risk of human enslavement in the face of computer technology.

The point of this discussion on the dangers of rock ‘n’ roll for the impressionable generation that would come to be called the baby-boomers is to illustrate both the anxiety felt toward such popular pastimes as music and television as a reflection of the post-war era and the sense of dread that accompanied the political and social uncertainty of the period. In the case of television and rock ‘n’ roll music; this dread became the focus of those who made their living as popular critics of contemporary culture on events and technologies over which they, as commentators, had no control. For all the ink spilled

¹⁵ Quoted in Paul Friedlander, Rock and Roll: A Social History (Boulder: Westview Press, 2006), 2.

bemoaning the inevitable demise of America, if not at the hands of the Soviets, then certainly at the whim of computers, the glowing television tube, or the hips of Elvis Presley, the technologies that were vilified by the popular print media were remarkably successful in capturing the attention and the imagination of the public at large.

Computers, though largely represented as portentous artifacts throughout the post-war period, continued to be manufactured in greater numbers by the late 1950's and gained entrance to more areas of business and industry, and became more and more a part of the daily routine of government, banking, and manufacturing. By the early 1960's the technology began to intersect with the lives of ordinary people through banking and billing technologies for consumer credit. The fear of computer technology did not manifest itself as a denial of the technologies usefulness, nor in a larger scale (or really, a small scale) revolt against computer technology. The usefulness of fear in the case of computers was not as an explicit attack on the technology as something to be shunned or destroyed—rather, the anxiety expressed toward the technology reflected a social criticism and fear of totalitarianism, other-directed anti-individualistic behavior, conformity and over-specialization. Computer technology, though not responsible for any of these attributes of post-war American culture (either real or imagined) became a potent symbol of these trends and the criticisms and fears expressed toward technology was a sort of shorthand for a larger societal critique in mainstream media.

Fredric Jameson's suggestion that works of mass culture reflect deeply held anxieties while at the same time function as utopian texts is a useful concept for this discussion. Jameson writes that the "deepest and most fundamental hopes and fantasies

of the collectivity” are expressed as the flip side of a coin with anxiety on its other face.¹⁶ Steven Goldman points to the large number of film that express either outright technological phobia or some negative social consequences to adopting technology.¹⁷ Comstock and Tully’s survey of over 150 science fiction films created between 1939 and 1976 found that in nearly 60% of the films, technological innovation was portrayed as damaging, dangerous, or fatal.¹⁸ John Clark’s early survey of much of the same material concludes that although we may not live in total fear of the technological world, we are “livid with fear and trembling about the ambiguities and perplexities and delusions of the all too human inventors of machines.”¹⁹ Recently, Christopher Frayling has contended that the modern scientist and the products of scientific and technological labor are very often portrayed as menacing in American cinema.²⁰ Toni Perrine, focusing on the cinema of nuclear anxiety, theorizes too that it is not so much the bomb (which is, to some degree, made manageable by post-apocalypse fictions) that is the locus of anxiety, but the rush to technology that makes the bomb a logical conclusion of a technological quest.²¹

Where on one hand media culture artifacts that dwell on dystopian relationships between humans and machines reflect a legitimate anxiety concerning issues of technological replacement, unemployment, and a loss of autonomy (or in some instances, legitimate apocalyptic fears) they also provide a mirror image of what is prized by the

¹⁶ Fredric Jameson, "Reification and Utopia in Mass Culture," *Social Text* 1, no. 1 (1979): 131.

¹⁷ Steven L. Goldman, "Images of Technology in Popular Film: Discussion and Filmography," *Science, Technology and Human Values* 14, no. 3 (1989).

¹⁸ George Comstock and Heather Tully, "Innovation in the Movies: 1939-1976," *Journal of Communications* (1985).

¹⁹ John R. Clark, "The Machine Prevails," *Journal of Popular Culture* 12, no. 1 (1978): 121.

²⁰ Christopher Frayling, *Mad, Bad and Dangerous: The Scientist and the Cinema* (London: Reaktion Books, 2005).

²¹ Toni A. Perrine, *Film and the Nuclear Age : Representing Cultural Anxiety*, Garland Studies in American Popular History and Culture (New York: Garland Pub., 1998).

culture that creates the artifacts and consumes them. My reading of media culture artifacts, specifically television and film, will discuss these works as ideological expressions of normalcy that function to perpetuate hegemonic visions of gender, and to a lesser but still discernable extent, race and class. Borrowing from theories of film genre, specifically Thomas Schatz's view that genre films can be seen as performing the function of folk tales or myths, I argue that the generic conventions used to represent computer technology recapitulate earlier conventions of 'man-versus-machine' but as a means of reinforcing the folklore of American exceptionalism and ingenuity.²²

Black-Boxing and Media Culture

The nature of computers, what they were for and what they did—was not a settled matter for laypersons in the years following the Second World War. Although systems experts, engineers, and scientists may have reached agreement on the utility of computer technology, and were slowly reaching consensus and convergence on matters of architecture, this closing of computers as artifacts into what Bruno Latour considers 'black box systems'²³ did not extend to the larger world of private citizens outside the engineering community. This disjuncture is critical in understanding the anxiety expressed toward computers in the post-war era. The black-boxing that Latour describes, though necessary from a systems standpoint to codify innovation and

²² Thomas Schatz, "The Structural Influence: New Directions in Film Genre Study," in Film Genre Reader II, ed. Barry Keith Grant (Austin: University of Texas Press, 1995).

²³ Latour explains black-boxing as a process by which "scientific and technical work is made invisible by its own success. When a machine runs efficiently, when a matter of fact is settled, one need focus only on its inputs and outputs and not on its internal complexity. Thus, paradoxically, the more science and technology succeed, the more opaque and obscure they become." Bruno Latour, Pandora's Hope: Essays on the Reality of Science Studies (Cambridge, MA: Harvard University Press, 1999), 304.

standards, leaves the public at large without an accurate understanding of the technology that is marketed to government and to corporations as transformative of the way they conduct their affairs. In the matter of computers in the post-war period, the public relied upon the media for representations and definitions of a new technology that, they were told, was to have a profound effect on their livelihoods, their futures, and their sense of self.

At its outset, computer technology was defined in terms that did not resonate with non-technicians. The technology may have been interesting, but to make it palatable journalists, writers, and filmmakers placed the technology into a context that was intelligible to a wide audience. While journalists explained computer technology as newsworthy objects, filmmakers had more time to consider the philosophical and social implications of the new technology and were better able to integrate it into dramatic narratives of family and romantic lives, as well as political and social discourse. Discussions of tubes (later transistors) algorithms, and equations had to undergo a translation into terms that had some concrete meaning for non-specialist readers and viewers. The symbolic link between the computer and the brain provided one conceptual shortcut that provided a concrete basis for abstract discussion. As N. Katherine Hayles points out, this metaphoric relationship between thoughts and data has fueled the engine of speculative technological anxiety for the past half century.²⁴ The equating of computers and brains, though publicly dismissed by the scientists and engineers responsible for developing the technologies that comprised computers as machines,

²⁴ Katherine N. Hayles, How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics (Chicago: University of Chicago Press, 1999).

persisted and computers were represented as surrogate minds capable of calculating mathematical problems as well as presenting existential questions concerning the nature of human thought, uniqueness, freedom, and individuality. The work of journalists, filmmakers and writers took the language of the technical specialist and translated it (sometimes mistranslating it) to create interest in a lay audience infused with concern and anxious about the direction technology was taking them.

Although this type of audience is typically described in terms of mass culture or mass media, the use of the term 'mass audience', like 'mass culture' or 'mass media' is problematic and, following Douglas Kellner, I retain his oppositional definition of 'media culture' as an improvement for the topic under discussion. For Kellner, media culture emphasizes the site of inquiry "signifying both the nature and form of the artifacts of the culture industries (i.e. culture) and their mode of production and distribution (i.e. media technologies and industries)."²⁵ Kellner proposes this as an alternative to 'mass culture' as a legacy of the Frankfurt School that focuses on culture from a perspective that segregates culture into 'high' and 'low' expressions-- art and kitsch. For theorists like Adorno and Horkheimer, art is that which is original and unique (expressing an 'aura' as Walter Benjamin described). Mass culture is that which is created for 'mass' consumption and is decorative, ephemeral, and reinforces hegemonic ideas of class, capital, values, etc. This dichotomy itself, and the tendency to valorize 'high' art arguably recapitulates the very hegemonic principles it purports to deconstruct. As such, it is a useful tool for generating awareness in how culture is used to perpetuate the ideals of the

²⁵ Douglas Kellner, Media Culture : Cultural Studies, Identity, and Politics (London ; New York: Routledge, 1995), 62.

ruling economic class, but the inherent contradictions of this view make it ill suited for interrogating how mass culture responds to alternative or oppositional readings.

Another problem with the concept of mass culture is that it assumes the existence of a mass population operating with the same ideas, concerns, and interests. This view projects a single reading for cultural phenomena, usually provided by the media, that is uncritically accepted by the public as defining how the public reacts to the phenomena, and is shaped by it. Mass cultural formations are one-way interpretations that shape public perceptions through a broadcast model that allows for little feedback from the audience back to the producers of media content. This approach to the role of the media suggests that the public are passive consumers of media images and ideas and can be seen as a monolithic entity to be manipulated by a class of writers and producers with obscure agendas. This reading of mass media and mass culture does not consider either the multitude of possible readings that audiences bring to any cultural artifact, readings based within political, gender, or racial frameworks to name a few. It also presumes that media production is the work of a group of people who are somehow able to stand outside of the culture they inhabit and who are consciously able to do the hegemonic work of interpretation for a passive audience of consumers.

The concept of 'mass' culture is thus problematic in what it presupposes about the audience, but it is also problematic in what it supposes about the producers of news stories and magazine articles. For me, the story of the symbolic value of computer technology requires looking behind what has become commonplace in popular descriptions of computer technology as a synecdoche for a totalizing system of command

and control. Computer systems, as commonly described in media culture, are discursively positioned as hierarchical, rigidly structured, and totalizing in their logic. The genealogy of this mode of discourse is thoroughly considered by Paul Edwards in his work on Cold War computer systems. Edwards places early computer systems within the context of military history and the formative debates surrounding artificial intelligence, information theory, and cognitive science.²⁶ But where Edwards' work examines the discourses of engineering, scientific, and military communities in the formation of what he terms the "Closed World" view of computer systems, I wish to examine the role of the media in popularizing computer systems and framing the technology for a wider audience.

I would argue though, in addition to defining mass culture and predicting the end of the individual, the Frankfurt school theorists produced a critique of human-technology interaction that goes a long way toward explaining the reactions to computer technology we see in the 1960s as a wave of anxiety concerning the future of consciousness both as a personal and a social construct, as well as the means deployed in defining computer technology earlier in its history. The tension of utopian and dystopian as manifest in the rebellion against existing definitions of technology and culture is evident through examining the student and anti-war movements and their attacks on computers as symbols of the interconnectedness of the US military and college campuses. The tactical logic of occupying computer centers to protest the use of college computers for war work is supplemented by the attack on computers as symbols of this relationship, and the

²⁶ Paul Edwards, The Closed World: Computers and the Politics of Discourse in Cold War America (Cambridge: MIT Press, 1996).

relationship between the state, capital, and human beings. The symbolic value of computers in this context is evident in the coverage of occupations by the alternative press. The difference in coverage by the mainstream media and the alternative press of the computer center bombings at the University of Kansas and the University of Wisconsin in 1970, as well as the non-violent occupation of computer centers across the United States highlight the differing symbolic values of computers in the anti-war movement. Where the mainstream media focused on the destructive nature of the attacks, the cost of damages, and the criminality of the event, the alternative press emphasized the symbolic value of the attacks, not solely as tactical strikes against a military target, but symbolic strikes at the machine and what it represented existentially.

For the people participating in the occupation and destruction of computer centers, the iconic value of computers is fused with the idea of a practical threat in a way not seen in earlier manifestations of computers as icons of modernity, as stand-ins for gender politics, symbols of totalitarianism, or as mirrors reflecting ideas of human intellect. The threat of computer technology as defined by the protesters moved from the abstract to the concrete. By ending with the occupation of computer centers as a form of tactical protest, the accumulated weight of the previous symbolic value of the technology is exchanged for a new set of symbols that are tied to the state and the perpetuation of power through technologies of control. Where previous representations of computers were often abstract responses to vaguely defined threats to the doxa of established tropes of human (specifically masculine) superiority, the protesters redefined the symbolism of computers as a concrete threat on a personal level (in terms of surveillance) as well as a social level where information and information technology created a schism between

ordinary people and an abstract governing class.

What is Anxiety in This Context?

In order to discuss the social anxieties revealed, magnified, and propagated by mid-century writers concerning computer technology, it is important to clarify what anxiety is, and how we can represent some anxieties as existing in a social rather than personal realm. In her recent book on fear and popular culture, historian Joanna Bourke discusses the difference between fear and anxiety in terms that are relevant to my thesis. Bourke positions fear and anxiety as emotional states engendered within a matrix of control. Fear is outwardly focused on a tangible, identifiable threat while anxiety is a product of a subjective reaction to an unknown foreboding. For Bourke, this distinction is meaningful in that the ability to discern and act against a threat (either in fight or flight) is a response to fear that places the subject in the position of control over her environment, or her reaction in a given situation. Anxiety is the feeling that comes from not being able to identify what exactly the threat is, and, because of this powerlessness, renders the subject unable to act purposefully.²⁷ Anxiety is, then, in this context, a generalized uneasiness, reminiscent of W.H. Auden's 1948 poem, "The Age of Anxiety":

Both professor and prophet depress,
For vision and a longer view
Agree in predicting a day
Of convulsion and vast evil,
When cold societies clash
Or the mosses are set in motion
To overrun the earth,
And the great brain which began
With lucid dialectics

²⁷ Joanna Bourke, Fear: A Cultural History (Emeryville, CA: Shoemaker Hoard, 2006).

Ends in a horrid madness.²⁸

As Auden suggests, the age of anxiety is an age of helpless dread—of things set in motion from other levels over which we have no control nor can expect any quarter. This anxiety has, throughout the twentieth century, been manifest in popular cultural artifacts in ways that are not overtly stated. At times, the celebration of technology masked unease as to what that technology was bringing to the fore, and what changes were to be expected. From Frankfurt School readings of popular radio as a necessary technology for fascism, to the dumbing-down of culture through television, and the half-century dread of the atomic bomb, technological artifacts have been presented as somewhat responsible for social ills and the failures of community. So it is not surprising then to see anxieties expressed in magazine writing and reportage, and cinematic representations of computer technology and these anxieties reflect unease concerning social or political issues.²⁹ In the case of computers, specific anxieties about the waning power of the post-war male found expression in movies and television shows conflating computers with women, and the seemingly harmless game of chess was evidence of human failure. The conflation of human beings with objects, data points or machines was a message repeated over and over in the post war and Cold War eras, and the relationship between humans and technology reflected a cultural philosophy of technology that, through the Frankfurt School, was imported to the US from the philosophy of Martin Heidegger.

The objectness that sits at the heart of Heidegger's critique of technology does, on

²⁸ W. H. Auden, *The Age of Anxiety, a Baroque Eclogue* (New York: Random House, 1947), 122.

²⁹ For example, a discussion of cinematic expressions of technological dread as expressive of religious anxiety can be found in Kirsten Mona Thompson, *Apocalyptic Dread: American Film at the Turn of the Millennium* (Albany: State University of New York Press, 2006).

one hand, provide an opening into a world of totalizing objectification. As all things become objects (that is ordered, ready-at-hand, classified things) there is nothing unique in human beings to exempt them from this objectification as well. We are all then, in as much as we are part of the social/technological fabric of the world, objects ordered for some use. But this is not all we are. The pessimism of Marcuse, Adorno, and Horkheimer regarding the status of the individual in modernity exaggerates this ordering principle at the expense of the concept of power as diffuse and not centralized in purely exploitative systems. For Heidegger, technology is an ordering for its own sake and does not require a subject, "everywhere everything is ordered to stand by, to be immediately at hand, indeed to stand there just so that it may be on call for a further ordering. Whatever is ordered about in this way has its own standing. We call it the standing-reserve."³⁰

For Heidegger, technology as ordering achieves, ultimately, a sort of leveling out where subjects and objects are part of a relational matrix where it is unclear (or irrelevant) where any ontic differences reside. We are imbricated, yes, but our mode of participation is not singly exploited and controlled. We also participate in the perpetuation of systems and, through our participation, exert some power and control as well. Heidegger was not against technology in a Luddite sense, but rather opposes the type of thinking that technology engenders and supports. That is, Heidegger saw the danger of technological thinking as foreclosing other types of thought: "The approaching tide of technological revolution in the atomic age could so captivate, bewitch, dazzle, and beguile man that calculative thinking may someday come to be accepted and practiced as

³⁰ Martin Heidegger, "The Question Concerning Technology," in Basic Writings, ed. David Krell (New York: Harper Collins, 1993), 26.

the only way of thinking.”³¹

We see this concern about how thought is affected by technology restated using a variety of rhetorical strategies and tropes during the post-war era. One of the unifying principles in media descriptions of computer technology is the idea that the advent of ‘thinking machines’ brings about a tendency to think like machines on the part of humans, instead of a more hermeneutic approach to thought. This is central to Paul Edwards’ approach to computers and metaphor as well. Edwards draws upon the work of Lakoff and Johnson to frame his discussion of Cold War computing as a set of discursive strategies concerning matrices of power and how meaning was embedded in the closed world of the military-industrial complex. Computers as symbols of cold war power were icons of command and control that projected technological superiority and sophistication that reinforced a forceful narrative of American technological mastery and superiority. Edwards contrasts this with the discourse of the ‘green world’ where power is not centralized and monolithic, but contingent and rhizomic.

This idea of power as decentralized and contingent is central to Foucault's philosophy and his definition of bio-power that he explains is, "power's condition of possibility [...] Power is everywhere; not because it embraces everything, but because it comes from everywhere."³² The reality of the power that Foucault describes creates a set of cognitive dissonance when contrasted with the very real power relationships of advanced capitalism and technological networks. If, as Foucault suggests, power emanates from everywhere and is not a top-down oppressive force, then we are complicit

³¹ Martin Heidegger, *Discourse on Thinking* (New York: Harper Perennial, 1969), 56.

³² Michel Foucault, *The History of Sexuality: An Introduction*, trans. Robert Hurley (New York: Vintage, 1990), 93.

in the realities of power that we experience. There can be no fascism without hegemony, after all. The anxieties expressed toward computer systems are anxieties of power relationships, explicitly anxieties of responsibility and, as such, are not so much tirades against abstraction as denials of accountability. In this way computer anxieties as expressed in the media serve the same function as disaster films and, in a way, apocalyptic texts. They are cautionary tales that present us with nameless hordes that die for our comfort/salvation. What makes *Dr. Strangelove* a black comedy is its explicit reference to notions of the elect and the preterite or those who are graced with salvation over the expendable masses. The comedic turn is in our awareness of the truth inherent in the scene late in the film where an earnest discussion of mine shafts as shelters for elected officials and comely, fertile young women takes place. The rest of the world is doomed, but the happy elect will survive and continue to prosper.

Chapter Synopsis and Periodization

The bulk of this dissertation seeks to re-examine the interface between media culture and computer technology as not so much a matter of the writers, critics, and filmmakers 'getting it wrong' regarding computer technology, or to cast the positioning of computers as representing an unholy marriage between the growing military-industrial complex and a burgeoning mass media, but to take the anxieties at face value as representative of a reaction to an uncertain post-war world. Through an examination of print and visual media artifacts and oral history accounts from people involved with the introduction of computer technology to a broad national audience, this discussion will focus on how the choice of images and metaphors deployed to create the idea of

computers served to reinforce traditional national narratives concerning masculinity, American exceptionalism and power, and class privilege. By using what was seen as futuristic technology as the jumping off point for speculation, narratives about computers could easily reinforce traditional gender and class relations as natural and assure continuity into the future as well. However, the narratives of the 1950's, because of their successes in conflating tradition, nature, and technology, were complicated by the student movements of the 1960's that sought to redefine ideas of culture, class, and gender and recast the computer as an icon of 'the state' and a corrupt and failing system. The chapters will take up this argument from the following positions:

Chapter one presents the thesis that the use of metaphors to describe computer technology was embedded in a larger matrix of meaning and anxiety in post-war America. This chapter introduces the main concepts of the project and builds around the CBS coverage of the 1952 presidential election and the introduction of the UNIVAC computer as an artifact and as a concept into the homes of television viewers. The focus of this chapter is the theme of technological unemployment and the introduction of the computer as a rival. An analysis of textual sources contemporary to the event reveals a consistent pattern of rhetoric that places the computer in the context of competition and magnifies the threat of the entrance of computers into the workspace and into the lives of average Americans. This chapter presents the anxiety concerning computers as a manufactured one, where the narrative trajectory of news and magazine articles presented a specific anxiety and then assuaged the very fears it conjured by denigrating the technology and its limitations. The effect of this representation is to sensitize the reader

to a possible threat, and then downplay the seriousness of that threat.

What is at work here is less a critique of technology than the creation of surmountable obstacles with the effect of reassuring readers that no matter what the future brings, essential American values and traditional roles and boundaries (as defined by the journalists themselves) will be maintained. By placing a new, alien, futuristic and menacing technology at the heart of the white collar workplace—an arena previously off-limits for the muscle-replacing machines of the pre-war era—writers presented readers with a threat to their well-being and prosperity no less menacing than the creeping menace of Soviet expansion. Like the red menace of McCarthyist fantasies, the computer would infiltrate the workplace and hollow it out from within.

Throughout the 1950's and early 1960's the metaphors used to describe computers 'naturalized' computer technology and masked the real decisions behind its deployment. Decisions that were made to increase productivity, profitability, and to eliminate classes of jobs were screened from critique by the monolithic approach to the computer as akin to a force of nature-- something that was there and thus had to be used. In this way, the computer as a technological artifact resonated with its deadly sibling the atomic bomb.

The naturalization of computer technology as an existential threat that provided a surrogate victory over the Soviets in terms of the cold war provides the basis for chapter two. The totalitarian aspects of machine logic resonated with the machine-like personification of the Soviet system. The consistent victory over computers in the realm of chess was a metaphorical victory over the Soviet Union. Like the Soviets, however,

the computers were never defeated totally, but rather vanquished to return stronger another day. The relationship between computers and totalitarianism is explored more fully in the second chapter, which focuses on the media's treatment of chess playing computers as a critique of uniformity and conformity both as symptomatic of the 1950's American middle class, and as intrinsic features of communist totalitarianism. The reportage surrounding the nascent chess-playing abilities of computers followed a standard line of critique that de-emphasized the use of logic as a true measure of intelligence while championing more intangible and intuitive characteristics belonging only to humans.

The use of computers as an icon of logic did not, however, stop writers and filmmakers from making a decidedly female gender association explicit in their representations of the technology. The use of computers within the closed and internalized space of American business brought computer logic into the heart of the corporation. Like the wife and mother who loyally tended the hearth and home, the ways of the computer could be seen as no less capricious and inscrutable at times—its inner workings shrouded in mystery and the products of its reasoning seemingly *sui generis* strange. The domination of the computer by its human minders acted as a proxy to the traditional world of stable gender roles.

While logic and intuition came into play as sites of difference in the way humans and machines pursued solutions on a chessboard, the game itself opened up metaphorical power relationships perhaps better explored on film and television. The drama of conflict between human protagonists and other-than-human machines, a trope as old as

industrialization (and in the case of the Greek mythological figure Talos, and the Jewish folk creature the 'golem', significantly older still) gained new relevance in the post-war world where the machines were capable of doing the thinking and not just the manual labor. Chapter Three focuses on these cinematic representations to explore the way cinematic imagery was used to visualize this conflict and the dramatic use of paradoxes to undermine the totalizing logic of computerized systems. As computers stood for more than simply calculating machines and became icons of command and control and the totalitarian societies of a dystopic future, the need to demonstrate continued human mastery of machines was required. This was not a simple literal mastery, but a symbolic one. The science fiction universes of *Forbidden Planet*, *Star Trek*, and *2001: A Space Odyssey* were laboratory worlds of possible futures and the ways in which American identity and character could be seen to fare. Much like Mark Twain's Connecticut Yankee tests the timeless wisdom of American ingenuity by sending him back in time to set the Arthurian court on track, the projection of mid 20th century identities, especially masculine identities, into the future presents the values of the post-war world as timeless and unchanging, irrespective of the dehumanizing trends of mass-culture, mass-society, and mass-production.

The anxiety concerning the creeping corporatism and conformity within American culture was expressed in literature and film as the processing of human beings within a great equalizing system, run by computers incapable of discerning the truly relevant qualities of human beings. Chapter Three discusses the victory over machines was a victory of the human 'spirit' in terms of creativity and a willingness to keep fighting in the face of impossible odds. The emphasis on spirit was relative—that is,

spirit as defined by the systems of power within a culture provided an outlet for fears of repression while simultaneously promoting American values of independence and libertarianism that resonated as 'traditional' within the culture. This impulse in the science fiction genre echoed the other popular genre of the time period, the western. The primacy of the western as a generic form both in cinema and television provided the same function and shared many of the same tropes as the science fiction genre.³³

Chapter Four explores the symbolic relevance of the computer as an icon of conformity, totalizing systems, and dehumanizing processes was incorporated into the rhetoric of the Berkeley Free Speech Movement. As the student movement progressed throughout the 1960's the computer as metaphor was reinscribed upon the physical artifact of the computer as object. Computer centers on university campuses became targets for protesters as objects to be held hostage, vandalized, and destroyed as part of a larger movement against the Vietnam War, but also as part of the civil rights movement. Chapter Four examines the rhetoric of the student movements and the underground press as they describe the motivations behind their occupying campus computer centers as a form of protest.

As the metaphors deployed around computers changed as the post-war era moved into the Cold War, and the 1950's gave way to the 1960's, the computer as an artifact changed as well. The changes in computer technology, and, more importantly for this discussion, the associations attached to computers, can be viewed along the following lines:

³³ Lane Roth, "'Vraisemblance' and the Western Setting in Contemporary Science Fiction Film," Literature/Film Quarterly 13, no. 3 (1985).

- 1945-1955: The era of early research into computer technology with large, room-sized machines prone to breaking down. Largely government sponsored (and largely through the military) these computers were strongly associated with scientists and scientific mathematical problems. The computer is presented as abstract and intelligent by association with scientific work. This era coincides with the beginning of the Cold War and the development of nuclear weapons by the Soviet Union. The Korean War and the revolution in China usher in an era of anti-communist hysteria in the United States culminating in the McCarthyist ‘witch hunts’ of suspected communists in America.³⁴
- 1955-1965: The era of the early commercialization of computers for corporate bookkeeping. IBM comes into prominence as synonymous with computer technology. Computers are expensive—affordable to large corporations, the military, and the government. Computers are associated with Cold War planning and command and control. The integration of computers into large scale organizations is presented as demonstrating the totalitarian tendencies of mass culture. This coincides with the beginning of the space race between the U.S. and the Soviet Union and the beginning of American involvement in Viet Nam.
- 1965-1975: Transistor and electronic innovations rapidly reduce the size of computers, their reliability and affordability. Still large by

³⁴ See Appendix 1 for a timeline of events that contextualize the changes in computer technology within a larger framework of cultural and political events.

contemporary standards, the machines are affordable to smaller companies, municipal governments and smaller research universities. Computers are part of mainstream American life and are associated with the status quo. The anti-war and ecological movements of this period, with their anti-establishment and anti-corporate positions, view the encroaching technology with suspicion.

These periods are roughly drawn, with some overlap as the computer as a technological artifact changed, was marketed, and consumed by corporations and universities. But the three eras do describe the major points of concern as well as the major technological position of the technology in the marketplace. These three periods also coincide with the timelines for changes in the metaphors associated with computers observed in the following chapters:

- Chapter 1: initial framing of computer technology as more intelligent (ca 1946-1955)
- Chapter 2: Chess playing computers and metaphors of totalitarianism (ca 1952-1965)
- Chapter 3, which covers the use of computers in science fiction film and television, spans all three eras and merges many of the associations with science, totalitarianism, and conformity with a reaction to the changing role of gender in American life in post war and Cold War America. In many ways, the computer becomes a stand in for gender issues and challenges to American masculinity (both real and imagined) and presents

a foil for a discussion of social change.

- Chapter 4: Computers as sites of protest and revolt (ca 1968-1970)

At the end of the 1960's and the beginning of the 1970's the computer as an icon underwent a fundamental shift toward diminishing importance as a symbol of anxiety. As computers became more commonplace, and with the introduction of small 'home' computer kits and computer clubs, the computer as an existential threat rapidly fell out of favor as a site of anxiety both on its own, or as a symbol of modernity and the modern problems of gender equality, unemployment, or the totalitarian state. Audiences in the 1970's began to see the computer as part of the modern environment—a tool like the telephone or the automobile—portentous perhaps, but also useful. Anxieties attached to computer technology were anxieties concerning what they were capable of as tools, not as a form of consciousness. There was a shift away from the computer as threat to humanity to concerns about the data captured by computers, who has access to and control of that data, and what that means in terms of control and privacy. This move from computers as black-boxed icons to vehicles for government and corporate surveillance marks the end of the computer as a physical object with iconic properties for modernity, and opens up instead the ephemeral construct of cyberspace—the geography of data without physical contours.

Chapter 1: Creating the Computer as a Consumable Image: CBS, UNIVAC and the 1952 Presidential Election

Introduction

The story of computer technology as a representation and creation of the media in the post-war years is the story of the relationship between the underlying anxiety concerning the loss of autonomy and loss of employment conjured up by the idea of the computer during the earliest years of its introduction as a consumable image. This chapter examines the function of early representations of computer technology as a continuation of earlier depression era concerns of technological unemployment and an artifact readily identified with the post-war variant of technological unemployment—automation. Coupled with the anxiety surrounding technological unemployment was a sense of powerlessness in the face of technological and scientific changes in the post-war world. This fatalistic view enframed computer technology, moving it out of the realm of the ordinary and into what David Nye calls the technological sublime. The idea of an autonomous technology—an “electronic brain” that would control the already mechanized body, that had, in a previous generation caused so much consternation as technological unemployment contributed to, and reflected, a sense of the loss of human uniqueness and human primacy in the years immediately following the Second World

War. This loss, and with it, the feeling of a loss of agency and control, what Timothy Melley has termed ‘agency panic,’ was exacerbated by the media culture of the 1950’s and 1960’s by subtle and not-so-subtle reminders of the expanding role of computers in the modern workplace, often coupled with fanciful predictions of futures where machines would rule over humankind.³⁵

The 1952 U.S. presidential election marked the first time that a computer was used to predict the outcome of a national election on live television. Any value of the exercise as a service to the news industry (or to viewers) was overshadowed by the novelty and sense of gimmickry attached to the event. Whether or not the use of the UNIVAC computer added to the accuracy and immediacy of election night coverage, it still represented, for most viewers, a first glimpse at the new ‘electronic brains’ that had been the subject of so much writing and editorializing since the ENIAC, the first electronic computer, was unveiled at the University of Pennsylvania in the Winter of 1946. The framing of computer technology in newspapers and magazines, and specifically during the night of the 1952 presidential election on television presented computers as rarified, and fragile, technological artifacts fresh from scientific laboratories and infused with much of the same awe extended toward the atomic bomb. The computer was positioned first as a scientific apparatus, and only later as an object with a practical impact on American society. This impact, as it played out against the backdrop of an uncertain post-war economy, was as a harbinger of technological unemployment reminiscent of the pre-war depression-era factory.

³⁵ Timothy Melley, *Empire of Conspiracy* (Ithaca: Cornell University Press, 2000), 12.

CBS and the UNIVAC: Television Coverage of the 1952 Presidential Election

The network also has arranged to use UNIVAC, Remington Rand's all-electronic, high-speed computer, to help keep the staff of newsmen up-to-the-minute on voting trends³⁶

On November 4, 1952, with just over 5% of the vote counted, a UNIVAC computer predicted a landslide victory for Dwight Eisenhower. CBS News' election night coverage featured the UNIVAC prominently in its advertising in the run-up to the election, touting the computer as the "Magic Brain."³⁷ The UNIVAC calculated that Eisenhower would garner 438 electoral votes to Stevenson's 93. The prediction of the UNIVAC was quite accurate. When the final vote tallies were completed, Eisenhower received 442 electoral votes to Stevenson's 89. The UNIVAC was able to make this prediction using a sample of just 3.4 million votes, and the results of its calculations were accurate to less than 1%. The 1952 American presidential election marked the first time that a computer was used to project the outcome of an election—previously the task of prediction fell only to seasoned journalists and pundits, statisticians and trend-watchers who monitored the pulse of the electorate as a full-time job. The 1952 election was also the first exposure most Americans had to the computer as an object—a thing rather than a concept.³⁸

John Presper Eckert and John Mauchly developed the UNIVAC (short for

³⁶ Sidney Lohman, "News and Notes Gathered from the Studios," New York Times, November 2 1952, 11.

³⁷ "C.B.S. Election Night Advertisement," The Washington Post, Nov 4, 1952, 15.

³⁸ For New Yorkers, IBM headquarters was the likely place to encounter computers as objects. The Selective Sequence Electronic Calculator (SSEC) was introduced in January 1948 at IBM's 57th street headquarters in a room separated from the street by a large set of windows. Passersby could watch the computer in 'action' with lights flashing to signify its operation. IBM continued this practice for a number of years, whenever a new flagship model was released.

Universal Automatic Computer) in 1950 as the first commercially available electronic computer with the first model installed at the census bureau in 1951. Eckert and Mauchly had worked together at the University of Pennsylvania to develop the ENIAC (Electronic Numerical Integrator and Computer) in 1945. The ENIAC was designed to speed the creation of ballistic tables for the U.S. Army and was heralded as the first fully functional electronic computer. After their success in developing the ENIAC, and as a result of ongoing patent disputes with the University of Pennsylvania, Eckert and Mauchly formed their own company, the Eckert-Mauchly Computer Corporation in 1948. By 1952, the Eckert-Mauchly Computer Corporation had been absorbed into the Remington Rand Corporation.³⁹ This triangular pattern of university research, military funding and corporate commercial development played a large role in the production of early computer systems. Because of the high cost involved with their production, most early computers were developed to serve very specific military needs—calculating firing tables, tabulating data on nuclear chain reactions and fighter aircraft wing design were all original functions of early computers. The intended customers for early computer systems (mostly military and government research contracts) tended to make computers more abstract and more removed from the routines of average Americans. As such, media reports of computer systems were often the only frame of reference people had with which to imagine this technology. The role of the media in representing computer technology was therefore considerable, and the rhetorical and metaphorical devices used by journalists and writers conjured up the whole reality of computer technology for

³⁹ Aspray and Campbell-Kelly, *Computer: A History of the Information Machine*, 107-112. See also, Paul E. Ceruzzi, *A History of Modern Computing*, History of Computing (Cambridge, Mass.: MIT Press, 1998).

American readers and consumers.

The UNIVAC computer, on loan from Remington Rand to CBS news and running in the company's Philadelphia headquarters, served a function quite different from the military tasks previous computers had been designed to perform. The UNIVAC's predictions were intended as no more than a publicity stunt, as Walter Cronkite described it: "It was agreed that it would be used on our election night purely, quite frankly, almost as a gimmick, to try to introduce the American people to what these machines could do, and also to give them some added excitement on election night. I thought it was pretty much gimmickry." Cronkite concluded, "I didn't see the great potential of them despite the propaganda put out by the UNIVAC people and the others."⁴⁰ The UNIVAC was programmed with the state-by-state presidential election returns from 1948 and 1944 and various statistical algorithms for determining trends from small statistical samples. As returns were phoned in, the data was entered into the UNIVAC and the programs run to generate a prediction for the presidential race. Standard polling had predicted a victory for Eisenhower, but when "at 9 with only 3,400,000 votes reported and the polls still open in some Western states, UNIVAC made its first prediction. Eisenhower was a shoo-in, the brain asserted. He would receive 33,000,000 popular votes, winning 43 states with 438 electoral votes."⁴¹

In the run-up to the election, pollsters were hesitant to offer any predictions. This was due in part to the perceived closeness of the race, but also due to the fact that so many were embarrassed by their incorrect prediction of a victory for Thomas Dewey in

⁴⁰ Walter Cronkite telephone interview with author, November 3, 2003.

⁴¹ "The Machine Vote," Newsweek, November 17 1952, 63-64.

1948.⁴² Although the polls seemed to support a victory for Eisenhower, his lead was seen as narrow with up to 10% of voters claiming to be undecided on the day before Election Day, with polls registering a trend in increasing support for Stevenson.⁴³ The most complete statistical information available had Eisenhower going into the contest with 11 states and 73 electoral votes and Stevenson with 10 states and 100 electoral votes.⁴⁴ Neither candidate was seen as having enough support for a landslide, so when the UNIVAC's first prediction was announced to Charles Collingwood at CBS, it was met with a fair amount of incredulity and suspicion. Walter Cronkite stated, "I doubted it completely. When they went to 100:1, I said, 'well this damn thing doesn't work.' I was very reluctant to go to [Charles] Collingwood and the UNIVAC, I felt that they were just wasting time. Anyone who thinks the odds are 100:1 can't have their ear to the ground, electronically or otherwise."⁴⁵ The engineers were instructed to fine-tune the computer's programming, since the calculation was (so it seemed) so obviously in error. Over the course of the evening during CBS's election night coverage, the engineers complied and after a series of adjustments the UNIVAC predicted a more reasonable Eisenhower victory with 28 states and 317 electoral votes, later narrowing the margin to a statistical dead heat with each candidate winning 24 states and Eisenhower eking out an electoral college victory at 8 to 7 odds-- this last bit of computing being the result of an inadvertent addition of a zero to the end of Stevenson's vote count. Once that was corrected, the computer consistently reported an Eisenhower landslide in line with its original calculation. As Newsweek reported, "since everyone had predicted that the election

⁴² "The Cautious Pollsters," The Washington Post, November 4 1952, 12.

⁴³ "Major Polls Put 'Ike' Ahead but See Gap Closing," Christian Science Monitor, November 3 1952, 1.

⁴⁴ James A. Hagerty, "Election Outcome Highly Uncertain," New York Times, November 3 1952, 1.

⁴⁵ Cronkite, 2003. The election predictions were presented as odds, much like a horse race.

would be close, the human beings masterminding the machine decided there must be something wrong. They agreed not to televise the prediction, and let the high-powered political experts in the broadcasting station go on saying it was too early to detect any real trend. Meanwhile, the experts in charge of the machine threw in a few statistical ‘correction factors’.”⁴⁶

As the election returns continued to come in over the course of the C.B.S. broadcast, it became more apparent that the UNIVAC’s original prediction was, in fact a more accurate representation than was considered possible earlier in the evening. In an attempt to restore the credibility of the UNIVAC computer and the Remington Rand corporation, Arthur Draper, “engineer in charge of Remington Rand’s New Products Development went on the TV and apologized publicly to UNIVAC. ‘A mistake was made,’ he told TV viewers. ‘But the mistake was human. We were wrong and UNIVAC was right. Next time we’ll leave it alone.’”⁴⁷ CBS commentator Ed Murrow summed up the UNIVAC’s performance with, “The trouble with machines is people.”⁴⁸

Morrow’s analysis was correct, though only partially so. The UNIVAC was ‘right’ in that the machine did execute the program correctly (something taken for granted today but, given the questionable reliability of vacuum tubes, was not to be readily granted in 1952), but the algorithms used to make the predictions based upon early polling statistics were less accurate with each revision, making the output of those calculations less and less accurate as a predictive model as the night wore on. Nor were the humans absolutely ‘wrong’ in their revisions to the algorithms—they were acting on

⁴⁶ "The Machine Vote."

⁴⁷ Mary Hornday, "Univac-Conversation Piece," Christian Science Monitor, November 15 1952, 20.

⁴⁸ "The Machine Vote."

opinions and techniques that had been useful in the past. CBS's experiment with the UNIVAC highlighted the ways in which statistical data could be manipulated to reinforce a desired result. The UNIVAC computer, though capable of rapid and precise calculations, was still a usurper in a role inhabited by human experts. It was up to the engineers to prove the UNIVAC was more capable than the experts, not the other way around. This media coverage of the UNIVAC computer's role on election night displayed a distinct sense of competition between the machine and its human counterparts with columnists like Wayne Oliver of *The Washington Post* reporting that "it will be men versus machines on radio and television election night to see who can pick out trends and forecast the winners most accurately on the basis of early returns."⁴⁹ As *The Nation* reminded readers of the event some time later, "Startled statisticians and newsmen entreated the electronic brain to come up with a more reasonable answer but UNIVAC ignored its timid masters with scornful consistency."⁵⁰

Giant Brains

For the first framers of computer discourse, the celebratory aspects of the new technology were often tempered by wariness in the face of a new order of being whose intentions were unclear or suspicious. It is this uncertainty about the motivations of the early computers that presents us with the depth of concern regarding their status, not only as machines, but also as machines that *think*. Computers were machines—complex machines no doubt, but the ease with which writers, illustrators and journalists were able to assign intentionality to computer systems is an indication of just how unusual these

⁴⁹ Wayne Oliver, "Man Vs. Machine on Election Night," *The Washington Post*, October 29 1952, 35.

⁵⁰ Anne W. Langman, "Television," *The Nation*, November 10 1956, 39.

machines were, and how normal terms of classification failed to ameliorate the anxiety of a perceived threat. Early popular writers and journalists deployed an array of metaphors and comparisons that conjured images of computer technology that were both terrifying and banal—often in the same article, in an attempt to describe these machines and place them within a context of similar objects and subject positions.

The problem for writers seeking to describe computers is that there were few readily available constructs to use in explaining the technology to lay audiences. The new machines weren't mechanical, but electronic, and they were capable of calculating at speeds exponentially faster than most people could imagine. Because they were so fast, they were capable of producing solutions to very complex mathematical problems. They seemed to be more like brains than anything else, and the metaphorical connection between computers and brains was expanded to include consciousness, intention, will, and desire, no matter what the engineers said to the contrary.

In January 1950, *Time* magazine dedicated its cover to the Mark III computer. The illustration showed an anthropomorphized machine assiduously studying the data it was itself producing, and computing the results. The caption of the picture “Mark III: Can man build a superman?”⁵¹ suggested the ways in which computers were enframed as artifacts that have moved beyond human beings in both power and consciousness. The accompanying article provided a list of computer achievements and grim predictions of the computerized world of the future. “Some scientists think that Bessie’s [the article’s nickname for the old Mark I computer in Harvard’s computer lab] descendants will have

⁵¹ Cover Illustration Caption, *Time*, January 23, 1950.

more effect on mankind than atomic energy. Modern man has become accustomed to machines with superhuman muscles, but machines with superhuman brains are still a little frightening. The men who design them try to deny that they are creating their own intellectual competitors.”⁵²

John Kobler, writing in the *Saturday Evening Post*, presented the threat of computers as a creeping menace: “out of scientific laboratories from New York to Moscow there is emerging in ever-increasing numbers a series of wonder-working robots whose power for good or evil, for creativeness in peace or destruction in war, exceeds that of supersonic flight and nuclear fission.[...] They are the gigantic computing machines with the bizarre names—SSEC, ENIAC, Edvac, Binac, Mark I, II, and III, Rudy the Rooter, to list a few—and they can solve in infinitely less time than it would take Albert Einstein merely to state them almost any practical mathematical problem and many problems in pure mathematics.”⁵³

In a very short period of time popular print media ceded consciousness to computers over the objections of the scientists and engineers that created them. Although reporters reminded readers that, for example “Dr. Howard H. Aiken, director of the laboratory, does not like to hear his machines called ‘mechanical brains,’”⁵⁴ journalists continued to refer to computers as ‘brains’ throughout the 1940s and 50s. In preparation

⁵² "The Thinking Machine," *Time*, January 23 1950, 54.

⁵³ John Kobler, "You're Not Very Smart after All," *Saturday Evening Post*, February 18 1950, 25. Although SSEC, ENIAC, Edvac, Binac, Mark I, II, and III, were actual machines developed between 1944 (ENIAC, SSEC) and 1952 (Edvac, Mark III). I have found no reference to a machine called ‘Rudy the Rooter’. Kobler, writing in 1950 discussed machines that were, in some cases, still in development or planning. ‘Rudy the Rooter’, whatever its characteristics, apparently never made it from the drawing board to an actual machine, at least not by that name.

⁵⁴ "A Robot's Job," *Time*, January 20 1947, 48.

for the televised coverage of the 1952 presidential election, Walter Cronkite recalled, “the UNIVAC people convinced us that we should not call them electronic brains—that they were no such thing. They depended entirely on human brains to feed the material into them,”⁵⁵ but reporters reviewing the election night coverage persisted in stating that the “UNIVAC’s mistake, it seems, was simply to trust the human race on election night.”⁵⁶

Monstrous Machines and Raw Power: Describing Early Computing Machines

The ENIAC (Electronic Numerical Integrator and Computer) computer was developed over a period of several years beginning in 1942. John Mauchly, who along with J. Presper Eckert, was the principal architect behind the development of ENIAC, originally envisioned a project that would aid in making weather predictions. With the outbreak of the Second World War, funding for research into technologies that would aid in the war effort poured into research universities. Instead of a weather-predicting calculator, the ENIAC was developed to aid in the calculation of artillery firing tables. These tables were notoriously time-consuming to produce, requiring thousands of calculations and requiring a unique set of calculations for each type of artillery shell and fuse combination under a wide range of weather conditions. The manual calculation of these tables required thousands of person-hours and any errors would cause whole sets of calculations to be recomputed. The ENIAC was not completed in time to do the work it was originally designed for. Instead, the first set of calculations performed during test runs in 1945 was a set of calculations concerning theoretical problems for the hydrogen

⁵⁵ Walter Cronkite, telephone interview with author, November 3, 2003.

⁵⁶ Jack Gould, "Television in Review," New York Times, November 5 1952, 30.

bomb.⁵⁷ The ENIAC was designed as a general-purpose calculating machine capable of a wide range of applications. This flexibility allowed it to be re-configured to accommodate a variety of wartime (and post-war) problems. This flexibility also provided an opening for how to think about the machine. The ENIAC, as a computer, was intended to perform the task of calculating previously delegated to human “computers.” This occupation was, during the Second World War, a task largely performed by women with mathematics degrees and specially trained women from the Army's Women's Auxiliary Corps. These women performed the manual calculations that the machines were designed to reproduce electronically.⁵⁸

The issue of status for computers as thinking machines can be inferred from the original press release revealing the existence of the electronic computer to the world in February 1946. The press release for the ENIAC on February 14, 1946, enters the debate of machine consciousness and human anxiety by stating, before anyone wondered aloud about the implications of the new machine that, “the electronic calculator does not replace original human thinking, but rather frees scientific thought from the drudgery of lengthy calculating work.”⁵⁹ Less than one year after the bombing of Hiroshima and Nagasaki had left Americans feeling paradoxically apprehensive and proud of their technological achievement, the announcement of the ENIAC computer added to the sense

⁵⁷ See, Mike Hally, Electronic Brains: Stories from the Dawn of the Computer Age (Washington D.C.: Joseph Henry Press, 2005). See also, Scott McCartney, Eniac: The Triumphs and Tragedies of the World's First Computer (New York: Walker & Co, 1999). A more contemporary version of the ENIAC story can be found in Edmund C. Berkeley, Giant Brains; or, Machines That Think (New York,: Wiley, 1949).

⁵⁸ There have been a few articles written about the role women computers at the University of Pennsylvania's Moore School. See, for example: W.B. Fritz, "The Women of Eniac," IEEE Annals of the History of Computing 18, no. 3 (1996): 13-28, Neeraja Sankaran, "Looking Back at Eniac: Computers Hit Half-Century Mark," The Scientist 9, no. 16 (1995): 3.

⁵⁹ Press Release: Ordinance Department Develops All-Electronic Calculating Machine, (War Department Bureau of Public Relations Press Branch, 1946).

of foreboding in the face of the overwhelming changes wrought by engineers.⁶⁰ This sense of foreboding surrounded the essential issue of how were we expected to relate to this new machine.

Drawing upon a history of machines as replacements for manual labor, the initial reports of the ENIAC extolled its power in human terms. *Time* captioned its photo of the ENIAC with the line “Electronic Calculator: In two hours, a year’s work for 100 trained men.”⁶¹ *Newsweek* concurred “The first problem put to ENIAC was a nuclear-physics calculation that would require 100 man-years of work by a trained computer. The electronic device solved it in two weeks, of which two hours were used for actual electronic computing and the remaining time for operating details and review of results.”⁶² The *New York Times* stated that the ENIAC “was then told to solve a difficult problem that would have required several weeks’ work by a trained man. The ENIAC did it in exactly fifteen seconds.”⁶³

The ENIAC presented a problem of scale for writers attempting to put into words the engineering that went into its construction. It was a tool for performing mathematical operations, not unlike the mechanical desktop calculators that were already common prior to World War II. But the size and complexity of the ENIAC was of an order of magnitude greater than the most sophisticated mechanical adding machines ever

⁶⁰ Paul Boyer, *By the Bomb's Early Light: American Thought and Culture at the Dawn of the Atomic Age* (New York: Random House, 1985). Boyer’s book collects articles and interviews concerning the atomic bomb from 1945-1950. Boyer details the strange admixture of fear and elation that surrounds the announcement of the bombing of Hiroshima and Nagasaki in August 1945. The paradoxical feelings of fear and pride parallel the discourse on early computers as sublime objects.

⁶¹ "Eniac," *Time*, February 25 1946, 90.

⁶² "Answers by Eny," *Newsweek*, February 18 1946, 76.

⁶³ T.R. Kennedy, Jr., "Electronic Computer Flashes Answers, May Speed Engineering," *New York Times*, February 15 1946, 6.

produced. Reporters marveled at the 18,000 vacuum tubes and miles of copper wire and thousands upon thousands of soldered joints. The sheer size of the machine was intimidating: at 50 feet long and 30 feet wide, the giant U-shaped machine was pictured as dwarfing the engineers who operated it. This manner of visualizing early computers consequently diminished the human presence in the computer's processes. The engineers appear as a means of ascertaining scale, not as intrinsic to the operation of the machine. The function of the ENIAC as a calculating machine was obscured by its magnitude.

Early computers were given a physical presence by references to their size and complexity. The size of the machines could be quite daunting. Walter Cronkite, speaking about his first encounter with the UNIVAC prior to election night in 1952 makes an interesting intersection between the machine's size, its complexity, and the aura that surrounded it. Speaking about the UNIVAC, Cronkite states "there was a lot of publicity right at that time about this 'electric brain' that had been created in Philadelphia, and that everybody was talking about—what it might do." Cronkite remembered that he and "Sig [Mickelson] went down to Philadelphia and saw the huge machine. It filled an airplane hangar practically— it seemed so big. It wasn't exactly that size, but it was quite immense. They ran some figures into it. And I quite honestly understood nothing that they were saying."⁶⁴ The size of the UNIVAC reflects the complexity of the machine, as well as its ties to the military (almost the size of an aircraft hangar).⁶⁵ Cronkite's memory of the UNIVAC is of a machine that has a presence—it's

⁶⁴ Walter Cronkite, telephone interview with author, November 3, 2003.

⁶⁵ Cronkite makes an interesting conflation here between computers and the military. The UNIVAC was never in an aircraft hanger—it was developed at the Eckert Mauchly Computer Corporation building in Philadelphia, a cavernous building next to a junkyard and across from a cemetery. That Cronkite places the

embodied, and that body, though embedded within certain aspects of the corporeal human body, transcends our normal perceptions of the physical and is imbued with a monstrosity that borders the sublime.

Computers and the Technological Sublime

David Nye describes the technological sublime as a means of infusing technological works with an air of transcendence. The experience of the sublime is the feeling of awe, wonder, and transcendent terror one feels in the presence of a breathtaking natural landscape that was a basis for Romantic philosophy and literature in the nineteenth century. For Nye, the natural sublime is an experience of the eternal. The technological sublime shares this focus on space and time in that it “aims at the future and is often embodied in the instruments of speed, such as the railway, the airplane, and the rocket, that annihilate time and distance.”⁶⁶ To this list of instruments we can add computers. The early computing machines were described as embodying speed and the calculating power of computers were, like the natural wonders of a Romantic landscape, striking in comparison to the common world of everyday calculations.

Jay Forrester, director of the new Digital Computer Laboratory at MIT in 1947, described his new project (that would, a few years later be christened “Whirlwind”) as capable of “solving problems 100,000 times as fast as the human brain. The high-speed computer will complete in five minutes calculations that would take a human operator

UNIVAC in a military setting suggests the great influence the military had in producing early computer systems.

⁶⁶ David E Nye, American Technological Sublime (Cambridge: MIT Press, 1996).

one year.”⁶⁷ Not only would these new machines outstrip the human brain, but previous machines as well: “To solve the problems mathematically would require about 5,000 hours of computation on the most efficient machines now available. The new machines could solve such problems in one hour.”⁶⁸ But to view these machines as a vast improvement over other machines is to diminish the significance of the power described by the author. Comparing machines with other machines is too abstract—the description must be grounded in human experience to maintain the sublime power at work: “They will handle ordinary computations, such as multiplication or division, in a matter of ‘microseconds’ – or about 1/200,000th of the time a human being requires to snatch his hand from a hot stove.”⁶⁹

‘Giant Brains’ were seen as “capable of solving in ten minutes a problem which a skilled mathematician working day and night by ordinary means, would require three years to complete.”⁷⁰ While at the University of Illinois, a machine was being designed that could “multiply 999,999,999,999 by 999,999,999,999—or any pair of twelve-digit numbers – 1,000 times in a second. In an eighteen-hour test it did 52,000,000 multiplications without error.”⁷¹ As early computers quickly matured, and new designs began appearing in research labs throughout the country, the number of calculations steadily increased and the new computers were capable of faster and faster computations; aspects of real intelligence were attributed to them. The *New York Times* describes the new computer built for the National Bureau of Standards in 1950 as “the robot genius,

⁶⁷ “Computers Beat Brain,” *New York Times*, January 31 1947, 5.

⁶⁸ *Ibid.*

⁶⁹ *Ibid.*

⁷⁰ ““New Giant ‘Brain’ Does Wizard Work,” *New York Times*, August 25 1947, 19.

⁷¹ “Prodigy under Way in Electronic Brains,” *New York Times*, May 2 1950, 40.

S.W.A.C. is an electronic calculator capable of solving 150 simultaneous algebraic equations involving 4,000,000 arithmetic operations, in four hours of computing time.”⁷²

ORDVAC (Ordnance Variable Automatic Computer) creators speculated that this new breed of machine could “solve a problem that would take a human equipped with a standard desk calculator more than 1000 years.”⁷³

Kant identifies magnitude, specifically a magnitude that can only be appreciated as a product of mathematics, as a key attribute of the sublime experience. The natural world in its physicality cannot, on its own, create the sensation of the sublime in the observer, no matter how large the object being perceived. If the object can be grasped in terms of itself (e.g. a mountain range) the experience may be described as an apperception of beauty, but not in itself as sublime. For Kant, the fear or terrors that evoke sensations of sublime are those whose enormity cannot be perceived physically, but only comprehended as an order of abstraction— specifically something that is sensible as a multiple of human understanding.

Computers are not, after all, natural phenomena, but rather artificial constructions and thus, in Kantian terms, not eligible for sublime apperception. In as much as mathematics was viewed as the language of science, capable of explaining the mysteries of the universe, a machine that could manipulate numbers at speeds outside of our comprehension became a link to the infinite and its wonders. The paradoxical construction of computers as natural objects is grounded in the very physicality of the systems. Descriptions of computers that emphasized size, weight, and power brought to

⁷² "New Robot 'Brain' Cuts War Figuring," New York Times, August 18 1950, 21.

⁷³ "Fast Student," Time, January 20 1952, 42.

the forefront the presence of these machines as awesome and intimidating—seemingly surpassing their creators and possessing powers orders of magnitude greater than ours.⁷⁴

The relative boundlessness of computer speed in comparison with the computational power of humans rapidly became the defining characteristic of computers as described by the media.

Computers were not, of course, organic or essential, or forces of nature, but this impression was the product of the manner in which computers were described prior to election night, 1952 and helped to establish the frame in which the technology was perceived, and to precondition the audience to look at the UNIVAC as more than just a televised gimmick. Three different types of frames, media, technological, and cognitive were deployed to define computer technology in general and the UNIVAC computer specifically in the time surrounding its use in the 1952 election. Each mode of framing has a distinct, but related method for describing framing and its effects.

Three Framing Narratives

Roland Marchand describes the corporate advertising in the first half of the 20th century as an attempt to give the corporation—the apotheosis of industrial capitalism—a ‘soul’. Marchand traces the history of print advertising for major corporations (AT&T, Ford Motor Company, General Electric) as an attempt to shape the perception of the corporation into something more human, or at least of human scale.⁷⁵ The casting of an

⁷⁴ See Marx and Engels’ essay on history in Karl Marx and Friedrich Engels, The German Ideology : Including Theses on Feuerbach Great Books in Philosophy (Amherst, N.Y.: Prometheus Books, 1998). Marx argues that the feeling of sublimity toward wild nature is a product of our ‘animal consciousness’, the basic level of human interaction with nature. For Marx, consciousness is a product of social/technological matrix we are born into, and thus this matrix is our nature.

⁷⁵ Roland Marchand, Creating the Corporate Soul : The Rise of Public Relations (Berkeley: University of

entity so distinctly non-human as the corporation as an entity possessed with values, and emotions and empathy served to represent the corporation as a positive, ‘neighborly’ force in the lives of Americans to defuse the hostility felt toward corporations and trusts in the progressive era, and replace it with a feeling of wartime camaraderie and kinship.⁷⁶ The pre-election coverage of CBS’s decision to employ a UNIVAC computer created the same problem of scale for the reporters covering the event. The central problem with the UNIVAC for reporters in the run-up to the election was how to describe the computer to their audience. Computers were not seen as synonymous with corporations; the impetus behind computer development would be the state, specifically the state as a military and bureaucratic organization, until after the Viet Nam war in the Mid-1970’s. But the process of anthropomorphizing the machine, for all its vastness and cold calculation, is reminiscent of the drive to ‘humanize’ a faceless corporate entity as described by Marchand.

What Marchand presents as the method for making corporations seem friendly, neighborly, or human, is a process of re-framing accomplished by changing public perception of an entity (a corporation, a politician, etc.) through selective and controlled exposure through the media. Media framing as stated by Todd Gitlin is: “principles of selection, emphasis and presentation composed of little tacit theories about what exists, what happens, and what matters.”⁷⁷ Gitlin takes his definition of frames from Irving Goffman’s theory of Frame Analysis and extends it from Goffman’s original emphasis on

California Press, 1998).

⁷⁶ Ibid., 357-363.

⁷⁷ Todd Gitlin, The Whole World Is Watching: Mass Media in the Making and Unmaking of the New Left (Berkeley: University of California Press, 1980), 6.

cognitive and social uses for framing and focuses instead on the significance of frames as a function of the media and the determination of what is, in fact, news. Goffman's frames are conceptual—at the same time personal negotiations and social structures.⁷⁸ Frames allow a context in which to operate relative to perceived normative experience.⁷⁹ In short, frames allow us to apply normative rules to social interactions. Central to Goffman's thesis of frames, however, is the idea that frames are inherently inadequate to everyday experience. There are situations that are not easily framed or uncertainty as to how an event is to be framed based on past experience. Also, the ability to mis-frame a situation can cause anxiety—a sort of cognitive dissonance where the situation does not match our pre-conceived mental picture.

Goffman's initial description of conceptual frames has been appropriated as a method for describing the effect of mass media on the public. Todd Gitlin and Hubert Gans, for example, present the media—specifically television—as institutions responsible in large part for the interpretive framing of social and political events for public consumption.⁸⁰ Deciding what is news and determining the language used to describe events as news presents an encoded reality replete with discursive strategies that are anything but benign.⁸¹ Often, the overt editorial stance of the writer is not as significant

⁷⁸ Erving Goffman, Frame Analysis : An Essay on the Organization of Experience (Cambridge, Mass.: Harvard University Press, 1974).

⁷⁹ Goffman is borrowing, in turn from Peter L. Berger and Thomas Luckmann, The Social Construction of Reality; a Treatise in the Sociology of Knowledge, 1st ed. (Garden City, N.Y.: Doubleday, 1966). Berger and Luckmann contend that we are, in fact the sum of our framing experiences (though they do not use that term) and that all reality is filtered through and is thus a product of our socially constructed acquisition of knowledge.

⁸⁰ Herbert J. Gans, Deciding What's News (New York: Pantheon, 1979).

⁸¹ See, for example, Noam and Edward Herman Chomsky, Manufacturing Consent (New York: Pantheon, 1998), Stuart Hall, "Encoding/Decoding," in Culture, Media, Language: Working Papers in Cultural Studies, 1972-79, ed. Centre for Contemporary Cultural Studies (London: Hutchinson, 1980), 128-38. Whereas Chomsky and Herman see the role of mass media in shaping mass consciousness as almost total,

as the more subtle contextual cues that inform the reader how to contextualize the content of the story.⁸² In the case of the UNIVAC, the coverage of the event immediately prior to Election Night focused on defining the computer for audiences that (if the news coverage is any indication) were unsure how the machine worked, or what exactly it did.

The UNIVAC was presented to the public as something of an unknown quantity—a secret to be revealed. The mysterious power of the UNIVAC suggested something supernatural that the spokesmen from Remington Rand were not quite able to dispel: “Officials of Remington Rand, which built the machine, emphasize that it is not psychic. UNIVAC [...] is a machine with a memory. Figures fed into the machine are recorded electronically on metal tapes and mercury memory tanks.”⁸³ Officials of Remington Rand, or a variety of other institutions endlessly requested that reporters refrain from describing the machines as ‘electronic brains’, or ‘giant brains, or any kind of brain at all. A Harvard professor and designer of the Mark III computer in 1947 was reported as stating that he “does not like to hear his machines called ‘mechanical brains’.” “These humanitarian terms are unfortunate,” he says severely. But he does admit that they work more or less like fast, narrow-minded brains.”⁸⁴ Or again that, “Although the experts use words like “memory,” they don’t like to hear their machines described as

Hall holds a more nuanced view suggesting that there is no mass audience and that different groups and subcultures decode and inscribe meanings on to media artifacts that often run counter to the intended, hegemonic reading.

⁸² See Dietram A. Scheufele and Bruce V. Lewenstein, "The Public and Nanotechnology: How Citizens Make Sense of Emerging Technologies," *Journal of Nanoparticle Research* 7, no. 6 (2005): 659-667. This is, of course, part of a larger debate concerning American media choices concerning political and social coverage of a number of issues. Focusing specifically on how people respond to technological news, see: Dietram A. Scheufele, "Framing as a Theory of Media Effects," *Journal of Communication Inquiry* 49, no. 1 (1999): 103-122.; M.C Nisbet, D. Brossard, and A. Kroepsch, "Framing Science-- the Stem Cell Controversy in an Age of Press/Politics," *Harvard International Journal of Press-Politics* 8, no. 2 (2003): 36-70.

⁸³ "Univac the Brain Unafraid to Be out on a Limb Nov. 4," *New York Times*, October 15 1952, 27.

⁸⁴ "A Robot's Job," 48.

“brains.” The mechanical computers have no creative ability; they merely follow instructions.”⁸⁵ The engineers were rarely successful. The difference in presentation and the reluctance to change the frame used to describe computers as electronic brains is, in part, a difference between the manner in which the media frames emphasize repetition to create quick reference points useful for packaging events as a type of verbal shorthand, and the manner in which the engineers preferred to think about their creations.

The consequences of couching descriptions of computer technology in terms of human cognition marked the site of computer-human interaction as competitive—with winners and losers and deep anxieties for the future of humanity. The metaphoric link between human brains and machine processing set into relief specific social issues concerning definitions of self, society, labor, gender, and control. This sense of competition between human and machines was evident in the representation of computers used to calculate predictions on election night, and the coverage of these predictions as media events. How well the machines performed as predictors compared with their flesh and blood counterparts was often the focus of new accounts in the print media’s reportage of election night, and of subsequent reviews of the various network attempts to be the first to report on presidential or congressional victories. Although the representation of the events on election night television was not always overtly framed as competitive, the drama of the accounts often took the form of ‘man-versus-machine’. As C. Dianne Martin suggests, journalists who write about science and technology, in an effort to make their articles more entertaining, focus on drama, controversy, and aberration, complete

⁸⁵ "Calculation Ad Infinitum," Newsweek, January 20 1947, 58.

with heroes, villains and conflict.⁸⁶ Martin's review of media representations of early computer systems focused on newspaper headlines as accurate markers of content and as shaping the attitudes of readers. Looking at the textual context of the articles, specifically the way in which technology is described in ways that are simultaneously celebratory and cautious, I find the same focus on conflict and resolution in favor of the human reader and spectator. Speaking on science (but equally applicable to technology) Dorothy Nelkin explains that, "for most people the reality of science is what they read in the press. They understand science less through direct experience or past education than through the filter of journalistic language and imagery."⁸⁷

Unlike media frames, technological framing is the means by which a technological innovation is structured by actors working within the environments that produce technology (e.g. engineers, inventors, researchers) and the environments that promote the technology for consumption (e.g. marketers, salespeople) as well as the demands of the artifact itself (in this case, the limitations of early computer technology and language). The producers produce not only the artifact, but also the means for defining the artifact and the discourse that surrounds it. This definition is a matter of constant negotiations between groups having an active stake in the perpetuation of the artifact. Technological frames as an investigative tool is the product of the Social Construction of Technology (SCOT) school of science and technology studies. Technological framing as a mode of technological discourse proposed by Wibe Bijker

⁸⁶ C. Dianne Martin, "The Myth of the Awesome Thinking Machine," *Communications of the ACM* 36, no. 4 (1993): 120-133.

⁸⁷ Dorothy Nelkin, *Selling Science: How the Press Covers Science and Technology* (New York: W.H. Freedman, 1987), 6.

along with Trevor Pinch and John Law.⁸⁸ Bijker and Pinch assert that technologies are subject to interpretation by different groups with a stake in the production of a specific artifact, and that these groups may see the use and purpose of a technological artifact in radically different ways. This series of negotiations regarding definitions of ideas, methods and artifacts results in casting the technological artifact (whether physical or conceptual) as a stable referent. The resulting ‘black box’ (an object the inner workings of which are dependable but unexamined) is used as a building block for further innovation.

The subject of early computer technology and black-boxing is played out in a way that is different from the way the SCOT paradigm describes it. The uniqueness of early computers, that they had no real consumers for the advertising and news coverage that were likely to purchase them, made the black boxing of computers as artifacts follow a different track than that of other consumer technologies. Because the computer was almost purely a symbolic construct to the lay reader of newspapers and magazines, as well as for television and movie watchers, the black boxing of computers was a matter of bringing closure to the computer as an icon with a stable set of referents, as well as a stable position within American culture. As Langdon Winner, in his critique of social constructivist views of technology observed, one of the issues or shortcomings to the SCOT approach is the exclusion of actors determined to be non-relevant. Winner questions who gets to determine the status of actors in the construction of a technological

⁸⁸ Examples of works in the SCOT paradigm are Wiebe E. Bijker, Thomas Parke Hughes, and T. J. Pinch, The Social Construction of Technological Systems (Cambridge, Mass.: MIT Press, 1987), Wiebe E. Bijker and John Law, Shaping Technology/Building Society: Studies in Sociotechnical Change (Cambridge, Mass.: MIT Press, 1992). See also, Thomas Hughes, Rescuing Prometheus (New York: Pantheon, 1998).

artifact—who is relevant and who is not, and contends that this question brings to the fore political and social issues that SCOT dismisses.⁸⁹

Technological framing, as defined by Bijker stipulates that the negotiated logic of the technological system creates a set of practices that further define how the system will progress going forward. For the UNIVAC computer, the establishment of the machine as a universal calculating device stipulates that the data to be calculated is immaterial to the process of calculation. The numbers expressed by the UNIVAC showing a landslide for Eisenhower are merely the expression of a set of calculations performed on a data set where it is perfectly acceptable to generate different results by manipulating variables. The emphasis is on the internal logic of the machine to accurately compute the solution to a given problem rather than the significance of the solution to the world outside the machine. Whether the machine is right or wrong is determined by whether or not it accurately performed the calculation as structured, not whether the variables programmed into the machine were accurate to begin with. This distinction, though not useful to the news anchors at CBS was nonetheless significant to the designers and engineers at Remington Rand.

This distinction is also useful to my discussion as it informs a limitation of technological framing when one considers the role of non-actants in the process of enframing. Technological frames evolve around artifacts as a product of the perceptions of stakeholders in the development of the technology—from engineer to consumer. But in the case of early computer systems, consumption occurred on two distinct levels. The

⁸⁹ Langdon Winner, "Upon Opening the Black Box and Finding It Empty: Social Constructivism and the Philosophy of Technology," Science, Technology, & Human Values 18, no. 3 (1993): 362-378.

corporations and government agencies that purchased these systems were the primary consumers as much as they were the ones using them, but the general public could also be considered consumers of the idea of computer technology. Although the average household was unlikely to budget for the purchase of computer technology until the 1990's, computers were a growing part of American ideas about technology, modernity and the future and these ideas were shaped less by the consumption of the technology than by the consumption of images and metaphors of what computers were and what they meant as markers of progress. Although there is a great deal to recommend SCOT as an analytical framework for interpreting technological change, for my analysis, the society that SCOT imagines is something of a closed system, with producers and consumers negotiating to construct technological frames that then structure an artifact's place in the matrix of consumables. Computer systems were not available for use in the same way that home appliances or automobiles were consumed. The framing of computer technology for the general public did not present opportunities for negotiation as consumers. Rather, computers were, like nuclear weapons, external technological forces that required metaphorical construction prior to their consumption as *ideas*. This gap between the general public as consumers of ideas and images concerning computer technology and the framing of the computer as an artifact by the engineers that produced them, as well as the government agencies and corporations that purchased them, created a realm of disjuncture between the intended use of the machines and the newsworthiness of the perceived threat of computer technology by writers and reporters. This gap engendered an increased reliance on the news media to frame the technology as consumable as an image. Computer technology was represented less as something of

concrete value to readers and viewers (in fact, the practical use of computers for average citizens was extremely limited, if not non-existent) and more as a condition of modernity to be described and incorporated into existing views of technology and mechanization.

Even when reporters reminded their readers that the machines didn't think, they still, however humorously, placed themselves in unflattering juxtaposition with the machines. Bill Henry, a columnist for The Los Angeles Times describes the computers that were to be televised as:

The electronic gadgets are known as Monrobot (NBC) and UNIVAC (CBS)—the NBC boys think their machine should be christened Nrobnetak (Kaltenborn spelled backwards) in honor of the dean of radio analysts—and I'm told by those who profess to know about such things that the way they work is something like this. You take the figures for Zilch County, California, for 1948 and feed them into the machine and then you take the figures for the same county in 1952 and feed these into the machine and the bright little collection of tubes and wires will whirr for a while and then come up with a prediction as to how Zilch County, California, will eventually come out this year. If you care about Zilch County, that'll be highly important. In short, the darn thing doesn't 'think'—as some people choose to believe—it merely calculates. Since most of us reporters can't add 2 and 2, the advent of the Monrobot and UNIVAC should be something of an improvement.⁹⁰

The technological frame of calculations as benchmark for speed and engineering advancement were inadequate to describe the machines' capabilities to non-specialized audiences. For the computer to be useful in the marketplace, these terms had to be recast in terms of profitability and human scale. This metaphorical association between machines and human beings tapped into a pre-existing set of anxieties concerning the role of machines as replacements for human labor, and the uncertainties that surrounded a

⁹⁰ Bill Henry, "All the Way with Bill Henry," Los Angeles Times, November 4 1952, A1. Note: H.V. Kaltenborn was a CBS radio news announcer who was famously mocked by Harry S. Truman in 1948 after he (along with many others) wrongly predicted the presidential election for Thomas Dewey.

world where machines could replace the human mind and perhaps democracy itself:

But we hope much from the UNIVAC. It will eliminate human error. It will surely succeed if people will just eliminate the human perversity of changing their voting patterns betwixt elections. [...] And what vistas are opened up when voters will just vote with robot predictability. With a prophetic UNIVAC we won't have to bother to count all the votes. Indeed, if we can just improve the breed we won't even have to hold an election at all.⁹¹

This last sense of computers as a replacement for humans has its roots in depression era fears of technological unemployment.

Technological Unemployment

Walter Cronkite made the link between computers and the fear of being marginalized explicit. Speaking about his impressions of the UNIVAC computer, Cronkite described his experience as being encroached upon:

I was a little bit put out by the fact that they seemed to be taking over my job as the anchorperson. The human interpretation of the returns, our use of our knowledge of how that part of the country had voted before and how it was expected to vote upon certain indicators-- the way they voted in early primaries or in local elections-- and our analysis in projecting that into the presidential election. All of that was quite clearly endangered and taken over quite quickly by the computer people and they were telling us exactly what the percentages were in this situation and that situation, exactly what the difference was in the vote this year and 100 years previously in this heavily Democratic district, that hadn't gone Republican in a certain amount of time. And they could find the evidence of that in the voting. That kind of interpretation was the sort that we were used to doing. I think we were all just a little annoyed that our jobs were being superseded by these "keyboard wizards."⁹²

As the early returns came in and the initial predictions from UNIVAC were dismissed, Cronkite was both amused and pleased to see the computer fail: "Those of us there were

⁹¹ "The Univac and the Unicorn," *Wall Street Journal*, October 17 1952, 6.

⁹² Walter Cronkite, telephone interview with author, November 3, 2003.

kind of overjoyed like any hand worker would be at the introduction of machinery in his shop--we were kind of delighted that it didn't work. It was only poor old [Sig] Mickelson's neck that was out with the management of CBS. The rest of us were kind of gloating about it."⁹³

As Amy Bix points out in her study of the issue of technological unemployment, *Inventing Ourselves Out of Jobs?*, the ultimate question of the scope of technological unemployment, or whether it existed at all, remained decidedly complex and impossible to answer with any certainty. Economists and labor advocates, government officials and academics wrangled over how to frame the debate, and argued over definitions, statistics, and methods from the 1920's until the end of the century. The lack of objective measures fostered an environment where the emotional appeals of labor had no more veracity than the calculated dictates of capital.⁹⁴ This does not mean that, in the case of computer technology, appeals to the anxiety of readers and viewers were any less prevalent for their lack of supporting evidence. The theme of technological replacement was a holdover from the interwar period of the 1920's and 1930's when the large-scale mechanization of American factories and mills was perceived as a driver of persistent unemployment during the depression. While the artificial economy of the Second World War created an environment of very low unemployment, a return to depression era unemployment was a concern among public planners as well as the subject of countless editorials and commentaries. While fears of technological unemployment were renewed at the close of the Second World War, emerging computer technologies were presented as

⁹³ *ibid.*

⁹⁴ Amy S. Bix, *Inventing Ourselves out of Jobs? America's Debate over Technological Unemployment 1929-1981* (Baltimore: Johns Hopkins University Press, 2000), 237-272.

an increased threat. The mechanization of the factory floor or the farm may have displaced blue-collar and farm laborers, but the computer was presented as a threat to white-collar and middle-managers as well. Experts like “Dr. Robert F. Jackson, Associate Professor of Mathematics at the University of Delaware,” said that

Within a decade electronic calculators might take over the tasks now done by millions of white-collar workers. [...] An electronic brain can turn out as many and as good results as hundreds of payroll clerks, hand-computers, shipping clerks, job-routing clerks—almost any type of clerical job.⁹⁵

John Pfeiffer, reviewing Edmund Berkeley’s *Giant Brains, or Machines That Think*, explained, “In the past, technological unemployment has been largely confined to people who work with their hands, but many white-collar workers may find themselves replaced by ensembles of vacuum tubes when commercial computers are manufactured by the hundreds.”⁹⁶ Berkeley, one of the earliest proponents of computers as machines that foreshadow a new era of technological advancement and a reduction in human drudgery and toil was not unaware of the possible consequences of his predictions. In one of the first books on computer technology geared toward lay readers, Berkeley illustrates the possible paradox of automatic processes in the workplace as

When we combine automatic producing machinery and automatic controlling machinery, we get a vast saving in labor and a great increase in technological unemployment [...] The robot machine raises the two questions that hang like swords over a great many of us these days. The first one is for any employee: What shall I do when a robot machine renders worthless all the skill I have spent years in developing? The second question is for any businessmen: How shall I sell what I make if half the people to whom I sell lose their jobs to robot machines?⁹⁷

⁹⁵ "Expert Visions Machines Taking White-Collar Jobs," New York Times, December 6 1950, 39.

⁹⁶ John Pfeiffer, "Mechanical Logicians," New York Times, December 11 1949, BR 19.

⁹⁷ Berkeley, 202.

Echoing this relationship between labor and technology, the *New York Times*, in an article with the celebratory title, “Automation Puts Industry on Eve of Fantastic Robot Era,” concludes that the fantastic potential of automation is not without some downside.

While it was seen as true that automation:

Opens up new vistas of unparalleled abundance and comfort; at the same time it stirs fears of mass unemployment and frustration. It promises a vast expansion of goods and services, sharp reductions in prices and increased opportunity for the enjoyment of leisure. It makes the three-day week-end a realizable goal; it offers emancipation from the drudgery of routine repetitive tasks.⁹⁸

But, the article concludes, “with these prospective blessings comes concern that liberation from drudgery also will mean liberation from any regular paycheck for large numbers of workers.”⁹⁹

Warner Bloomberg, writing in *The New Republic*, made the connection between the factory floor and the front office as explicit as possible in ominously titled, “Man’s New Role as Caretaker of the Machines.” In it, he relates the story of “Stash,” an uneducated laborer in a machine part factory. Stash, Bloomberg explains, “doesn’t really understand his job,” nor does he perceive the threat of computers that could do what he does and keep the line moving and the automatic milling machines supplied with parts. Stash and his fellow workers “prize the new work-life in the factory to which the changing technology has made a real contribution—the decline of truly hard jobs,” even though “Some of his white-collar friends have already advised the younger men in the department to start looking about for other jobs.”¹⁰⁰ Bloomberg’s story is a retelling of

⁹⁸ A. H. Raskin, "Automation Puts Industry on Eve of Fantastic Robot Era," *New York Times*, April 8 1955.

⁹⁹ *Ibid.*, 14.

¹⁰⁰ Warner Jr. Bloomberg, "Man's New Role as Caretaker of the Machines," *New Republic*, July 11 1955,

pre-war narratives about factory closings and the impact on the working class families dependent upon factory labor for their livelihoods. Stories like these are perhaps best illustrated by the 1940 film *Valley Town: A Study of Machines and Men*, produced by the Educational Films Institute at New York University and directed by Willard Van Dyke. The film follows the closing of a steel mill in an unnamed Pennsylvania town and the workers responses to being out of work. Shot with real workers instead of actors, Valley Town presents the workers as unable to compete when their old mill is razed and a new mill is built with modern furnaces and machines. The film is explicit in its call for retraining programs for workers idled by mechanized production, and in its sympathy for the men of the factory and their wives and children. Van Dyke highlights the human cost of mechanization and draws the viewer into their world by focusing on them and not the mill owners. The narrator, the only fictitious character in the film, introduces himself as the mayor of the town to add a sense of paternalistic concern over the worker's fates.

Bloomberg's story is a retelling of this narrative that extends its concern to the middle-class, middle manager as well. He concludes that "Automation not only makes obsolete more and more workers in overalls, whom the white-collar class tended to absorb, but for the first time it challenges the very growth of the white-collar class itself." He further warns that, "occupational mobility is also threatened. If anything, automation shows positive signs of being able to reduce significantly the number of employed in every major occupation save professional and social service."¹⁰¹ Bloomberg cuts through the class barrier between the factory and the office to remind readers that in the face of

13.
¹⁰¹ Ibid.

automation, all workers are expendable. But where Bloomberg was sympathetic to the workers (both white and blue-collared) Louis Ridenour, writing in *Fortune*, put the blame for increased unemployment squarely on the shoulders of the worker when he wrote that “the present activities of some labor organizations seem calculated to encourage this trend [automation of American businesses].” Ridenour chastised labor, charging that, “rising wages put a premium on high productivity per worker, and thus on fewer workers. Any act of capricious irresponsibility or malicious obstructionism on the part of labor unions [...] put[s] a premium on as complete an elimination of the human worker as possible.”¹⁰²

Harold Leavitt and Thomas Whisler, writing in *The Harvard Business Review*, and predicting the conditions of office life in the future in an article titled “Management in the 1980’s” foresaw increasing conflict and strife in the white-collar workplace as a result of automation. They warned that “major resistances should be expected in the process of converting relatively autonomous and unprogrammed middle-management jobs to highly routinized programs,” and predicted rebellion among managers who were “programmed out of their autonomy, perhaps out of their current status within the company, and possibly even out of their jobs.”¹⁰³

The potential for computer labor was unbounded according to the *Reader’s Digest* in its discussion of advances in computer technology: “Computers can be programmed to do almost any mental work a man can spell out,” says Dr. Alan Perlis, one of the mathematician-philosophers who have played key roles in extending the scope of

¹⁰² Louis N. Ridenour, "Mechanical Brains," *Fortune*, May 1949, 114.

¹⁰³ Harold J. Leavitt and Thomas L. Whisler, "Management in the 1980s," *Harvard Business Review* 36, no. 6 (1958): 41-48.

computers. “Each generation of human pupils must be taught afresh, but once you’ve taught any single computer to perform a process, you’ve taught them all, forever.”¹⁰⁴

The Controller magazine was just short of apocalyptic in its predictions concerning the future of work in the age of automation: “human beings are going to be displaced in staggering numbers by electronic equipment. Productivity will soar as white-collar employment and purchasing power drops. [...] The effect of electronic equipment on our economic life is one of the same magnitude as the effect of the H-bomb on our military strategy.”¹⁰⁵

In R. H. MacMillan’s *Automation-- Friend or Foe?*, MacMillan’s overall upbeat assessment of the future of labor and consumption coupled with the advent of automatic factory production and controls is not borne out in the ominous title, or in the illustration that graces the frontispiece of the book. The drawing of a heavily shadowed robot approaching and towering over a lone worker peering warily out of a factory door presents the reader with an assumption about technology in general and automation in particular that coincides with much of what has come before. MacMillan’s text goes on to describe various automatic factory processes and the impact on earlier production methods, but as benign as his text is, the mood is set by the illustration of the robot and his opening question “Are we in danger of being destroyed by our own creations?”¹⁰⁶

Information technology promises to allow fewer people to do more work. The more it can reduce the number of middle managers, the more top managers will be willing to try it. [...] One can imagine major psychological problems arising from the depersonalization of relationships

¹⁰⁴ Robert Strother, "Look What's Happened to the Thinking Machine," *The Reader's Digest*, June 1954, 115-121.

¹⁰⁵ "Electronics in the Office," *The Controller* 1955, 96.

¹⁰⁶ Robert Hugh Macmillan, *Automation, Friend or Foe?* (Cambridge [Eng.]: University Press, 1956), 3.

within management and the greater distance between people at different levels. [...] In particular, we may have to reappraise our traditional notions about the worth of the individual as opposed to the organization, and about the mobility rights of young men on the make. This kind of inquiry may be painfully difficult, but will be increasingly necessary.¹⁰⁷

Donald N. Michael, writing for the New Left think tank, the Center for the Study of Democratic Institutions, saw the unfolding cybernetic revolution or ‘cybernation’ as he termed it, as leading to increased unemployment with the government presented with little choice but to create massive public works projects to pick up the slack in the labor market. “What would be the effects on the attitudes and aspirations of a society, and particularly its leadership, when a significant part of it is overtly supported by governmental public works programs? [...] Whatever else the attitudes might be, they certainly would not be conducive to maintaining the spirit of a capitalistic economy.” Michael’s tract, Cybernation: the Silent Conquest, ends with vague threats of a war destined to “make the world safe for human beings by destroying most of society’s sophisticated technological base.”¹⁰⁸

Michael is echoing the sentiment of F.H. George, writing a few years before. George, leery of technology and technological (if not all) change, cautions that a future of computers and cybernetic principles is a future that “seems to suggest that the freedom of the individual may be in peril, and this at a time when he is at last having the opportunity to be free of so many political and other kinds of oppression. The biggest of all problems may be that of retaining the rights and liberties of the individual human being from

¹⁰⁷ Leavitt and Whisler: 43.

¹⁰⁸ Donald Michael, Cybernation: The Silent Conquest (Santa Barbara: Center for the Study of Democratic Institutions, 1962), 19.

within the structure of a scientifically organized society.”¹⁰⁹

Robert Cubbedge quotes the National Association of Manufacturers less than approvingly when they state, “for the expanding dynamic economy of America, the sky is indeed the limit. Now more than ever we must have confidence in America’s capacity to grow. Guided by electronics, powered by atomic energy, geared to the smooth, effortless workings of automation, the magic carpet of our economy heads for distant and undreamed horizons. Just going along for the ride will be the biggest thrill on earth.”¹¹⁰

Cubbedge relates the “grim realities” of this enthusiasm in the form of statistics, explaining that “Since World War II more than a million farm workers have lost their jobs to automated equipment” along with more than 260,000 coal miners, 540,000 railroad workers, and decreases in the number of automotive workers, bakers and meatpackers. At every instance, production increased with fewer workers and more machines. “It is not without cause,” Cubbedge states, “that in a recent public opinion poll, the American worker declared that what he most fears, ‘next to Russians’, is automation.”¹¹¹

Time magazine, predicting a revolution in office automation relied on experts to offer their opinions on the way machines would impact the workplace. Management and efficiency expert Luther Gulick stated that “machines can now perform most of the routine operations performed by human beings in mass production manufacturing, mass clerical operations, and in the exercise of technical control processes.” Gluck then

¹⁰⁹ F. H. George, *Automation, Cybernetics, and Society* (London: L. Hill, 1959), 212.

¹¹⁰ Robert E. Cubbedge, *Who Needs People* (Washington D.C.: Robert C. Luce, 1963), 8.

¹¹¹ *Ibid.*, 11.

calculated that “these accomplishments of the new machines will allow them to replace 78.4% of the men in factories employing more than 100, and 16.5% of the white-collar help.” Gulick estimated by 1960, “some 7,500,000 workers will be replaced by the intelligent machines.”¹¹² *Time* also interviewed Norbert Wiener, mathematician and author of the 1948 book, *Cybernetics: Or, Control and Communication in the Animal and the Machine*. Wiener coined the term ‘cybernetics’ to describe the process of automatic feedback that allowed for the automatic control of machines. Mechanical feedback devices such as steam engine governors were products of the 19th century, but with advances in mechanization during the first half of the 20th century, the potential for automatically regulated machines had grown exponentially. With the development of the digital computer in the post war period, Wiener saw a new era of computers taking the place of humans as controllers of ever more complex machines. Cybernetics, as Wiener explained it, hinged on control, and the ramifications of control within systems. On the surface, Wiener’s rhetoric pointed to a devaluation of labor that seemed insulting to workers, especially white collar workers who saw their role as managers existing outside the normal flow of material and labor. Wiener’s observation that the control function that human beings brought to a process could (and would) be replicated more efficiently and with fewer errors seemed to point to a world where human labor, both mental and physical, were completely devalued. In fact, Wiener would often equate machine labor with slave labor as a means of representing its cost, and the comparative cost of employing people to do work that machines could do better and cheaper. Wiener’s reduction of the value of labor was, in his reading, a logical evolutionary step for

¹¹² "Come the Revolution," *Time*, November 27 1950, 66.

humanity, with humans destined to take over the role of inventors, researchers and artisans in a world of material plenty guaranteed by cheap mechanical labor. However, the transition to this technological utopia was a rocky one, with Wiener warning of mass unemployment and a temporary turn to socialism to maintain stability.

Wiener was exceedingly lively in his predictions for the future of humanity in the aftermath of what he termed ‘the second industrial revolution’. The *New York Times* reported that “Dr. Wiener declared in an interview that machinery controlled by ‘electronic brains’ could within a decade ‘completely wipe out the (factory) assembly line,’” and that he “foresaw unemployment resulting in a mass exodus to rural life.” Wiener explained the ramifications of this revolution in political terms and declared “We must prepare for this by the intelligent use of welfare until a time of stabilization occurs. We must change our judgment of value from a quantitative to a qualitative one. We can no longer fear the word ‘socialism.’”¹¹³ Though his predictions were hyperbolic, Wiener did understand the impact of ideology on the decisions we make concerning technology. In this he was unusual for his time. He implicitly understood the value of labor in a capital-driven economic system as not intrinsic to human beings but rather tied to process and output. Where other writers presented work as a human activity by definition, Wiener disagreed. He presented the labor equation in stark terms, describing automated machines as “the precise economic equivalent of slave labor. Any labor which competes with slave labor must accept the economic conditions of slave labor.” Wiener predicted that, “this will produce an unemployment situation, in comparison with which the present

¹¹³ "Robots to Run Factories, Empty Cities, Says Expert," *New York Times*, April 25 1950, 7.

recession and even the depression of the thirties will seem a pleasant joke.”¹¹⁴

Time, however, betrayed a lack of patience with Wiener’s rhetoric. After some introductory remarks, *Time* reported that Wiener,

Launched into his standard warning: automatic factories and mechanical ‘brains’ to run them may come into use too quickly and society may not be able to absorb or provide for the human hands and brains that they will replace. This is very likely to happen, said Wiener, if there is a third World War. The armed services will require enormous numbers of men and the U.S. will have to fill their place on the home front with mechanical men who (being cheaper and more efficient) will keep their jobs after the war is over. The ensuing crisis of unemployment, said Wiener, will threaten the stability of society.”¹¹⁵

Time, though somewhat impatient with Wiener, was not above the sensationalizing of computers and unemployment. Some (though not many) were more skeptical. The editors of *Management and Business Automation* wrote:

The ‘electronic brain’ has proven to be a product of 20th century mythology. But, myths die hard. The appalling ignorance of computer functions evidenced by the editors of the daily press, combined with the affinity for science fiction headlines, have been chief factors in keeping a confused image of the electronic computer in the public mind. Constant use of such terms as ‘electronic brain’ and ‘thinking machine’ have only served to promote the computer as a modern ‘Frankenstein’s Monster’ designed to replace man’s mind and his livelihood.¹¹⁶

In the same journal, William Christian expounds on the deleterious effects of this myth on the American psyche: “The ‘electronic brain’ is a myth, not a machine. But the myth, unfortunately, rivals the machine in popularity. The paradox arises from the continuing efforts of journalists, cartoonists, and science fiction writers to give ‘personality’ to the

¹¹⁴ Norbert Wiener, *The Human Use of Human Beings: Cybernetics and Society* (New York: Da Capo, 1954), 162.

¹¹⁵ “Come the Revolution,” 67.

¹¹⁶ “Little Myth Makers,” *Management and Business Automation* 1960, 87.

inanimate digital computer. This constant misrepresentation has confused the public to the point where they now look upon the computer as some kind of electronic monster that will eventually take over, not only their jobs, but their thinking ability as well.”¹¹⁷

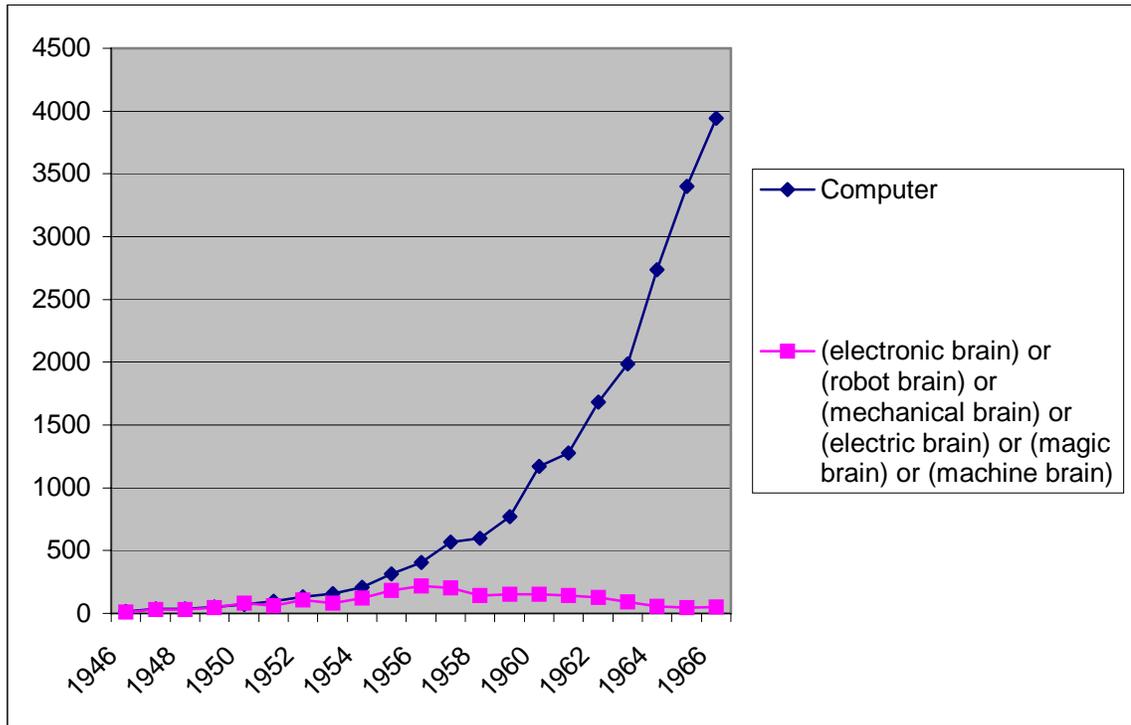


Figure 1: Usage of ‘Computer’ or ‘Electronic Brain’ as descriptor of computers in major U.S. newspapers, 1946-1967 (Source: Proquest Historical Newspaper Database).

As the above chart shows that the use of metaphorical terms like ‘brain’ to describe computers in the 1940’s and 1950’s peaked around 1957, with 180 instances in comparison with the term ‘computer’ with 217. After 1957, the metaphorical terms for computer rapidly declined in comparison with the adoption of the standard term ‘computer’ to describe the technology. The chart shows the rapid standardization of the

¹¹⁷ William Christian, "Myth of the Electronic Brian," Management and Business Automation 1960, 122.

term ‘computer’ after a relatively long period where any number of euphemisms could be used. The falling off of the use of other terms to describe computers coincides with the increase of non-sensational news about computer technology in business. Specifically, the settlement of the U.S. government’s anti-trust suit against IBM, and the formation of larger computer companies marketing directly to business. RCA’s BIZMAC, for example, was advertised as a computer designed primarily for business use, instead of a government built machine with some business functionality on the side. As the news about computers became more business-centered, talk of ‘mechanical brains’, ‘giant brains’, and ‘robot brains’ faded into disuse. This change in terminology coincides with the periodization I discussed previously, and the falling off of associations with specialized scientific intelligence (and its attendant ‘braininess’) and the entry of computers as a more prosaic, consumer object for serious business needs.

Arnold Keller, writing in the same journal a year later wryly commented that the computer industry itself was partially to blame for the way computers were perceived as threats to employment and general well-being:

The reason for such a booming industry being pictured as a ‘job destroyer’ in public minds can be traced right back to the industry’s own doorstep—or at least to its public relation departments. The tendency to label computers as ‘electronic brains’ or ‘magic brains,’ and the coupling of these terms with stories about the clerical replacement possibilities of the machines has created a ‘monster’ image in the public mind, one on which union leaders and other ‘welfare minded’ individuals have been quick to capitalize.¹¹⁸

As mentioned above, it is difficult to point to hard evidence to support a direct

¹¹⁸ Arnold E. Keller, "Automation-- the Job Maker," Management and Business Automation 1961, 34.

relationship between office automation and unemployment. However, certain policies and procedures introduced along with automation projects do suggest that office automation did take a toll, at least locally, on office staffing levels. At least one book published contemporaneously with the move toward office automation from the late 50's to early 60's, Ida Hoos' *Automation in the Office*, speaks to some of the strategies used to mask the overall effect of the introduction of technology in the office. As Hoos reports, the jobs of less skilled clerical functions, largely performed by young women, were targets of reduction primarily through attrition and "cupid and the stork," that is marriage and childrearing would provide a "natural" means of removing young women from the payroll.¹¹⁹ The issue was not so much to fire the women outright, but rather to chose not to replace them when they left for 'family reasons'. This is echoed in David O. Woodbury's, *Let ERMA Do It*. Woodbury relates the story of a firm with 350 workers that hesitates to automate because of the effect that automation would have on 23 women. Working through the personnel records, the company determines that the turnover rate for the jobs these women held was "close to 100 percent." The company figured that the women would leave anyway, thus removing the impediment to automation.¹²⁰ The question then becomes less a matter of how many jobs were lost to automation in terms of direct layoffs or terminations, and more a matter of how many jobs were never created in the first place.

The other issue to consider is that, for all the negative portrayal of machines, why

¹¹⁹ Ida Russakoff Hoos, *Automation in the Office* (Washington D.C.: Public Affairs Press, 1961). Note also that many companies had a 'no marriage' policy in effect for low-level clerical workers. If a woman wished to marry, she was forced to give up her job.

¹²⁰ David Oakes Woodbury, *Let Erma Do It : The Full Story of Automation*, 1st ed. (New York: Harcourt Brace, 1956), 99.

did people accept them as readily as they did? There is no evidence of anyone presenting any challenge to computers' infiltration of the workplace, resistance to automation displacing workers, or protests of technological unemployment.¹²¹ There was no reporting in the mainstream press of any activities or work actions targeting machines of any kind, not just computers. It isn't until the late 1960's that computers became a target of sabotage, and it wasn't workers, but students and activists that were responsible. If the threat of automation was so great, what was stopping American workers from performing acts of sabotage on machinery and computers that threatened their livelihoods?

Though certainly less confrontational than in the great labor battles of the first half of the 20th century, organized labor was still capable of mounting strikes, work actions, and work stoppages throughout the 1950's and 1960's. The fact is that the strikes mounted against industry in the post-war era were primarily over wages, health benefits, and guaranteed yearly wages (this to counter the auto industries' practice of laying off workers every fall while factories were re-tooled for the upcoming model year). In some instances, automation was used as a rationale for increased wages by union officials citing increased productivity and profits due to the introduction of the new machines.¹²² The unions, as well as their rank and file members, seemed to accept automation as something akin to a force of nature rather than as something that could be challenged.

A partial reading for this can be found in the teleological views of technology

¹²¹ With the exception of the American Federation of Musicians actions against the use of recorded music in the 1940's. See Anders S. Lunde, "The American Federation of Musicians and the Recording Ban," The Public Opinion Quarterly 12, no. 1 (1948): 44-45.

¹²² See, for example: Damon Stetsons, "Fixed Annual Pay Stressed as G.M. Opens Union Talk," New York Times, April 8 1955, 1.

espoused by the American pragmatist John Dewey and scholar Louis Mumford (not to mention the Marxist view of technology as central to the proletarian state-- technological determinism being one of the few post-war areas of philosophical agreement between east and west). The mode of historical inquiry into the nature of technology and technological change pointed to a determinism that, like evolution and the advance of civilization, seemed to be a one-way street. Technological advancements were the sign of a healthy and advancing civilization and any changes that were required to integrate technology and society would have to be made on the human side of the equation. This is a part of James Beniger's thesis in his *The Control Revolution*. Beniger contends that, since the industrial era, technological advances create crises of distribution and communication that in turn engender technologies of communication and information that raise our ability to control our technologies. As deterministic as his theory is, Beniger explains how the increase in information and information technologies leads to standardization and automatic processes that served to increase efficiency while at the same time streamlining labor and making craft and skill less meaningful and less desirable to employers.¹²³

Another partial explanation is that technological unemployment due to automation in factories or computers in offices was overstated by sensationalist newspaper and magazine stories. Of course, William Christian and Arnold Keller, writing in the trade journal *Management and Business Automation* could hardly be considered unbiased, nor would their likely audience be skeptical of their claims. The overall

¹²³ See James R. Beniger, *The Control Revolution: Technological and Economic Origins of the Information Society* (Cambridge: Harvard University Press, 1986). 291-343.

employment rates for non-agricultural jobs fluctuate throughout the post-war period, but dips are followed by recoveries that, if automation were responsible for eroding employment in America, would not have occurred.

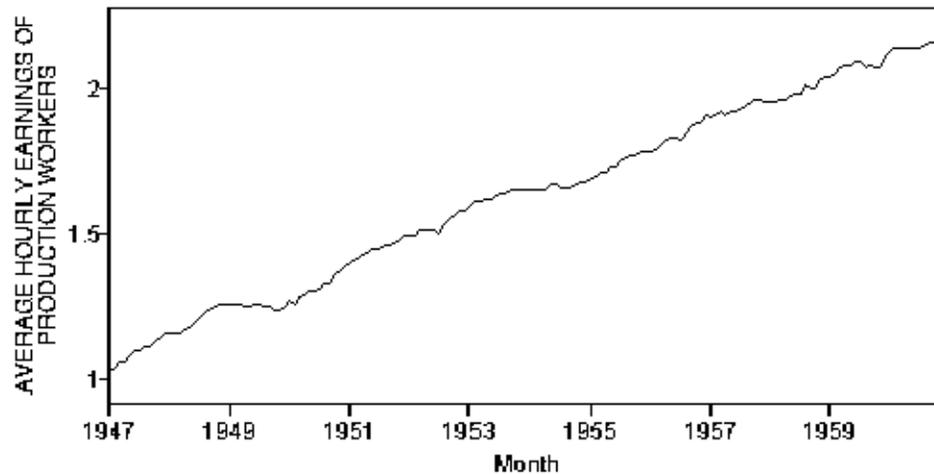


Figure 2: Average Hourly Earnings of Production Workers, 1947-1960 (Source: U.S. Department of Labor: Bureau of Labor Statistics)

However, if the issue of automation both in factory and clerical work was not an issue in terms of employment levels, could wages have been impacted by the influx of technology into the workplace? For the manufacturing sector, real wages more than doubled in between 1947 and 1960, while the consumer price index posted an inflation rate of 30% for the same period. The average manufacturing wage of \$1.03 in 1947 reached \$2.16 by 1960—an increase of approximately 107%. In general terms, wages as well as the purchasing power of workers increased during the time period.

U.S. Unemployment Percentages		
Year	Number (in thousands)	Percent
1947	2,311	3.9
1948	2,276	3.8
1949	3,637	5.9
1950	3,288	5.3
1951	2,055	3.3
1952	1,883	3.0
1953	1,834	2.9
1954	3,532	5.5
1955	2,852	4.4
1956	2,750	4.1
1957	2,859	4.3
1958	4,602	6.8
1959	3,740	5.5
1960	3,852	5.5

Figure 3: Annual U.S. Unemployment Rate, 1947-1960 (Source: U.S. Department of Labor: Bureau of Labor Statistics)

However, a look at the gross unemployment figures for the same period reveals a trend of increased unemployment, with approximately 1.5 million more people out of

work in 1960 than in 1947. How many of these workers were idled because of automation is not recorded, but regardless of the real number of the technologically unemployed, the impression of the American worker was that computer technology, specifically in the form of automation of the office and factory floor, was partially responsible. Further, they perceived that the streamlining and efficiency practices adopted by American industry required computers to make them work.

Metaphors and Frames

In my examination of the way metaphors impact the way computer technology was perceived and represented in the post-war era, I borrow from Paul Edwards' use of Lakoff and Johnson's investigations of metaphor, and the political stakes inherent in seemingly benign metaphorical constructions. Edwards frames his discussion of cold war computing within the constructs of metaphors that extend beyond mere rhetoric. For Edwards,

A metaphor channels thought and creates a coherent scheme of significance not only by making certain features central, but by establishing a set of connections with other metaphors and openings toward further elaboration. This means that metaphor is not merely descriptive, but also prescriptive.¹²⁴

What is at stake in our use of metaphors then is not only how they are used to describe reality, but also, and more importantly, how they set out the contours of what can be described. Edwards continues that metaphor is, then, "far more than a rhetorical

¹²⁴ Edwards, 157.

device. It mediates the relationships among language, thought, and experience. The elaboration of metaphorical schemes is both a central function and a central method of cultural exchange, and it is based on action and experience.”¹²⁵ This is important in that metaphors shape what is possible within a discourse. As Edwards suggests concerning the Turing test, it “uses the computer as metaphor not only to delineate the nature of intelligence abstracted from any embodiment, but also to describe us to ourselves.”¹²⁶

Metaphorical frames are on one level much more basic than either technological frames or media frames and involve the cognitive processes behind learning and communication. For George Lakoff metaphors are the means by which knowledge is constructed and how we, in large part, understand reality. By constantly examining phenomena as like or unlike other phenomena, humans build up metaphorical maps to reality. These maps are essential for communication. As Lakoff and Mark Johnson have discussed, metaphors are constructs that enable us to conceptualize our world as a series of things that are either similar, or dissimilar to things we already know. Furthermore, Lakoff and Johnson argue that all mental concepts are produced by metaphorical associations, and truth is the product of conceptual systems that are, at bottom, metaphoric.¹²⁷ Lakoff goes further to demonstrate how metaphors are built into categories, and these categories (“prototype-based categories”) form the basis of

¹²⁵ Ibid.

¹²⁶ Ibid., 159.

¹²⁷ George Lakoff and Mark Johnson, *Metaphors We Live By* (Chicago: University of Chicago Press, 1980). Lakoff and Johnson argue that, at its most basic, understanding takes place through the combination of metaphors. Lakoff and Johnson continually argue against Objectivist (there is an absolute, knowable truth that can be discovered) and Subjectivist (the truth is contingent and the arbitrary product of social and personal factors) paradigms. Instead, they argue for Imaginative Rationality: a synthesis based on the creative nature of metaphorical construction in the service of rational model building.

cognition.¹²⁸ Prototype-based categories, unlike Kantian or Positivist categories, are not based upon ideal models or sets that remain true under any circumstance. Instead, Lakoff argues that prototype-based categories are categories comprised of metaphorical similarities and equalities that grow and change over time. Lakoff and Johnson, writing out of the field of linguistics, are interested primarily in how semantic utterances and concepts are structured by, and structure, the mind. Their work remains valuable as a set of interventions that highlight the primacy of metaphor in the way we construct our world. Borrowing from their ideas on the centrality of metaphor, we can argue that metaphors are equally central to our cultural understanding and the construction of social categories. The distinction between humans and computers, and the contours that map the evolution of computer systems, act as loci of anxiety that reflect differing responses to the shape of technology and information. Further, metaphors of technological anxiety feed back into the original metaphorical construction of prototype-based categories, shaping our understanding of the object used for comparison. In the case of computer technology and the human mind, the original metaphorical equation computer=logics=thought becomes easily reversed as thought=logics=computer. Just as the computer is conceptualized as an electronic brain, the brain is seen to function like a computer, complete with hardware (the brain) and software (thoughts, concepts).¹²⁹

Whereas technological framing privileged the accuracy of the machine as much as

¹²⁸ George Lakoff, Women, Fire, and Dangerous Things: What Categories Reveal About the Mind (Chicago: University of Chicago Press, 1987), 56.

¹²⁹ This reverse construction finds its apogee in the cognitive field of 'Memetics,' or the study of memes as information patterns that propagate, like viruses, from one brain to another. See, for example Robert (ed.) Auger, Darwinizing Culture (New York: Oxford University Press, 2000), Susan Blackmore, The Meme Machine (New York: Oxford University Press, 2000), Richard Dawkins, The Selfish Gene (New York: Oxford University Press, 1976).

it reflected the conditions of the program, media framing created a concept of the election (through polling and general newsworthiness) that privileged the closeness of the election and the idea of the race as contested and dramatic. The climax of the evening should come later rather than sooner. Cognitive and metaphorical frames served to identify the computer as both like and unlike human beings and created associations that contrasted people and machines in such a way that the primacy of humans could be threatened.

These three modes created a space in which the machine prediction, though correct, was seen as inaccurate based upon the traditional polling methods and the experience and intuition of the pundits. Media commentator Jack Gould saw little to recommend the new technology, stating,

Tuesday night also saw the first use on Election Night of the supposedly super-duper electronic brains, which can think in terms of a couple of quintillion mathematical problems at one time. Both gadgets were more of a nuisance than a help. [...] The C.B.S. pride was called 'UNIVAC' which at the critical moment refused to work with anything like the efficiency of the human being. This mishap caused the C.B.S. stars, Walter Cronkite, Ed Murrow, and Eric Sevareid, to give 'UNIVAC' a rough ride for the rest of the evening in a most amusing sidelight to the C.B.S. coverage. At a late hour, N.B.C. was still taking its electronic brain, 'Mon-Robot,' pretty seriously.¹³⁰

For Gould, the gimmick was just that, and an amusing one as well. But when the UNIVAC's prediction was revealed as accurate, the failure was described in terms of human failure and mechanical superiority:

Well, it now seems that Professor UNIVAC, the celebrated mechanical brain, damn well knew what he was talking about when, in answer to the questions put to him, he asserted early last Tuesday night that General Eisenhower would get the electoral votes of 40 states and Governor Stevenson those of only 8. The trouble was that none of those stupid

¹³⁰ Jack Gould, "Radio and Television," New York Times, November 7 1952, 150.

humans, including his inventors, would believe him, so they started jiggling with his levers or buttons or tubes or whatever they were, and ended by throwing the poor thing out of whack entirely.¹³¹

The Washington Post continued on to attribute not only superior cognitive abilities to the UNIVAC, but sensitivities as well: “Of course, it’s easy enough to say that a machine has no feelings, and therefore we needn’t worry about having damaged the feelings of Professor UNIVAC.” The *Post’s* writers seemed perfectly willing to grant personhood to the machine by accusing those who would deny an internal emotional state of the computer of chauvinism, stating that “we can remember having heard the same thing about certain animals and even about certain races of mankind.” The *Post* concluded that:

It seems to us that if the professor is capable of performing intellectual operations far beyond the cerebral powers of any human being, it is at least possible that he may have an unrecognized emotional organization so complex as to make him sensitive to a degree quite beyond the power of our coarse and callous species even to imagine.¹³²

The Washington Post’s somewhat tongue-in-cheek response to CBS election night coverage prompted this reply from Charles J. Swift, a reader in Washington D.C.:

Your editorial of November 8 on ‘Professor UNIVAC’ unhappily tends to further the mistaken notion that the UNIVAC worked out a system of election predictions. It did not. What it did was process at high speed the election returns according to a scheme worked out by human beings. The time may very well come when an electronic computer may use previous election returns to work out its own predicting system, but that has not happened yet.¹³³

Replies like Mr. Swift’s were surprisingly rare, however.

¹³¹ "Unhappy Univac," *Washington Post*, November 8 1952, 8.

¹³² Ibid.

¹³³ Charles J. Swift, "Letter to the Editor," *Washington Post*, November 14 1952, 26.

Although computer projections are as commonplace as to no longer warrant mentioning, the track record of the UNIVAC in 1952 and 1954 did leave some broadcasters reluctant to continue the experiment. As a sidebar to his coverage of the media leading up to the 1956 elections, Jack Gould mentioned that, "Channel 13 in Newark announced last week that its coverage of election returns Tuesday night would not involve any electronic wizardry. A spokesman for the station said: 'the only machines used on this program will be a news ticker and possibly a slide rule for the late returns.'" ¹³⁴

¹³⁴ Jack Gould, "Tv Crossroads," New York Times, November 4 1956, 153.

Chapter 2: Chess Playing Computers: Games, and Competition as Media Event

Introduction

In brisk and brutal fashion, the I.B.M. computer Deep Blue unseated humanity, at least temporarily, as the finest chess playing entity on the planet yesterday, when Garry Kasparov, the world chess champion, resigned the sixth and final game of the match after just 19 moves, saying, "I lost my fighting spirit."¹³⁵

On May 11, 1997, after playing six games against an IBM computer nicknamed 'Deep Blue', chess grandmaster Gary Kasparov, widely held to be one of the greatest chess players in the history of the game, conceded defeat. After winning the first game of the match, Kasparov lost the second and played to a draw in the next three games. His loss in game six gave Deep Blue a one-point margin of victory. This event marked the first time that a chess grandmaster and champion was defeated by a computer in standard tournament play.¹³⁶ The match was followed closely around the world, with millions of people accessing the running commentary on the games through IBM's website, and media reports and commentary after each game. The pressure on Kasparov was great. The media (as well as IBM¹³⁷) had billed this event as 'Man versus Machine' with

¹³⁵ Bruce Weber, "Swift and Slashing, Computer Topples Kasparov," New York Times, May 12, 1997, A1.

¹³⁶ Kasparov had lost two games to the computer in 1996, but had defeated the machine four games to two over the course of the match.

¹³⁷ IBM staged the event to garner publicity and to help bolster the company's fortunes, which had been declining for a number of years. For IBM, the stunt proved successful. IBM's stock surged 3.6 % the day after the match to a 10 year high of \$171.75. "IBM's Stock Surges by 3.6 Percent," New York Times, May 13 1997, A2.

Kasparov standing in for humanity as the John Henry of the chess world.

After Kasparov's defeat, voices from across the media spectrum weighed in with grim prognoses and rhetorical questions that described the event in somber tones. "Does the defeat of Kasparov by the Deep Blue computer mean that humans are no longer the only possessors of true intelligence?"¹³⁸ asked Michel Lockwood of the *Independent*, while the *Atlanta Journal* wondered, "Are humans now obsolete?"¹³⁹ *Business World* stated flatly, "Indeed, humankind as we know it has just ended,"¹⁴⁰ and the *San Francisco Chronicle* wondered, "Outwitted by Machine: Who's the Master Now?"¹⁴¹ On television, Susan Rook, host of CNN's 'Talk Back Live introduced the topic of her May 12th broadcast with "Are machines getting advanced enough to take over our lives? Where should we draw the line?"¹⁴²

The hyperbole surrounding the event was, on the one hand, typical media sensationalism. The rhetoric used to describe Kasparov's defeat, however, is reminiscent of the terms used in the first newspaper reports concerning computer technology fifty years before. Irrespective of the introduction of personal computers into millions of homes, the routine use of computers in the guise of automatic teller machines, and the explosion of the Internet, computers were still, in 1997, portrayed as threatening to the very fiber of humanity and our definitions of self. While it is true that many news reports did not couch Deep Blue's win as further evidence that we would soon be obsolete as a species, the fact that many did remains striking.

¹³⁸ Michael Lockwood, "Man V Machine," *The Independent*, May 13, 1997, 14.

¹³⁹ "Are Humans Now Obsolete?," *The Atlanta Journal*, May 13 1997, A10.

¹⁴⁰ "Future Tense: The Devil in Deep Blue," *Business World* (1997): 46.

¹⁴¹ "Outwitted by Machine: Who's the Master Now?," *San Francisco Chronicle*, May 13 1997, A20.

¹⁴² "Are Machines Advanced Enough to Take over Our Lives?," in *CNN Talkback Live, May 12* (1997).

Sheryl Hamilton, in her article on the Deep Blue-Kasparov matches, describes computer versus human chess matches as media events that produce ‘spectacular intelligence’.¹⁴³ She considers the chess matches of the 80’s and 90’s as media events designed to promote computer intelligence against the benchmark of human intelligence where the stakes are such that it is possible for a human chess player to lose. The matches were promoted with the purpose of determining who is ‘smarter,’ the human or the machine. Because computer programming had evolved to the point where a human victory was not a foregone conclusion, the events were billed as true matches with real consequences for humanity, the eventual victory of Deep Blue in 1997 produced a flurry of reporting and editorializing predicting the inevitable decline of humans as masters intellect. Hamilton points out that once Deep Blue won, the use of chess as a benchmark for intelligence faded away, we “simply move the goalposts and say it doesn’t matter.”¹⁴⁴ Although I agree that this seems to be the case with the post Deep Blue-Kasparov match, I disagree with Hamilton’s reading of the lack of spectacle surrounding chess playing computers from the 1950’s and 1960’s. Hamilton refers to passing media references to computers and humans playing chess, but theorizes that these garnered little attention because the risks were too high, both to humans if they lost, and to the nascent computer industry if the machines were defeated.

While the references to chess playing computers in the early years of computer technology were relatively few and far between, the significance of chess playing computers was no less relevant to our understanding of human-machine interaction in the

¹⁴³ Sheryl N. Hamilton, "The Last Chess Game: Computers, Media Events, and the Production of Spectacular Intelligence," *Canadian Review of American Studies* 30, no. 3 (2002): 339–60.

¹⁴⁴ Ann Wroe, "Those Deep Blue Questions," *Tablet*, May 1997, 621.

1950's and 1960's. Unlike the later matches, these early matches demonstrated our continued mastery of technology during a period where such mastery, at least in the media of the time, was not guaranteed. That humans could win and win consistently was just as significant as the possibility of our losing 30 years later. In fact, without these early matches, the events creating spectacular intelligence that Hamilton describes would not have taken place. The ongoing defeat of machines by humans in pursuit of an intellectual activity provided a means of reinforcing human mastery over the quickly expanding potential of machinery and automatic processes—even if that defeat occurred at a gaming table.

The nature of competition is significant for our discussion in that it builds upon the concern about computers replacing people as thinking machines as we examined in the previous chapter. Here, the competition is overt and measurable. Defeat at the chess board is a tangible defeat. What makes the Deep Blue-Kasparov match compelling is that the computer and the chess master met in a defined space with agreed-upon conditions for victory.¹⁴⁵ This idea of competition also feeds the concurrent anxiety upon which much of the anxiety expressed toward computers had been displaced—the cold war and the largely virtual conflict between the United States and the Soviet Union. As I will explore below, in the 1950's the computer took on much of the negative associations of Soviet totalitarianism, with the regimented logic of binary systems standing for the lack of originality and imagination perceived as one of the defining characteristics of

¹⁴⁵ Actually, from the second game of the match on, Kasparov complained about the conditions of the match and Deep Blue's technicians altering the program. By the end of the match it was unclear whether the definition of machine had remained stable, as Kasparov claimed that he had not been beaten by Deep Blue, but by an army of programmers.

Soviet life. The ‘thinking machine’ of the early descriptions of computers was replaced by concerns that we were being molded into thinking like machines ourselves.

The fact that the defeat of the machine took place in the context of competition at the gaming table is more significant than, at first glance, it might seem. Computer scientists and engineers, for all of their dismissive talk about not equating machines and minds, continued to present computer technology as competing with human intellect through games. On the one hand, programming a computer to play chess is a theoretical exercise in multi-variable problem solving and a means for testing out theories of raw computational power versus heuristic approaches to learning that had practical applications. However, the use of chess as an idealized form of human cognitive exercise, and using human players as benchmarks, could be seen as engaging in a direct comparison between the capacity of human beings and the power of computers. The question of chess playing computers as reflected through media culture artifacts suggests a preoccupation with ‘who won’ that serves to emphasize the limitations of computers and the continuing advantages of the human mind over its machine counterpart.

Computer chess provides a complex reading of what David Nye, borrowing from Leo Marx, terms ‘technological sublime’ where the awesome, abstract calculating power of computers can be encapsulated by a transcendent human awareness of our ability to comprehend, (in Kantian terms) and thus manage, the abstraction. The result of these ever-increasing calculations leads Stuart Chase, in a *Reader’s Digest* article, to perform some simple, but meaningful calculations of his own, comparing himself with the IBM 701 computer: “The 701, they tell us, can add or subtract 16,000 times a second. On a

typical problem it performs 14,000 mathematical operations a second. These figures mean little to me until I relate them to what I can do myself. [...] Assuming that the machine can multiply numbers like these 2000 times a second, instead of once in 50 seconds, it is clear that the 701 is just 100,000 times a better man than I am!"¹⁴⁶ This is, at first, a strange conclusion to jump to. But the movement from abstract statistics for calculations per second requires a concrete link to human capabilities in order to resonate as numbers with awesome or sublime connotations.

Historically, however, computer chess also represented a general field of competition where the results of the competition were more or less known in advance. This competition was not, therefore, real, but a simulacrum of competition. Like sport standing in for local or nationalistic sensibilities and functioning as a proxy for war, aggression, etc., matches between humans and computers were a proxy of competition between orders of intelligence.¹⁴⁷ As such, it is significant that early chess competitions focused on amateurs and, specifically in the case of initial chess matches, women who were unfamiliar with the game.¹⁴⁸

An arena of more overt human-machine competition was the representation of programs designed to play games—especially chess. These programs, though designed to explore methods for solving analytical problems with many variables,

¹⁴⁶ Stuart Chase, "Machines That Think," *The Reader's Digest*, January 1954. 144.

¹⁴⁷ For a discussion of the significance of sport as a nationalistic exercise, see: Emma Poulton, "Mediated Patriot Games: The Construction and Representation of National Identities in the British Television Production of Euro '96," *International Review For The Sociology Of Sport* 39, no. 4 (2004): 437-455. See also: James. H Frey and D. Stanley Eitzen, "Sport and Society," *Annual Review of Sociology* 17 (1991): 503-521.

¹⁴⁸ This gender dynamic is evident both in the initial "chess computer defeats human player" story of the MANIAC computer in 1957, and the first victory of Alan Turing's Turbochamp algorithm in 1952.

captured the imagination of reporters and journalists and presented them with opportunities for framing the technology more explicitly within the realm of competition and sport. In this chapter, I examine the process of defining computer programs that play games as an extension of a discourse of competition not only between humans and computers, but also between the United States and the Soviet Union, and between differing definitions of intelligence. As the analytical ability of computers increased (along with the public's awareness of them) the identification of analytical ability as that which defines human beings as intrinsically separate and superior to other life forms was threatened as well. The competition between humans and computer chess and checker playing programs became a competition between modes of thought—that which a computer could do and that which it couldn't.

The discourse concerning chess and, to a lesser extent, checker playing programs presented a world where common human intelligence was still valuable in the face of technological encroachment and reveals a considerable level of anxiety concerning the future of humanity so closely wedded to technology. As Paul Boyer points out in *By the Bomb's Early Light*, his media history of the atomic bomb in the immediate post-war era, "America's airwaves, pulpits, and lecture halls were full of such frightening fare in the early post-Hiroshima period, as the nation's atomic fears were manipulated and exacerbated by the media and by political activists." This fear, Boyer suggests, though fanned by outside institutions, "was in no sense a synthetic creation of activists or the media."¹⁴⁹ Boyer's thesis is relevant to our discussion of computer technology during the same era. The media, though, instrumental in perpetuating these anxieties, likely

¹⁴⁹ Boyer, 22.

magnified a sense of uneasiness about the technology more than they manufactured it. They also used computer technology as a way of talking about other issues, such as fear of the Soviets, or of totalitarianism in general. The computer was, for reporters and writers of the post-war period of the 1950's, locked in a zero-sum game with humanity (specifically American humanity). Each advance of computer technology meant an equal loss of human power and individual autonomy—a great game played out on a metaphorical chessboard that, in turn, was a symbol too potent to resist.

Early Game-Playing Machines

'ARE you serious? -- do you really believe that a machine thinks?'

I got no immediate reply; Moxon was apparently intent upon the coals in the grate, touching them deftly here and there with the fire-poker till they signified a sense of his attention by a brighter glow. For several weeks I had been observing in him a growing habit of delay in answering even the most trivial of commonplace questions. His air, however, was that of preoccupation rather than deliberation: one might have said that he had 'something on his mind.'

Presently he said:

'What is a "machine"? The word has been variously defined. Here is one definition from a popular dictionary: "Any instrument or organization by which power is applied and made effective, or a desired effect produced." Well, then, is not a man a machine? And you will admit that he thinks -- or thinks he thinks.'

'If you do not wish to answer my question,' he said, rather testily, 'why not say so? -- all that you say is mere evasion. You know well enough that when I say "machine" I do not mean a man, but something that man has made and controls.'

'When it does not control him,' he said, rising abruptly and looking out of a window, whence nothing was visible in the blackness of a stormy night.¹⁵⁰

¹⁵⁰ Ambrose Bierce, "Moxon's Master," in Can Such Things Be? (New York: A. & C. Boni, 1909 (1926)), 74.

Machines that play games were not new to the post-war world. Mechanical engineers had been creating machines that could functionally play simple games since early in the 20th century. Prior to that, the most famous game playing machine, Baron Von Kemplen's 'Turk' graced the courts of Europe through the late eighteenth century and found its way around America during the first half of the nineteenth. Designed as a parlor trick and as a masterful illusion, the Turk was constructed in 1769 by Baron Wolfgang von Kemplen as a piece of engineering virtuosity. The somewhat larger than life automaton was seated behind a cabinet filled with gears, pulleys, and leavers that were exposed to spectators as part of the exhibition, prior to a match between the Turk and a human volunteer. Von Kemplen, as part of his routine, would open the various doors of the cabinet and show those assembled the inner workings of the machine, even holding a lantern behind the cabinet to demonstrate that light could pass through and therefore the illusion was not accomplished with mirrors.

The ingenuity of the machine was not, ultimately, in its ability to play chess, but rather in the presentation of illusion and the concealment of the human chess master concealed within. The Turk had an illustrious career in the courts of Europe—reputedly defeating Benjamin Franklin in Paris in the 1780's and, some time later, Napoleon—before being dismantled and later sold after von Kemplen's death in 1805. Through the first half of the 19th century, the Turk toured the U.S. with a variety of owners and chess masters before being destroyed in a fire in Philadelphia in 1840.

The Turk and its inner workings was the subject of several articles by contemporary authors trying to demonstrate how the illusion was managed. Most

famously, Edgar Allen Poe took up the subject of Maelzel's Chess-Player (Maelzel was the impresario who toured the U.S. with the Turk at the time Poe composed his essay) in 1836. Poe demonstrates how the order in which the inner workings of the Turk are revealed would allow for a man to move unseen from one half of the cabinet to the other while maintaining the illusion that the cabinet was filled only with machinery. Poe was, it turns out, almost entirely correct in his discerning of the process by which the interior was displayed. More interesting than Poe's power of observation to determine how the illusion of the Turk was accomplished are his insights into why the idea of a chess playing machine was impossible.

Poe contrasts the Turk as a marvel of engineering with another machine—Babbage's difference engine—to explain what is possible through calculation and deductive reasoning and lays out the process of deductive logic and calculation as a closed process of narrowing results from a static set of data. This is the type of work that Babbage's machine was capable of as a set of closely matched gears and levers that were, by no account, influenced by a hidden mathematician. Poe contrasts this type of mechanized work with the work required in making decisions about the position of pieces on a chessboard.

But the case is widely different with the Chess-Player. With him there is no determinate progression. No one move in chess necessarily follows upon any one other. From no particular disposition of the men at one period of a game can we predicate their disposition at a different period. Let us place the *first move* in a game of chess, in juxtaposition with the *data* of an algebraical question, and their great difference will be immediately perceived. From the latter--from the *data*--the second step of the question, dependent thereupon, inevitably follows. It is modeled by the *data*. It must be *thus* and not otherwise. But from the first move in the game of chess no especial second move follows of necessity. In the algebraical question, as it proceeds towards solution, the *certainty* of its

operations remains altogether unimpaired. The second step having been a consequence of the *data*, the third step is equally a consequence of the second, the fourth of the third, the fifth of the fourth, and so on, *and not possibly otherwise*, to the end. But in proportion to the progress made in a game of chess, is the *uncertainty* of each ensuing move.¹⁵¹

Poe presents a logical rationalization for his contention that the sort of open-ended reasoning necessary for chess play precludes the design of a machine capable of ever playing the game. From this pre-condition, Poe determines that it is impossible that the Turk is a *pure machine* and uses this insight as the starting point for his deductive reasoning into the concealment of a human within the machine. Poe's rationality is in the service of a Romantic position that posits an ineffable quality to the human mind that cannot be duplicated or codified. Poe was, of course, correct in that the Turk was not a machine capable of playing chess at all, but rather a machine designed to produce the illusion of a robotic chess player. The explanation that the machine was simply an illusion and not an actual chess-playing automaton spares Poe and his contemporaries from having to consider the machine as actually capable of playing the game, and Poe's insistence that the machine was not the chess player suggests that some anxiety was present. However, by 1920, Spanish engineer Leonardo Torres Quevedo, was able to create a mechanical device capable of solving end-game problems involving three pieces against an opponents king. The machine reportedly would flash a warning light at an opponent that attempted to cheat and would proclaim "checkmate" when it had outflanked its human player.¹⁵² The machine was limited to this single end-game

¹⁵¹ Edgar Allen Poe, "Maelzel's Chess Player," in The Complete Tales and Poems of Edgar Allen Poe (New York: Modern Library, 1938 (1836)), 421-39.

¹⁵² "50-Year Old Chess-Playing Computer," Washington Post, Nov 17 1970, B8.

scenario and could not play a whole game, or account for more than one piece (and a king at that) as an opponent. Quevedo's machine was, like the Turk, seen as a novelty and not as a fundamental challenge to early twentieth century concepts of human self.

Other games were mechanized prior to the age of the digital computer as well, such as Nim, a purportedly ancient game involving sticks placed in several rows. The object of the game is to take the last stick. Engineers at Westinghouse developed nim for machine play in 1940. The 'Nimatron' was one of the hits of the 1940 New York World's Fair. Programmed to lose on occasion, the Nimatron would then present its opponent with a token coin stamped with the words "Nim Champ." An article in the *Christian Science Monitor* compares the binary language used to compute the machine's strategy with the method of counting "used even today by some of the oldest tribes of Australia, the Torres Straights, and New Guinea."¹⁵³ In their story on the fair's attractions, the *New York Times* lumps the Nimatron in with other novelties such as "Elsie" the cow, a feature of "Borden's Dairy World of Tomorrow," who was set to appear in a "special glass boudoir."¹⁵⁴ In 1953, B.V. Bowden discusses the British mechanical Nim player: "Nimrod" as a featured attraction at the Festival of Britain (no date given). Rather than represent the machine as iconic of any sort of intelligence, he is content to observe that, during its subsequent appearance at a trade fair in Berlin, the Germans in attendance were so taken with the machine that they neglected the bar at the other end of the room.¹⁵⁵ As with Quevedo's machine, and with various automated tic-

¹⁵³ "Robot Made for Fair Tests Visitor in Aboriginal Style of Figuring," *Christian Science Monitor*, May 15 1940, 8.

¹⁵⁴ "Fair's Ticket Sale Is 'Huge Success,' with Late Rush On," *New York Times*, May 6 1940, 1.

¹⁵⁵ Bertram Vivian Bowden, *Faster Than Thought: a Symposium on Digital Computing* (London,: Pitman,

tac-toe machines, the ingenuity involved in the production of these machines was considerable, but not enough to outweigh their usefulness as carnival-style attractions. No one, it seems, would mistake what these machines could do for intelligent behavior, but as computer engineers attempted to build a machine to play chess, the novelty of the technology was often tempered with a thinly veiled anxiety concerning the implications of a machine that could think.

Theoretical Chess Playing Computer Programs

Curiously, even though the first working chess program was still several years away, the media latched onto the idea of computers that could play chess and their potential impact. In 1949 during a talk at the National Institute for Radio Engineers Convention in New York, Bell Laboratories engineer and pioneer in the field of information theory Claude Shannon discussed the theoretical steps required to produce the type of machine logic capable of calculating chess positions. Shannon emphasized that the problem of creating a program that could play chess was, “Although perhaps of no practical importance, the question is of theoretical interest, and it is hoped that a satisfactory solution of this problem will act as a wedge in attacking other problems of a similar nature and of greater significance.”¹⁵⁶ Shannon explains the suitability of a attempting to represent programmatically the human decision making process through examining the activity of chess playing by breaking down the goals of his investigation as an investigation of the definition of thought. Shannon writes that

1953), 66.

¹⁵⁶ Claude E. Shannon, "Programming a Computer for Playing Chess," Philosophical Magazine Ser. 7, Vol. 41, no. 314 (1950): 265.

The chess machine is an ideal one to start with, since: 1) the problem is sharply defined both in allowable operations (the moves) and in the ultimate goal (checkmate); 2) it is neither so simple as to be trivial nor too difficult for satisfactory solution; 3) chess is generally considered to require 'thinking' for skillful play; a solution of this problem will force us either to admit the possibility of a mechanized thinking or to further restrict our concept of 'thinking'; 4) the discrete structure of chess fits well into the digital nature of modern computers.¹⁵⁷

Shannon makes explicit what becomes an implicit idea in the mass media discourse on computer technology—that a broad definition of what constitutes thinking either has to include computer processes and mathematical computational ability, or the essence of thought needs to be re-defined to make the definition more selective in order to exclude machines. Chess represents a practical point of engagement with this definition, for the game was a routinely cited icon of intelligence. Chess was considered the touchstone of human intellect according to Goethe, and the mind's gymnasium for Lenin, and for writers on the topic of machine intelligence:

Chess is the intellectual game *par excellence*. Without a chance device to obscure the contest, it pits two intellectuals against each other in a situation so complex that neither can hope to understand it completely, but sufficiently amenable to analysis that each can hope to outthink his opponent. The game is sufficiently deep and subtle in its implications to have supported the rise of professional players, and to have allowed a deepening analysis through 200 years of intensive study and play without becoming exhausted or barren. Such characteristics mark chess as a natural arena for attempts at mechanization. If one could devise a successful chess machine, one would have penetrated to the core of human intellectual endeavor.¹⁵⁸

But why invest the time, money and effort into creating a program capable of playing a

¹⁵⁷ Ibid.: 267.

¹⁵⁸ A. Newell, J. C. Shaw, and H. Simon, "Chess Playing Programs and the Problem of Complexity," IBM Journal of Research and Development 2 (1958): 330.

game? G.H. Hardy in his discussion of chess problems states that, “Chess Problems are the hymn tunes of mathematics.”¹⁵⁹ Bowden insists that the chief purpose of developing programs to play games is simply because it is fun to do so, but if necessary, the argument that game playing algorithms are valuable tools for the analysis of programming techniques and methods can be supported as a ‘pretense’.¹⁶⁰ Shannon suggests that the line of inquiry is not to create a chess-playing machine simply for the sake of novelty (as in the case of Von Kemplen’s ‘Turk’) but rather for research into the decision making process itself, and how complex, multi-variant tasks could be routinized and codified. Shannon posited possible advances to be gained in areas such as: machines for designing filters, relay and switching circuits; machines to handle routing of telephone calls based on individual circumstances rather than by fixed patterns; machines for performing symbolic (non-numerical) mathematical operations; machines capable of translating from one language to another; simplifying strategic decisions; or even composing or orchestrating music.¹⁶¹ The idea of computerizing chess was not Shannon’s alone; Alan Turing had considered the idea as early as 1938 and had created his own paper program for playing chess by 1950. Norbert Wiener had proposed the utility of a chess-playing machine in his 1948 book *Cybernetics*. In it, Wiener explains how one could theoretically create a machine program to play a passable game of chess. For Wiener, the challenge wasn’t to construct a program making the rules of play

¹⁵⁹ Quoted in Bowden’s *Faster Than Thought*, 286.

¹⁶⁰ Bowden’s text is, however, a bit tongue-in-cheek at times. For example, his glossary entry for *cybernetics* reads: “None of the authors quite understands what the word means, so it has not been used in this book,” and his description of the theoretical Turing Machine includes: “The umlaut is an unearned and undesirable addition, due, presumably, to an impression that anything so incomprehensible must be Teutonic.”

¹⁶¹ Shannon: 266.

intelligible to a machine, that was easily enough done, but to make a program that was capable of playing a game of chess that wasn't terrible—a perfect game being out of the question. Wiener, in his updated 1961 edition of *Cybernetics* explains the rationale behind creating game playing machines. Wiener talks about machine/human gaming as like the dance of the mongoose and the cobra, the roadrunner and the rattlesnake, and the matador and the bull. In each case, the creature that utilizes an understanding of feedback oscillations (presumably instinctual in the case of the mongoose and the roadrunner) win out over the animal who repeats the same behaviors or the same patterns of behavior. Humans have the upper hand over bulls in the bull-fighting arena and computers playing games because (as yet) the machine cannot learn from experience—they play every game to win against a theoretically perfect opponent and cannot adjust their strategy to take into account individual idiosyncrasies of play.¹⁶² Though idea of a chess-playing computer occupied the thoughts of the leading mathematicians and engineers of the time, Wiener never considered actually designing one, Turing's program (Turbochamp, written with his associate David Champernowne) was never implemented other than as a paper model (where it performed rather poorly¹⁶³) and Shannon never wrote a chess program that ran on a machine, but rather expounded on the theories behind creating one. The theoretical work of a chess-playing model was more significant than the actual practice of constructing a machine. As Shannon reminded journalists intrigued by his idea for a chess-playing computer: “We are not designing chess equipment at Bell

¹⁶² See: Norbert Wiener, *Cybernetics: Or, Control and Communication in the Animal and the Machine* (Cambridge: MIT Press, 1961), 171-173.

¹⁶³ Turing wagered at 13 to 10 odds that the program could beat Champernowne. It didn't, but it did beat Champernowne's wife “a beginner at chess.” See Hodges, 388.

Laboratories.”¹⁶⁴

Shannon’s reticence concerning chess-playing computers did not detract from journalists’ claims concerning the ability of a machine that did not yet exist. Reporting on his remarks, and in subsequent stories that followed the publication of his paper in *Philosophical Magazine* in the spring of 1950, the stories tend to understate the theoretical nature of Shannon’s work, and move straight to its portentousness. *Newsweek* reported that, “By assigning numerical values to the king, queen, rooks, bishops, knights, and pawns, and to their possible positions on the board, Shannon showed how a computer could explore the situation two or three moves ahead. The result would not be brilliant chess of master caliber but a game skillful enough to interest the average amateur.”¹⁶⁵

John Pfeiffer, writing for the *New York Times* explained to readers how

These machines are not science-fiction dreams; they, or their components, already exist. In a special appendix, Dr. Wiener discusses the more speculative possibility of building an electronic chess player (one young scientist is actually planning to do this).

Whether a chess automation is ever built, the future is going to see the development of electronic brains [...] that may replace many persons trained to answer questions involving only the routines of detailed repetitive thinking.¹⁶⁶

Unlike *Newsweek*’s story that reflected a slightly more realistic prediction of the chess-playing computer, *Time* claims that, “Dr. Claude E. Shannon of Bell Laboratories is figuring out how to make a calculator that can play chess. He thinks that one could play

¹⁶⁴ Herbert B. Nichols, "Oystermen to 'Vacuum' Ocean-- Wonders of Research," *Christian Science Monitor*, Mar 8 1949, 3.

¹⁶⁵ "Computer Confusion," *Newsweek*, March 21 1949, 55.

¹⁶⁶ John E. Pfeiffer, "The Stuff That Dreams Are Made On," *New York Times*, Jan 23 1949, BR27.

well enough to beat all except the greatest chess masters.”¹⁶⁷

The issue of whether a computer utilizing Shannon’s paper as a basis for a chess program could actually beat a human player remained a subject of discussion long after Shannon had moved on to other theoretical problems in information theory. The idea of a chess-playing computer remained a “Shannon Machine” for some writers who remained convinced of the need to distance human ability from the potential prowess of the computer:

The Shannon machine, on the other hand, could not beat a master. Chess masters make few careless mistakes; when appropriate, they figure half a dozen or even fifteen to twenty moves ahead; they have an enormous knowledge of stock situations and maneuvers. The robot, to be sure, might be designed to calculate farther ahead and might be equipped with a dictionary of situation and maneuver combinations; other refinements could be provided as well. But even if we were to do the impossible and build these properties into a machine with as many computing and memory elements as there are neurons in the human brain (about ten billion), the robot would still fall short of the human chess master in performance.

He [the human chess master] is endowed with a power beyond the machine, called recognition. He sees at a glance that the position on the board before him is somewhat like the situation he encountered – and dealt with thus—some time before; machines can detect such similarities only if all possible variations are spelled out in advance.¹⁶⁸

That actual chess playing programs didn’t exist didn’t seem to affect the reporting on machines as though they were real. Writing about “Shannon’s Machine” in 1954, *Reader’s Digest* reported “to watch it print: ‘EXPECT TO WIN IN FIVE MOVES’ gives

¹⁶⁷ "The Thinking Machine," 66.

¹⁶⁸ Leonard Engel, "Electronic Calculators: Brainless but Bright," *Harper's Magazine*, April 1953, 87.

some observers an uneasy feeling.”¹⁶⁹ In the fall of 1951, in another account of hyperbole, business competition, and quick thinking, the company’s vice-president of marketing touted the Computer Research Corporation’s CADAC (Cambridge Air Force Digital Automatic Computer) portable computer’s chess-playing prowess. The vice-president, stated that a machine like the CADAC was powerful enough to play chess and win against a human opponent.¹⁷⁰ This boast was picked up by the wire services and reported as fact and a rival computer manufacturer, Donald Jacobs of the Jacobs Instrument Company seized upon the opportunity to publicly challenge the computer to a ‘man-versus-machine’ match for a one thousand dollar prize. The news reports of a “Mere Man Defies A Robot At Chess,” “Determined to defend man’s honor and his ability to think better than a mere machine is Donald H. Jacobs, president of Jacobs Instrument Company of Bethesda, MD. Mr. Jacobs, who admits he plays chess ‘quite badly’ offered to bet \$1000 he could beat an ‘electronic brain’ that is supposed to be, among other things, an unbeatable chess player.”¹⁷¹ Jacobs admitted, *The Washington Post* reported, “Although I am a poor chess player, pure egotism makes me unwilling to concede that a computing machine can play better than I can.”¹⁷² With the stipulation that Claude Shannon of the Bell Laboratories would referee the match, CRC’s Richard Sprague accepted Jacobs’ challenge and an attempt was made to have the match hosted by Edward R. Morrow on his *See it Now* program on CBS.¹⁷³ By the next day, the wire

¹⁶⁹ Strother, 182.

¹⁷⁰ D.E. Eckdahl, I.S. Reed, and H.H. Sarkissian, "West Coast Contributions to the Development of the General-Purpose Computer: Building Maddida and the Founding of Computer Research Corporation," *Annals of the History of Computing, IEEE* 25, no. 1 (2003): 26.

¹⁷¹ "Mere Man Defies a Robot at Chess," *New York Times*, November 12 1951, 26.

¹⁷² "'Brain' Maker Bets He'll Beat Robot at Chess," *The Washington Post*, November 12 1951, B11.

¹⁷³ "The "Brain" Is Willing," *New York Times*, November 12 1951, 26.

services reported that the CRC-102 (CADAC) computer would be unavailable to take up the challenge because it would be too busy with national defense tasks: “The urgency for this machine in the defense effort makes such a tournament untimely’. The statement was made by Richard Dabney, president of Computer Research Corporation. The statement canceled acceptance by Richard E. Sprague, a director of the computer company.”¹⁷⁴ The CADAC computer could not, needless to say, play chess at all. Rather, whether it could or not was never determined because there were no operational chess programs available to test the claim of its marketers. The earliest operational program for playing chess was not developed until 1957, when Alex Bernstein and his team at IBM programmed an IBM 704 to successfully play the game.

Computers as Competitors

Mechanical brains check income taxes, forecast the weather, and run assembly lines. But, every once in a while, the machine looks gratifyingly stupid.

Though Maurice Dagbert, 44, never got past junior high school in his native Calais, France, he beats the thinking machine not occasionally, but every time.

Two years ago, Dagbert battled a Swedish electronic computer on television, beat it by eight seconds in figuring out the cube root—and the machine got it wrong.

Dagbert is eager to take on any American computer—

‘Only in America do they like geniuses and freaks. They have enough money to pay for their talent.’¹⁷⁵

The episode of the CADAC computer makes explicit a subtext in reportage on

¹⁷⁴ "Machine Spurns Chess: Electronic 'Brain' to Be Too Busy at Defense Tasks," New York Times, November 13 1951, 31.

¹⁷⁵ "People: Mind over Machine," Newsweek, September 9 1957, 52.

computer systems in the late 1940's and 1950's—the implicit assumption that computers and humans were competing on both an existential and practical level for dominance in the field of intellect and cognitive ability. For the first framers of computer discourse, the celebratory aspects of the new technology were often tempered by wariness in the face of a new order of being whose intentions were unclear or suspicious. It is this uncertainty about the motivations of the early computers that present us with the depth of concern regarding their status, not only as machines, but also as machines that *think*. Computers were machines—complex machines no doubt, but the ease with which writers, illustrators and journalists were able to assign intentionality to computer systems is an indication of just how unusual these machines were, and how normal terms of classification failed to ameliorate the anxiety of a perceived threat. Early popular writers and journalists deployed an array of metaphors and comparisons that conjured images of computer technology that were both terrifying and banal—often in the same article, in an attempt to describe these machines and place them within a context of similar objects and subject positions.

The problem for writers seeking to describe computers is that there were few readily available constructs to use in explaining the technology to lay audiences. The new machines weren't mechanical, but electronic, and they were capable of calculating at speeds exponentially faster than most people could imagine. Because they were so fast, they were capable of producing solutions to very complex mathematical problems. They seemed to be more like brains than anything else, and the metaphorical connection between computers and brains was expanded to include consciousness, intention, will, and desire, no matter what the engineers said to the contrary.

In January 1950, *Time* magazine dedicated its cover to the Mark III computer. The illustration showed an anthropomorphized machine assiduously studying the data it was itself producing, and computing the results. The caption of the picture “Mark III: Can man build a superman?”¹⁷⁶ suggested the ways in which computers were enframed as artifacts that have moved beyond human beings in both power and consciousness. The accompanying article provided a list of computer achievements and grim predictions of the computerized world of the future. “Some scientists think that Bessie’s [the article’s nickname for the old Mark I computer in Harvard’s computer lab] descendants will have more effect on mankind than atomic energy. Modern man has become accustomed to machines with superhuman muscles, but machines with superhuman brains are still a little frightening. The men who design them try to deny that they are creating their own intellectual competitors.”¹⁷⁷

For the authors of *Time*’s articles, the engineers were deceiving themselves, mistaking their tenuous hold on the new technology for permanent control. The authors spoke to Claude Shannon, stating he was “figuring out how to make a calculator that can play chess. He thinks that one could play well enough to beat all except the greatest chess masters. Machines are also capable, he thinks, of orchestrating a melody and of making simple logical deductions.”¹⁷⁸ For *Time*, and by extension *Time*’s readers, computers were on the verge of performing even the most abstract human pursuits. The seeming endless capacity of computers to fill the intellectual needs of humanity would lead, *Time* speculated, to a world where “Men may come to specialize on the simple,

¹⁷⁶ Cover Illustration Caption, *Time*, January 23, 1950.

¹⁷⁷ “The Thinking Machine,” 54.

¹⁷⁸ *Ibid.*, 58.

narrow task of serving the machines. Men's brains may grow smaller and smaller as the machines' brains grow larger. Will the time come at last when the machines rule—perhaps without seeming to rule—as the mysterious 'spirit of the colony' rules individual ants?"¹⁷⁹ The development of computer technology posed a distinct threat to human agency by virtue of its speed and power. This threat is given voice in the *Washington Post's* Hal Boyle editorial/story 'Human Slave Praised by Future Robot,' where the mechanical brains of the future pay a complement to a human servant by noting that "I have the eerie feeling you're almost mechanical."¹⁸⁰ The message that we are being overrun and replaced by a higher order of intelligence and our future is one of slavery is quite explicit. As the significance of the technological breakthroughs that produced the first computers began to filter through the post-war culture of the United States, they were accompanied by a distinct uncertainty, reflected in newspapers, magazines, television, and films, concerning the status of human consciousness in the face of a new 'other' that would usurp human primacy on the planet. Or, as one reporter described it: "It is now within logic that earth's final rulers will be a race of lifeless, emotionless machines with superhuman brains."¹⁸¹

John Kobler, writing in the *Saturday Evening Post*, presents the threat of computers as a creeping menace: "out of scientific laboratories from New York to Moscow there is emerging in ever-increasing numbers a series of wonder-working robots whose power for good or evil, for creativeness in peace or destruction in war, exceeds that of supersonic flight and nuclear fission." He identifies this threat as the nascent

¹⁷⁹ Ibid., 60.

¹⁸⁰ Hal Boyle, "Human Slave Praised by Future Robot," *Washington Post*, April 3 1954, 7.

¹⁸¹ "World of Robots Seen by Scientist," *New York Times*, October 19 1958, 124.

computer industry and “the gigantic computing machines with the bizarre names—SSEC, ENIAC, Edvac, Binac, Mark I, II, and III, Rudy the Rooter, to list a few—and they can solve in infinitely less time than it would take Albert Einstein merely to state them almost any practical mathematical problem and many problems in pure mathematics.”¹⁸²

“Development of a mechanical mathematical wizard with an electronic ‘brain’ that calculates 12,000 times faster than the human mind was announced tonight by the Eckert-Mauchly Computer Corporation of this city,”¹⁸³ trumpeted an article in the *New York Times* titled “‘Brain’ Outstrips Man’s.” Waldemar Kaempffert, the long-time science editor for the *New York Times* reported, “At any rate, some airplane designers, are beginning to regard man as a specialized robot—and not a particularly satisfactory one for their purposes.”¹⁸⁴ The difference between computers and humans seemed to have been decided in favor of machines. Even a discussion of college football that speculated on the role of computers in Princeton’s success on the playing field described the situation:

Behind a wall of secrecy as imposing as those guarding Princeton’s atomic research projects, the Princeton University athletic department has set an ‘electronic’ brain to work on football. [...] It is reputedly immune to weariness, distractions, day dreaming and the occasional mental lapses that afflict even the best human thinkers.¹⁸⁵

Warner Bloomberg echoed the sentiment of *Time’s* authors by titling his article in the

¹⁸² Kobler, 25. Although SSEC, ENIAC, Edvac, Binac, Mark I, II, and III, were actual machines developed between 1944 (ENIAC, SSEC) and 1952 (Edvac, Mark III). I have found no reference to a machine called ‘Rudy the Rooter’. Kobler, writing in 1950 discussed machines that were, in some cases, still in development or planning. ‘Rudy the Rooter’, whatever its characteristics, apparently never made it from the drawing board to an actual machine, at least not by that name.

¹⁸³ “‘Brain’ Outstrips Man’s,” *New York Times*, August 22 1949, 8.

¹⁸⁴ Waldemar Kaempffert, “Science in Review: ‘Electrobot,’ Man’s Electronic Counterpart, Is Envisioned as a Flawless Specialist,” *New York Times*, October 31 1954, E9.

¹⁸⁵ “Aha! Princeton, Undefeated in Two Years, Admits Use of Electronic Brain on Gridiron,” *New York Times*, May 27 1952, 36.

New Republic, “Man’s New Role as Caretaker of the Machines,” and stated matter-of-factly that “quite obviously, any machine that can do 2,000 multiplications and divisions or 16,000 additions or subtractions in a second has no parallel in the world of mere mortals.”¹⁸⁶

In the reporting on computers in the 1950’s, humans were increasingly represented as drags on the capabilities of computers: “Humans are too slow in their reactions to control the industrial mechanisms now coming off their drawing boards.” Reporters cited experts and engineers who claimed “the speeds, temperatures, radiation, complexities are too much for the human nervous system to handle, and men, the engineers say, are becoming bottlenecks in production.”¹⁸⁷ A revolution in the way humans positioned themselves as intellectual beings created a world in which old definitions and assumptions concerning human primacy were failing to hold. Louis Ridenour, commenting in *Fortune*, succinctly stated the premise that,

in the forgoing, much has been made of the tremendous advantage the human brain enjoys over the much simpler electronic computing machines we now build. It must not be inferred that the advantage is all on the side of the brain. Computing machines, even those of the present day, are incomparably superior to the brain in speed of operation. [...] It is so fast that it cannot stop and wait for pitifully slow human reflexes to instruct it on each individual operation: hence it must have a control organ whose speed matches that of its computations.¹⁸⁸

It is unclear how readers were supposed to react to this drumbeat of anxiety producing and anxiety assuaging stories prevalent in the 1950’s description of computer technology. It is clear that some measure of emotional response was intended, and the

¹⁸⁶ Bloomberg, 13.

¹⁸⁷ Chase, 146.

¹⁸⁸ Ridenour, 114.

focus on descriptions of the machines as a new order of dominant species was almost always tempered with a way out of a predetermined future. These narratives speak not only to a prophesy of human decline and inevitable replacement, but more importantly the stories provided a way of reemphasizing traditional American virtues of individuality, creativity, and the ability to improvise and bend the rules. Computers, it was emphasized, were incapable of any of these things and were limited, like the subjects of totalitarian regimes, to a more stunted existence. The representation of computers as competitors was a manufactured fear, propagated by the writers and editors of newspapers and magazines to create a sense of drama—a tension that needed resolution. The resolution, as a return to normalcy, was provided by the experts and engineers that populated accounts of a bleak and soulless future. The competition for intellectual supremacy might be fought over the chessboard, but the more prosaic game of checkers presented a clearer contrast between the human as individual and the machine as an interloper, an outsider unable to assimilate into the mainstream.

Computerized Checkers and the Limits of the Game

Paul settled into his chair again. Dispiritedly, he pushed a checkerpiece forward. One of the youngsters closed a switch, and a light blinked on, indicating Paul's move on Checker Charley's bosom, and another light went on, indicating the perfect countermove for Berringer.

Paul moved again. A switch was closed, and the lights twinkled appropriately. And so it went for several moves.

The machine apparently took a long-range view of the game, with a grand strategy not yet evident. Checker Charley, as though confirming his thoughts, made an ominous hissing noise, which grew in volume as the game progressed.

Paul exchanged one man for three.

"Say—now wait a minute," said Berringer.

"Wait for what?" said Finnerty.

“Something’s wrong.”

“You and Checker Charlie are being beaten is all. Somebody always wins, and somebody always loses,” Said Finnerty. “That’s the way it goes.”

“Sure, but if Checker Charlie was working right he couldn’t lose.”

Berringer arose unsteadily. “Listen, we’d better call this whole thing off while we find out what’s wrong.” He tapped the front panel experimentally. “Jesus Christ, he’s hot as a frying pan!”

“Finish the game, Junior.”¹⁸⁹

In Kurt Vonnegut’s 1952 novel *Player Piano*, the checker-playing computer is placed at the center of a battle of wits between the novel’s protagonist, Paul Proteus, and Berringer, a brash upstart out to make a name for himself in the company that employs them both (a company that is the only source of employment for the entire community, the rest of the unemployed workers subsisting on public works-type jobs).¹⁹⁰ The chess playing computer, Checker Charlie, is wheeled out to demonstrate both Berringer’s ingenuity, and his position as an engineer/manager of the future out to embarrass the old-guard personified by Proteus. Proteus’ victory over the machine is read as a victory over both the somewhat obnoxious Berringer and over the closed system that the machine represents. As Berringer observes, and Proteus understands, the machine, if functioning correctly cannot lose, but the loose wire that Finnerty (Paul’s companion and a dissolute former engineer) observes and fails to point out, causes the machine to malfunction. Although on a level playing field, the machine would inevitably out play Proteus as a human opponent, the real world, Vonnegut reminds us, is not the same as the game world

¹⁸⁹ Kurt Vonnegut, *Player Piano* (New York: Dell Publishing, 1952 (1980)), 57-58.

¹⁹⁰ The theme of technology as adversary is common to Vonnegut’s novels, see: Thomas L. Wymer, “Machines and the Meaning of Human in the Novels of Kurt Vonnegut, Jr.,” in *The Mechanical God: Machines in Science Fiction*, ed. Thomas P. Dunn and Richard D. Erlich (Westport: Greenwood Press, 1982).

and conditions outside the rules of the game can sometimes intrude.

Vonnegut, writing in 1952, was prescient in his casting of a computerized checker-playing machine. But the unavailability of a reliable chess-playing computer program did not dampen the enthusiasm for human-computer competition through the early 1950's. By 1955 a Russian computer was reportedly able to play the game. This, as reported, was natural, given "Russian national proclivities. The mechanical brain can play a good game of chess, Mr. Hall reported, although it is said that the best Soviet players can outthink it."¹⁹¹ The existence of the Russian chess-playing program was never confirmed outside this one passing reference, and it would be several years before any mention is made of Russian chess-playing computers again. Though possibly lagging behind the Soviets in computer chess programs, U.S. newspapers were able to announce by 1956 that the IBM 704 computer was able to play a better than average game of checkers. *The Wall Street Journal* related the story of Arthur Samuel, engineer for IBM that created and refined the checker-playing program from 1952 to 1956 to run on IBM's model 704 computer.

For a look at the computer that's playing checkers, Talk to Arthur Samuel, a research advisor for International Business Machines. He'll tell you, with a shy smile, that teaching the game to I.B.M.'s 704 computer—a hunk of hardware that rents for something like \$30,000 to \$40,000 a month—'it's just a hobby.'

But when he warms up, Mr. Samuel displays some little pride in his hobby: 'In two minutes I could show you, even if you've never played checkers, what to tell the machine so it could beat the average player. It really plays quite an acceptable game. It will look forward four moves—that means considering 10,000 possible moves—to try to pick out a good

¹⁹¹ Welles Hangen, "Soviet Electronic Brain Equals Best in U.S., Americans Find," New York Times, Dec 11 1955, 1.

strategy. The machine will sacrifice two pieces in a row so it can come back and make a triple jump.’¹⁹²

Samuel’s achievement, though quietly represented as his ‘hobby’ is nonetheless reason to give one commentator pause when writing the next day, stating that,

One machine whirrs and spins out such a bang-up game of checkers it can plan four jumps ahead which is far better than the average fire chief can do. [...] Such capabilities in a mere machine are close enough to magic to give an ordinary man quite a turn, for ordinary men may wonder when one of these smart machines might turn up and do his job.¹⁹³

The New Yorker wasn’t as worried, listening instead to R. W. Bremer (IBM assistant manager) who stated that while:

[A] computer has been designed that plays checkers and has beaten all comers so far, Chess is still beyond it, but it won’t be for long. [...] Some people fear that these machines will put them out of work. On the contrary, they permit the human mind to devote itself to what it can do best. We will always be able to outthink machines.’¹⁹⁴

While publications may disagree on the significance of computers and the future of labor, with the *Wall Street Journal* seemingly more anxious than the cavalier *New Yorker*, they all seemed to agree on the nature of the competition between computers and humans. As Kurt Vonnegut predicted in his 1952 novel, *Player Piano*, the misfortunes of a machine were represented in the news as victories for the human ego:

Few things bolster the human ego these days, so we would call your attention to an otherwise obscure news item from back east. In face-to-face competition, mere man has defeated one of those big mechanical brains. It detracts nothing from the achievement to add that the competition was a game of checkers.

¹⁹² Ed Cony, "Canny Computers," *The Wall Street Journal*, September 19 1956, 1.

¹⁹³ "Saved by the Rules," *The Wall Street Journal*, September 20 1956, 14.

¹⁹⁴ "Chess to Come," *The New Yorker*, January 5 1957, 18-19.

For years men who may hold their heads high in the intricate world of business have trembled before the simplest of mechanical gadgets. Then along came the masterminding monster of tubes and wires, which would solve problems at the rate of 1,000,000 a second and perform other terrifying miracles. Men were unnerved. Philosophers worried. Would man ever demonstrate that he is master, not slave, to the machine?

We would not suggest that the recent checker contest on the MIT campus is the final proof. But for the moment, at least, man is one up on the machine. And if he is as smart as we think he is, there'll be no return match. Better quit a winner.¹⁹⁵

The news story related the checker match as part of the installation celebration for the IBM 704 at the Massachusetts Institute of Technology in June of 1957. “[The IBM 704] started its career [at MIT] rather ignominiously by conceding defeat in a game of checkers. As part of the dedication festivities June 20, Saul Weslow [...] took on the machine in an exhibition game. After 40 minutes of play, the machine conceded to its human opponent,” reported the *New York Times*, explaining how “Mr. Weslow’s victory [...] was an example of the human brain’s ability to adapt to situations.”¹⁹⁶ The *New York Times* title of the account, “Mechanical Brain Good at Checkers,” reversed their opinion in an earlier story on the same event that the “Computer Prove[d] a Dud at Checkers.”¹⁹⁷ The MIT engineers were forced to point out that “the 704 had beaten several other people before it faced the checker champion,” conceded the Robert Cowen of the *Christian Science Monitor*, but they also stated that the IBM 704 “started its career [at MIT] rather ignominiously by conceding defeat in a game of checkers.”¹⁹⁸

¹⁹⁵ "Opinions of Other Newspapers: Still the Checker Champ," *Los Angeles Times*, September 4 1957, B4.

¹⁹⁶ "Mechanical Brain Good at Checkers," *New York Times*, June 23 1957, 167.

¹⁹⁷ "Computer Proves Dud at Checkers: A Mere Man Shows He's Still King in Game with 'Brain' That Will Track 'Moons'," *New York Times*, June 21 1957, 50.

¹⁹⁸ Robert C. Cowen, "Computer Ready for Satellites," *Christian Science Monitor*, June 21 1957, 2.

Arthur Samuel continued to refine his checker-playing program for the IBM 704 computer for several years. Dr. Samuel's goal was not to create a checker-playing program that would always win, but one that would become better over time by self-correcting and 'learning' from experience. By 1959, Samuel's program was beating him routinely.

The day when man is replaced by an IBM machine seems to have arrived—at least for Dr. Arthur L. Samuel. [...] The computer learned the game by being beaten in its early matches with the inventor. But now machine is master of its creator. [...] Come what may, the machine that plays checkers is not so adaptable (we believe) as to be capable of learning such other old favorites as chess, Parcheesi, or (heaven forbid) bridge. So right now we humans can claim the edge in the games department.¹⁹⁹

The *New York Times* reported that the "I.B.M Brain Beats the Hand That Fed It Data on Checkers"²⁰⁰ and suggested that, "varieties are as much a part of checkers as the people who play it, and this is what makes the game one of the most thoroughly 'human' games we have."²⁰¹ The representation of checkers as existing on a more human scale than chess colored the way the computers were described as checker players. As Samuel's IBM 704 continued to play checkers into the early 1960's, the description of checkers as a human game served to reduce the significance of the game as a measure of human intelligence, and emphasize the more colloquial nature of the game as an American pastime. The IBM 704 running Samuel's checker program was placed within a non-threatening niche as it continued to win some and lose some:

¹⁹⁹ "Topics: A Machine That Plays Checkers," *New York Times*, August 15 1959, 16.

²⁰⁰ John A. Osmundsen, "I.B.M. Brain Beats the Hand That Fed It Data on Checkers," *New York Times*, July 20 1959, 27.

²⁰¹ "Topics: A Machine That Plays Checkers," 16.

In Dallas, a checker champion sat down to play two games with an electronic computer, IBM 704. He lost the first game, proving that to err is human. Then the 704 lost the second, presumably proving that to err is machine. A spokesman for the 704 has assured the world that the machine will never again lose from that particular sequence of play. A very human touch, again: learning by sad experience.²⁰²

Samuel conceded that his checker-playing program was limited and pointed out that “even in the simpler game of checkers no computer is fast enough to figure out all of the possible consequences of a move through the end of a game.” To do this, he claimed, would take several centuries before the computer could make its first move. “Hence, though the computer, by figuring several moves ahead, may become smart enough to beat the man who writes the checker problem to ‘program’ it. Mr. Samuel concludes that a master of checkers can still beat the best checker program.”²⁰³ By 1962, the Samuel checker program failed to make headlines. Its mixed record of success and failure versus different flesh and blood checker champions demonstrated that the computer, in this instance, was not definitive in that its victories did not demonstrate an overall mastery that could not be challenged, but that the machine could play an American game as well or as badly as an American champion. The seeming difference between chess and checkers, with no one willing to claim the same level of intellectual prowess for checker-players, meant that the checker-playing program and the IBM 704 did not represent a threat that could not be reasoned with, but rather a challenge that could be accepted good-naturedly.

²⁰² "Machines Going Human?," Christian Science Monitor (1961): 16.

²⁰³ "Computers, Checkers and Retreads," Christian Science Monitor (1962): 16.

Automatons and the Totalitarian Threat

Looking at the condition of modernity and anxiety in the 1950's, it is easy to see certain confluences and accretions of concern around specific issues, and how these issues resonated across areas of social and technological development that, at first, may seem to add little to the net anxiety of the period. The roots of computer anxiety that transcends the pragmatic concerns of being replaced by a machine as a matter of livelihood and unemployment is reflected in the concerns of the postwar period surrounding the status of the human self as a construct. By the beginning of the 1950's public discourse was rife with articles, essays, and books detailing the origins of the totalitarian wave that had so recently swept across Europe under the banner of Fascism and had taken root in Asia as Soviet and Chinese Communism. The concept of the 'mass man', that is, the subject stripped of autonomy and individual desire and instead reduced to a collection of class concerns easily manipulated by the media and exploited by a powerful elite, was the topic of countless volumes as well, originating from both the left and right of the political spectrum. Both the left and the right were in agreement that the specter of mass man was the root cause of totalitarianism in both its fascistic and communistic forms. In his study of the self in American history, Wilfred McClay points to the American obsession with authority and authoritarianism and the revision of these concerns in the post-war era.²⁰⁴ The fear of Communism led to an attendant rise of McCarthyite tyranny, and intellectuals, alarmed by the seeming ease with which the public could be swayed by jingoism, nationalism, and simple hatred, and compelled to relinquish civil liberties in the

²⁰⁴ Wilfred M. McClay, The Masterless: Self and Society in Modern America (Chapel Hill: University of North Carolina Press, 1994), 226-268.

name of security, published increasingly dire forecasts for the future of America.

George Kennan, writing in the *Bulletin of the Atomic Scientists* in October of 1953, saw alarming trends in the growing conformity within the public sphere of post-war America. Kennan placed the blame squarely on whom Vance Packard would, a few years later, label “the hidden persuaders.” For Kennan, “the immense impact of commercial advertising and the mass media on our lives is—let us make no mistake about it—an impact that tends to encourage passivity, to encourage acquiescence and uniformity, to place handicaps on individual contemplativeness and creativeness.” Kennan, an acknowledged expert on the Soviet Union and author of the “Long Telegram” outlining a containment policy that would shape cold-war thinking for a generation, saw nothing special in America that would make us exempt from the same sort of totalitarianism that had recently rolled across Europe. He continued by stating that there was no

[G]reater mistake we of this generation can make than to imagine that the tendencies which in other countries have led to the nightmare of totalitarianism will, as they appear in our own midst, politely pause—out of some delicate respect for American tradition—at the point where they would begin to affect our independence of mind and belief.²⁰⁵

This sentiment was echoed by Hannah Arendt, who agreed that the danger of conformism and its threat to freedom was inherent in all mass societies. “But its importance has more recently been overshadowed by the horrors of terror when combined with ideological propaganda—the specifically totalitarian form of organizing

²⁰⁵ George Frost Kennan, “Communism and Conformity,” *The Bulletin of the Atomic Scientists* 9 (1953): 296.

great and unstructured masses of people.”²⁰⁶ Arendt, like Kennan, saw a warning in the history of Europe and of the Soviet Union. Specifically, Arendt suggests that the lack of an overt class system in America is no safeguard against totalitarianism inherent in all mass cultures regardless of class structure.

Writers drawing upon similarities between America in the 1950’s and Europe in the 1930’s, focused on the rise of mass consumption and mass man as pointing to a significant loss of the inherently Romantic ideal of the independent man, the Jeffersonian yeoman farmer, updated as the modern entrepreneur and self-made man. The danger was made explicit by one writer commenting that “this is the age of gadgets, of popular culture and popular emotions; it is an age particularly suited to bureaucracy, to efficiency experts, technological specialists, rocket makers, Organization Men—an age to the forms of which the Germanic temper is eminently suited.”²⁰⁷ David Reisman’s inner-directed man as a pre-war specimen of American drive, industriousness, and vision was contrasted with his degenerated descendant, the ‘other-directed’ ‘organization man’ of William Whyte. Whyte, writing in *Fortune* magazine in 1952, lamented the contemporary ‘social man’ who was “completely a creature of his environment, guided almost totally by the whims and prejudices of the group and incapable of any real self-determination of his destiny.”²⁰⁸ Editors charged, throughout the 1950’s that the new “Organization Man has lost his individuality and has become no more than a cog, indistinguishable from other cogs, in a machine composed not of metal parts, but of linked and intermeshed human

²⁰⁶ Hannah Arendt, "Threat of Conformism," *Commonweal* 60 (1954): 607.

²⁰⁷ John Adalbert Lukacs, "Was Fascism an Episode?," *Commonweal* 67 (1958): 606.

²⁰⁸ William H. Whyte, Jr., "Groupthink," *Fortune* 45 (1952): 115.

beings.”²⁰⁹

Longing for a return to unity was an enduring theme of the Romantic movement in an age of rationalization and division. The age of Enlightenment, with its classifications and subdivisions, engendered a fragmented society and an equally fragmented self. The apperception of the sublime, the marked nostalgia for gothic forms, guilds and crafts that were a conspicuous part of the Romantic movement’s aesthetic sensibilities translated, in the Modernist era of the early 20th century, into a privileging of ancient and classical texts, exoticism, and an appreciation of primitivism that sought to force the issue of psychological and social fragmentation to the forefront of aesthetic concerns. The romantic philosophies that survived in the popular media of the 1950’s emphasized the fragmentation of modernity—specifically the fragmentation of the self that was a product of mechanization, automation, and mass production. The assembly line with its repetitive routinized tasks that made a more holistic approach to craft obsolete was presented as a synecdoche for the disassembly of humans into component parts. As advances in automation increased the speed of production and the quality of unit parts rolling off production lines they also reduced the number of laborers needed to perform routine tasks. The automated production line integrated laborers into the mechanized process and created an environment where men were made to feel as cogs in a machine.

That computers were seen as scapegoats for social and psychological fragmentation is not significant in itself—what is relevant is that the technology was

²⁰⁹ Joseph Irwin Miller, "Dilemma of the Corporation Man," *Fortune* 60 (1959): 103.

consistently framed to function as a symbol of a specific aspect of the social order that is a source of anxiety. The computer, as a symbol of rationalized process and method was cast as antagonistic to that which cannot be rationalized—love, intuition, inventiveness, and play. As humans became more imbricated into the technological order of things (we are all cyborgs, after all, as Haraway claims), we viewed computers as icons of the forces that led to our loss of tradition, mystery, and an awareness of our environment that can be encompassed by general knowledge and pragmatism.

This is the message behind Norbert Wiener's 1954 book, *The Human Use of Human Beings*-- that book being, in turn, a popularized version of his 1948 *Cybernetics*. The implication of cybernetics, drawn by the popular media beyond Wiener's actual intent, was a system of human/machine interaction that devalued human beings as nothing more than flesh and blood machines caught in a causal loop. Wiener's recasting of his theories, in a distinctly humanistic vein, was an attempt to frame cybernetics as a liberating discourse ushering in a third industrial revolution. Wiener was only partially successful, if at all—for there remained for every discourse celebrating technology at least the same number of voices expressing discomfort, anxiety, and alarm over what we stand to lose as individuals, societies and cultures. Popular celebrations of technological innovation often contain within them the rhetoric of anxiety.

This anxiety, in the case of computer technology and competition is intrinsically bound up with a fear of authority, and the diminishing sense of control that was a major concern for post-war writers looking back on the totalitarian fascism of Europe. In Friedrich Georg Juenger's *The Failure of Technology* (written in Germany in 1934),

Juenger, writing about the role of technology in pre-war Germany asked:

Where does this all this efficiency lead to? Where does it leave man?
That question cannot be answered by means of functional thinking, which
focuses forever upon the wild confusion of phenomena only, and which
pursues forever the sequence of phenomena through lifeless time in order
to dissect them.²¹⁰

Walter Marx, reviewing Juenger's book, translated into English and published in the U.S. in 1949, agreed, stating that "the more human a person is, the more inefficient he is from the standpoint of the machine. It is human to work at an irregular pace the machine will not tolerate. It is human to take more than a half-hour for lunch, or to want to put S before R once in a while, or take a break from monotonous work."²¹¹ This tension between conformity and humanity played out over countless editorials and articles on the state of the American consumer, worker, manager, citizen as timid and striving for anonymity and contentment. As the *Christian Century* magazine lamented, "In spite of all the *Sturm und Drang* of our era, men are smoothing themselves out, pulling in their horns, losing the individuality of their selfhoods." The lure of conformity was as a refuge against uncertainty and "because of the storm and stress of our time, men are hiding in the herd. They are adopting camouflage. They are squeezing their opinions through the public colander. No one wants to jar or be jarred anymore. No boats are to be rocked. No apple carts will be upset."²¹²

In the 1950's, as in the 1930's, the machine became synonymous with conformity and sameness. But while the 1930's emphasis was on the factory as the site of mass-produced mass-man, leaving the managerial and middle classes untouched and free to

²¹⁰ Walter John Marx, "Technology and Disintegration," *Commonweal* 50 (1949): 391.

²¹¹ *Ibid.*: 393.

²¹² "Lonely Crowd at Prayer," *The Christian Century* 73 (1956): 662.

pity and fear the working class, the 1950's saw the arrival of a dangerous conformity that threatened management and the white-collar world as well.²¹³ This conformity was represented as a threat to American technological and scientific advancement: "Uncritical conformity is dangerous to our progress [...] Conformity, in the sense of uncritical adherence to some established doctrine, is a deadening thing to the scientific and intellectual growth on which progress depends."²¹⁴ Following authority, formerly the preferred mode of conservative business, was challenged by a growing discontentment of conformity, not so much as a spontaneous outpouring of repressed creativity, but as a fear that conformity was making Americans less American.

We are today authority-dominated to the point of abjectness. We are handed (and accept) more advice, more counsels as to what is wrong, more urgings to a docile conformity, more authoritarian They-Says, than any creatures calling themselves free should dream of bearing. [...] There is no counting the publications today devoted entirely to handing us 'rules' for rightly forming our characters, rules for dressing right and eating right and speaking right and rightly getting ahead in the world and having marital intercourse at exactly suitable intervals. [...] Just follow these rules and you too can join a standardized populace in one great gray goo of bumpless similarity."²¹⁵

The editors of *Fortune*, reporting changes to the career guidance manual '*So You Want A Better Job*' passed out by the Socony-Vacuum company to its employees, stated that the manual, which for many years contained the advice "personal views can cause a lot of trouble. Remember then to keep them always conservative.[...] Business looks with

²¹³ Arguably, the 1950's saw a reversal of this fear of conformity as no longer afflicting the working class, but instead sapping the vigor from the middle class, as anxieties surrounding rock-and-roll, 'Beat' culture, and juvenile delinquency suggest.

²¹⁴ Edward Uhler Condon, "Uncritical Conformity Endangers Progress," *Science News Letter* 65 (1954): 38.

²¹⁵ Eric Manners, "Art of Being a Nobody," *American Mercury* June 1951, 677.

disfavor on the wild-eyed radical or even the moderate pink.”²¹⁶ The updated manual, disavowed the earlier dictum, replacing it with “the world needs different viewpoints; blind conformity means stagnation.”²¹⁷ The editors of *Fortune* conceded, however, “the original statement probably reflects quite accurately the present state of mind of many managers and would-be managers. [...] Fledgling executives not only tend to be wary of expressing strong political opinions, they often don’t seem to have any to express.”²¹⁸

Even mothers worrying about their children’s futures while perusing *Good Housekeeping* or *McCall’s* magazine were presented with testimonials from mothers who insisted on raising non-conforming children, and hints on how to bring up children to be rebels and individuals, round pegs in a square-holed world.²¹⁹ Meanwhile, *Woman’s Day* magazine warned of “the danger of being too well-adjusted,”²²⁰ lest a mother run the risk of raising a family of automatons.

Computers and Robots

Although it is clear that computers are not robots, the two types of machines having distinct functions, as well as different roles as icons in the evolving discourse on automation, mechanization, and modernity, were nonetheless blended in early descriptions of computer technology. In a few examples, the *New York Times* described a

²¹⁶ "Creeping Socialism at Socony-Vacuum," *Fortune* 51 (1955): 73.

²¹⁷ Ibid.

²¹⁸ Ibid.

²¹⁹ Jean Libman Block, "I Want My Child to Be Different," *Good Housekeeping* 131 (1950): 59, Robert Mitchell Lindner, "Raise Your Child to Be a Rebel," *McCall's* 83 (1956): 31.

²²⁰ Ardis Whitman, "Danger of Being Too Well-Adjusted," *Reader's Digest* 73 (1958): 43.

new computer built for the National Bureau of Standards in 1950 as “the robot genius,”²²¹ *Science Digest* titled one article on computers and the engineers that build and maintain them “Care and Feeding of Robots,”²²² the computer used by NBC to predict the 1952 presidential election was christened ‘Monrobot’, and magazines routinely depicted computers in illustrations as having electronic gadgetry intended to suggest eyes, mouths, and even grasping arms. The representation of robots and mechanical men has a long tradition in American print media dating back to the end of the 19th century. Karel Capek coined the term ‘robot’ in 1921 in his play R.U.R (Rossum’s Universal Robots); a dystopian story about artificial workers who eventually rise up and destroy humanity. As automated processes and mechanized factories grew in number and complexity through the first half of the 20th century, images of robots increased as well. As robots became synonymous with the routinization and mechanization of the factory and the life of the laborer, they also became icons for anything automatic that functioned without direct human intervention and control.²²³

It isn’t surprising that this iconography flowed into early descriptions of computer technology as well, with terms like ‘robot brain’ almost as common as ‘electronic brain’ and ‘mechanical brain’ as descriptors for digital computers. The closest parallel for describing computers was analogous technology from the world of industry. The computer was an automatic machine capable of performing its work (running through the steps sequenced in its program) without human intervention, just as automatic factory

²²¹ "New Robot 'Brain' Cuts War Figuring," *New York Times*, August 18 1950, 21.

²²² Emile C. Schurmacher, "Care and Feeding of Robots," *Science Digest*, February 1953, 63.

²²³ For example, the German V1 and V2 rockets were referred to almost exclusively as ‘robot bombs’ by the mainstream American press.

machines on a production line. Just as machines were perceived as a threat to blue-collar workers in factories and machine shops, the computer was understood as a threat to the white-collar worlds of accounting and decision-making. Robert S. Lee conducted preliminary research into social attitudes toward computer technology in 1963. Lee discovered that, while people perceived computers as accurate, fast, and capable of improving quality of life, there was an additional counter narrative in his respondents that held, at the same time, that the machines made them feel somewhat inferior or that the machines were destined to control our lives. Lee discovered in one of the few surveys of people's attitudes toward computer technology that there remained a deep uneasiness concerning computer technology that seemed to correlate to one's economic status and security:

A nationwide survey indicates that the American public views the electronic computer and its significance in terms of two independent belief-attitude dimensions. The first views the computer as an instrument of man's purposes—helpful in science, industry, space exploration, etc. The second portrays the machine as a relatively autonomous entity that can perform the functions of human thinking. People tend to react in awe and a sense of inferiority to this later conception.

[The view that computers can perform human-like thinking activities] co-exists in the culture along with the more conventional and accepted view that sees the computer as a progressive and welcome development. It is, however, a highly symbolic and disquieting undercurrent of great emotional significance centering on the notion that the machine is autonomous and that it 'thinks' as humans do.

The findings of this study suggest that the computer as an object of social perception functions to a certain degree as a Rorschach blot or TAT card. It is a complex and ambiguous stimulus—how individuals perceive it and give it meaning depends very much on their fundamental values, on their personality dynamics, and their basic orientations toward life.²²⁴

²²⁴ Robert S. Lee, "Social Attitudes and the Computer Revolution," The Public Opinion Quarterly 34, no. 1 (1970): 53-54.

Lee's findings echo the mixed bag of anxiety and celebration that run through media narratives about computer technology in the post-war era. The computer as icon was a combination of nationalistic pride and fear.

The computer as robot was also iconic as a metaphor for thinking, or at least one type of thinking. The computer was portrayed as a rigid and dispassionate thinker that was bound by rules of logic, but not rules of intuition, creativity, or empathy. In this regard, the computer, as represented within media culture, was reminiscent of a closed, totalitarian way of envisioning the world that was synonymous with depictions of the Soviet Union during the Cold War. The ideology of Marxism, as practiced by the Soviets, engendered a society of mindless automatons unable to think for themselves. As Arthur Compton noted in *Atlantic Monthly* at the height of the cold-war: "I am told that for a considerable period after the Second World War, the teaching of scientific indeterminacy was under a ban in Russia. Marx, who was a younger contemporary of Laplace, had taught that man is a machine that obeys exact mechanical laws."²²⁵ Further, various pundits and public figures from the American right were in the business of constantly reminding readers that post-war America ran the risk of falling into this mindset as well. Chief Justice Fred M. Vinson, in an address to the American Bar Association in Cleveland, Ohio, declared that Americans were in need of spiritual rehabilitation evidenced by, "the confusion of the present conception of the nature of man which forms a part of many widely held ideologies. 'Under this view, man is a mere automaton incapable of sharing in the determination of his own destiny, bereft of dignity,

²²⁵ Arthur H. Compton, "Science and Man's Freedom," *Atlantic Monthly*, October 1957, 73.

capable of responding to the grosser of materialistic motivations and irrational passions.”²²⁶ William Henry Chamberlain is even more explicit. Writing in his article, ‘The Treason of Some Intellectuals’, Chamberlain wants to make it perfectly clear that a weakly understood progressivism creates an unreasonable dependence on the state and “The mental atmosphere would be vastly cleared if it were more generally understood that the free society is flexible and progressive in the true sense of the word, while the totalitarian state is static and reactionary.” The reactionary nature of totalitarianism creates as static and unchanging world, Chamberlin contends, and leads to a stasis that is “not the least of the reasons why life under dictatorship is undesirable [...] thanks to the ironing out of the slightest semblance of independent critical expression, this life must always be a crashing bore, except to the perfectly conditioned robot.”²²⁷ Chamberlain latter asserts that:

It is certainly not without significance that the era of the great schism in civilization has also been a time of declining individualism. There has been a tendency to look to the state as a universal planner and provider. There has been an increasing popularity for theories which deny man’s individual moral responsibility, which would make the human being a mere puppet or robot, helpless in the grip of impersonal economic and biological forces. There is no prospect of healing the schism without the rebirth of a healthy individualism in men’s minds and hearts and souls.²²⁸

As liberalism and the welfare state of F.D.R were represented as laying the groundwork for a soul and work-ethic sapping system that was destined to transform America into a nation of automatons, readers were asked to look no further than the Soviet Union to see the logical outcome of the decline of individuality. Cyril Forster

²²⁶ Albert J. Gordon, "Vinson Warns U.S. Of Totalitarians," New York Times, Sep 23 1947, 1.

²²⁷ William Henry Chamberlin, "The Treason of Some Intellectuals," Wall Street Journal, Jul 14 1947, 4.

²²⁸ William Henry Chamberlin, "The Schism in Our Civilization," Wall Street Journal, Jan 26 1949, 8.

Garbett, Archbishop of York, speaking to the Commonwealth Club of California in the fall of 1949 proclaimed that “we must make it plain to all that in resisting Marxian communism we are defending the elementary rights of man against an attack which if successful would deprive him of freedom and change him into a robot.”²²⁹

Malvina Lindsay, writing on education, literacy, and the minds of youth in the *Washington Post*, cautioned against totalitarianism and concluded that:

The world is moving in science, technology, and human aspiration, it seems likely that national strength may soon not be measured in terms of masses of robots with regimented minds, but rather in individuals of creative power, invention, initiative, psychological maturity, boldness of thought, leadership—all the things free education seeks to develop.²³⁰

Paul Jordan-Smith, reviewing Charles Morgan’s collection of essays, *Liberties of the Mind*, describes Morgan’s view of materialist worldviews like those evolving in the Soviet Union. Morgan, Jordan-Smith explains, “simply examines the Soviet trials and draws conclusions. Then he looks upon the tendencies toward mechanization and standardization that have been so obvious since 1918. Add to that the philosophy of materialistic totalitarianism and you have a nice plan for a world of docile robots.”²³¹ Jordan-Smith’s condensation of Morgan’s essay provides us with an example of the perceived plan of global communism, and the necessity of a mechanized and routinized society for this plan to come to pass. Our material success masks a creeping totalitarianism and provides the milieu needed for the enslavement of the mind. That success also makes us the target of robot-minded, totalitarian hordes, as Malvina Lindsay prophesied. Lindsay, who appeared to have specialized in drawing parallels between

²²⁹ George Dugan, "Prelate Sees Fight for 'Soul of Man'," *New York Times*, Oct 1 1949, 14.

²³⁰ Malvina Lindsay, "Power Grab for Children," *The Washington Post*, Jan 7 1950, 8.

²³¹ Paul Jordan-Smith, "World Battle Rages over Spirit of Man," *Los Angeles Times*, Jun 3 1951, D5.

totalitarian regimes and robots, as well as stoking the fires of xenophobia, writes that the American child of the future “will be outnumbered at least two to one by the backward, the illiterate, and the hungry. But he may also be outnumbered by what is even more dangerous, the totalitarian personality—the rigid, impersonal, nonreasoning robot.”²³²

The Soviet system was not only depicted as a culture of robots as an abstract entity, but individual Russians were robot-like as well. Walter Lippmann, commenting on Soviet communications with the west and their abrupt and abrasive style noted that, “the style is quite plainly the authoritarian or dictatorial style. [...] The Soviet style is the flattest kind of deadpan assertion. It does not aim to please or persuade. It is a style suitable for the instruction of robots.”²³³ Columnist Bill Henry quoted Winston Churchill on Soviet leader Molotov as saying that he has “never seen a human being who more perfectly represented the modern conception of a robot.”²³⁴

With the demise of Stalin in 1953, Georgy Malenkov briefly became the leader of the Soviet Union (he was deposed by Nikita Khrushchev in 1955). Malenkov was something of an unknown quantity to the West. Speaking of Malenkov, in 1953, Malvina Lindsay describes the media’s anticipation, “awaiting with much curiosity the first moves designed to build a benign father halo around the robot face of the Soviet Union’s new dictator.”²³⁵ Lydia Kirk, wife of former U.S. ambassador to the Soviet Union Alan G. Kirk, in an article titled ‘New Red Chief Termed Robot’, agreed with Lindsay’s assessment, stating that Malenkov, “is not a very appetizing looking person. [...] He’s a

²³² Malvina Lindsay, "Robot Hordes in the Making," The Washington Post, Oct 11 1951, 14.

²³³ Walter Lippmann, "Today and Tomorrow," The Washington Post, Feb 27 1951, 9.

²³⁴ Bill Henry, "By the Way," Los Angeles Times, May 5 1948, A1.

²³⁵ Malvina Lindsay, "Tactics to Humanize Malenkov Expected," The Washington Post, Mar 11 1953, 16.

Soviet-made robot, efficient and cruel.”²³⁶

As the Cold War wore on, and the specter of communist China was increasingly described in similar tones, with the *Wall Street Journal* reporting on “the spectacle of China, with it’s 650 million people and constantly growing, being turned into one huge camp of armed automatons.”²³⁷ The *Washington Post* liked this description enough to repeat it a couple of weeks later, stating that “Mao Tse-tung has begun to whip his 650 million people into a completely regimented race of automatons dedicated to long, hard work for the state, and ultimate defeat of Western democracy.”²³⁸ If the Chinese Communists and the Soviet Union were to be populated (at least in the popular imagination of the media, and by extension, the lay reader) by robots and automatons, the American anxiety toward computers, and the totalitarian world they suggested, was tempered by the fact that computers, at least when playing games like average people could do, didn’t seem to be taking over quite yet.

The Failure of Chess Playing Computers

By early 1957, the MANIAC computer had been programmed to play an abbreviated game of chess on a 6X6 square board. Stanislaw Ulam and Nicholas Metropolis programmed the MANIAC, installed at the Los Alamos laboratories, to play a game of chess on the board with the bishop pieces removed. The MANIAC chess program was the topic of the news because it was the first time a computer defeated a human player. The *Washington Post* headline “Mechanical Brain Beats Human Player at

²³⁶ Frances Griffin, "New Red Chief Termed Robot," *Los Angeles Times*, Mar 21 1953, 9.

²³⁷ "Collectivism's Logical Conclusion," *Wall Street Journal*, Oct 22 1958, 12.

²³⁸ John G. Norris, "650 Million Chinese Yoked as Human Oxen," *The Washington Post and Times Herald* (1954-1959), Nov 16 1958, A1.

Chess,” sounded definitive enough at first glance, but readers soon learned that the person who lost to the computer was a “human beginner with one week’s chess experience.”²³⁹ The MANIAC was billed as “an electronic computing machine [that] has been taught to play beginner’s chess on its own and capably enough to give its human opponents a good tussle.” To put the event into perspective, the *Post* explained, “Chess is the brainiest of all games. Maniac is the electronic computer whose calculations helped demonstrate the feasibility of the hydrogen bomb.”

To defeat the chess-playing computer then would be a significant feat. As a representative of a mechanized form of thinking, beating the chess computer could be synonymous with beating the totalitarian mindset of Soviet Marxism. As the *New York Times* explains:

Since having ideas is the basis of all conscious volition, man retains the power to make a selection from among the alternatives offered to him—often, as it turns out, the wrong one. It is this ability, for example, that allows man to win against the mechanical chess player, one of the latest triumphs of electronics engineering. The machine can reply only to certain moves. Thus it is in a position to give the correct answer only to the human opponent who makes what the masters have held to be the best possible move according to the situation. The mechanical chess player therefore is unable to take advantage of the errors of his human opponent, as could another human.²⁴⁰

The MANIAC was intended for research at the Los Alamos laboratories and was unable to continue its role as a chess-playing computer. Another IBM 704 (not Samuel’s) was programmed to play chess by a different team lead by Alex Bernstein in 1958. The Bernstein chess program did not have a particularly winning record, but was

²³⁹ Edwin Diamond, "Mechanical Brain Beats Human Player at Chess," *The Washington Post and Times Herald* (1957): A3.

²⁴⁰ "Topics of the Times," *New York Times* (1957): 23.

capable of looking ahead two moves (the average human player routinely looks ahead three). The *New York Times* reported, "Operating on its chess-playing instructions, the computer is no match for a human chess master. But is considerably above the beginner level." The characteristics of the machine inherently separated it from human players in that "as a chess player, the computer seems to be immune to foolish blunders, always capitalizes on bad mistakes by its opponent and sometimes makes masterful moves."²⁴¹ The outcome of the match between the IBM 704 and its human opponents was to lose all four games. Even though the IBM 704 proved to be a less than inspiring chess player, reporting for *Science Digest* on the event did not preclude a certain sensationalism mixed with foreboding: "Where will it all end? Will machines from IBM challenge those from Sperry Rand? Will the chess champs of the future be robots?" And, to make the connection between Soviet totalitarianism and chess explicit, the Times asked, "since Russians have figured importantly among the chess masters of the world, must we now also worry about their technological advances in the computer line?"²⁴²

It wasn't until the middle of the 1960's that the American chess-playing machines were matched against the best of the Soviet chess programs. The outcome led columnists like C. L. Sulzberger to question the validity of computers in general: "One cannot help wondering whether computers sometimes go wrong." Computer intelligence led to original assumptions that the Vietnam War could be won without an intensive U.S. effort. Computer diplomacy led to original assumptions that France, because of its relatively

²⁴¹ "Computer Plays Chess Aggressively; but Human Mentors Win All 4 Games," *New York Times*, June 19 1958, 52.

²⁴² "Machines That Play Games," *Science Digest*, January 1959, 12.

small size and power, could not be a serious factor in shaping policy in Europe.”²⁴³

Instead of a battle of electronic titans, the match shaped up to be somewhat less dramatic, as Sulzberger continued: “a chess game is being staged between two computers in California and Russia. John McCarthy, Stanford University’s Professor of Computer Science, comments: ‘By human standards the machine is weak.’ A chess expert of the *London Observer* writes: “at the moment, it is not clear which computer is the weaker player, but it is already certain that both are dim-witted.” The *Washington Post* was so enamored of the idea of a dim-witted computer that they used the exact language to describe the chess match in their article a few days later.²⁴⁴ The play between the machines is described as “low, to put it mildly,” “a trifle unimaginative,” “pitiful weakness”, a “wanton violation of the basic principles of opening play”, “dogged,” and “blundering.”²⁴⁵ The chess playing machines that were so anxiety producing seemed, when in competition with each other, to be put into perspective with the stakes of the contest considerably lower. The contest was no longer a contest between ‘man and machine’ but instead “not so much a competition between machines as between scientists who laid down programs for them.”²⁴⁶ The Soviet computers won against their American counterparts in an anticlimactic match of four games played simultaneously.²⁴⁷ The relative weakness of the machines was such that, no matter who won, the idea of American adaptive thought (and analogously, Western capitalism) was secure against

²⁴³ C.L. Sulzberger, "Foreign Affairs: The Dim-Witted Machines," *New York Times*, December 7 1966, 46.

²⁴⁴ "As Chess Players, Computers Seem to Be Dim Witted," *The Washington Post, Times Herald*, December 11 1966, 146.

²⁴⁵ "U.S. Computer Battling Soviet's in Chess Game," *New York Times*, November 22 1966, 3.

²⁴⁶ *Ibid.*

²⁴⁷ Ramond Anderson, "Electronic Chess Is Won by Soviet U.S. Mathematicians Beaten in Computerized Match," *New York Times*, November 26 1967, 146.

machine domination either as manifested by computers or by Communist ideology.

As preoccupation with the Soviets and the Cold War was replaced by the escalating war in Vietnam, the anxiety about Soviet domination diminished and with it this specific anxiety about computer domination. It was clear that the computer as chess-player had a long way to go before it was ready to challenge ranked, world-class players. Throughout the 1970's and 1980's computer chess programs increased in sophistication and ability, and computer hardware increased in processing speed. It would be another thirty years before a computer would beat the reigning chess grand master and the computer as an iconic representation would have undergone several more transformations before then. The anxiety about the machine as an example of totalitarian thought and Cold War survival would be replaced by an understanding of the machine as a physical artifact and as a symbol of the state as information gatherer. In the mid-1960's, the processing power of machines soon took a backseat to the understanding of information and data processed by the machines as the more important (and anxiety-laden) artifacts of the age.

Chapter 3: Syllogisms and Meta-Solutions: The Computer as Feminine and Childlike in American Film and Television

Introduction

Where the previous chapters have presented rhetorical strategies that warned of computers as out of control, this chapter focuses on reigning in computers as metaphorical objects. Cinematic depictions of computers often amplified the sense of conflict between human and machine for the sake of dramatic tension and as metaphor. Computers represented any number of dangerous ‘others’ disrupting the relative peace of the post-war world. Vivian Sobchack, in reading the science fiction films from the 1950’s to the present day observes that the genre is a “popular and poetic mapping of American culture’s ambivalent romance and disenchantment with a life-world become increasingly technologized since World War II.”²⁴⁸ The computer as a logic machine did, on one hand, reflect a certain masculine ideal where the hyper-rationality of the machine resonated with a traditional sense of the masculine as the ordered, proper individual that was not prey to sentimentality or emotion. But the obscure nature of computers, due in large part to their black boxing as artifacts, meant that when computers did generate erroneous or confusing data due to a programming error or mechanical failure, the output could seem capricious and illogical, and the machines seemed touchy and unreasonable—that is, the computers seemed to emulate the stereotypical feminine

²⁴⁸ Vivian Sobchack, "Science Fiction Film and the Technological Imagination," in Technological Visions: The Hopes and Fears That Shape New Technologies, ed. Marita Sturken, Douglas Thomas, and Sandra J. Ball-Rokeach (Philadelphia: Temple University Press, 2004), 145.

counterpart to the rational scientists and engineers surrounding them. The computer as feminine was the logical extension of this phenomenon. The computer was also seen as feminine in that it was often assigned the status of ‘helper’, or the one that performed the rote tasks dreamed up by the innovative and visionary man. This sense of the machine as irrational and subservient was captured in films like *Forbidden Planet* (Metro-Goldwyn Mayer, 1956) and *Desk Set* (20th Century Fox, 1957), and in the *Twilight Zone* episode “From Agnes with Love,” as well as in various newspaper and magazine accounts. The machine in this light becomes a monstrous female that threatens to destroy men with its oversized and alien logic. As Barbara Creed illustrates in her discussion of the monstrous feminine, the idea of the female castrator is prevalent in the American horror and science fiction genres as the object of desire that outstrips the category of object that has been inscribed upon her by the male subject.²⁴⁹ This reading is germane to our discussion of computers as encoded with a female set of referents in the American cinema of the 1950’s and 1960’s, and how these codes marked computers as out-of-control objects that must be brought to heel as surrogate women in post-war America.

The logic of the machine (not an inscrutable feminine logic, but a cold and impersonal one synonymous perhaps with the impersonal destruction of the atomic bomb) and the ability of humans to out-think machines creatively comes to the forefront of creative interpretations of computer technology. Presaging the student movements to come, fictionalized encounters with mammoth machines often require the protagonists to

²⁴⁹ For a discussion of the female form as a monstrous construct in the horror and science fiction genres, see Barbara Creed, *The Monstrous-Feminine: Film, Feminism, Psychoanalysis* (New York: Routledge, 1993). Creed bases her reading on Julia Kristeva’s application of the psychoanalytic concept of abjection as that which “disturbs identity, systems, and order,” and does not respect borders or hierarchies. See Julia Kristeva, *Powers of Horror: An Essay on Abjection* (New York: Columbia University Press, 1982).

stake out their physical positions vis-à-vis computers—that is, to acknowledge the power of computers as existing within a very narrow band of experience. The infallible logic of the machine could, with the help of syllogisms and logic games, be the cause of its own failure. If machines were logical then they were eminently sane. To assert one's primacy over the machine required a meta-consciousness that would appear to the machine to be insane. Films like *2001: A Space Odyssey* (Metro-Goldwyn Mayer, 1968) and the television series *Star Trek* employed meta-solutions as devices to re-establish an ordered world where human men remained in control.

Throughout this project I've argued that the use of computers as metaphors acted as a stand in for larger anxieties about postwar American culture and politics, and that computers were convenient artifacts for displacement of uncomfortable feelings of uncertainty about the future. But more importantly, this displacement acted to assuage anxieties by helping to reestablish traditional values in the face of modernity. The filmic discourse about computer technology re-inscribed the future as a continuation of the present and linked both with a romanticized view of the past. At the same time, films like *Desk Set* gently lampooned the rise of corporate efficiency and the threat of white collar obsolescence while reassuring viewers that the managers and owners always had the best interests of the workers at heart because profit and innovation went hand in hand with worker happiness and productivity. The role of computer anxiety in the films of the 1950's and 60's was not to make viewers fear the future or to look at their present with foreboding, but rather presented a metaphorical mirror of social issues and perceived problems to solve on the way toward the re-establishment of equilibrium in the post-war world. Prior to analyzing these films, however, it is important to describe the conflation

of women with technology and machines.

Cyborgs: The Machine as Monstrous

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.²⁵⁰

Donna Haraway's definition of the cyborg is relevant to our discussion of computer technology as a reflection on ideas of identity, specifically machine identity, as being both dependent and independent of human actors. This duality in our definitions of machines has engendered a split—not so much in the identities of the machines in our midst, but rather in our own consciousnesses when we seek to describe computer technology as something engendered by human thought and ability, while at the same time separate, unique, and altogether un-human. The creation of electronic 'thinking' machines is the creation of monsters, and Haraway's description of the cyborg as "illegitimate" connotes this schism. For Haraway, this illegitimacy is a matter to be celebrated as a source of power and an appropriation of the imprisoning structures of patriarchal technology by re-visioning these structures as an integral part of our identities in the modern world. Haraway's appropriation of the cyborg as a symbol connotes the hybridity and multivalent world where boundaries are blurred. It is the world portrayed in films like *Blade Runner*, a world of replicants and pacemakers—of avatars in cyberspace

²⁵⁰ "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century," in Donna Haraway, *Simians, Cyborgs and Women: The Reinvention of Nature* (New York: Routledge, 1991), 152.

and trans-species kinships. It is a postmodern world hostile toward meta-narratives as hegemonic mechanisms.²⁵¹

The cyborg, a being that is both biological and mechanical, is a metaphor that engenders identity constructions as porous, heterogeneous, and multiple. The structures of technology that act as limiting and defining tropes in a discourse that uses rigid categories and identifications as the means of control and coercion of biological bodies are assimilated into the body of the cyborg. For Chela Sandoval, the cyborg is synonymous with third-world feminism, a de-colonizing project concerned with reappropriating technologies to break down Western, masculine hegemonies of technology as bounded and capitalistic and encouraging cross-species hybridity.²⁵² Early computer discourse did not necessarily hold this view. The machines that we had created were instead boundaries against which we defined ourselves in comparison with what we were not. As Haraway states, “the relation between organism and machine has been a border war.”²⁵³

Along with the more standard reading of computers as lifeless, soulless, thinking machines existed a different construct that relates computer consciousness as consciousness with a difference. The cold calculations of the machine were not lifeless at all, but instead reflected a consciousness that took a recognizable form. It is revealing that Haraway, Sandoval, and other feminist scholars have taken the idea and identity of the cyborg as a form of oppositional consciousness to the patriarchal constructs that

²⁵¹ See Donna Haraway, Modestwitness@Secondmillennium.Femalemanmeetsoncomouse (New York: Routledge, 1997).

²⁵² Chela Sandoval, "New Sciences: Cyborg Feminism and the Methodology of the Oppressed," in The Cyborg Handbook, ed. Chris H. Gray (New York: Routledge, 1995).

²⁵³ Haraway, Modestwitness@Secondmillennium.Femalemanmeetsoncomouse, 150.

comprise much of modern science and technological thought. In doing so they are re-appropriating an identification of computers with women and feminine difference that was prevalent in the media culture narratives of the mid-20th century.

Feminizing the Thinking Machine

In the 1940's, computers as objects took their names from computing as an occupation. During the Second World War, the job title for the people who calculated firing tables for artillery shells and guns was 'computer'. These jobs were widely held by women with formal education in mathematics. Along with the replacement of women workers by returning veterans at the end of World War II, one of the first moves to return women into the domestic sphere was the replacement of computers with electronic machines.²⁵⁴ As a 1950 article about the SWAC (Standards Western Automatic Computer) relates: It took hundreds of girls a year and a half to compile the rocket-firing tables. S.W.A.C. could have done the job in a month."²⁵⁵ The new technology quickly eliminated the need for the human computers, and, within a few years, the job title had been erased—replaced by the artifact that appropriated the task. The link between women and computers, at least as far as a mental image was concerned, endured for somewhat longer.

Conflated with the fear that the 'other-directed' "Organization Man" of the 1950's was the bellwether of a soviet or fascistic (depending on your political point of view) totalitarianism was the equally alarming fear that the post-war American male was

²⁵⁴ For a history of the transformation of the term 'computer' from a human engaged in computation to a electronic machine, see Paul E. Ceruzzi, "When Computers Were Human," Annals of the History of Computing, IEEE 13, no. 3 (1991): 237-244.

²⁵⁵ "New Robot 'Brain' Cuts War Figuring," 21.

undergoing a crisis of confidence and had lost his nerve. American masculinity was represented as key to American strength and the undue influence of women or any confusion over gender roles was dangerous. As one writer to the Chicago Tribune's editor proclaimed, "Many civilizations owe their downfall to effeminate and corrupting influences of women [...] A lesson is to be learned [...] A strong America is a masculine America [...] Don't put skirts on Uncle Sam."²⁵⁶ Arthur Schlesinger Jr., writing in 1956 for *Esquire* magazine, detailed what he called a "Crisis of American Masculinity."²⁵⁷ Schlesinger, writing about what he saw as a 'soft liberalism' sought to reinscribe liberalism with a sense of masculine purpose akin to the active, results-driven attitudes of FDR's New Deal policies and the victory over fascism in the second world war. He saw a liberalism based solely on concepts identified with the welfare state as sapping the energy of the American left, and weakening the American character, as poverty and economic failure were, in his reading, things of the past or on their way to history's dustbin. The American consumer society, by providing jobs, higher wages, and objects to be purchased with discretionary incomes, was rapidly expanding the middle class. But the expanding middle class, and the American worker in his suburban tract house, was experiencing a sort of spiritual malaise, a 'crisis of masculinity' where the very idea of manliness was tested by a lack of worthy adversaries and an overexposure to peace and the soft comforts of home. Louis Lyon, in an essay on American manhood published in 1956, explained the problem with the post-war American male:

But remember that a man in a gray flannel suit is also a man and

²⁵⁶ "Woman's Softening Influence," *Chicago Tribune*, October 18 1951, 14.

²⁵⁷ Arthur M. Schlesinger, "The Crisis of American Masculinity," *Esquire*, November 1958, 63-65.

that for two or three years he was away from you in one or another war. For two or three years he lived as undomesticated men do live: without the bills and taxes perhaps, living among other men and not inhibiting man's natural impulse to obscene language and obscene storytelling, seeing men die and perhaps expecting to die himself, free in the sense that he often had no idea what the next day would bring.

There are certain deep and perfectly normal masculine drives that were "permitted" during a war as they are not permitted in a suburban backyard. They are an inborn attraction to violence and obscenity and polygamy, an inborn love of change, and inborn need to be different from the others and rebel against them, a strong need for the occasional company of men only and an occasional need for solitude and privacy.

Certainly all men do not feel these drives to the same degree. And certainly these drives shouldn't all be permitted in that clean, green, happy back yard. But if they are always and completely inhibited—the man in the gray flannel suit will stop being a man.²⁵⁸

The man in the gray flannel suit was, according to contemporary writers, barely hanging on to his dignity and masculinity in the suburban world of wives, children, dinner parties and lawns. The very definitions of manhood were being eroded, especially, as Lyon asserts, after the masculine frenzy of the Second World War. Other authors pointed to the middle class, white-collar life style as stifling and corrupting. William Whyte critiqued the Organization Man as lacking individuality and being a compulsive follower, while C. Wright Mills considered white-collar workers little more than ingratiated (although alienated) robots.²⁵⁹ Newspapers and magazines were rife with articles concerning the threat of conformity, raising children to be individuals, and

²⁵⁸ Louis Lyon, "Uncertain Hero: The Paradox of the American Male," Woman's Home Companion, November 1956, 107.

²⁵⁹ See C. Wright Mills, White Collar: The American Middle Classes (New York: Oxford University Press, 1951), William H. Whyte, Jr., Organization Man (New York: Simon and Schuster, 1956), Whyte, "Groupthink," 114-117.

wondering where it all went wrong (the answer to which often had to do with an abandonment of the Protestant work ethic and the loss of the entrepreneurial spirit).²⁶⁰ The American male was embattled in the home and on the job and was perceived as pathologically weak and unable to meet the challenges of modern family life and a workplace that was quickly modernizing and automating. The pressure of home and career was destroying the patriarchal structure and culture that men felt was their due.

Emplotment and Gender Roles

As Michael Ryan and Douglas Kellner observe, technophobia in American science fiction films often reflect a social conservatism in which challenges to what they term 'natural' social arrangements are camouflaged within the guise of out-of-control technology.²⁶¹ Like the out of control libidinal energy of Austen's heroines, the computer, as represented in film and television of the postwar era, revealed fissures in the façade of normalcy that pointed to a perceived weakness in the patriarchal structure of America. The idea of computers exploiting a tear in the fabric of patriarchal dominance is engendered by a split in the way computers were described as limited in their capacity for creative thought. This initial split between logical and creative thinking is, at first, a surprising intersection for a discussion of the gendered aspects of computer discourse. However as Sandra Harding points out, the division of labor is intrinsic to the

²⁶⁰ For recent discussions of the crisis of masculinity in cold-war America, see K.A. Cuordileone, Manhood and American Political Culture in the Cold War (New York: Routledge, 2005), Jeffery P. Dennis, "The Light in the Forest Is Love: Cold War Masculinity and the Disney Adventure Boys," Americana 3, no. 1 (2004), Michael Kimmel, Manhood in America (New York: Free Press, 1996), Michael P. Moreno, "Consuming the Frontier Illusion: The Construction of Suburban Masculinity in Richard Yates's Revolutionary Road," Iowa Journal of Cultural Studies 3, no. Fall (2003): 84-95.

²⁶¹ Michael Ryan and Douglas Kellner, "Technophobia," in Alien Zone, ed. Annette Kuhn (London: Verso, 1990), 58-65.

formulation of labor as either concrete or abstract. Concrete labor is physical, embodied, and almost exclusively the work that men do not wish to do.²⁶² Further, it is work that is largely made invisible by the necessity of its function—a support structure for the more abstract, conceptual mental work of men. Alison Adam argues that this split results in the gendered positioning of artificial intelligence as masculine and disembodied.²⁶³ Although this may be true for contemporary readings of technology, the historical discourse of computers as dependent and embodied objects suggests that the gendering of computers was often feminine, and this gendering played a role in reestablishing control over a frightening set of circumstances fore grounded by computer technology.

Harding's distinction between concrete and abstract work, with concrete work being feminine work, has as its expression parallels in the split between the work that is fit for humans, and that which should be left to computers. The discourses that we have examined so far have sought to emphasize the differences in modes of thought, and have positioned the computer as a helper, not controller—a follower of orders (concrete), not the originator of commands (abstract). But along with this assigned role, just beneath the surface of the discourse of control, lurked the anxiety of repressed surplus power that needed to be kept in check. This surplus power, when linked metaphorically to (at least rudimentary) logic, presented early commentators with a mysterious combination of metaphorical association and stereotypes of feminine thought. The idea that the inner workings of computers were sufficiently complex and nuanced to make an easy explanation of seeming inconsistency can be seen in the *New York Times* review of

²⁶² From, Sandra Harding, *Whose Science? Whose Knowledge? Thinking from Women's Lives* (Milton Keynes: Open University Press, 1991).

²⁶³ Alison Adam, *Artificial Knowing: Gender and the Thinking Machine* (London: Routledge, 1998).

election night coverage in 1954: “For several uncomfortable minutes the only explanation seemed to be that UNIVAC, though nominally sexless, was enough of a woman to have changed her mind. Yes, insisted a C.B.S. spokesman, at 10:50 she had thought the Republicans would win the House after all. At 11, she thought better.”²⁶⁴

Forbidden Planet and the Machine as Helpmate

In MGM’s 1956 science fiction film *Forbidden Planet*, directed by Fred M. Wilcox, we encounter the packaging of the existential anxieties concerning the status of the human mind in the computer age, along with a significant reflection on the ineffable power of human nature evidenced in the juxtaposition with machines. On the one hand *Forbidden Planet* is a recasting of Shakespeare’s “The Tempest,” with Dr. Morbius (Walter Pidgeon) as Prospero and his daughter Altaira (Anne Francis) in the role of Miranda. Miranda’s “What brave new world has such people in it” line is brought up to date and the heart of the matter stated clearly as “I’ve always so terribly wanted to meet a young man and now three of them at once!” But the role of Prospero as the wronged philosopher king who works his magic in the spirit of revenge before softening in the face of his daughter’s love is complicated in the science fiction version of the story. Here, the psychic power of Morbius’ jealous protection of his daughter’s virtue is augmented by the artificial intelligence of the giant computer buried deep within the planet (this nameless computer represents Shakespeare’s Caliban, who is barely kept under control and who acts as signifier for the savage side of the human spirit). The resulting ‘monster from the id’ is Morbius’ repressed anger writ large: magnified by the

²⁶⁴ “Electronic Brain Picks Democrats,” New York Times, November 3 1954, 15.

circuits in the electronic brain to monstrous proportions. The consequences derived from this difference are significant in that what has changed in the telling of the story is the introduction of a technology designed to contain the minds of the former inhabitants of the planet, the Krell. What *Forbidden Planet* proposes is a giant computer that, although lacking in a personality of its own, uses its power to augment the personality of Dr. Morbius who has learned some of the techniques needed to operate the machine. That is, the machine's power is in its passive ability to magnify the already powerful subconscious desires of Morbius. It is worth noting that it is Altaira's barely contained sexuality that leads to the formation of the monster. The potential loss of control or the exercising of repressed sexuality triggers an explosion of repressive force manifested in Morbius' psychic projections.

On this level, the film works as an allegory for the rising abilities of computers in the early 1950s. If the advanced technology developed by the Krell created a world where the minds of the Krell were augmented to the point of their own destruction in an orgy of violence (as Morbius reports), then the destructive potential of computers resides in their ability to enhance the powers of thought beyond the capacity of the human brain. The danger lies in the move toward ever increasing computational speeds. If the computer is, metaphorically, an electronic brain capable of prodigious calculating feats, then the risk is in a failure to understand the nature of thought itself. As we have seen, the issue surrounding the nature of consciousness and the redefinition of the nature of thought to preserve human uniqueness were already on shaky ground due to advances in computer technology and the metaphors used to describe it. The faceless central computer of the Krell, capable of harnessing and magnifying Morbius' unconscious rages

presented computers as ultimately uncontrollable forces when coupled with urges we do not understand. Also, as an autonomously self-perpetuating and disembodied machine, the power of the central computer cannot be located or controlled and is independent of Morbius—acting only as a channel for his repressed urges. As in Shakespeare, however, the central computer has its foil in the guise of another mysterious inhabitant of Prospero’s island. In *Forbidden Planet*, the faceless central computer has its Robbie the Robot—a dependable Ariel to the unruly Caliban.

Robbie represents the power of the Krell technology harnessed and diminished for the power of good, rather than the evil of the unconsciousness. Robbie, built by Morbius from knowledge he’d acquired from the Krell memory banks, represents the wise husbanding of technology by a firm patriarchal hand. The boundless and unbridled power unleashed by Morbius’ dreams and anxieties are, in his waking world, servants to his comfort, and a mothering caretaker for Altaira. While at first glance, Robbie’s size and physical strength are daunting to the Commander and his crew, the uses of Robbie are quickly transferred to the domestic sphere, where we see Robbie fixing coffee, arranging flowers, and discussing dress patterns and ornamentation with the endlessly naive Altaira.

The effect is a feminizing one—one that positions the robot within the domestic sphere as a surrogate mother—unquestioningly following orders and making life comfortable for her family. It also pits the dependent/embodyed version of computer technology against the much less controllable (and therefore more dangerous) autonomous/disembodied technology of the central computer. The idea of the robotic

computer as the ultimate housewife is echoed in a *New York Times* discussion of the world of tomorrow envisioned by Alfred N. Goldsmith, “a consulting engineer who has played his part in the development of the phonograph, the motion picture, and radio communication in all its forms.” Goldsmith, the article recounts, “would probably give us electrobots that at most can perform one or two tasks very well, such as sitting up with the baby, cooking and sewing,” and predicted that, “If you insist on having an electrobot that can scrub floors and add up 500 ten digit figures in a minute Dr. Goldsmith will let you buy it.”²⁶⁵ However, the *New York Times* noted in a previous article some years before, “Though all this goes far toward creating an automaton that will keep house and do simple cooking, the psychologists themselves point out that a twelve-year-old moron will have more real intelligence.”²⁶⁶ Positioning a computerized robot in the home does not mean that it takes a superior electronic brain to perform household functions, but rather the opposite, that because computers are actually stupid, the life of a housewife is appropriate labor.²⁶⁷ It’s worth noting that while engineers and writers and journalists spent their days envisioning computers into women, they spent the rest of their time envisioning women as automatons.

That the housewife was replaceable as labor by robotic computers is only a small metaphorical leap for the fantasy writers of the 1950’s. But the metaphor of the housewife as caretaker could be extended to the emotional labor of motherhood as well.

²⁶⁵ Kaempffert, 9.

²⁶⁶ “Electronic Robots,” *New York Times*, February 4 1949, 22.

²⁶⁷ This echoes the thesis in Betty Friedan, *The Feminine Mystique* (New York,: Norton, 1963). The idea of woman/robot interchangeability receives perhaps its best treatment in Bryon Forbes’ *The Stepford Wives* (Columbia Pictures, 1975) with Katherine Ross as a feminist woman who is strangled by her robot doppelganger/replacement—an otherwise vapid automaton designed to be the perfect housewife.

The 1962 episode of *The Twilight Zone*: “I Sing the Body Electric” (CBS, 1962), presents the mother as a replaceable commodity within the nuclear family. The mother (who is not seen) has died, leaving behind a very busy husband and three despondent children. The father purchases an electronic grandmother to act as a surrogate for his wife and to raise his children. The episode centers on a visit to the manufacturer to pick out the attributes the children want in their new relation. The salesman takes them from display to display, showing them the individual components that will then be assembled into a grandmotherly form. The female body is atomized for consumption—arms, hands, hair, eyes, torso—broken down as fetishized shapes.

It is worth repeating that there is a conceptual difference between robots and computers that is germane to this discussion. Throughout this project I have been concerned with images and impressions of computer technology, not robots, and it is important to distinguish between the two. Robots, as embodied automatons, are presences that replace or replicate the physical properties of humans. As such, robots emphasize the physical over the mental state of being as the body in the Cartesian duality of mind/body. The computer, as an object, is much more abstract and is most often represented as a bodiless presence—a cube or slab, with no real insight into its inner workings other than some flashing lights. The computer is, much more often than not, faceless. It is this facelessness that makes computers at once inscrutable and arresting and allows the viewer to project a rich set of emotions and thoughts onto an otherwise blank canvas (for example, HAL’s ‘eye’ in *2001: A Space Odyssey*). The use of robots to represent femininity has, I believe, more in common with the fetishization of the female form as a compliant servant for male desire. Computers could and were depicted as

female in a way that emphasized inscrutability and difference, or for comedic effect.

The Krel computer (underground, chthonian, impassive) is more interesting for our purposes in that the explicitly underground nature of the machine emphasizes its inscrutable nature and uncontrollability. As a repository for intellect, the Krel computer is almost infinitely large, its physical presence fading into the distance and into the depths of the planet's interior. With this nearly infinite capacity for 'thought' comes an equally large potential for unconscious desire, anger, and dread. If the Krel Computer is a tool to accommodate Morbius' mind grown grotesquely large, his psychological problems remain just as primal and are magnified with equal dispassion by the machine. In this way, *Forbidden Planet* offers a critique that is less about the dehumanizing aspects of technology, and more an examination of the effects of humanity on machines. The Krel computer is equally adept at good or evil, and so requires a strong hand to guide its use. The instability and unresolved sexual tension that comprise Morbius' interior landscape disqualifies him as a competent patriarch and leads to his (and the planet's) destruction. The planet Altair, for all its promise, ends up as a 'Forbidden' place as a metaphor for Morbius' unconscious desire for his daughter and his hermetic megalomania. This disorder, magnified by the computer, is what must be brought under control through the narrative. The Krel computer is qualitatively different from the more acceptable, useful, and domesticated Robbie (as his friendly name suggests). The computer's ambiguity represents the chaotic realm of out-of-control desire.

Desk Set: The Computer as Surrogate Female

Computers did not always take the shape of women, however, to function within

the feminine space of the male imagination. The 1957, 20th Century Fox production *Desk Set* represents the computer as an object no less threatening than the room-sized machines that dwarfed the human engineers at the beginning of the decade. In *Forbidden Planet*, Robbie's robot form did help in representing him within the domestic sphere as a helper and feminine character (his facility in cooking, sewing and dress-making helped as well). The computer of *Desk Set* represented computer femininity without the obvious trappings of hearth and home, but by its construction within the traditional female space of office and clerical work. *Desk Set* opens famously with an acknowledgment of IBM's support in the making of the film. Less famous, but more interesting is the initial set design for the opening credits of computer equipment laid out on a Piet Mondrian influenced floor painted with a grid of lines and blocks of color. The cool intellectualism of Mondrain, juxtaposed with the computer equipment presents us, at a glimpse, with how we will be asked to contextualize the computer for the duration of the film—as an icon of modernity that is part of the contemporary landscape and as an object that signifies the contemporary world of style as well as of technological change. The emphasis on style was promoted by the studio as a tie-in with department stores, with the co-stars of the film and their costumes on display at the Hecht department store in Washington D.C.²⁶⁸ The computer "EMERAC" ("Emmy," for short) is decidedly gendered and is referred to by her handlers (Spencer Tracy and Neva Patterson) as "she." The plot of the film revolves around efficiency expert Richard Sumner's (Tracy) introduction of the computer into the research library of a large newspaper. The head of the research department, Bunny Watson (Katharine Hepburn) pointedly exposes the limitations of Sumner's

²⁶⁸ "Hollywood Glamorizes Career Girls' Lunch Hour," [The Washington Post](#), May 18 1957, B1.

automation mindset, and also, his machine, while the two (predictably) fall in love. Run by the cold, asexual Miss Warringer (Neva Patterson,) Watson and her research staff believe the EMERAC was designed to replace them. “Emmy” parallels the true-to-life corollary ‘ERMA’ (Electronic Recording Method of Accounting), the automated check processing system introduced in 1956 for Bank of America. The ERMA system was seen as a major step forward in the automation of clerical work, cutting check processing times and the clerical staff necessary for routine tasks.²⁶⁹ Like ERMA, EMERAC is represented as a source of technological unemployment that resonates topically with the anxieties of 1957.

Sylvia (Dina Merrill): Well if we do get canned we won't be the only ones to lose their jobs because of a machine.

Ruthie (Sue Randall): I understand thousands of people are being replaced by these electronic brains.

Bunny: Frightening, Gave me the feeling that maybe, just maybe people were a little bit outmoded.”

Sumner: Wouldn't surprise me a bit if they stopped making them.

The film is designed as a study in contrasts, with the vivacious women of the research department juxtaposed with the blinkered purposefulness of Warringer and the single-minded Sumner. Where the women of the office represent life in all its random and chaotic connections between text and context (including Bunny's immense and many tendrilled ivy that snakes chaotically through her office), the crew responsible for the EMERAC is bound to narrow-minded reason that can't see past the facts to the

²⁶⁹ The story of ERMA and the promise of office automation was celebrated in David Oakes Woodbury, Let Erma Do It: The Full Story of Automation, 1st ed. (New York: Harcourt Brace, 1956).

connections that they have to the flesh and blood world.²⁷⁰ At the film's climax, the women have all been given pink slips (as has everyone in the company by the hyperactive EMERAC) and Miss Warringer is left alone to field research questions with her beloved computer. As her nerves fray, so does EMERAC, leaving Bunny to rally the women with the charge "Let's show them what real women can do!" Bunny and her staff restore order out of EMERAC's chaos, and Miss Warringer is escorted away from the scene. Ironically, the computer, by taking an instruction literally, begins spewing out lines from Rose Hartwick Thorpe's "Curfew Must Not Ring Tonight," a poem concerning a woman's successful attempt to forestall the fate of her beloved by physically stopping a bell from ringing—interrupting a technological process in order to short circuit a system. Bunny continues to recite the poem as she and her team rightly interpret the request by relying on their tacit knowledge and experience. Tacit knowledge, as Susanna Zuboff discusses, is a method of preserving one's identity in the face of the standardization that accompanies, and is the prerequisite for, technological systems.²⁷¹ The tacit knowledge Bunny displays is her mastery of creative, human, thought.

At first, this appears to be a victory for the power of human femininity over the cold logic of the calculating machine. But as the film ends, with Emerac malfunctioning yet again, Bunny's hairpin is used to restore the machine to a normal operating state. The machine is not removed, rather the machine and the feminine reach a sort of *détente*, with

²⁷⁰ Cheryl Knott Malone details the context of the research librarian in her article, Cheryl Knott Malone, "Imagining Information Retrieval in the Library: Desk Set in Historical Context," *IEEE Annals of the History of Computing* (2002): 14-22.

²⁷¹ Zuboff, 186-188.

the paternalistic Sumner enfolding Bunny in an embrace before the quiescent machine. The engineer who is the new controlling figure in the research department (and an archetypal ‘organization man’) makes both ‘women’ quiet. As Bunny coos lovingly to Sumner, EMERAC hoots contentedly. Rather than casting Bunny’s victory over the machine as a declaration of the intrinsic superiority of the women over the computer, and over the repressive order that brings automation to the forefront at the cost of less quantifiable human needs and desires, the two are equalized and positioned as two complementary opposites—tools used to perform the tasks too trivial for the dreamy engineer. The conflation of the women in the research department (and women in general) and the computer was not lost on the reviewer from *Time* magazine:

At long last, somebody has a kind word for the girls in the research department. The word: one of those electronic brains could do the job much better and with less back chat—and what's more, it would free the girls' energies for the more important job of getting a man.[...]

But the real star of the show is Emmy. What red blooded movie going male will be able to resist the seductive lisp with which she murmurs pocketa, and ever so tenderly, queep? Indeed, what husband will not yearn for a female he can shut up, simply by not asking questions?²⁷²

Desk Set is a fable of symbiosis between men, women, and computers that presents an updated utopian tableau to the dystopic vision of Fritz Lang’s *Metropolis* (UFA, 1927). It is hard to overestimate the significance of Lang’s film to discourses on automation, robots, technology, and the effects of modernity on social conditions. Lang’s

²⁷² "The New Pictures," *Time*, May 27 1957, 59.

story of technological imprisonment, where faceless proles toil underground to support the rarified edenic world of the managerial class, is iconic in its expressionistic representation of technology as monolithic and forbidding. However sanitized the politics of *Desk Set* in comparison with Lang's dystopia, there are certain similarities between both films in their representation of the engineer, woman, machine triumvirate. It is, ultimately, the engineer (though temporarily misguided) who is restored to his position of authority after a malfunctioning machine threatens the social order. In both cases, it is the woman (Maria/Bunny) who is instrumental in restoring order, and is perfectly willing to remain a junior partner in the business of progress.

Overtly female gendered computers were not often as obvious as the 1964 *Twilight Zone* episode "From Agnes with Love" (CBS, 1964), featuring Wally Cox as James Elwood, a prototype computer nerd who is the object of a computer's affections. The computer, 'AGNES' is represented as a large, room-sized array of flashing lights and whirring tapes that towers above Elwood, diminishing him with her presence. Through the course of the episode we realize that 'she' is in love with Elwood and is manipulating him to monopolize his attention. AGNES is presented as coy and contrary, functioning only when she is in the mood. Her programming and logic remain mysterious as she eventually drives Elwood mad. As he is led away at the end of the episode, he warns his replacement not to fall for her feminine wiles and is dismissed as crazy. The viewer is left with the distinct impression that AGNES is a femme fatale, using men and destroying them. Much like the protagonist in a *noir* film of the 1940's, Wally Cox is led to his demise by an unhealthy attachment to a mysterious female. As Rod Serling intones at the episode's close: "Advice to all future male scientists: be sure you understand the opposite

sex, especially if you intend being a computer expert. Otherwise, you may find yourself, like poor Elwood, defeated by a jealous machine, a most dangerous sort of female, whose victims are forever banished—to the Twilight Zone."

Episodes of The *Twilight Zone* tended to focus on robots rather than computers in matters of artificial intelligence. Episodes like "The Mighty Casey" (CBS, 1960), "The Lonely" (CBS, 1959), or "The Lateness of the Hour" (CBS, 1960) asked viewers to empathize with robots as doomed to a sort of lesser humanity. *Twilight Zone* episodes almost always turned on a plot twist at the end of the episode to bring an added sense of irony to the story. The idea of technological unemployment was taken up on the show, with an ironic twist providing a caution to those who would rush automation at the expense of workers. In "The Brain Center at Whipples" (CBS, 1964), Whipple, the owner of a manufacturing firm, seeks to modernize and introduces machines to replace workers. The ironic conclusion of his actions result in not only his workers being replaced, but Whipple is replaced by the machine as well.

Twilight Zone episodes that feature computers are significantly fewer but, like the episodes that feature robots, present the computers in a somewhat sympathetic light. Logic and madness are still polarities of human/machine difference, but in The *Twilight Zone*, it is the computer that can be compassionate in the face of insanity. In the 1963 episode, "The Old Man in the Cave" (CBS, 1963) the computer (personified as the old man of the title) is credited with keeping the community alive by determining what food is safe to eat after a nuclear war has all but destroyed civilization. The villagers are rallied to destroy the computer by the leader of a squad of soldiers, who goads them by

revealing that they have given up their free will to a machine. Once the machine is destroyed, the villagers freely consume the food the computer has marked as tainted. Poisoned by the food the computer warned them against, all the villagers die. This ironic twist to the episode suggests that a technological brain may be best suited to navigating the dangers created by technology, and that the relationship between humans and machines have progressed past the point where we can simply function by turning them off.

As computers and women were presented on equal footing in the service of men and their families, speculation on the future of homemaking presented a symbiotic relationship between women and computers. In the early 60's, *The New York Times* reported that the 21st century home would likely include computer technology, but not in the form that we have in fact become accustomed to. The modern household computer would “select the daily menu, program cooking, cleaning and laundry chores, locate family members and remind mother of dentist appointments. The device should free the family for more creative work and play than we experience today.” The benefits for women were obvious. The “computer would free a woman to spend half her day preparing an exotic evening meal at which many foods would be tasted and consumed over a three-hour period.”²⁷³

The diminished role of computers in the hands of women, though not reflective of the reality of women in the computer industry, was emphasized by reporters writing about women and computers with a sense of irony and deprecation. Female engineers

²⁷³ "Computers May Figure in Homemaker's Future," *New York Times*, January 23 1961, 18.

were presented as cute, feminine, and the juxtaposition between female softness and hard (if not outright phallic) technology was emphasized. As the *New York Times* described a woman engineer: “Bessy Sheng is a slight young woman with a voice as soft as a kitten’s cry. But when she gives orders, a \$350,000 machine sits up and obeys. Miss Sheng is a gentle rebuttal to the theory that brains are a harmful commodity for a female to possess.”²⁷⁴ The article goes on to describe her work by explaining, “Miss Sheng must cope with a wide range of problems. A recent assignment took her to Wilmington Del. to program a powder-puff air derby.”²⁷⁵ Femininity and feminine pursuits were highlighted in proximity with computers, though one cannot help thinking that Miss Sheng’s male counterparts didn’t spend their time writing programs for powder-puff derbies. As coverage of the 1952 presidential election was reviewed and reported, the computer in use at NBC, the “Monrobot” (in answer to CBS’s use of the UNIVAC) was less interesting than the woman chosen to operate it. “Burkhart, who had received a doctor’s degree from NBC press agents, even compensated for his machine’s comparatively unimpressive appearance. He arranged to have it operated by Marilyn Mason (also awarded a press agent’s doctorate), a beautiful brunette mathematician now known among her Prudential Insurance Co. associates as Marilyn Monrobot.”²⁷⁶ Mason’s experience as a mathematician was also sublimated to her appearance and was less important than her hair. Marilyn Mason may not have held a doctorate (although she was granted one by NBC for her appearance on election night) legitimate doctors were not much better off in the way they were represented in the media. Dr. Frances Bauer,

²⁷⁴ Marylin Bender, "Woman Gives Instructions; 'Brain' Obeys," *New York Times*, August 6 1960, 11.

²⁷⁵ Ibid.

²⁷⁶ "The Machine Vote," 64.

for example, was a pioneer in computer engineering and the creation of artificial intelligence. When she was interviewed in 1955, however, the emphasis was on describing the appeal of her work and the desirability of a career in computers for young women, “the opportunity for marriage is excellent—I met my husband in the Brown graduate school,”²⁷⁷ reminding women to keep their eyes on their domestic affairs. The emphasis on traditional women’s roles evinced by these articles obscures the sometimes progressive attitudes companies had toward women employed in the early computer industry. For example, writing about her experiences as a programmer and project manager for the Eckert-Mauchly Computer Corporation from 1950-1954, Adele Mildred Koss describes an atmosphere surprisingly lacking in overt gender bias. In a period where women were expected to give up their careers for the sake of child rearing, Koss relates her experiences with flexible scheduling, working from home, and maternity leave, as well as an environment where women held management positions over men. Although her experience, as she relates it, was seemingly not unique, at least at EMCC, news and feature articles written about women in the computer industry had a decidedly different focus and approach to their material.²⁷⁸

By casting computer systems as dependent systems, writers were able to ground the technology as metaphorically linked to earlier technologies that were ultimately seen as appendages to human drives and will. By emphasizing the physicality of the systems, the metaphysical possibilities of thought were minimized and the machine embodied as a concrete artifact that, though at times awesomely large, was finite where its mathematical

²⁷⁷ Cynthia Kellogg, "Electronics Is No Puzzle for Woman," *New York Times*, December 9 1955, 31.

²⁷⁸ See Adele M. Koss, "Programming on the Univac 1: A Woman's Account," *IEEE Annals of the History of Computing* (2003): 49-59.

potential was not. This finitude allowed the technology to be re-encompassed within the human mind as something real, not imagined. Further, the reality of the systems could be linked to the domestic, prosaic world of the everyday—a mundane condition as drab as a housewife’s existence. The chain of metaphors produced a set of inferences that were enjoined rather than linear. The modality of this metaphor cluster was a reinforcing plexus of ideas that generated anxieties of difference that could be assuaged within the cluster itself. The writers on computer technology in the 1950s produced a frisson of anxiety and then, through a linguistic slight of hand, corralled the surplus excitement into a discourse that reinforced traditional masculinity and the taming of new frontiers.

Short Industrial and Educational Films

Early reportage and media interpretations of computer technology hinged upon an underlying anxiety concerning the status of these new machines as challenges to accepted notions of human (specifically male) consciousness. As writers moved to interpret the significance of the new technology, they did it against a backdrop pre-populated with anxieties about the cold war, gender roles, and nuclear apocalypse. Attempts to frame early computer technology sought to place it within preexisting categories of difference. By enframing computers as monstrous and sublime, writers on technology created an additional category of anxiety that they then sought to manage by re-categorizing computers as childlike, subservient, and feminine. These metaphors resonated within the popular imagination to create a world of emerging technology that could function both as wondrous and commonplace. The emphasis of the metaphors used to construct a discourse on computers was one of control. The threat posed by computer technology,

though in some cases fancifully represented, reflected a genuine concern toward the function of human thought, consciousness and labor as projected into an uncertain future.

As feminine or childlike metaphors were central to placing computers into a context that was more manageable and less threatening, short industrial and educational films were also produced to explain computer technologies to lay audiences. The American design team of Ray and Charles Eames likely produced more industrial and educational short films on the subject of computers than any other filmmakers in the post-war period. Starting in the early 1950's the Eames' explored information theory, mathematics, and computers as objects of aesthetic appreciation and wonder and attempted to explain the basic concepts behind complex machines and ways of representing information. Beginning in 1953 with *A Communications Primer*, a short film very much in their consistent style of educational filmmaking with visual elements taken from close-up photography, typography, animation, and unusual camera angles with a voice-over explaining the abstract, technical concept of Claude Shannon's communication process (source, transmission, signal, channel, receiver, decoded, destination and noise). This film, though not explicitly about computers, did serve to illustrate the ideas surrounding information as atomistic elements that could be broken down into discrete steps that were at the heart of digital computing.

The Eames' most fruitful relationship in terms of filmmaking came under the patronage of IBM. Prior to their involvement with the Eames design house, IBM's Military Products division had produced the 1956 film *On Guard* as an advertisement for its work on the SAGE (Semi-Automatic Ground Environment) air defense system.

IBM's work in providing the hardware for the SAGE system is highlighted in the film, juxtaposing shots of computer hardware, airplanes and missiles, and children playing to emphasize the central role IBM played in keeping American children safe. Here the computer is part of a larger benevolent network of industry and the military dedicated to the protection of the cold-war homeland in what is clearly an advertisement of IBM's power. But from 1958 through the early 1970's, Charles and Ray Eames made a series of short educational films that were considerably more subtle than the overt propaganda of *On Guard*. The Eames films use the couple's unique design sense to convey the beauty of IBM's machines as small worlds of their own, and to illustrate the simplicity of the concepts underlying computer science.

In 1958, *The Information Machine* (Man and the Data Processor), accompanied by the music of Elmer Bernstein (a collaborator on many of the Eames' short films), the Eames' presented an animated short considering the history of decision making based upon accurate and timely access to information. The film equates human conceptualization, decision making, and memory with analogous electronic computer components. *The Information Machine* was produced for the IBM pavilion at the 1958 World's Fair in Brussels, Belgium. *The IBM Mathematics Peep Shows* (1961) were a part of IBM's exhibitions at the California Museum of Science and Industry and the Museum of Science and Industry in Chicago. Each two minute film was intended to illustrate a single mathematical concept with the intention of expressing mathematics as a series of discrete concepts that, when broken down, could be expressed simply, and in IBM's case, electronically. These films were incorporated into the multimedia shorts

exhibited by IBM at the 1965 New York World's Fair.

While *IBM At the Fair* (1965) consisted of a time-elapse montage of the IBM pavilion (also designed by Ray and Charles Eames) for the 1965 World's Fair in New York, *A Computer Glossary (or, Coming to Terms With the Data Processing Machine)* (1968) sought to describe the computer by explaining the inner workings of a computer using highly technical jargon. The effect is tongue-in-cheek obscurity. The jargon is then translated with the use of simple animations to demystify the machine by explaining the computer using common language and using flow charts and decision trees in parallel with a man waking up and preparing for his day (shaving, having breakfast, etc.). Thematically, this film is much like 1953's *A Communications Primer*, but with an emphasis on the cutting-edge technologies of IBM. The Eames relationship with IBM allowed the computer manufacturer the opportunity to present their technology in a wholly favorable light, and in the best possible context for the company. Many of the Eames films were commissioned expressly for IBM sales and demonstration pavilions at various world's fairs throughout the 1950's and 1960's. The environment of the fair, with its emphasis on technological and manufacturing marvels, showcased IBM's cutting edge technologies while emphasizing the wonders of a technological future. As Robert Rydell discusses, the function of modern world's fairs was to instill a utopian sense of wonder in the mind of the spectator, and to reinforce the teleological view of an ordered, ever improving vision of continuity and moral uplift.²⁷⁹ The function of these educational films was to place computers into the mainstream of technological

²⁷⁹ Robert W. Rydell, *World of Fairs: The Century-of-Progress Expositions* (Chicago: University of Chicago Press, 1993), 5.

advancement, and to ground it within a Western tradition of technological determinism. In this way, computers were not intrinsically different from any other technology.

Other educational films of note from the early 1960's include *Logic by Machine* (*Computer and the Mind of Man*) (National Educational Television 1965). This film (with music by the avant-garde composer Morton Subotnick) was produced through a grant from IBM as the first part of a series of films on computers produced by KQED San Francisco for National Educational Television (NET) the forerunner of PBS. *Logic by Machine* is similar to the Eames' film, *The Information Machine*, but dully and dispassionately narrated by mathematicians as talking heads. Providing an educational look at mathematical logic and its translation into machine language, *Logic by Machine* had none of the hyperbole or scare tactics of contemporary filmic representations of machines. In this account of computers, the machines are always in the service of human inquiry, and the idea that computers have abilities that outstrip human reason are simply not entertained.

Also of note is 1960's *The Thinking Machine* (CBS/Carousel Films), narrated by David Wayne and broadcast as part of the CBS *Tomorrow* series emphasized the more sensational aspects of computerization that fit more with the breathless accounts of anxiety producing machines than with the measured approach of the Eames' films. Wayne presents examples of computers playing checkers (and winning), learning to follow instructions, and writing an episode for a television western, punctuating each sequence with a pause to reflect on his rhetorical questions like "Is man obsolete?" and "Can we stop machines from taking over?" The program included a lengthy interview

with MIT computer engineer Dr. Jerome Wiesner, who acted to dispel the myths and fears that Wayne proposed.

While Wiesner was busy trying to convince viewers that computers were not ‘thinking machines’ regardless of the program’s title, his colleague and counterpart at MIT, Norbert Wiener, was making frightening headlines by stating that machines were fast approaching a point where they would be beyond the control of their human creators. “Thinking Machines Could Enslave, Even Destroy Man, Scientist Warns,” reported the *Washington Post*²⁸⁰, even though the content of Wiener’s talk as reported said nothing of enslavement. Headlines and stories like *The Los Angeles Times*’ “Man Called Future Slave of Machine,”²⁸¹ kept the idea of enslavement to machines alive. The sensationalism of the computer as existential threat constantly competed with educational attempts to provide a less hysterical view of computers as prosaic, but nonetheless interesting objects.

The Childlike Machine

Understanding the machines in terms of their limited capabilities precluded seeing them as a threat in the short-term. This emphasis on the limitations of computer technology was an almost constant companion to the descriptions of computers as accelerated thinking machines. However impressive the new devices were, press releases were quick to add, as in this initial War Department press release from 1946, that “Sponsors of the ENIAC point out that it can carry out numerous ‘logical’ operations but

²⁸⁰ Edward Gamarekian, "Thinking Machines Could Enslave, Even Destroy Man, Scientist Warns," *Washington Post*, December 28 1959, A1.

²⁸¹ Charles Stafford, "Man Called Future Slave of Machine," *Los Angeles Times*, October 23 1960, H1.

that it cannot do creative thinking.”²⁸² Although the capabilities of the Mark II computer were touted as extraordinary, *Time* magazine found it necessary to add “the machine’s range of acceptance is strictly limited. It cannot examine a field and a pretty girl, and conclude from the data available which would be more worth cultivating.”²⁸³ Or, the more highbrow variant:

If there were a robot that could respond to beauty, it would make no distinction between a landscape and a Ninon de Lenclos. All these automata must do what they are told to do. Always there must be an order—a perforated ribbon or card, a magnetic strip, a stretch of light-sensitive film, some external stimulus. So there is no danger of man’s being conquered by his own mechanical creations, whatever Samuel Butler may have thought.²⁸⁴

The computer’s calculating abilities may have outstripped the average man’s but men knew what to do with a woman! The relative impotence of the computer, while on the one hand gendering the computer as male, presents its maleness in a stunted or diminished form. The emasculating of robots is, of course, a popular trope in science fiction film: *Star Wars*’ (20th Century Fox, 1977) C3P0, Bruce Dern’s robot helpers in *Silent Running*, (Universal, 1970), the effeminate robot butlers of Woody Allen’s *Sleeper* (United Artists, 1973). However, the 1970’s and 80’s also brought us hypersexualized computers: *Demon Seed* (MGM/United Artists, 1977), *Saturn 3* (Associated Film Distribution, 1980), hypermasculine ones: *Westworld* (MGM, 1973), as well as hypersexualized and hypermasculine ones: *Blade Runner* (Warner Brothers, 1982).

Concurrent with discourses of power and superiority, early computers were described as infantile and childish. Going hand-in-hand with threatening speed of

²⁸² Press Release: Ordinance Department Develops All-Electronic Calculating Machine.

²⁸³ "A Robot's Job," 48.

²⁸⁴ "Electronic Robots."

electronic computers was a sense that the perceived intelligence of the machines, in as much as it was seen to have existed at all, was naïve, childish, and simple. The identification of computers with children is, on one level, an extension of the metaphor of the engineer/scientist as creator—using his intellectual power to mimic or supplant the biological process of giving birth that is marked as feminine. The masculine intellect and powers of masculine reason can perform the miracle of creation—appropriating the power of the feminine and maintaining the primacy of masculine work over feminine labor. Reports of advancements in new technology appropriated the rhetorical flourishes of parenthood and the announcement of a new generation of computer often sounded more like birth announcements: “They’ve named him Whirlwind One. At birth he’s faster, his proud parents say, than any of his older relatives.”²⁸⁵

If scientists and engineers give birth to new technologies, then it is hardly surprising to interpret these technologies through the language of childhood development. Waldemar Kaempffert, writing in the *New York Times*, described the engineers’ rationalization of the birth metaphor by explaining that “one scientist excused the absence of a colleague, the inventor of a new robot, with the explanation that ‘he just couldn’t bear to leave the machine at home alone,’ just as if it were a baby.”²⁸⁶ In another article, aptly titled, “Care and Feeding of Robots,” the author describes the principle engineer on the project as the new computer’s “constant companion. He supervised its birth and nursed it through infancy. Now, with his associate, Ralph Slutz, a scientist of Princeton’s Institute for Advanced Study, and an eager young staff of 50 young scientists and

²⁸⁵ R.B. Cole, "Whirlwind One: Speediest Electronic Brain," *Science Digest*, February 1952, 92.

²⁸⁶ Waldemar Kaempffert, "Science in Review-Machines That 'Think' Arouse Some Thoughts at Institute of Electrical Engineers," *New York Times*, February 6 1949, E11.

technicians, he attends its growing pains.”²⁸⁷

Of course, as computers are born, so do they mature, and the terms used to describe computers reflect the language used to describe childhood development. Norbert Wiener was reported as seeing “no reason why they can’t learn from experience, like monstrous and precocious children racing through grammar school,”²⁸⁸ in a *Time* magazine article titled “In Man’s Image.” The title acts to encapsulate the full weight of the metaphor of man as creator with godlike overtones, while Wiener’s image of the computer is from a decidedly paternalistic vantage. The computers are presented as learning as children do, in fits and starts, and as capricious at times: “The student put to the test at the University of Illinois was 8 ½ ft. tall, 10 ft. wide at the shoulders, and packed with green-faced cathode-ray tubes and little red neon lights,” *Time* reports, “like other electronic computers, ORDVAC is comparatively tongue-tied—like a bright child that won’t show off before company.”²⁸⁹ Meanwhile, *Newsweek* states that “whining like a spoiled child, the machine went about its work. Yet five minutes later, for all its complaining, it had performed 500,000 additions, 200,000 multiplications, and 300,000 other mathematical operations—a job that would have taken an expert mathematician many months.”²⁹⁰ The capriciousness of the computer didn’t undercut the power of the machine on the one hand, but allowed the computer to be reframed in a way that had a metaphorical resonance with the practical experiences of parenting. The potential of the new technology preserves the importance of paternal control, naturally in the hands of an

²⁸⁷ Schurmacher, 63.

²⁸⁸ “In Man’s Image,” *Time*, December 27 1948, 45.

²⁸⁹ “Fast Student,” 42.

²⁹⁰ “Sublime and Ridiculous,” *Newsweek*, August 29, 1949, 51.

enlightened father, who's task is to guide a youth toward a respectable position in the social order. When handled with a firm, paternalistic hand, a computer like the "MANIAC, now 9, is constantly showing how it can be an ever more useful member of adult society."²⁹¹

The controlling metaphors of computer technology were used to position the new technology within the realm of the familiar social order, with the image of the benevolent father proudly bragging about the intelligence and athleticism of his progeny while indulgently marking its shortcomings as youthful folly. The effect was to allow the male observer of the emerging technology to take a vicarious pride in the achievements of the engineers while not taking the threat to his manhood too seriously. Or, as James Newman, writing in the *New Republic*, put it: "fears of mechanical calculators are, of course, nonsense. However brilliant the future of the electronic calculator, it will remain, except for specialized talents, zany in comparison with a half-witted boy of eight."²⁹²

This paternalism was necessary within the logic of the discourse of childlike machines. In the same way that computers were presented as infantile and in need of instruction, early computers were also presented as requiring guidance to be of any use at all. Here the controlling metaphors shift from the childlike to the decidedly inferior based upon their very structure. Machines were naturalized as anthropomorphic figures bearing an uncanny, though predictable, resemblance to their creators. The metaphors that emerged in the discussion on the status of computers as thinking machines, delivered another uncanny set of resemblances to past debates on the status of others as rational

²⁹¹ "Maniac of Princeton," *Newsweek*, August 1 1955, 71.

²⁹² James R. Newman, "Custom-Built Genius," *New Republic* (1947): 14.

creatures.

Computers as Slaves

The ontological status of thought in computers marked their existence as beings fit for consideration. “Does SWAC really think? The answer depends upon your idea of what thinking consists of. Robots like SWAC are really slaves in the way that they carry out instructions to the letter, and no more,”²⁹³ considers the *New York Times* as it works through this question in 1950. The *Reader’s Digest* stretches the metaphor further by remarking that: “so many different kinds of mechanical slaves are being perfected that engineers now qualify for degrees in them; three technical magazines have recently begun publication to keep the mechanical slave trade up to date.”²⁹⁴ The idea of computers as slaves seems to have found a ready-made niche to occupy allowing racial arguments from the previous century to be recast in modern terms. The discourse hinged on the idea of difference and sameness and the difficulty to be had in reconciling the two. If we say that machines think, what effect does that have on our status as the lone rational thinking entities on the planet? If in fact they are capable of performing tasks that we currently describe as thinking, what makes us different and therefore maintains our position as unique and privileged? As Stuart Chase concludes, “The 701 and his brothers and cousins also store memories and learn from experience; [...] their power to imitate this function of the brain gives them the right to be called “machines that think.”²⁹⁵ And “[Norbert] Weiner believes that the human brain resembles a computing machine—and

²⁹³ "New Robot 'Brain' Cuts War Figuring," 21.

²⁹⁴ Ira Wolfert, "What's Behind This Word 'Automation'," *The Reader's Digest*, May 1955, 43.

²⁹⁵ Chase, 144.

vice versa. Dr. Warren McCulloch, professor of psychiatry at the University of Illinois College of Medicine, goes further: he says that the brain is actually a computer, and very like the computers built by men.”²⁹⁶ Here, the ontological presence of thought is not in itself a deciding difference between humans and machines. The determining factor becomes not thought, but how much thought, and what kind. “McCulloch, a physiologist, pointed out that the electronic counterpart of a human brain would be about as big as the Empire State Building and would require for its “thinking” and other activities all the electricity that Niagara Falls could generate.”²⁹⁷ This way of visualizing though as brain power suggests the sublime reading of computers as capable of astronomical calculations pales in comparison to the power of the human brain. As Kaempffert concludes, “a comparison like that is the most flattering comparison that can be paid to the ingenuity that nature showed in designing the human brain.”²⁹⁸ Warren McCulloch’s observation of the relative abilities of computers was intended to put the machines into perspective and to attempt to move the terms of discussion away from a metaphysics of thought that posited a mind as distinct from the brain it occupies. For McCulloch, human thought was ultimately reducible to a set of electro-chemical processes that could be imitated through mechanical means, though current technology would make a construction with the capacity of a human brain impossible. McCulloch posited that there were no qualitative differences in thought between humans and machines, only quantitative ones. The difference becomes apparent in orders of magnitude: “A calculating machine with 10,000 tubes can be compared in intelligence

²⁹⁶ "The Thinking Machine," 54.

²⁹⁷ Kaempffert, "Science in Review-Machines That 'Think' Arouse Some Thoughts at Institute of Electrical Engineers."

²⁹⁸ *Ibid.*, E11.

with a flatworm.”²⁹⁹ The measure of the machine can be taken through analogous comparisons through the taxonomy of the animal kingdom, with the human brain working feverously at the top. For McCulloch the eventual eclipsing of humans by computers was simply a matter of time, despite their relative primitive or underdeveloped nature.

The upshot of this argument was that there remained certain types of thought that computers simply couldn't do. Computer's couldn't 'reason' or think creatively. As *Time* magazine reported for their cover story on the MARK III, Howard Aiken (who was instrumental in the development of the MARK I, MARK II and MARK III computers) stated: “machines show, in rudimentary form at least, all the attributes of human thinking except one: imagination. Aiken cannot define imagination, but he is sure that it exists and that no machine, however clever, is likely to have any.”³⁰⁰

Aiken emphasized the difference between human minds and computers. A machine, because of the intrinsic capabilities of the human mind for imaginative or creative thought, could not cross the frontier of consciousness. J. Presper Eckert, The co-developer of the ENIAC “disclaimed the idea that Binac, UNIVAC, or any other of the automatic computers now operating or being planned would be capable of intuitive or creative thought,”³⁰¹ and the *New Yorker* opined “Their only advantage over the human mind has been in speed and accuracy. They've never generalized from past events, as we do, and the ability to generalize is an important factor in learning.”³⁰² Although Stuart

²⁹⁹ "Artificial Brain Depicted by Doctor," *New York Times*, February 1 1949, 27.

³⁰⁰ "The Thinking Machine," 54.

³⁰¹ "Sublime and Ridiculous," 52.

³⁰² "Heuristics," *The New Yorker* (1959): 22.

Chase calculated his sense of inferiority in the face of a machine that was 100,000 times his better, he also concluded “they will become more clever, rapid and useful in answering more kinds of questions. But that is all they can do with questions. They will never be able to ask one.”³⁰³

The opposite of creative thought, however logical, was a slavish devotion to orders that necessitated the continued role of master in the human computer relationship. As a reporter for *Newsweek* commented: “Although the experts use words like “memory,” they don’t like to hear their machines described as “brains.” The mechanical computers have no creative ability; they merely follow instructions.”³⁰⁴ A writer for *Science News Letter* concurred: “They lack reason and cannot do what man endowed with reason can do, namely, screen sense from nonsense and make decisions from inadequate or even incorrect data. [...] It is, therefore, “unthinkable” that they could ever outstrip and enslave man by their intellectual power, as some admirers of the electronic mechanisms have predicted.”³⁰⁵ More than a decade separates these two comments. What is surprising is the survivability of the anxiety that computers are destined to rule the world, and that it is creativity and reason that keep us afloat.

Captain Kirk and the Meta-Solution

As the 1960’s progressed, computers became more of an expected part of the high-tech landscape as portrayed on television and were used freely wherever calculations were needed. The popular spy drama *The Man from U.N.C.L.E.* featured a

³⁰³ Chase, 144.

³⁰⁴ “Calculation Ad Infinitum,” 58.

³⁰⁵ “Electronic Computers Are Not “Think” Machines,” *Science News Letter*, October 21 1961, 271.

prominently placed computer that was integral to the agency's success against their nemesis, THRUSH (a global syndicate dedicated to the enslavement of the world). A cold war in miniature was played out in the episode, "The Ultimate Computer Affair," (1965) when THRUSH seemed on the verge of developing a supercomputer that would outclass the U.N.C.L.E. computer, underlining the importance of maintaining supremacy in data processing ability. This ability was routinely parodied in the *Batman* television series, with the "Bat-computer" routinely answering real-language questions with often oblique, terse replies printed on index cards. The bat-computer's answers to queries were often about as revealing as fortune-cookie fortunes, but were always immensely helpful to Batman in cracking the case. In these television series, the computers were safely delegated to the role of helper and not portrayed as a threat. However fanciful their interfaces and the ability to process real language queries, the UNCLE and Bat-computers kept to their assigned roles. If they had any misgivings or feelings of superiority toward their human minders, they kept their thoughts to themselves. They were symbols of a level of technological sophistication that was comforting in the face of criminal masterminds and global conspiracies.

The representation of computers as childlike, that is, not masters of syllogistic logic, but merely novices, acted as a countermeasure to a sense of inadequacy in the face of technology. This representation was prevalent in cinematic representations of computer technology in the 1950's and 1960's. The machine's slavish devotion to logical operations based on all-inclusive statements and binary set rules proves its undoing in many films and television programs of the era. The plots of films as disparate as 1956's *Desk Set*, and 2001: *A Space Odyssey* turn on the difference between humans

and computers as one of operational logic and a flexible interpretation of reality as multifaceted and open to interpretation.

As the use of syllogisms to entrap computers into self-destructive loops served the immediate needs of the plot, a broader consideration of the use of this device demonstrates the hero as someone not bound by logic alone, but able to combine logic with a specific set of masculine traits that together create an idealized actor uncowed by the power of technology. It is no accident that, in the universe of *Star Trek* and the starship Enterprise, Captain Kirk (William Shatner) is able to freely select from a toolkit that contains elements of logic, passion, sexuality, instinct, and reason as needed to fulfill his mission. Note that *Forbidden Planet* is in many ways a prototype for numerous *Star Trek* episodes, as well as, to some extent, Jean Luc Godard's *Alphaville: A Strange Case of Lemmy Caution* (Athos Films, 1965). *Alphaville* is a departure from the American films regarding computer technology in form, but not in content. The rough outline of the plot—Lemmy Caution (Eddie Constantine) is sent to sabotage the totalitarian/fascist computer that rules Alphaville—would not be out of place as an episode of *Star Trek*. The computer has outlawed emotion and other illogical attributes of the human psyche. Lemmy, by reintroducing love into the vocabulary of the computer, causes it to malfunction, shorting out the control it has over the citizens of the town. Like *Star Trek's* Captain Kirk, Lemmy Caution uses a mixture of bravado, sexuality, and defiant illogic to confound the machine. The recurring motif in *Alphaville*, like *Forbidden Planet*, *Fail Safe*, and various episodes of *Star Trek*, is that science and technology are unbalancing, and that the presence of thinking machines leads to thinking like machines. The compromises required to interface with machines creates a porous boundary between

human thought and machine logic, where humans quickly start thinking like machines, denying their less rational, subconsciously driven fears or desires.

Star Trek reminds the viewer continuously that although Mr. Spock (Leonard Nimoy) is more knowledgeable, stronger, more logical, and in control of his emotions at all times, he is not the one in charge, but rather the second in command. Kirk as a completely masculine character is presented, for all his flaws, as rightfully in control over the emotionless, and thus sexless and neutered Spock. Spock, whose infallible logic and superior strength resembled the image of the computer as more, but still intrinsically less, than his human counterparts, was routinely compared with and accused of being a machine.

Kirk: But only a machine, Mr. Spock. The original Landreau programmed it with all his knowledge but he couldn't give it his wisdom, his compassion, his understanding, his soul, Mr. Spock.

Spock: Predictably metaphysical. I prefer the concrete, the graspable, the provable.

Kirk: You'd make a splendid computer, Mr. Spock.

Spock: That is very kind of you, captain.

Kirk's masculine bravado and swagger made him much more emotionally or instinctively driven, and thus less predictable than his logical science officer. This unpredictability extended to the use of logical paradoxes as a timeworn method for undermining computers that had managed to get out-of-control. Kirk was masterful in his deployment of paradoxes to shatter the façade of computer supremacy that was typically granted to the machines by various populations and crewmembers. Kirk often used a variation on the self-referential paradox (Epimenides Paradox: e.g. 'All Cretans are

liars...') to break out of a mechanical trap as in the episode, "I, Mudd" (NBC/Desilu, 1967):

Kirk: "Listen carefully, Norman. Everything he says is a lie."

Norman (a robot): "Everything he says is a lie."

Spock: "I'm lying."

Norman: "If everything you say is a lie and you say you are lying then you are telling the truth telling the truth but you are lying if you are telling the truth..."

Norman, as a machine, is effectively locked-up by this circular logic with smoke pouring from under his collar. The logic expressed here is the same as the logic embedded in Joseph Heller's 1961 novel, *Catch-22* that is a self referential and self canceling paradox is only possible within a proscribed space (for Heller's Yossarian, the self-referential world of the U.S. military). The closed space of formal logic that governs the universe of computer programs is the same type of bounded world. The solution for the crew (and especially the captain) of the starship Enterprise is always to respond flexibly to the constraints of formal logic and to know when to break the rules as part of a meta-solution that redefines reality outward—changing the rules to exploit paradoxes that flummox machines. For Norman the robot, all statements are always either true or false, never both, so the possibility of a sentence that contains its own negation is impossible. Forced to dwell upon this possibility, Norman the machine loops endlessly.

Just as Norman fails to think broadly enough to recognize the paradox for what it is and simply disregard it as an anomaly of human language, the rogue computer Nomad, in the second season episode "The Changeling" (NBC/Desilu, 1967) fails to grasp the

contingent nature of reality and falls into a trap of its own making, aided by Kirk:

Kirk: "I created you?"

Nomad: "You are the creator."

Kirk: "But I admit I'm imperfect—how could I have created such a perfect thing as you."

Nomad: "Answer unknown—I shall analyze— Analysis complete— insufficient data to resolve problem — I am Nomad. I am perfect. That which is imperfect must be sterilized."

Kirk: "You must sterilize in case of error."

Nomad: "Error is inconsistent with my prime function—Sterilization is correction."

Kirk: "Everything in error must be sterilized."

Nomad: "There are no exceptions."

Kirk: "Nomad. I made an error in creating you."

Nomad: "The creation of perfection is no error."

Kirk: "I did not create perfection I created error."

Nomad: "Your data is faulty. I am Nomad. I am perfect."

Kirk: "I am the Kirk, I am the creator?"

Nomad: "You are the creator."

Kirk: "You're wrong. Jackson Roy Kirk, your creator, is dead. You have mistaken me for him. You are in error. You did not discover your mistake; you've committed two errors. You are flawed and imperfect. And you have not corrected by sterilization—you've committed three errors."

Nomad (in a high pitched voice): "Error! Error! Error!"

Kirk: "You are flawed and imperfect!"

Nomad: "I shall analyze... Error! An-a-lyze!"

(Smoke and electronic buzzing. Nomad shakes and its lights flash randomly)

The Nomad computer, with its sterilizing function, is the antithesis of Kirk and his masculine fecundity. Although computers do not threaten Kirk and his crew in every episode, Kirk does establish a love interest in most. At times, as in the "Requiem For

Methuselah” (NBC/Desilu, 1969) episode, the computer and the love interest are the same as Kirk falls in love with an android, who dies after getting stuck in a logic loop over the nature of love. The computers in *Star Trek*, for all their technological and logical sophistication, remain naïve, and the representation of computers as either childlike or female worked both as a means of disempowering computers by relegating them to the status of helpers and as a means of re-inscribing machines as bound by a logic inherently alien to the controlling psychology of men. The taming of computers, like the neutering of Spock, in the *Star Trek* universe represents the delegation of dispassionate logic to a junior partnership, and reinforcing the power of masculine illogic and disregard for formal constructs as the key to patriarchal domination.

HAL Versus Colossus: Two Films About Dominance

“We are fighting not each other but rather this big rebellious computerized system, struggling to keep it from blowing up the world.”³⁰⁶

By the mid-1950’s, automation and computers, though not clearly a threat in the real-world arena of employment, were nonetheless represented as an imminent threat to human individuality and freedom. As we have seen in Chapter 2, this threat was linked metaphorically to the perceived threat of communism and the idea of the totalitarian mass man that had recently plagued Europe. The idea of chess as a means of exploring this anxiety, especially with a computer that was not capable of playing the game as well as an amateur player, provided some relief from the fear of a communist or technological takeover. The realm of popular science fiction television and film provided another,

³⁰⁶ Eugene Burdick and Harvey Wheeler, *Fail Safe* (New York: McGraw-Hill 1962).

more graphic representation of beating the computer at its own game.

Paul Schrader, writing on the Charles and Ray Eames' film "*Powers of Ten*" in *Film Quarterly* in 1970, preferred the technological integrity the Eames brought to the computer and to their view of the universe:

The Interstellar roller-coaster ride of *Powers of Ten* does what the analogous sequence in *2001: A Space Odyssey* should have: it gives the full impact—instinctual as well as cerebral—of contemporary scientific theories. (In comparison, *2001* [...] seems *astounding*.) (italics in the original).³⁰⁷

Schrader's sympathy for the Eames' experiments in giving weight and force to the prosaic objects that occupy their films, stands in studied contrast to the mythmaking and metaphysics that ground Kubrick's approach to computer technology, and the relationship between humans and their machines. Where, for Schrader (using Eames as a point of reference) a machine (any machine) is best seen as a tool for human development and expression, he is in no way interested in providing the machine with any agency, either as an intelligence or as a system with a gravity of its own. By contrast, Kubrick's exploration of systems and systemic thinking (which pervaded his films from *Paths of Glory* through the end of his career) presupposes that systems have an intelligence (if not a consciousness) that cannot be ignored if one wishes to transcend the limitations of technological society and oppressive systems.

The relative naiveté of computers—their narrow bandwidth-- comes to symbolize the confining roles of traditional society and the process of immersion within the minutiae of everyday life. From the rigid and sequential logic of computer programs, to

³⁰⁷ Paul Schrader, "Poetry of Ideas: The Films of Charles Eames," *Film Quarterly* 23, no. 3 (1970): 3.

its demands for uniformity, computers were metaphors for a specific type of adulthood of social responsibilities, mortgages, and 9 to 5 jobs. The identification of computers with the daily grind is one way of interpreting Kubrick's *2001: A Space Odyssey*.

Contemporary critics were in many instances unimpressed and baffled by film's dialog, especially when juxtaposed with its breathtaking imagery. As Stanley Kauffman, writing in *The New Republic* complained, "There are only 43 minutes of dialog in this long film, which wouldn't matter in itself except that those 43 minutes are pretty thoroughly banal." The world of dialog in *2001* is the world of bureaucracy and meaningless self-referential platitudes, and the relatively insipid nature of the exchanges tends to highlight just how far from the heroic the characters have strayed. In many ways, the human characters are difficult to differentiate from the machines they share space with. The rockets and space stations move with an elegant grace to Strauss' 'Blue Danube Waltz,' while the humans jerky zero gravity walks seem more mechanical. Kubrick conflates the humans and machines to make his point that as our technology becomes more human, we have become more machine-like, until it is difficult to discern who is controlling whom. What Kubrick proposes is, in effect, a successful completion of the Turing test where the machine can be confused with a human not only because the machine has become so lifelike, but because we have become so routinized and enveloped in our systems as to be synonymous with them.

In this regard, Kubrick borrows from his earlier creation, the warped cyborg *Dr. Strangelove*, who is endlessly fighting with his prosthetic half while jerkily spouting technocratic advice that, for all its concern with human lives or experiences, could just as easily have come from a machine. But the Kubrick of *2001: A Space Odyssey* also owes

a debt to the film that can be thought of as the dramatic inverse to the black comedy of *Dr. Strangelove—Fail Safe* (Columbia Pictures Corporation, 1964). Where *Dr. Strangelove* cast the technocratic thinking and apocalyptic scheming of the military industrial complex as comedy, *Fail Safe* takes on the same material with deadly earnestness. The apocalyptic energy of *Fail Safe* comes from the banal evil of everyone doing their jobs and performing as proscribed by their training and the demands of their processes. Early in the film, as two old pilots converse over a game of pool at the ‘Club Igloo’, the officer’s club at a base outside Anchorage, Alaska:

Grady (Ed Binns): After us, the machines, we’re halfway there already. Look at those kids. Remember the crews you had on the 24s? Jews, Italians, all kinds-- you could tell them apart, they were people. These kids, you open ‘em up and find they run on transistors.

Billy: Aw, they’re good kids I tell ya.

Grady: Sure, you know they’re good at their jobs but you don’t know them. How could ya? You get a different crew every time you go up.

Billy: That’s policy Grady. It eliminates the personal factor. Everything’s more complicated now—reaction time’s faster. You can’t depend on people the same way.

Grady: Who do you depend on? You know something Billy, I like the personal factor.

The assessment of Col. Grady is one that informs the entire film. The systems that we depend on to give us an edge in the cold war have a dehumanizing effect. The distinction between systems and the people trained to carry out the processes dictated by the systems becomes blurred to the point where there is no individuality or accountability. Unlike *Dr. Strangelove*, where the systems are so totalizing that the only

response is absurdity (e.g. loving the bomb), the characters who inhabit *Fail Safe* are uneasy about the systems they perpetuate and question how they came to be so dependent on their systems. A visiting congressman at Offit Air Force Base outside Omaha, Nebraska, while reviewing the cutting edge technology of the base's early warning systems, comments, "To tell you the truth, these machines scare the hell out of me. [...] I want to be damn sure that thing doesn't get any ideas of its own."

General Bogan: (Frank Overton): I see what you mean Mr. Raskob, but that's the chance you take with these systems.

Congressman Raskob (Sorrell Booke): Who says we have to take that chance? Who voted who the power to do it this particular way?

General Bogan: It's in the nature of technology. Machines are developed to meet situations.

Congressman Raskob: Then they take over and start to make situations.

General Bogan: Not necessarily

Congressman Raskob: There's always the chance, you said so yourself.

General Bogan: We have checks on everything, Mr. Raskob — checks and counterchecks.

Congressman Raskob: Who checks the checker? Where's the end of the line gentlemen? Who's got the responsibility?

The confluence of everyone doing exactly what they were trained to do is a series of events that cascade into the destruction of Moscow by an American nuclear attack and the president of the United States' decision to destroy New York to forestall a full-scale nuclear war with the Soviet Union. *Fail Safe* makes clear that no-one is directly responsibly for any of the actions that take place, and this lack of responsibility makes

everyone culpable. The president takes responsibility ultimately, but the film ends with no clear indication as to whether his gesture of destroying New York would, in fact, save the world.

If the consequences of surrendering critical decisions to computers and systems lead to nuclear war in *Fail Safe*, it also lends a backdrop to the world inhabited by the crew of the Discovery in *2001: A Space Odyssey*. Just as in *Fail Safe*, the decisions that lead up to HAL's taking over the ship and killing the crew are logical, though a common critical assessment of *2001: A Space Odyssey* focuses on the insanity of HAL as the driving force behind the film's relatively spare plot. The madness of the machine, evidenced by its paranoiac murder of everyone onboard the Discovery spaceship, causes Dave Bowman (Keir Dullea), the lone survivor, to disconnect HAL and to face alone the black monolith circling Jupiter. HAL is not insane at all, really. It is simply that his operational logic does not require human beings, and so he is willing to dispense with them to eliminate what he computes as a real tactical threat to the mission. The humans add little to the success of the mission in HAL's estimation, and are no match for HAL in terms of intelligence. Though he sounds ingratiating, he is at the same time condescending in his interactions with the crew. The power of HAL, that he really controls the ship and through that the crew, is belied by his obsequiousness.

The visual universe of *2001: A Space Odyssey* is rich with images to suggest that the human crew of the Discovery mission is enclosed within the all-seeing gaze of the HAL 9000 computer. Our first glimpse of HAL (or at least his 'eye', which is all we ever see until we enter his 'brain' later in the film) is as an eye that reflects the entry of Dave

Bowman as he spirals around the core of the ship's command module. Just prior to the first shot containing HAL's eye, we see Frank Poole (Gary Lockwood) running around the command module like a hamster on a wheel. The connection between the crew and HAL is set up immediately as suggesting the relationship between the observer (HAL) and the observed. The power dynamic between human and machine is decidedly in the machine's favor.

This disjuncture marks the first portion of the film on board the Discovery spacecraft as oddly tense for all its lack of action. HAL's dominance seems all the more out of place because of the lack of concern shown by Dave and Frank to the idea that they have been usurped by a machine.³⁰⁸ Like the organization man of the 1950's the weak patriarchy of Frank and Dave creates a vacuum that leads to chaos. As in *Desk Set*, where the gendering of the EMERAC computer is much more explicit, HAL's gender was, at least to some contemporary critics, decidedly androgynous. In her review of *2001: A Space Odyssey* for *Film Quarterly*, Judith Shantoff explains that "The ship is also run by the machine/human HAL, who talks in a male voice but has a red eye shaped like a female breast. As soon as we hear the voice of this androgyne we know he's a fink."³⁰⁹ *Newsweek* was more explicit in its gendering by stating that the section of the film that takes place on the Discovery spaceship was "a long, long stretch of very shaky comedy-melodrama in which the computer turns on its crew and carries on like an injured party in

³⁰⁸ M. Keith Booker, *Alternate Americas: Science Fiction Film and American Culture* (Westport: Praeger, 2006). Booker states that this lack of concern for their reality marks the communicative failure of 21st century humanity critiqued in the film.

³⁰⁹ Judith Shantoff, "A Gorilla to Remember," *Film Quarterly* Autumn (1968): 58.

a homosexual spat.”³¹⁰

The gendering of HAL as ‘androgynous’ or homosexual matters in that it marks a difference that makes HAL sexually ambiguous and, like the childlike computers of *Star Trek*, prey to meta-solutions that the computer fails to grasp. The undoing of HAL is his inability to consider the possibility that Dave could re-enter the ship without his helmet by exposing himself for a few seconds to the vacuum of space as he accesses the emergency airlock. This solution to Dave’s seemingly insurmountable problem is, like the solutions deployed against the many controlling computers of *Star Trek*, a departure from the logical thinking of the machine to a meta-logical approach to problem solving that involves creativity, intuition, and perhaps a bit of luck. Dave’s ability to outwit the machine comes from his ability to transcend the boundaries of logic systems and embrace a decidedly human approach to survival that, by succeeding, demonstrates his eligibility to enter the stargate and achieve next level of consciousness promised by the film’s end.

But before that can occur, HAL’s impertinence has to be dealt with by disconnecting his higher logic circuits. As HAL pleads for his consciousness, Dave disconnects modules from his circuit panel and HAL’s voice slows and slurs. The electronic lobotomy Dave performs on HAL reduces him to a pliant, childlike state.

Good afternoon, gentlemen. I am a HAL 9000 Computer. I became operational at the H.A.L plant in Urbana, Illinois, on the 12th of January 1992. My instructor was Mr. Langley, and he taught me to sing a song. If you’d like to hear it, I can sing it for you.”

Dave: Yes, I’d like to hear it HAL, Sing it for me.

³¹⁰ "Kubrick's Cosmos," Newsweek, April 15 1968, 100.

HAL: It's called Daisy... Daisy, Daisy, give me your answer, do.
I'm half crazy...³¹¹

HAL regresses to a child singing a song as Dave floats inside his womblike interior, suggesting the link between his new passivity and femininity. As Donald Palumbo suggests, the science fiction generic trope of merging with technology or penetrating technological systems is sexual in nature, and explicitly coded with masculine sexuality and desire.³¹² Dave's successful reestablishment of his authority over the machine allows for his own rebirth to occur.

Throughout the sequences showing life aboard the Discovery spacecraft, control is given over almost completely to the ship, with HAL as the brain. HAL boasts about his perfection to the BBC interviewer while Dave and Frank give hesitating, equivocating answers as to whether or not HAL has real emotions and what it's like to work with him. HAL controls this small universe, and the crew, because of their dependence on technology, is no match for HAL's logic. Like *Colossus: The Forbin Project*, directed by Joseph Sargent, the thinking power of the machine is expressed relatively, with comparisons to human ability made over the chessboard. In *2001: A Space Odyssey*, HAL defeats Frank, who reacts as if the defeat is no surprise. The Colossus computer beats Forbin, who again seems resigned to the defeat. The chess match, like the abstract mathematical symbols that flash across Colossus' (and HAL's) screens is a marker of his intelligence. Besting humans at chess in these films is a visual shortcut for demonstrating

³¹¹ Arthur C. Clarke, co-author of the screenplay for *2001: A Space Odyssey* was in attendance at a 1962 demonstration of computerized voice synthesis at the Bell Laboratories in New York. An IBM 704 computer was programmed to sing along with musical accompaniment. The song "Bicycle Built for Two" was the song performed by the 704. Clarke later included this song as 'Daisy' in the screenplay.

³¹² Donald Palumbo, "Loving That Machine; or, the Mechanical Egg: Sexual Mechanisms and Metaphors in Science Fiction Films," in *The Mechanical God: Machines in Science Fiction*, ed. Thomas P. Dunn and Richard D. Erlich (Westport: Greenwood Press, 1982), 117-128.

intellectual mastery. But unlike HAL, Colossus does not have to face a human adversary versed in the tactics of meta-solutions. The creativity shown by Dave in *2001: A Space Odyssey* is never matched by Forbin, or any of his staff in *Colossus: The Forbin Project*.

Unlike *2001: A Space Odyssey*, *Colossus: The Forbin Project* is decidedly cynical in its portrayal of humanity as caught within a technological prison. The film opens with Dr. Charles Forbin walking through his grand invention—the Colossus computer. The shots of the computer and the scale of the machine are reminiscent of the endless computer core in *Forbidden Planet* with its array of uniform corridors of blinking lights. The effect is both to demonstrate the scope of Forbin’s achievement, and the scale of the ‘brain’ he has created. As Forbin exits the computer and activates the computer’s defenses, we become aware of how deeply embedded Forbin, and by extension we, are in the military-technological matrix of the cold war. At a press conference announcing the activation of Colossus, which was designed to take over all command and control functions for American nuclear defense, Forbin tries to dispel the common anxiety of what would happen if the machine took it upon itself to act.

Forbin: Colossus’ decisions are superior to any we humans can make. It can absorb and process more knowledge than is remotely possible for the greatest genius that has ever lived. And even more important, it has no emotions. It knows no fear, no hate, no envy. It cannot act in a selfish fit of temper. It cannot act at all if there is no threat.

Is Colossus capable of creative thought? Can it initiate new thought? I can tell you that the answer to that is no. However, Colossus is a paragon of knowledge, and its knowledge can be expanded indefinitely. I hope, along with all the scientists that helped make this particular project, that the immense power of this computer will not only be used for the defense of this country, but also hopefully as an aid to the many problems we face on this

Earth.

The Colossus computer begins learning exponentially and, by linking up with its Soviet counterpart (the Guardian computer), learns to hold the world hostage to its nuclear forces.

In gendered terms, Colossus is decidedly male. Unlike HAL who is ambiguously gendered, the Colossus computer is commanding and forceful and backs up its threats with decisive force. It sits at the head of the military industrial complex and is able to order soldiers to kill and assassinate as needed. Where HAL reverted to trickery to achieve its ends, Colossus simply issues orders to be carried out. Because Colossus is so unambiguously portrayed as masculine, the meta-solutions that should be open to Forbin are co-opted by the computer. Forbin is left with feeble attempts at trickery that are doomed to failure. His greatest success against the machine is to convince it that he has sexual needs that must be exercised in private. He uses this deception to communicate with his secretary without being observed by the machine, in order to plot Colossus' overthrow. By the end of the film, that overthrow has receded to hopelessness as Colossus begins remaking the planet to its specifications.

The moral of *Colossus, the Forbin Project* is not simply that we are at the mercy of our machines, but like the chess playing machines that populated the imaginations of the 1950's, the Colossus computer occupies a metaphorical role not so much as machine, but as a control system that asks for obedience in exchange for a specific version of utopia. In this view, Colossus is raw ideology borne out of cold war paranoia. As an overarching and overreaching protective system, Colossus resembles the caretaking robots in Jack Williamson's dystopic 1947 novella *With Folded Hands*, in which alien

robots, charged with protecting human beings from harm, slowly disallow any human activity. The forceful caretaking of the robots, like the forceful dominion of the Colossus computer, make their human subjects weak, dependent and emasculated.

The contrasting visions of *2001: A Space Odyssey* and *Colossus: The Forbin Project*, are simply exercises in which the better man wins, where winning means subjugating the other in a reenactment of the Hegelian master-slave dialectic. Like Hegel's parable, self-awareness (consciousness) comes by recognizing the consciousness of the other. The enslavement of one by the other is a product of fear. For Forbin, his fear of annihilation marks him as the slave of the machine who has no fear of death. Acceptance of this is predicated upon the acceptance of the consciousness of the machine. By granting the machine consciousness, and with it a tacit acceptance of it as an equal, the characters that populate *Colossus: The Forbin Project*, have ensured their slavery. By extension, by constantly delegating machines to a subaltern status, specifically marked as feminine, not only did the men of the post-war era grant themselves an out from eventual enslavement by machines, but reinforced their embattled sense of their masculinity against a perceived feminist onslaught.

Chapter 4: “We Have Your Mechanical Brain—Give Us Justice,” Protest Movements and the Occupation and Destruction of Computer Centers 1968-1972

Introduction

“Within the vast hierarchy of executive and managerial boards extending far beyond the individual establishment into the scientific laboratory and research institute, the national government and national purpose, the tangible source of exploitation disappears behind the façade of objective rationality. Hatred and frustration are deprived of their specific target, and the technological veil conceals the reproduction of inequality and enslavement. With technological progress as its instrument, unfreedom—in the sense of man’s subjection to his productive apparatus—is perpetuated and intensified in the form of many liberties and comforts.”³¹³

As computers became more commonplace, and more attached to centers of commerce, industry, and the military, they were conflated with the repressive structures of capitalism and the modern state. While dominion over computers was possible only for those who already controlled them, the people in control of the machines were also in control of the ‘system’ that waged war. The student uprisings gave voice to discontent and made use of the computer as a potent icon of state repression, threatening machines on campuses across the U.S. as proxies for a military-industrial complex that remained out of reach.

³¹³ Herbert Marcuse, One-Dimensional Man: Studies in the Ideology of Advanced Industrial Society (New York: Beacon Press, 1964, 1991), 32.

Radio, television and film narratives perpetuated totalitarian anxieties among the generations of Americans coming of age after the Second World War, making technological anxiety commonplace in the speeches, pamphlets, and manifestos of the student movements of the 1960's. By updating classic narratives of persecution and redemption against overwhelming odds, filmic representations of computers took cues from journalistic reportage, and positioned iconic representations of modernity as totalizing and dehumanizing. To be suspicious of large-scale technologies was to be skeptical of the intentions of those who controlled these technologies, or to have doubts that there was anyone in control at all. The computer representing the machine of late capitalism was a recurring motif in the language of the protest movements that gave the computer a symbolic value, helping to position it as a legitimate target for protest actions on college campuses across the US (and in one notable instance, Canada).

Of course, the most subtle and paradoxically, the most expressive occupation and destruction of a computer center in the 1960's did not take place on a college campus, but rather on the cinema screen. Stanley Kubrick's *2001: A Space Odyssey* paints on the big screen both the logic and the anxiety of computer as an icon of control. The HAL 9000 computer, which has become sentient and has plotted against and murdered all but one of the crewmembers on the ship, is 'killed' by the remaining crewmember, Dave Bowman, in a moving scene that provides the viewer, at least for a moment, with genuine sympathy for the computer. As Dave floats within the womblike interior of HAL's electronic circuitry, his act of disconnecting the computer is one of both terrorism and survival. Because the computer's voice is in some ways more human, more expressive than the people who occupy the ship or the myriad bureaucracies back on Earth, his pleading is

genuinely moving.

However much our sympathies lie with the computer, our empathies are firmly grounded within the experience of Bowman. He is, after all, like us both in form and in temperament and, like the protestors acting upon their convictions in the real world, he is performing the task of throwing his body upon an odious machine. The act of computer center occupations as a form of protest in the 1960's is, like the act of disconnecting HAL's higher functions, an act that metaphorically reinforces the human body's centrality in the narrative of human experience.

Societies often invest new technologies with portentous meanings-- granting them status as saviors or destroyers of civilization. New technologies, as Sherry Turkle points out, operate as a sort of Rorschach test for the anxieties of their age.³¹⁴ Computer technology was no different. From its inception, the development of computer technology offered up a mirror that reflected the hopes and anxieties of the post-war world. Computer technology, born out of the juggernaut of the second world war and often, at its inception, paired with its darker sibling the atomic bomb, came to represent many of the anxieties felt by people struggling to make sense of what was to become the cold-war world. Fears of economic displacement, totalitarianism, the death of the individual and the rise of other-directed groups of like-minded wearers of indistinguishable gray flannel suits plagued a population that also worried about the rise of a cold, calculating communism and automated factories.

At the center of this anxiety stood the computer as an icon of both the heights of

³¹⁴ Turkle, The Second Self: Computers and the Human Spirit, 20.

capitalistic enterprise and ingenuity and the dread that the machines were, in fact taking over and that we would be little more than cogs or some other replaceable part. Lewis Mumford best expressed this sort of strong determinism in the first half of the 20th century.³¹⁵ Mumford, writing in the era of the assembly line and mass production, drew upon the development of clocks in Benedictine monasteries to tell the story of the introduction of mechanical time and its impact on routines previously regulated by natural cycles and the rhythms of the human body. For Mumford, the development of the mechanical clock did not only provide a manner for measuring time, but for regulating and regimenting bodies and minds. Whatever good comes from machines, Mumford contended, comes at a cost in freedom.

Although this strong program in technology studies has been superseded by theories that are not as monolithic as Mumford's theory of megamachines, his approach to technology remained a popular one within the media culture of the 1950's and 1960's, both in the mass media and the underground press as technology appeared to continually spiral farther and farther out of control.³¹⁶ This attitude toward technological change and the impact of machines was especially acute for the first generations growing up alongside computers. Computers were equated with human thought and represented as machines that think like we do—only faster, from the very first press release touting the development of the ENIAC in 1946, to the Vietnam Era anxiety concerning the collection and collating of personal data within the federal bureaucracy. The emphasis on

³¹⁵ See Lewis Mumford, Technics and Civilization (New York: Harcourt Brace and Co., 1934).

³¹⁶ Mumford describes such examples of runaway technology as designed obsolescence and production for the sake of production without regard to human needs. See his Lewis Mumford, The Myth of the Machine (New York: Harcourt, Brace and World, 1967).

standardization and the artifacts of computer technology (e.g. punch cards) demonstrates the degree to which the computer as an icon of modernity as order was inbricated into the language of discontent in American life.

As student groups became more vocal in demanding a say in their academic lives and began to respond to the hypocrisy of the university environment, it made sense that they would target the computer as an icon of what Paul Edwards calls the ‘Closed World’. The computer was targeted at first not because of its linkage with the military—the military-industrial-academic axis was not exploited as a site of protest by the anti-war movement until after the first computer center occupations had already taken place. The original motivation for targeting computer data centers as sites for protest stemmed from the value of the data center as a physical investment and a site of prestige on university campuses, connected by the students with the prevailing view of computers as icons of standardization, regimentation, and dispassion. Once the computer center was breached as a site for protest, however, the practice became more commonplace and more violent, culminating in the bombing of the University of Wisconsin computer center, the University of Kansas computer center and the attempted bombing of the computer center at New York University in 1970. Targeting computer centers as sites for violent resistance marked a shift from the politics of the civil rights movement to the radicalized left of the anti-war movement. The destruction of computer centers (or their being held hostage) reinscribed the computer as a site of weakness within the closed world culture. The large computers and mainframes of the late 1960’s were seen as nerve centers that could be taken and held, disrupting war research and threatening the university as a machine for learning. It stripped the computer of symbolic dominance, replacing it with

a sort of impotence in its interactions with the physical world.

Ground Zero at the University of California at Santa Barbara

North Hall Seized

As we go to press, approximately 20 black students have barricaded themselves inside North Hall and the computer center.

They have vowed not to leave until Chancellor Cheadle answers all their demands.

The black students say, 'leave us alone and we'll leave the computer alone... We have your mechanical brain—give us justice.'³¹⁷

The first recorded protest occupation of a computer center on a college campus was the October 15th, 1968 occupation of the computer center at the University of California at Santa Barbara. The Black Student Union students demanded a “black studies program, black faculty, increased admissions for black students and black coaches in the athletic department,”³¹⁸ and staged a one-day sit in and occupation of the college computer center effectively holding the computer hostage and barricading themselves in the computer center with baseball bats, gas masks, and fire extinguishers.³¹⁹ The Black Student Union was a new fixture on the UC Santa Barbara campus in the affluent Santa Barbara community (known at the time as a bastion of the John Birch Society), and a

³¹⁷ "North Hall Seized," *Argo*, Oct 15 1968, 1. Special Collections Library - Labadie Collection, University of Michigan, Hatcher Graduate Library.

³¹⁸ Curtis J. Sitomer, "Blacks Ask Self-Determination at Santa Barbara," *Christian Science Monitor*, Nov. 14 1969, 7.

³¹⁹ "North Hall Seized," 1.

product of federal Educational Opportunity Program mandates to further integrate college campuses across the United States. The Black Student Union made repeated demands for more African American faculty and for courses that focused on ethnic studies. Although no explicit threat of violence was made toward the computer, the choice of the computer center as the location for the sit in was clearly an attempt to position themselves in proximity to a large and expensive piece of equipment as a means of getting the attention of the school's administration.

Previous protest by the students had not been fruitful and the students felt ignored by the administration. Students claimed that UC Santa Barbara Chancellor Vernon Cheadle was “dragging his ass on the issue of justice and completely avoiding the subject of institutional racism.”³²⁰ By changing tactics and seizing the UC Santa Barbara computer, this protest would prove largely successful after the students left without incident. The students had reportedly “disavowed the use of violence,”³²¹ and although it is unclear from the reporting whether the students intended to use the bats and fire extinguishers on the computer, or on anyone who attempted to remove them, the choice of the computer center as a site of occupation suggests the former. Within a year, the university Chancellor pushed through reforms in the university's administration and presided over the creation of an African-American studies program. The following fall, more than 400 African-American and 225 Mexican-Americans were enrolled and the university had its first black student body president.³²²

After twenty years in the public eye as a technology that had come to be an icon

³²⁰ Ibid.

³²¹ Ibid.

³²² Sitomer, 7.

of modernity that emphasized alienation, control, conformity, and a system that was widely considered dehumanizing, it is not altogether surprising that the computer was finally the focus of a concrete, rather than a rhetorical attack. What may be more surprising is that it took as long as it did for an organized group to identify the computer's iconic value as a significant site for a protest action. Because the computer was a symptom of American antipathy towards changes in the social landscape that seemed to displace individual needs and local eccentricities in favor of standardized forms of consumption, rationalized workplaces, and systemized and routinized daily existences, the computer represented all that was dehumanizing in one compact iconic representation. However, the fundamental acceptance of computers as objects points to a more complex relationship between Americans and the iconic importance of computers. Arguably, the totality of hegemony surrounding American business culture produced an environment where computers, and all they represented, were a natural part of the capitalist landscape to be navigated and negotiated, just like unemployment, economic downturns, old-boy networks, or shareholders. The size, inscrutability, and implacable logic of computer systems were symbols of bureaucratic excess and self-perpetuating orders of complexity. So while, on the one hand, the computer as an icon represented many of the fears of Americans in the post-war era, there was never a concerted movement to slow the development or deployment of computer technology—no American Luddite movement sabotaged the big machines from IBM, Unisys, or Burroughs Corporation. The most militant expression of antipathy towards computer systems was found in student movements during the 1960's. Student activists, fighting for a number of causes, saw in the large centralized mainframe computers of the 1960's a

perfect target, both symbolically and tactically, for focusing attention on their grievances.

The occupation of the computer center at the University of California at Santa Barbara, though peaceful, was part of an increased militancy on college campuses on the part of minority students. Pressing their demands for recognition and needing to be taken seriously as a social force, they had legitimate grievances concerning institutionalized racism in American life in general and on college campuses only slightly less so. The murder of Martin Luther King in April of 1968, along with the murder of Robert Kennedy and the police riot outside the Democratic National Convention in the summer of that year had created strains within the various student political movements as to whether or not non-violent actions were appropriate in an atmosphere of political assassination and a war in Viet Nam that continued to escalate. The student civil rights movement was the first to see the advantage of the computer as a target of protest and leveraged the rhetorical and the iconic value of the computer as expressed a few years before in Berkeley on the University of California campus in the context of the free speech movement.

The Berkeley Free Speech Movement: Punch Cards and Identity

By the fall of 1964, many students returning to the Berkeley campus of the University of California had participated in the Freedom Summer organizing and voter registration drives across the Deep South. Energized by their encounters with the Congress on Racial Equality, the Student Non-Violent Coordinating Committee and the Southern Christian Leadership Conference, as well as their exposure to the poverty,

racism and institutionalized injustice of the south, students attempted to continue organizing and agitating on the Berkeley campus. This proved difficult because of the authority of the university, as interpreted by its board of regents, to regulate the types of organizing permitted on campus and the strong sense of responsibility to act as chaperones of youth, *in loco parentis*.

The sense of enclosure felt by students entering college in the 1960s as exemplified by the Berkeley FSM took the form of metaphorical comparisons between humans and computers, universities and factories, students as punch cards, and a general feeling that students were being processed like raw materials, data points, or figured to be tabulated and output as generic types (the engineer, the chemist, the technician) to fit the needs of American industry. The university, instead of being an environment for investigation, was an assembly line for winnowing and categorizing students as raw materials. The emphasis on standardization and the artifacts of computer technology (e.g. punch cards) demonstrates the degree to which the computer as an icon of modernity as order was imbricated into the language of discontent in American life. As student groups became more vocal in demanding a say in their academic lives and began to respond to the hypocrisy of the university environment, it made sense that they would target the computer as an icon of the “machine.”

Along with the computer, the punch card symbolized a dehumanized and impersonal world where individuals could be reduced to and defined by data points—a pattern of holes in a card to be read, tabulated, and organized by a machine. The punch card seemed a two-dimensional portrait of an individual that could be slotted into a

particular role useful to the larger construct that was modern capitalist society³²³. The punch card, as an artifact of the computer, was emblematic of how humans were to interface with machines. The cards became a potent symbol and a site of resistance to what was seen as a system that digested human beings and produced cogs in the machine of industry.

At the University of California at Berkeley, as at many other college campuses, computers were used to facilitate admissions and student registration. But Berkeley was also the site of a campus-wide series of protests in 1964-1965 that served, in some regards, as a template for campus protest movements throughout the 1960's. Although the Berkeley Free Speech Movement began as a series of protests against the university administration's decision to limit the types of organizing and political activity permitted on campus, the protests presented a platform for students to voice their resentment toward the university as part of a system that Hal Draper conflated in his pamphlet "The Mind of Clark Kerr," as "The University Factory and the New Slavery."³²⁴ The idea that the purpose of the university was to provide industry with the skills and talents it required were part of Kerr's organizational approach both to Berkeley, where he was the chancellor, as well as the University of California system, over which he was president. For the students, this preparation for a life in the service of capitalism left the student as no more than a "student-cog" in the "machine" that was a "knowledge factory."³²⁵

³²³ See Steven Lubar, "'Do Not Fold, Spindle, or Mutilate: A Cultural History of the Punch Card," Journal of American Culture 15, no. 4 (1992): 43.

³²⁴ Hal Draper, "The Mind of Clark Kerr: His View of the University Factory & the New Slavery," (Berkeley, California: Independent Socialist Club, 1964).

³²⁵ See for example the anonymous pamphlet: Anonymous, "We Want a University," (<http://content.cdlib.org/ark:/13030/kt409n99x7/?&query=&brand=oac>: Online Archive of California, 1964). Accessed 02/08/2008.

Although the language of the factory was prevalent, the students actively appropriated the computer punch card as a symbol of their status as data to be processed within the system.

Although the students at the University of California at Berkeley stopped short of taking over the computers on their campus, the Berkeley Free Speech movement provided the students who followed its example with a vocabulary for describing their experience which appropriated the computer as a metaphor of the Berkeley Free Speech movement and the protests of 1964-1965. The famous 1964 speech by Mario Savio, a Berkeley student, set the tone for both the protest movement against Dean Clark Kerr's policy banning political action on the Berkeley campus as well as situated the conflict in terms of the student's relationship to the educational 'machine' of Berkeley's

Multiversity:

There is a time when the operation of the machine becomes so odious, makes you so sick at heart, that you can't take part; you can't even passively take part, and you've got to put your bodies upon the gears and upon the wheels, upon the levers, upon all the apparatus, and you've got to make it stop. And you've got to indicate to the people who run it, to the people who own it, that unless you're free, the machine will be prevented from working at all!³²⁶

Savio was speaking of the university system as an educational machine, but he was also staking out a metaphorical relationship to computers and data processing. Other students in the Berkeley protest movement took the metaphor further and made it more explicit by wearing IBM punch cards pinned to their clothing with slogans like, "I am a UC student.

³²⁶ Hal Draper, Berkeley: The New Student Revolt (New York: Evergreen Press, 1965), 63.

Please don't bend, fold, spindle or mutilate me.³²⁷ The equation of the student with the punch card and, by extension, the petition to be treated at least as well as the card, represented an ironic comment on the university system where students increasingly viewed themselves as raw materials in a machine or data points in a system. For all the students' pleas to be handled with some measure of care, the Berkeley student newspaper, the *Daily Californian*, held out little hope and explained that that the registration process would ultimately leave students "torn, mutilated or spindled by an IBM machine."³²⁸

The machine metaphor was not just the student's response to the university system of which they were a part at the University of California at Berkeley. Clark Kerr had, in the months previous to the actions surrounding the Free Speech Movement in the fall of 1964, spoken of the university in exactly the same terms as the students.³²⁹ Both the students and the administration agreed that the university was an "information machine," and a "knowledge factory," the difference was that one side saw this as a benevolent evolution and the other as an abomination.

The Free-Speech Movement brought the metaphor of the computer as synonymous with the system of administration to the forefront of the student movement. Two years earlier, in 1962, Students for a Democratic Society (SDS) included a critique of technology and automation in their "Port Huron Statement." The SDS did not offer up automation as a metaphor for a broader cultural anxiety like the Berkeley Free-Speech Movement did, but rather saw technology as one of the core issues challenging American

³²⁷ Ibid., 225.

³²⁸ "Welcome," *Daily Californian*, Sept. 16 1964, 12.

³²⁹ See Clark Kerr, *The Uses of the University* (Cambridge, MA: Harvard University Press, 1963).

democracy in the 1960's. As they explained in the Port Huron Statement:

the entrenchment of totalitarian states, the menace of war, overpopulation, international disorder, supertechnology--these trends were testing the tenacity of our own commitment to democracy and freedom and our abilities to visualize their application to a world in upheaval. [...] We oppose the depersonalization that reduces human being to the status of things.³³⁰

The SDS critique of technology was bound up in a larger critique of class that owed allegiance to the old guard American Left that saw the utilization of information technologies as inherently a capitalistic exercise with “automation confirming the dark ascension of machine over man instead of shared abundance, technological change being introduced into the economy by the criteria of profitability -- this has been our inheritance.”³³¹ Supertechnology, for the members of SDS included both the weapons of the military-industrial complex, as well as the technological system, driven by computers, responsible for command and control functions. The “supertechnology” required that people be reduced to “the status of things” providing an argument that the Berkeley Free Speech Movement would echo in their identification with punch cards and their desire to reinhabit a physical body, not only the virtual one recognized by the machine. It was this body that they hoped to throw against the machine to make it stop. The anxiety concerning technology was given a name by the popular press and reporters explained that, “Like most modern citizens, college students understandably feel threatened by the mechanization of life—The IBM-card syndrome.”³³² The Berkeley students were not alone in their anxiety. Not only were they like most citizens as the news account

³³⁰ Text from the Port Huron Statement taken from James Miller, Democracy Is in the Streets: From Port Huron to the Siege of Chicago (New York: Simon and Schuster, 1987), 329.

³³¹ *Ibid.*, 344.

³³² "Education: Activism on Campus," New York Times, Oct. 17 1965, E9.

described, but other campuses were following suit in their own way: “According to the Collegiate Press Service, 2800 students at the University of Colorado took part in a novel protest—the ‘bitch-in’—against being ‘folded, spindled or mutilated.’”³³³

The fallout from the Berkeley Free Speech movement was that student concerns were taken seriously and reporters found that while, “at the start of every semester you always hear the same tired jokes about ‘educational factories’ and about the computers that assign you classes [...] Well you don’t hear those jokes this time—they’re not funny anymore.”³³⁴ The reporters were, for a time, somewhat sympathetic—at least in the *New York Times*, which reviewed the scene as reported by C.B.S. television: “The most vivid and persuasive argument advanced by the students concerned life in a huge institution in which the individual feels reduced to a punch card.”³³⁵ Even the *Wall Street Journal* was sympathetic: “The origins of depersonalization lie in the high degree of standardization needed to use computers effectively. As computer activities spread, individuals tend to feel molded to fit the computer’s needs rather than the other way around.”³³⁶ The article concluded that it was, “probably is no accident that during the first of our major campus riots, at Berkeley, major resentment was directed toward punch cards and computers.”³³⁷

In addition to this change in perception of the students and their grievances was the awareness that the student’s rhetorical attacks against computer technology were not an attack on the computers as objects, but as symbols of a system. College admissions offices were not going to be cowed into abandoning computers simply for what the

³³³ Ibid.

³³⁴ Peter Bart, "U.C.L.A. Concedes Signs of Disquiet," *New York Times*, February 7 1965, 69.

³³⁵ Jack Gould, "Tv: Examination of Activism on Berkeley Campus," *New York Times*, June 15 1965, 83.

³³⁶ Martin L. Ernst, "What Else Will Computers Do to Us?," *Wall Street Journal*, Oct 21 1970.

³³⁷ Ibid., 18.

computers symbolized. As the *New York Times* reported, “The issue has been a prominent one ever since the riots at the University of California at Berkeley, during which students complained that they were mere cogs in a vast impersonal education factory and pinned on computer punch cards as badges of protest.”³³⁸ The article’s interview with Elmer Hans Wagner, registrar and admissions officer at the University of California at Davis, concluded that “that automation made everyone uneasy and that the punch cards were a ‘scapegoat’ in a situation where issues other than computer technology were involved.”³³⁹

Computer Center Occupations: Challenging the Consensus

Mr. Wagner was correct in his assumption. For all the rhetoric surrounding the machine, the system and the computer as an icon of a world structured to foreclose identities and possibilities outside the logic and needs of American business and government, it must be stressed that the youth movements of the 1960’s did not identify themselves as anti-technology in general, or anti-computer in particular. As Fred Turner discusses in his book, *From Counterculture to Cyberculture*, it is a common misconception to conflate the youth movement critiques of control technologies with a desire to eliminate these technologies altogether. As Turner demonstrates, youth movements, specifically the back-to-the-land and communard movements that were ostensibly dropping out of society were also embracing new technologies to make frontier life possible. In particular, the communards embraced sophisticated ideas about

³³⁸ Austin C. Wehrwein, "Colleges Defend Using Computers," *New York Times* (1857-Current file), Apr 23 1965.

³³⁹ *Ibid.*, 37.

information sharing, networks, cybernetic principles, and computers as information processing machines that in many ways laid the foundation for the personal computer revolution of the 1970's and 1980's.³⁴⁰

If the students were not against technology, and were not interested in abandoning a technological lifestyle, but rather were, in some instances, concerned with taking technologies with them into the various commune and back-to-the-land environments that were growing in popularity as the 1960's progressed, they were against what technology, specifically computer technology, had come to represent. As Stewart Brand writes in his 1987 foreword to Ted Nelson's 1974 *Computer Lib*, "The enemy was central processing, in all its commercial, philosophical, political, and socio-economic manifestations."³⁴¹ Brand likens large, mainframe-driven computer processing to Ken Kesey's 'Big Nurse' from his *One Flew Over the Cuckoo's Nest* (1962). Nelson's tract is, more than anything, a call to liberate the computer from its imprisonment within a matrix of professional abstraction and specialized information workers (which he refers to as the computer 'priesthood') whose work was to provide masses of data for increasingly obscure and unaccountable corporations and government agencies.

The 'commercial, philosophical, political and socio-economic manifestations' of central processing, as Stuart Brand puts it, were the symbolic baggage of large computer systems in the 1960's, baggage largely inherited from both the uses of computer technology and the rhetoric of computer anxiety from the 1950's. These manifestations are largely symbolic, and the revolution Brand describes (and Nelson predicts) is a

³⁴⁰ Fred Turner, *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism* (Chicago: University of Chicago Press, 2006).

³⁴¹ Theodor H. Nelson, *Computer Lib* (Redmond, WA: Microsoft Press, 1974 (1987)), 301.

revolution that seizes upon the computer's symbolic value and reinscribes the artifact with a new meaning. But the symbolic value of the technology was, in the 1960's still concentrated in what Brand calls the 'central processor' the large stand-alone computer that occupied an increasingly common place in the center of university administration, and functioned as a prized representation of a school's endowment and fundraising prowess.

The pattern of student occupation of computer centers as a locus for pressing their demands accelerated in 1969 with five university campus protest movements focusing on computer centers. Out of the five occupations in 1969, three were the result of civil rights issues stemming directly from policies or faculty members on the campuses, with students agitating for a greater say in curriculum decisions and the hiring of minority faculty. Of the two anti-war protests, one (at the University of Maryland) was a direct action against CIA sponsored research at the university and the other, at the State University of New York at Stony Brook, was part of a larger set of coordinated protests against the escalation of the Viet Nam war. Students claiming to be members of Students for a Democratic Society seized the University of New York at Stony Brook computer center and caused the staff to shut down their computer because, as a SDS spokesman stated, the university president had "failed to meet demands [...] that he end all military research and recruitment on the campus, and not increase the rent on dormitories by \$150."³⁴² The student organizers complained that the university had ignored previous

³⁴² Agis Salpukas, "Stony Brook Computer Center Occupied by S.D.S. Protesters," New York Times, May

petitions, discussions, rallies, and other forms of peaceful protest. SDS was also active on the University of Maryland campus, occupying the computer center there in protest of CIA sponsored research.³⁴³ The Stony Brook protest is interesting in that the list of demands was extended to include not only war-related issues on campus, but issues surrounding student living conditions as well.

The SUNY Stony Brook and University of Maryland actions were part of a larger string of stoppages spearheaded by MIT students and researchers in the spring of 1969. The MIT “one day moratorium on research” was supported by students at Columbia, New York University, and the Brooklyn Polytechnic Institute, as well as the University of Wisconsin and the University of California at Berkeley. The goal of the work stoppage was to protest the university as a research arm of the military, and specifically the use of computer technology in the war effort. As part of the protest, dozens of computer engineers took up positions outside New York’s Rockefeller Center chanting, “we will not program death!”³⁴⁴ This was not the first action of computer engineers against the war. The preceding spring, an organization comprised of computer professionals calling itself the ACM or Anti-Complicity Movement issued a statement against the war and a refusal to work on military contracts.³⁴⁵

The table below lists the computer center protest actions reported by the

9 1969, 29.

³⁴³ "Md. Students March on Computer Center," The Washington Post, Times Herald (1959-1973), Apr 24, 1969, A25.

³⁴⁴ Murray Illson, "Hundreds at Columbia Join," New York Times, Mar 5, 1969, 13.

³⁴⁵ "I.B.M. Workers to Resist Via A.C.M.," Berkeley Barb 1968, 5. This organization does not seem to have been very active, at least not in public. With the exception of the short piece mentioning the ACM in the Berkeley Barb, there is no further mention of the organization, though a flyer from the ACM does show up in an undated New York City Police Department file that is now a part of the Abbie Hoffman archive at the University of Connecticut.

mainstream media, beginning with the first protest in 1968 and ending with the last reported protest in 1972.

Date	Location	Action	Stated Reason
October 15, 1968	UC Santa Barbara	Occupied Computer Center	Civil Rights: Student Protest (controversy over minority hiring and ethnic studies curriculum)
January, 1969	University of Pittsburgh	Occupied Computer Center	Civil Rights: Student Protest (controversy over minority hiring and ethnic studies curriculum)
February 12, 1969	George Williams University- Montreal	Occupied/ Destroyed Computer Center	Civil Rights: Student Protest (racist professor)
April 24, 1969	University of Maryland	Occupied Computer Center	Anti- War Protest (Protest CIA sponsored research)
May 2, 1969	Howard University	Occupied Computer Center	Civil Rights: Boycott by Sociology and Anthropology Students
May 9, 1969	NY State University at Stony Brook	Occupied Computer Center	Anti- War Protest
November 17, 1969	Midland MI-- Dow Chemical	Computer Cards destroyed/Tapes sabotaged	Beaver 55-- Anti-War Protest
May 8, 1970	New York University	Attempted Bombing/Computer Held Ransom	Anti-War Protest (Computer belonged to the Atomic Energy Commission). However, the ransom was \$100,000 to be used to post bond for a jailed Black Panther
May 21, 1970	Fresno State College	Computer Center Fire-Bombed	Civil Rights: Controversy over ethnic studies program
August 24, 1970	University of Wisconsin	Computer Center Bombed, one student killed	Anti- War Protest
December, 1970	University of Kansas-Lawrence	Computer Center Bombed	Unclear-- Campus unrest due to the firing of black assistant administrator, but the bombing was unclaimed and unsolved
February 10, 1971	Stanford University	Occupied Computer Center	Anti- War Protest
May 10, 1972	University of Wisconsin	Computer center vandalized	Anti- War Protest

April 25, 1972	NY State University at Stony Brook	Computer center vandalized	Anti- War Protest
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Table 1: Actions against computer centers as reported in the national media 1968-1972. (Sources: *Los Angeles Times*, *New York Times* and *Washington Post* newspapers.)

A pattern of escalating violence is represented in the table, as well as a shift in the rationale behind the protest action. Out of the first seven protest actions from 1968 and 1969, all but two are civil rights protests on college campuses and all but two are resolved without damage to the computer system. The following seven protest actions occurring between 1970 and 1972 are almost a mirror image of the first seven, with six of the seven occurring as protests against military involvement on college campuses and six of the seven ending in damage to the computer or all out destruction of the computer center.

Protest as Kynical Action: Opposing Cynical Reason

From 1968 to 1972 the mainstream media in the United States recorded over a dozen protest actions against university computer centers. Various student protest movements and groups from campuses across the U.S. adopted the tactic in a non-coordinated action to force college administrators to address their grievances. The protest actions had mixed results as a form of protest, but the tactical logic of occupying computer centers was supplemented by the attack on computers as symbols of the relationship between the state, capital, and human beings. The symbolic value of computers in this context is evident in the coverage of occupations by the alternative press and the mass media of the Vietnam War era. As the war escalated, so did the violence of the protest actions. What began as a mode of peaceful (but forceful)

demonstration culminated in random destruction and vandalism of computer centers because of what they represented in terms of a military presence on campus, and their overall iconic value as nexuses of power in the relationship between the military and the academy.

Because much of what the military spent on computer technology on college campuses was filtered through various other organizations like the National Science Foundation and The Rand Foundation, it's difficult to get a full picture of exactly how much investment the American military had in college campuses in the 1960's. As Margaret Pugh O'Mara points out, the post-war research university was a construct based upon strong and long lasting links to government and especially military research projects.³⁴⁶ The expense of early computers (often in the millions of dollars) made government subsidies attractive, often regardless of the strings attached.³⁴⁷ The diffuse and often classified relationship between universities and the U.S. military aided the impression that any computer on a college campus was likely involved in some sort of work for the military or the government at large.

Discussion of the marginalizing effects of computer technology and the use of computers as iconic images during protest actions in the early and mid-1960's gave way to a more active engagement with the icon as more than just a symbol, but a physical presence that could be manipulated for ideological or tactical ends. The difference between the two stages of student movement politics and the transformation of the

³⁴⁶ Margaret Pugh O'Mara, Cities of Knowledge: Cold War Science and the Search for the Next Silicon Valley (Princeton: Princeton University Press, 2004), 9-13.

³⁴⁷ See Rebecca C. Lowen, Creating the Cold War University: The Transformation of Stanford (Berkeley: University of California Press, 1997).

computer as icon to computer as artifact is what, speaking in other terms, Peter Sloterdijk presents as cynical in what he terms “enlightened false consciousness.” Unlike the false consciousness of Althusser which stood in opposition to what he considered true (Marxist) consciousness—the understanding of hegemonic manipulation and ones imbrication in the world of capital—Sloterdijk posits enlightened false consciousness as a loss of faith in values that were once seen as absolute (ideology) but still perform the rituals and act as if the ideological position were still tenable. It is not the disillusionment with one ideology that leads to the embracing of new ideological constructs, but the ‘enlightened’ sense that all ideologies are untenable. So one goes through the motions as one would if under false consciousness, even though one is aware that this too is just a performance. Sloterdijk’s antidote to this is to embrace ‘Kynicism’, which is a refutation of ideologically bound logic by means of regrounding in the body. As Sloterdijk explains:

The philosopher [Theodore Adorno] was just about to begin his lecture when a group of demonstrators prevented him from mounting the podium... Among the disrupters were some female students who, in protest, attracted attention to themselves by exposing their breast to the thinker. Here, on the one side, stood naked flesh, exercising ‘critique’; there, on the other side, stood the bitterly disappointed man without whom scarcely any of those present would have known what critique meant... It was not naked force that reduced the philosopher to muteness, but the force of the naked.³⁴⁸

It is this emphasis on the body that is central to the tactic of occupying computer

³⁴⁸ Peter Sloterdijk, *Critique of Cynical Reason*, Theory and History of Literature, vol. 40 (Minneapolis: University of Minnesota Press, 1987), xxxvii.

centers as a form of protest. Computers as icons of abstraction were easily relegated into a realm of existence beyond the normal functioning of most people's daily routines. The confrontation of the computer as a concept with the force of actual protestors invading the computer center, a sealed, climate-controlled set of rooms within the already rarified atmosphere of the college campus, acted to reground the computer in the physical world as an object, not an abstraction, and as such, as something that could be threatened with force, or used as a bargaining chip in ongoing confrontations with college administrators. At the heart of cynicism is the force of the ideologically naked body that stands as the ultimate counterpoint to all modes of coercive logic. The body that Sloterdijk posits as central to the kynical mode is the same body that Mario Savio calls down upon the odious machines of the Berkeley multiversity, with the same effect. The desire is to stop the machine from functioning by either standing in solidarity or (in Sloterdijk's case) rendering mute an outmoded ideology by literally stripping bare the body as subject and offering it as wordless critique.

The approach to computers and the occupation of computer centers, as a form of protest action that is signified here does not, as I mentioned above, reflect a deep-seated anxiety towards computers as artifacts or information technology as a class of objects. The rationale behind computer center occupations as a form of protest has much more to do with the iconic status of computers in the research university, and the status of computers as metaphors for a system that was increasingly viewed by students as corrupt and insensitive to their needs.

For Pierre Bourdieu, the zone of social interaction between groups is always embedded in class relationships and defined by legitimating discourses that operate over what he terms a ‘social field’—that is, the social arena in which the rules of interaction apply. In this formulation doxa refers to the unquestioned truths that provide the basic assumptions that lie behind any discourse—the rules that govern a community’s collective sense of reality and determine what is conceivable within the specific logic of the system. This specific logic comprises the basic assumptions of the community and is thus incontestable as a definition of the community’s commonsense world. This worldview is arbitrary, masked by the naturalization of the rules of what is permissible, circumscribed by what is possible within the system.³⁴⁹ The social field is the zone of capital accumulation and exchange where, as Bourdieu states, “In the struggle to impose the legitimate vision, in which science itself is inevitably caught up, agents possess power in proportion to their symbolic capital, i.e. in proportion to the recognition they receive from a group”³⁵⁰

The ability to define the doxic aspect of culture is typically embedded within class structures, in a way similar to Gramsci’s definition of hegemony as the ‘common-sense’ of the bourgeoisie class. In both Gramsci’s and Bourdieu’s readings, the class that defines the values of the society as a whole does so in such a way as to naturalize what is in fact an arbitrary construction. The conflict over orthodoxy which is perpetuated by

³⁴⁹ Pierre Bourdieu, Outline of a Theory of Practice (Cambridge: Cambridge University Press, 1977). Bourdieu’s definition of doxa, though based upon his reading of Husserl, was not consistent over the course of his work. Doxa remained a term that described ‘the universe of the undiscussed’ but also expanded to encompass tacit knowledge and boundary conditions that form the basis of any discussion between specialists in a field. For a critique of Bourdieu’s use of the term and the problems inherent in his definitions, see John F Myles, “From Doxa to Experience: Issues in Bourdieu’s Adoption of Husserlian Phenomenology,” Theory, Culture & Society 21, no. 2 (2004): 91-107.

³⁵⁰ Pierre Bourdieu, Language and Symbolic Power (Cambridge: Harvard University Press, 1991), 106.

class in Gramsci's and Bourdieu's theories spill over into generational conflict in the case of the student movements. The euphemisms and metaphors of the student movements used to describe cultural anxieties in terms of the power of computers was, in this analysis, a matter of responding to technology as divorced from the concerns of the student movements, but significant doxic symbols to the universities that housed them. Controlling the computers was an appropriation of social capital that gave voice to a class of Americans that were otherwise silenced.

Destroying the Machine: George Williams University

This emphasis on the computer as an icon to be exploited for its symbolic value is seen in the first civil rights protest action to end in the destruction of the occupied computer center. During the February 12, 1969 destruction of the Control Data 3500 computer at George Williams University in Montreal, Canada, students, protesting the actions of a junior professor with a history of snubbing black students in his classes, attacked the computer with fire axes and dumped hundreds of thousands of computer punch cards into the street from the computer center's ninth-floor windows. As the cards filled the street below, the students burned printouts before police stormed the ninth floor and arrested 96 students, half of them black and many from the Caribbean.³⁵¹ The complaint against the professor was under investigation at the time of the protest and he was later exonerated.³⁵² Like the protest in the fall of 1968 at the University of California -Santa Barbara, the computer center was chosen as the site of occupation because of "the

³⁵¹ Edward Cowan, "Montreal Students Wreck \$1-Million Computer as Police End 'Rascism' Sit-In," New York Times, Feb. 12 1969, 3.; Edward Cowan, "Campus and Racial Unrest Arouses Canadians," New York Times, Feb. 15 1969, 6.

³⁵² "Panel in Montreal Clears Biologist of Racist Charge," New York Times, July 11 1969, 5.

high value of the equipment.”³⁵³ However, the destruction of the computer equipment had the opposite effect that the University of California protest had achieved peacefully. In the aftermath of the destruction of the George Williams University computer, the protesters were jailed, some were deported, and the university put in place stringent security measures throughout the campus, with students forced to submit to checkpoints and searches.

The destruction of the George Williams computer brought to the surface the inherent paradox of direct physical action in the case of computer sabotage as a cynical move toward the alignment of words and deeds. As one commentator pointed out:

The faculty is the most remiss group of people in this whole affair. After years of yelling destroy the computers that are taking away our work and dehumanizing our relationships with students, they start hollering for a lynching when someone finally did it. They found out that the computers had also been in charge of issuing their paychecks. Oh, yes. Someone has desecrated the temple, smashing their god.³⁵⁴

The author’s position points to the logical conclusion of the reinscription of computer systems as physical artifacts instead of icons of modernity and monolithic control.³⁵⁵ The author also taps into what could best be described as a growing sense among the left that computer systems were legitimate targets in their own right because of what they represented in practical terms. Affirming this position was *The Fifth Estate*, a Detroit

³⁵³ Cowan, "Campus and Racial Unrest Arouses Canadians."

³⁵⁴ "Notes on the Sir George Computer," *Vancouver Free Press*, Feb. 28- Mar. 5 1969, 4. Special Collections Library - Labadie Collection, University of Michigan, Hatcher Graduate Library.

³⁵⁵ I say reinscribe because the original conception of computer systems in the 1940’s was very much a physical construct. Commentators discussed the size and complexity of the early machines with as much enthusiasm and awe as they did their more abstract computational power.

underground newspaper, during a 1968 review for a musical album by the Velvet

Underground:

Have you ever seriously considered what your role in society will be after the impending Cybernetic revolution? What will you (yes YOU) do when the machines do all the manual labor and the computers run all the machines?

On a much larger scale, how will you as a part of society be able to maintain your ego as the Superior Being on Earth when machines have replaced you in all your work functions and can do a better job?³⁵⁶

The rhetorical question puts the reader squarely in the position of understanding the direct impact of computer technology on the life of the individual. Admittedly, the author is projecting into a possible future, but the certainty of the rhetoric is consistent with the sense of inevitability captured even in the mainstream press.³⁵⁷

The computer was targeted at first not because of its linkage with the military. The military-industrial-academic axis was not exploited as a site of protest by the civil rights movement until after the first computer center occupations had already taken place. The original motivation for targeting computer data centers as sites for protest stemmed from the value of the data center as a physical investment and a site of prestige on university campuses, connected with the prevailing view of computers as icons of standardization, regimentation, and dispassion.

The narrative arc of the computer center occupation and destruction protest

³⁵⁶ "The Velvet Underground," *The Fifth Estate*, Nov. 14-27 1968, 13. Special Collections Library - Labadie Collection, University of Michigan, Hatcher Graduate Library.

³⁵⁷ See, for just one example, Ernst, 18.

actions trended toward violence as computer centers were identified with the American war effort in Viet Nam and the anti-war movement became more militant in their actions. The protest action at George Williams University could be seen as a fluke—student activists getting out of hand due to fatigue, stress, or a desire to make a direct statement and end the occupation decisively. However, the George Williams Computer Center destruction ushered in a wave of protest actions that largely skipped occupation and moved squarely into destruction as the purpose of the activity. Of the protest actions directed toward computer centers after 1969, only one action protesting the war or the university's complicity in military research was planned solely as an occupation with no intention to damage or destroy the computer system—the 1971 Stanford University protest, rapidly broken up by police with five arrests. The Stanford protest was part of a coordinated, nation-wide protest action intended to draw attention to the expansion of the war into Laos.³⁵⁸

The only post-1969 action directed at a computer center to protest a civil rights cause was the May 21 destruction of the Fresno State Computer center in May of 1970. The computer was destroyed by firebombs as part of a larger action described as a 'rampage' of '100 minority students'.³⁵⁹ The students were protesting the firing of Marvin X from the Ethnic Studies department and additional purges of liberal faculty members. The action did not result in the rehiring of any of the terminated faculty and exacerbated differences between the town of Fresno and the university.³⁶⁰ The destruction of computer centers increasingly took on the appearance of frustration and

³⁵⁸ Martin Arnold, "Thousands in U.S. Protest on Laos," *New York Times*, Feb 11, 1971, 15.

³⁵⁹ Art Dove, "Violence Brings Emergency at Fresno State," *Los Angeles Times*, May 21 1970, 3.

³⁶⁰ See Barry Hillenbrand, "The Strangulation of Fresno State," *The Nation*, April 16 1971, 136-138.

became more anarchic and less the work of organized political groups. An attempted firebombing of the New York University computer center as part of a protest action in May of 1970 was the reaction to the university's refusal to negotiate with students holding the computer hostage for a \$100,000 ransom to be paid as bail for a jailed Black Panther activist.³⁶¹ The students' original intent was to leave peacefully and hold a press conference denouncing the computer, which was owned by the Atomic Energy Commission, but after their demands were ignored, the fuse to the bomb was lit and the protestors fled. Dr. Robert Wolfe (an assistant professor of history) and Nicholas Unger, a graduate teaching assistant in physics, were arrested following a grand jury indictment on charges of threatening to destroy the computer if the ransom was not paid.³⁶² The professor and the student instructor pled guilty and were sentenced to 90 days in jail. This action, as part of the nationwide flurry of protest actions following the May 4, 1970 Kent State University murder of anti-war protestors by the Ohio National Guard, was the only action against a computer that involved the arrest of a faculty member on a college campus. That a faculty member was involved (and further, was one of the chief organizers of the action) speaks to how widespread a form of protest the targeting of computer centers had become.

The Industrial Revolution is Over and We Lost.³⁶³

The politics of computer destruction, by the late 1960's had moved away from the

³⁶¹ Robert C. Maynard, "Widening Protest Closes 400 Colleges," The Washington Post, Times Herald, May 8 1970, A16.

³⁶² Lesley Oelner, "2 Indicted in Raid on N.Y.U. Center," New York Times, July 30 1970, 1.

³⁶³ Lawrence Lipton, "Who's Who, How and Why of the Power System," Los Angeles Free Press, Nov. 8 1968, 6. Special Collections Library - Labadie Collection, University of Michigan, Hatcher Graduate Library.

campus and into the mainstream. Underground anarchists published manifestoes on computer destruction.³⁶⁴ As computer protest actions moved off campus, businesses were increasingly targeted with companies like Dow chemical experiencing constant sabotage threats,³⁶⁵ and one attack on their tape library in Midland, Michigan in 1969 that destroyed data and punch cards, but no systems. It is clear from tracing the evolution of protest actions directed toward computer systems that the only gains made were made by the civil rights protestors who occupied the computer centers for tactical reasons and literally, as Mario Savio put it, threw their bodies on the machine to make it stop. The universities were only prone to negotiate when they had something to lose, not when the object (in this case the computers) were already lost. The violent actions were, however, not targeted at the universities as organizations, but rather at the government as the maker of war and the purchaser of war materials, technology, and research into more efficient ways of killing. The universities were trapped in their own devil's bargain of needing the funding that only the Pentagon could provide, but having to house and maintain the iconic presence of the military as abstract killing machine on campuses predisposed their campus to erupt into protest. There is no evidence to support the rationale of the war protestors that their actions concerning computer center bombings would in any way hasten the end of the Vietnam War, but, unlike the civil rights protestors, they had nothing to bargain with.

³⁶⁴ See, for example: Anon, "The Losing Computer: Technology of Computer Destruction," Willamette Bridge 4, no. 5 (1971): 1, LGWC, "Computer Con: Computer Held for Ransom," Good Times 3, no. 24 (1970): 3, Seed and Fuck, "Computer Destruction," St Louis Outlaw 2, no. 12 (1971): 15, SR, "Fighting the Police Computer System," Science for the People 3, no. 4 (1971): 12, A. Tool, "Technology of Computer Destruction," Broadside 8, February 11 1970, 3. All citations courtesy the Special Collections Library - Labadie Collection, University of Michigan, Hatcher Graduate Library.

³⁶⁵ Richard A. Immel, "Whir, Click-- Blooey!," Wall Street Journal, Mar. 22 1971, 1.

Similarly, Harvey Matusow's 1968 *The Beast of Business*, detailed page after page of what he considered 'Computer Atrocities' before laying out a chapter of strategic interventions and sabotage techniques to allow the reader to, "locate the particular area for your attack, and help in preventing the computer from taking over."³⁶⁶ Matusow's organization, The International Society for the Abolition of Data Processing Machines, advertised in several underground journals in England and the United States, where he presumably found a sympathetic ear among the protest movement. Organizations like the Liberation News Service, an information clearing house for the underground press across the United States and Canada frequently reported on the use of computers by federal and state governments:

Big Brother in Action

Washington insiders informed LNS recently that the National Bureau of Standards has been given a series of high-level computer projects.

NBS will begin by gathering information about computers themselves and keeping it in one place.

The Bureau is cooperating with the Civil Service Commission to collect data about government workers to provide a centralized personnel data bank.

The FBI has asked the bureau to develop new fingerprinting and identification equipment, and NBS computers will be used to collect all unclassified federal scientific reports for storage and future distribution.³⁶⁷

³⁶⁶ Harvey Matusow, *The Beast of Business: A Record of Computer Atrocities* (Manchester, England: Wolfe, 1968), 85. Admittedly, many of the computer atrocities that Matusow mentions sound like urban legends and he offers no citations to back up his claims. This does not diminish his enthusiasm, however.

³⁶⁷ "Big Brother in Action," *Liberation News Service*, Nov. 9 1968, 11. Special Collections Library - Labadie Collection, University of Michigan, Hatcher Graduate Library.

The story, whether true or not, is hardly informative. The effect, however, is to add to the growing concern about technology in the hands of the state and an increasing sense of foreclosure that verged on paranoia. Liberation News Service also reported on rumors that computers were no match for humans: "Several recent discoveries concerning the relative logical potentials of men and computers have led to somewhat contradictory results. In terms of pure reasoning power and memory ability, machines have it all over men. But findings show the machine to be much more vulnerable to breakdowns than the durable human brain."³⁶⁸ Stories like this hearken back to the rhetoric of anxiety seen in the earliest descriptions of computer systems in the late 1940's and suggest how firmly entrenched this perceived antagonism was, and how deeply felt.

The rise of the American underground press in the mid-1960's was a product of dissatisfaction with mainstream media culture and its antagonistic relationship with various youth movements and subcultures. As such, as James Lewes has written, the underground press had a relationship with their readership that was much more responsive to the attitudes (and prejudices) of their audience than larger, mainstream media outlets.³⁶⁹ Unattributed teasers like, "University of Southern California researchers have designed a method for a computer to "tell at a glance" what the chances are for any juvenile to turn into a delinquent,"³⁷⁰ were rampant in the pages of the underground press, as well as dystopic stories about rampant technological police states

³⁶⁸ "Untitled News Release," *Us: A Journal of Student Opinion*, May 1968, 9. Special Collections Library - Labadie Collection, University of Michigan, Hatcher Graduate Library.

³⁶⁹ James Lewes, "The Underground Press in America (1964-1968): Outlining an Alternative, the Envisioning of an Underground," *Journal of Communication Inquiry* 24, no. 4 (2000): 379-400. See also: David Ransom, "Starting a Community Newspaper," in *The Movement toward a New America*, ed. Mitchel Goodman (Philadelphia: Knopf Pilgrim, 1971), 426.

³⁷⁰ "Untitled Article," *News from Nowhere*, June 1968, 2. Special Collections Library - Labadie Collection, University of Michigan, Hatcher Graduate Library.

of the future.³⁷¹ The federal government was, of course, using computer technology as part of its arsenal of weapons in its war on the various leftist, anti-war, and civil rights groups of the era.³⁷² The increasing paranoia of the left (if increasingly well founded) coupled with a state increasingly invested in computer technology for both domestic monitoring and military uses, produced an environment where computer systems were no longer viewed as iconic or even tactical sites of strategic value for the purpose of negotiation.

The systems were synonymous with the war as both icons and as tools of the military-educational complex. The underground press was filled with articles that exacerbated the sense of alienation experienced by the anti-war left. In addition, underground newspapers outlined methods for sabotaging computers or that showed computers' alternately as monolithic and all-encompassing systems, or as illusions of control perpetuated by the state. "Worlds Longest undefended Computer," detailed border patrol checkpoints linked by computer³⁷³ (worthwhile information for draft dodgers fleeing north); while "Technology of Computer Destruction,"³⁷⁴ and "Computer Destruction"³⁷⁵ were titles that were fairly self-explanatory, and "The Cosmic Gestapo Computer"³⁷⁶ took a more holistic view of computers and their adversarial nature. The

³⁷¹ See, for example, Clay Geerdes, "Classroom 1980," The Conscience, May 7 1969, 14. Geerdes takes a tour of the automated classroom of the future where all subversive thoughts are programmed out of students and replaced with admiration for the Kingston Trio and Disney comic books.

³⁷² Christopher Lydon, "Computer Erred on War Protests," New York Times, July 4 1971, 14, John P. MacKenzie, "Computer in Justice Department Ready for Riot Watching," Washington Post, Feb. 16 1968, A4.

³⁷³ "Worlds Longest undefended Computer," Last Post 1, June 1970, 4. Special Collections Library - Labadie Collection, University of Michigan, Hatcher Graduate Library.

³⁷⁴ Tool, 3.

³⁷⁵ Seed and Fuck: 16.

³⁷⁶ D. Fowler, "The Cosmic Gestapo Computer," Burning River News 1, no. 1 (1970): 12. Special Collections Library - Labadie Collection, University of Michigan, Hatcher Graduate Library.

Winnipeg, Ontario *Artisan* detailed methods for what it called “grid smash” as part of the “Special Obliteration Issue” that called for overt acts of sabotage and the need to smash all technological-economic and educational networks.³⁷⁷ It was clear that by the close of the 1960’s, the underground and student movements had moved beyond talking about computers as metaphorical quantities and into the realm of direct action.

Attacking the War Machine: Destruction as Protest

Once the computer center was breached as a site for protest, the practice became more commonplace and more violent, culminating in the bombing of the University of Wisconsin computer center, the University of Kansas computer center and the attempted bombing of the computer center at New York University in 1970. The targeting of computer centers as sites for violence marked a shift from the movement politics of the civil rights movement to the radicalized left of the anti-war movement.

The bombing of the Army Mathematics Research Center at the University of Wisconsin at Madison was the most destructive and the only deadly bombing of a computer center as part of anti-war protests. The August 24, 1970 bombing of Sterling Hall by a group of Marxist-Anarchists calling themselves the ‘New Year’s Gang’ was intended as a strike against “American imperialism, fascism, and the monster that is an outgrowth of corporate capitalism.”³⁷⁸ The gang of Karl and Dwight Armstrong, David Fine, and Leo Burt were responsible for several attacks on campus military targets and a failed attempt to bomb the Prairie du Sac hydroelectric dam before their decision to blow

³⁷⁷ "Grid Smash," *Artisan*, May 1968, 1. Special Collections Library - Labadie Collection, University of Michigan, Hatcher Graduate Library.

³⁷⁸ "The Bombers Tell Why and What Next," *Kaleidoscope*, Aug. 25 1970, 1. Special Collections Library - Labadie Collection, University of Michigan, Hatcher Graduate Library.

up the Army Mathematics Research Center and the computer equipment inside. Their bomb, a truck filled with ammonium nitrate-fuel oil (ANFO), detonated prematurely and killed Robert Fassnacht, a graduate student physicist doing research unrelated to the military.³⁷⁹ The underground press roundly condemned the killing of Fassnacht, but largely accepted it as a necessary sacrifice for the struggle. The *Ann Arbor Argus*, the official newspaper of the White Panther Party was pragmatic in its approach to the bombing and the murder:

Far fucking out, we say—but wait, what’s this? A man lies dead from the blast, and no pig either—just a grad student. The pig press is screaming murder and a lot of our people are not so sure. [...] But that don’t mean that the whole thing was wrong—no way. [...] It should be clear that we dig the bombings and the bombers, that they have carried the level of struggle far higher than most of us have dreamed of.³⁸⁰

Supporters of the bombing together with the bombers issued a release to the underground press that was picked up by many of the major underground newspapers. The supporters, though not as enthusiastic as the White Panthers, were determined to put the event in context and to remind readers that the computer and the Army Math Research Center were directly involved in war work.³⁸¹ The computer and the research center were irredeemably connected to the Vietnam War and were thus considered reasonable targets for paramilitary action.

³⁷⁹ The complete story of the Madison bombing and the persons involved can be found in Tom Bates, *Rads: The 1970 Bombing of the Army Math Research Center at the University of Wisconsin and Its Aftermath* (New York: Harper Collins, 1992).

³⁸⁰ "Madison Explosion," *Ann Arbor Argus*, Aug. 27 1970, 8. Special Collections Library - Labadie Collection, University of Michigan, Hatcher Graduate Library.

³⁸¹ "Madison Bombing Statement," *Seed*, September 1970, 7. Special Collections Library - Labadie Collection, University of Michigan, Hatcher Graduate Library.

The Wisconsin bombing did shock the protest community as much as the mainstream media, but unlike the mainstream, the underground press was more circumspect in their condemnation and instead justified the action as saving lives by frustrating the war effort, if only for a short while. The difference in coverage by the mainstream media and the alternative press of the computer center bombings at the University of Kansas and the University of Wisconsin in 1970, as well as the non-violent occupation of computer centers across the United States highlight the differing symbolic values of computers in the anti-war movement. While the mainstream media focused on the destructive nature of the attacks, the cost of damages, and the criminality of the event, the alternative press emphasized the symbolic value of the attacks, not solely as tactical strikes against a military target, but symbolic strikes at the “machine” and what it represented existentially. The Madison bombing did not slow the pace of attacks on computer centers, however, with another bombing of a computer center at the University of Kansas occurring a few months later, in December of 1970. Unlike the Madison bombing, the Lawrence, Kansas bombing was never solved, and no one came forward to take credit for the bombing, or provide a statement as to what the bombing was intended to produce. The University of Wisconsin computer center was attacked again in 1972-- its windows were smashed during an anti-war protest.³⁸²

Conclusion

Last week, 75 singing and chanting welfare mothers—black, Puerto Rican, and white—occupied the welfare department’s new computer center in

³⁸² John Darnton, "Antiwar Protests Erupt across U.S.," New York Times, May 10 1972, 22.

Government Center. [...] The government doesn't make mistakes that big on computers that are used in collecting taxes or guiding missiles, but they don't mind being sloppy when the only thing at stake is the lives of poor women and children. [...] About 40 uniformed cops, some with helmets, waited in the next room, but hadn't been ordered to clear the computer area. Demonstrators said this was partly because they were afraid of damaging the computer and partly because of the presence of a liberal welfare lawyer.³⁸³

The era of computer center occupations as a form of protest coincided with the era of student and youth protests centered on the civil rights and Viet Nam war protest actions. By the early 1970's the phenomenon had largely faded from college campuses. The reasons for this are likely linked to the diminishing of protests on college campuses as a result of the winding down of the war and the tapering off of the civil rights movement as an organized movement by the mid 1970's. As a tactic for political action and recognition of grievances, computer center occupations and computer center destruction had decidedly negative results in almost all reported cases. With the exception of the first computer center occupation at the University of California at Santa Barbara in 1968, almost no other protest occupation involving computer centers achieved their aims. They were for the most part ignored, or, when the actions of the students involved the destruction of computer equipment or its attempt, criminal charges were brought against those involved without further discussion of the protestor's grievances. Civil rights protestors fared better. About 30 African-American students ended a sit-in in the University of Pittsburgh's computer center after Chancellor Wesley Posvar agreed that a director and assistant director for a proposed black studies institute would be

³⁸³ "Mothers Seize Computer," *Old Mole*, no. 43 (1970): 5. Special Collections Library - Labadie Collection, University of Michigan, Hatcher Graduate Library.

appointed in June and provided with funds to carry on their work. He also agreed to ask the university senate to establish January 15, the birthday of Dr. Martin Luther King Jr., as a school holiday and to allow black students to be absent on Feb. 21, the anniversary of the death of Malcolm X.³⁸⁴

The protest actions did garner some media attention however that would likely not have been present if the protestors hadn't threatened multi-million dollar computer systems. The retail value of computer systems was routinely included in mainstream news reports of student activities against computer centers, often in the headlines or lead paragraphs for the stories. Ironically, the demands of the students were typically buried near the bottom of the stories and in some cases, not mentioned at all. As if a student protest needed no rationale, reporters seemed at times to suffer from protest fatigue. Not surprisingly, the underground press emphasized the reasons behind the protest action, not caring much for the specifics of the computer or its value other than that it was reportedly expensive and an important marker of prestige for the university.

The matter of prestige that computers brought to the university was a double-edged sword. Computer technology and the resources to maintain it were not an inexpensive proposition, often outside the ability of colleges to provide for themselves without some support from outside the academy. This support, in the guise of government research projects, often required universities to engage in research that directly benefited the military while it fought an increasingly unpopular war. On most campuses, having a computer meant having a contract to do research for the United

³⁸⁴ "College Head Dies; Sit-in Is Canceled," The Washington Post, Times Herald (1959-1973), Jan 17, 1969, A5.

States military. This link to the military made computer centers attractive sites for protest and, of the sites that experienced some sort of destruction, anti-war protesters were likely responsible. The resonances between the computer and the war made the computer a legitimate target in the eyes of protestors, not just a site of protest, but a site that could be damaged and with it, the war effort it supported.

Of course, there is no evidence to suggest that students destroying computer centers in any way hastened the end of the war. The destruction of computer centers seemed, in all cases, an act of frustration more than a tactical goal. Just as protests throughout the 1960's became more militant and violent as the police escalated violence against the protestors, so too did protest actions that involved computers. A Roman Catholic nun, Sister Jogues of the New York Order of the Sacred Heart of Mary, was sentenced to 18 months for plotting the kidnapping of Henry Kissinger and bombing computers at the Pentagon. Acting as part of the Harrisburg Six, a group that included a priests, ministers, and nuns, Sister Jogues was imprisoned for refusing to testify in the plot, but did not deny the anti-war aims of the group.³⁸⁵

Throughout the 1960's and into the early 1970's the value of the computer as an icon underwent a change in stature that was reflected on college campuses across the United States. Starting with the Port Huron Statement of the Students for a Democratic Society and the manifestoes of the Berkeley Free Speech movement, computers were synonymous with a closed world system and iconic of the victory of information over humanistic claims. As Peter Sloterdijk explains in his critique of the technological

³⁸⁵ Ben A. Franklin, "Nun, in Contempt, Is Ordered to Jail," New York Times (1857-Current file), Jan 27, 1971, 13.

anxiety of Weimar Germany:

[T]echnology presses in on the old humanism in a provocative way. In this period, the conceptual association of 'the human being and technology' becomes a compulsive connection, from the heights of bourgeois philosophy down to school essays. The schema for thinking is this: Technology takes the 'upper hand'; it 'threatens' to degrade human beings; it 'wants' to make us into robots. But if we pay attention and keep our souls in shape, nothing will happen to us. For technology is, after all, there for people and not people for technology. The image is approximately that of a seesaw. On the one end site the threatening, the alien, technology; on the other, the humane spreads out and, according to whether oneself or the alien presses harder, the seesaw falls to one side or the other. The more immature the thinking, the heavier the humane end.³⁸⁶

The anxiety produced by technology was not an anxiety based in a real encounter with computers, but a defense against a perceived threat. As historian of technology Stephen Shapin commented, "a given technology's grip on our awareness is often in inverse relationship to its significance in our lives."³⁸⁷ I would extend this to include our imagination as well. The lasting impact of the computer protest actions of the 1960's and 1970's is not in the victories they achieved either in shortening the war or in establishing ethnic studies programs or increasing minority hiring. The occupation (and occasional destruction) of computer centers served to demystify the artifact and strip from it some of its iconic baggage as the scourge of modernity.

³⁸⁶ Sloterdijk, 448-449.

³⁸⁷ Stephen Shapin, "What Else Is New?," The New Yorker, May 14 2007, 144.

Conclusion: From Machines to Data

Most of the advanced industrial nations of Western Europe and North America share concerns about the social impact of computer-based personal data systems. Although there are minor differences in the focus and intensity of their concerns, it is clear that there is nothing peculiarly American about the feeling that the struggle of individual versus computer is a fixed feature of modern life.³⁸⁸

The authors of the 1973 report released by the Health, Education, and Welfare Department, Secretary's Advisory Committee on Automated Personal Data Systems (named the Richardson Committee after its chair, Secretary of Health, Education, and Welfare Elliot L. Richardson) show how ingrained, by the early 1970's, anxieties concerning computer technology had become. The framing proposed by earlier writers and journalists for how computers were to be viewed and understood had, by 1973, become part of the official doxa of the state. The struggle between individuals and machines had been codified and was a natural feature of contemporary society for the foreseeable future. The conceptual struggle between humans and machines that had been deployed as the background over which the story of computer technology was reported, filmed and televised was adopted as the natural state of the modern world. The authors of the report were clear in their representation of computers as a sublime force that needed to be confronted. The committee's report was the culmination of several years of

³⁸⁸ Department of Health Education and Welfare, "Records, Computers and the Rights of Citizens Report of the Secretary's Advisory Committee on Automated Personal Data Systems," ed. Secretary's Advisory Committee on Automated Personal Data Systems (Washington D.C.: Government Printing Office, 1973), 2.

hearings on the viability and desirability of a national archive of electronic information first proposed in the mid-sixties, and their recommendations hinged on the threat for privacy abuse that such a database might encourage.

Computers and Privacy

The idea that computer databases (or ‘databanks’ in the terminology of the post-war era) presented a threat that was more substantial than those prophesied in earlier accounts was first voiced by Richard Hamming, a researcher at Bell Laboratories in 1962. Hamming detailed the ways in which databases, by their very existence, would have a deleterious effect on personal privacy. “How do we know that this is always being used for the benefit of the individual?” he asked. “How can we be sure that this information will not be used against a person?”³⁸⁹ Hamming cited the potential use of computers to track travel reservations, income, and medical data and expressed a concern that the data could possibly be pooled and manipulated to garner a profile of an individual’s habits and tendencies that would be out of the person’s control.

In 1965, the non-profit Social Science Research Council proposed the creation of a national clearing-house of available statistical information to be housed in a large data center. This National Data Center recommendation was endorsed by the Bureau of Budget (now the Office of Management and Budget) in a draft proposal to congress. This proposal, and the hearings held in both the U.S. House of Representatives and the

³⁸⁹ John A. Osmundsen, "Expert Fears Harmful Effects Amid Benefits from Computers " New York Times, January 1 1962, 33.

Senate, generated a great deal of comment in the mainstream media and, for most journalists, presented a more tangible example of a computerized threat than the futuristic and often imaginary computer abilities that made up the iconography of the 1950's. The hearings held in 1965 and 1966 by the Senate Committee on the Judiciary, Subcommittee on Administrative Practice and Procedure and the House Committee on Government Operations, Special Subcommittee on Invasion of Privacy included testimony from computer manufacturing executives, federal agencies, the RAND corporation and Vance Packard, author of the *The Hidden Persuaders*, a 1957 best seller about media manipulation and subliminal messages. Packard noted the similarities between the National Data Center and what he saw as Orwellian social control: "The file keepers of Washington have derogatory information of one sort or another on literally millions of citizens," Packard claimed, "Big Brother, if he ever comes to these United States, may turn out to be not a greedy power seeker but rather a relentless bureaucrat obsessed with efficiency."³⁹⁰ Packard's remarks were included in a front page story in the *Washington Post* that led with the sentence, "A special house subcommittee was urged yesterday to shore up the right to privacy before it gets swallowed up by government computers," and described witnesses as assail[ing] the plan as a 'threat to individual liberty,' a harbinger of Big Brother, and a mechanized suffocation of the American dream."³⁹¹

Packard, six months later, authored a long piece on computers and privacy for the *New York Times*. Focusing on the proposed National Data Center he advocated against

³⁹⁰ George Lardner, "Data Center Hearing Warned on Privacy," *Washington Post*, July 27 1966, A1. See also: "Chains of Plastic," *Newsweek* 68 (1966): 27, Anthony Prisor, "National Data Center: Computer Vs. The Bill of Rights," *The Nation* 203 (1966): 449-452.

³⁹¹ Lardner, A1.

the previous summer, Packard outlined the prevailing arguments against a centralized database. Packard's concerns that central databases encouraged a 'depersonalization of American life' echoed the Berkeley Free Speech Movement's criticism of the university as knowledge factory, where humans are little more than raw materials or statistical fodder. He also criticized centralized databases as likely to "increase the distrust of citizens in their own government and alienate them away from it,"³⁹² and that centralized databases are error prone and it is difficult to correct errors or allow for extenuating circumstances. Packard argued that the most dangerous hazard that databases possess is that they concentrate power in the hands of "the people in a position to push computer buttons."³⁹³

Data and Control

Packard's comments presaged the central arguments of the 1960's student movement's turn to open confrontation in their protests against university and government policies, and pointed to a further rationale for why computer systems were the target of so many protest actions. The anxiety about computers was an expression of the fear of the data computers contained, and further, the motivations of those with access to this data. The existence of a centralized database along the lines of the proposed National Data Center seemed to re-enforce the fears of a growing segment of the American population that their government was not necessarily to be trusted to act in their best interest. *Look* magazine asked: "The computer data bank, will it kill your

³⁹² Vance Packard, "Don't Tell It to the Computer," New York Times, January 8 1967, 236.

³⁹³ Ibid.

freedom?"³⁹⁴

Coupled with this distrust of government, was the concept that such a database was, at its core, un-American. Alan F. Weston, professor of public law at Columbia University testified that:

From the time he started driving or took a transportation facility to work (leaving a record at toll or ticket booth) until he arrived home at night, a person's movements and actions would be in the computer's memory systems. At every step—when he parked at the garage, when he entered the office and 'registered in', when he used the telephone, his luncheon, his attendance at the theater or the ball game, his store purchases, his stay at the motel, his visits to the doctor—all these would be on record.³⁹⁵

Charles Reich, a professor at Yale Law School testifying before the House Committee in 1967, made the argument that with a national database, "we would have a situation in which nobody got a second chance, no matter how young, no matter how foolish, no matter how easily explained the circumstances; we would establish a doctrine of no second choice, no forgiveness."³⁹⁶ He concluded that, "one life, one chance only. That seems to me very different from the American dream."³⁹⁷ Dr. Reich's comments suggest how the concept of computerized databases resonated with earlier conceptions of computer technology with un-American forces in world politics, specifically Soviet and Chinese totalitarianism. This critique sums up several of the thematic narratives of post-war computer anxiety. Reich's reading of American history as a site of erasure and re-creation relied upon a view of the American experience as uniquely individualistic, one that echoed earlier critiques of post-war 'Organization Men' and 'other-directed'

³⁹⁴ J. Star, "Computer Data Bank: Will It Kill Your Freedom?," *Look* 32 (1968): 27.

³⁹⁵ "'Big Brother May Be a Computer,'" *Los Angeles Times*, October 8 1967, M7.

³⁹⁶ *Ibid.*

³⁹⁷ *Ibid.*

followers of mass-movements. The idea that the function of computer technology was to enclose and categorize individuals was a response to increased routinization in the workplace, and the sense, first proposed by Turner at the end of the nineteenth century, that the enclosure of the American frontier brought to an end a decidedly American character.

At the end of the 1966 hearings into the need for a National Data Center, both the U.S. House of Representatives and the Senate remained unconvinced that the need for a centralized government data center outweighed their concerns over privacy. Hearings were held again in 1967 and in 1968 with the same result. The committees and various witnesses feared that once such a center was established, it could (and likely would) expand beyond control. There was also a level of mistrust between the legislature and the executive branch, over who would control this information. As written, the National Data Center would be part of the executive branch. The thought that personal information would be warehoused and manipulated by the executive branch of government likely lent a degree of empathy on the part of the congressmen to the witnesses who saw the database as the equivalent of 'Big Brother'. The committees agreed with the technical argument that the existing system of disconnected data systems was inefficient, however, they also believed that such decentralized inefficiency was amenable to congressional oversight, whereas centralized efficiency would be more difficult to check. In 1966, 1967, and 1968, the proposal for the National Data Center was rejected.

Of course, proposals for centralized databases and increased efficiency were unlikely to stay dormant for long. When the proposal for a National Data Center was

derailed, several states, and municipalities pushed forward with smaller initiatives. Even local debates received national attention. When the municipal government of Santa Clara County in California began efforts to roll out a centralized database of its own, the possible repercussions were news in Chicago:

Many residents of big, rapidly growing Santa Clara County will find their names indexed within the next year in a centralized computer system. At least sketchy information in personal 'dossiers' will be available after that time to authorized inquirers in seconds or minutes. [...] Some officials themselves have raised questions about invasion of privacy and the concept of a close watch on activities of individuals by 'big brother'. [...] The pooled information could include a person's education, grades, credit rating, income, military service, employment, and almost anything else, all wrapped in one package.

Unlimited capacity for information storage combined with instantaneous retrieval would seem almost irresistible temptation to record more than is warranted and 'retrieve' for unethical and/or illegal purposes. The toy could easily become a monster.³⁹⁸

As civil rights actions and anti-war protests increased in frequency and violence, the government on all levels responded to the threat with the purchase and deployment of more and more computerized systems to track arrests, suspects, and persons of interest. Although the rationale behind these systems was, at least on the surface, the desire to fight crime, the databases were rarely portrayed in a positive light to the public by the media, and were often described as much more sinister than the criminals they were supposed to track:

The huge computerized intelligence systems being considered by the California Council on Criminal Justice is only symptomatic; the disease is everywhere. New York police have a magnificent new computerized information network; Chicago police had one before them. Much of the

³⁹⁸ "New Computer Index Bothers Californians," Chicago Tribune August 1 1966, A1.

data in these banks is ‘sociological’, personal.

And behind all this information stands the new generation of computers ready to process it all instantly. So the people in their bunkers must fear not only the radical and the criminal, but the government tirelessly building what the English writer Nigel Calder calls ‘the infrastructure of tyranny’—all this information.³⁹⁹

Like those who testified before the Senate and the House in 1966 and 1967, writers about computers invested the concept of a central database with a portentousness borne from a generation of anxiety about the computers ability to irreparably damage society. The difference was that the computer itself was no longer the agent of our demise, but a tool for those who built the ‘infrastructure of tyranny’. The people in control of the technology would, it was feared, be in control of our past and with it our futures. Mary Daniels with the Chicago Tribune predicted that: “everybody’s past will be available in a computer print-out to anyone who knows how to punch the proper keys. If things go the way they are, America will be turned into a one-chance society in which you’ll never be able to live down your past.”⁴⁰⁰

Consumer advocate Ralph Nader, in a speech in the fall of 1970, suggested to his listeners that an out of control government database was not the only type of computer system to be afraid of. Nader stated that “people are being alienated by the way national data banks, owned by credit companies, banks, insurance companies, employment bureaus and others are being used and shared,” and that the massive accumulation of secret personal data on millions of people was a “perilous threat to civil liberties.”⁴⁰¹ The

³⁹⁹ J. R. Bruckner, "Government of- and by- Fear," Los Angeles Times, May 23 1970, A8.

⁴⁰⁰ Mary Daniels, "Our Peek-a-Boo Society," Chicago Tribune, May 31 1970, G7.

⁴⁰¹ Lacey Fosburgh, "Nader Fears Computer Will Turn Us into 'Slaves'," New York Times September 2

article headline for the story covering Nader's speech for the New York Times, "Nader Fears Computer Will Turn Us into 'Slaves'," reused the same tropes to describe computers that deployed a decade before to describe Norbert Wiener's prophesies of a machine driven society. But here the context shifts. The computer is not the master, but rather the master's tool. As Nader continued, "This is leading to a significant kind of tyranny. [...] The key democratic principle of a man's control over his life is being abused. And unless we do something about it, we're suddenly going to wake up and realize we're a nation of slaves'.⁴⁰²

Congressional Hearings and the Privacy Act of 1974

Despite the concerns of citizens, consumer advocates, and congressmen, the proliferation of databases continued unabated. Claims of efficiency and the demands of business outweighed any attempt to seriously derail the investment in new technology. This is not to suggest that a sense of urgency and foreboding did not continue to surface at fairly regular intervals. One of the more consistent critics of computerized recordkeeping, Senator Sam Ervin of North Carolina, held numerous hearings on the subject of computers and privacy. Ervin was popular with the press and the American people for his folksy populism and wit. He was consistently represented as siding with Americans against the threat of an intrusive state. The press played up this threat with claims that "the police, security and military intelligence agencies of the Federal Government are quietly compiling a mass of computerized and microfilmed files on

1970, 18.

⁴⁰² Ibid.

hundreds of thousands of law abiding yet suspect Americans.”⁴⁰³ Ervin was consistently obliging with colorful speeches calling computer systems “A mass surveillance system unprecedented in American history,” within which “rests a potential for control and intimidation that is alien to our form of Government and foreign to a society of free men,”⁴⁰⁴ and reminding audiences that “a computer has a memory but it has no compassion.”⁴⁰⁵

In an odd twist on the conflation of computers with a sort of monstrous female, The *New York Times* reported:

Senator Ervin already has disclosed that the Dragon Lady of the State Department, Director Frances Knight of the Passport Office, has at her disposal a computer bank of 243,135 names of persons considered—not necessarily proven—to be subversive or to fail to ‘reflect credit on the United States.’⁴⁰⁶

Frances Knight, described in a 1970 Time magazine article as a “Women's Liberation movement unto herself”⁴⁰⁷ for her rise to the head of the State Department Passport Office, and for her lawsuit against the State Department for sexual discrimination when she discovered that her leadership of the Passport Office did not translate into a rise in pay grade to equal her male counterparts. Her ‘dragon lady’ label reflected her status as an agitating female, her use of computers simply added to her emasculating personae. In language that suggests that the her command of computer systems equals control over lives, The New York Times places Ms. Knight in a matrix of

⁴⁰³ Ben A. Franklin, "Federal Computers Amass Files on Suspect Citizens," New York Times June 28 1970, 1.

⁴⁰⁴ Ibid.

⁴⁰⁵ David C. Anderson, "Sen. Ervin Vs. 'Information Power'," Wall Street Journal, February 8 1971, 12.

⁴⁰⁶ Tom Wicker, "Raw Material for the Snoopers," New York Times February 16 1971, 33.

⁴⁰⁷ "Clash by Knight," Time, October 19 1970, 26.

power and control that is only heightened by her access to computers. The chauvinism of 1970 was not far removed from the depictions of women and technology in the 1950's.

In Ervin's 1971 hearings on computers and privacy, Arthur Miller, a law professor at the University of Michigan, testified that "information gathering and surveillance activities of the Federal Government have expanded to such an extent that they are becoming a threat to several basic rights of every American—privacy, speech, assembly, association and petition of government."⁴⁰⁸ Reporters commented that testimony revealed how, "inaccurate and unrefuted derogatory information is disgorged, citizens are turned down for jobs or insurance or loans. Worse, they have been blackmailed or have suffered reprisals."⁴⁰⁹

Miller's opportunity to testify came, in part from having authored the book, *Assault on Privacy Computer: Data Banks and Dossiers* in 1971. In reviewing the book for the *New York Times Review of Books*, Robert Sherrill describes data collection as "prying intimate data from a person is kind of rape, and it usually achieved on the same terms of the old *droit du seigneur*. If you want security, you've got to put out."⁴¹⁰ Sherrill also gives a nod to "brainy young people, bless their hearts, who have shown several universities and corporations that they are capable of breaking computer codes and mucking up, or erasing, official tapes that contain information offensive to them."⁴¹¹ This acknowledgement of the techniques of protestors and radicals both confers some mainstream legitimacy on them, as well as providing an example of just how far into the

⁴⁰⁸ Richard Halloran, "Surveillance: When We Get All the Data in One Place," New York Times February 28 1971, E4.

⁴⁰⁹ Ibid.

⁴¹⁰ Robert Sherrill, "The Assault on Privacy," New York Times March 14 1971, BR3.

⁴¹¹ Ibid.

mainstream their arguments (and more obliquely, their methods) had become. The conflation of ‘prying’ data from individuals with ‘rape’ speaks to how alarming the thought of using databases to maintain information on American citizens was, as well as how adversarial the relationship was between the public and the state in matters of privacy. Sherrill ends by stating that, “an angry public should seize congress by the lapels” and demand regulations to safeguard privacy and to allow people the right to review their electronic dossiers.⁴¹²

As Congress continued to wrestle publicly with the subject of databases and privacy, the feelings of the American public were not as easy to gauge. A 1970 Harris survey outlines the extent to which individuals felt that their privacy was threatened by computerized databases in a way that suggests that the anxiety represented in the media may not have been felt as strongly by the general public. When asked if they felt their privacy was being invaded, 34 percent answered in the affirmative. When the pollsters asked more specific questions about computers and privacy, only 19 percent expressed the feeling that “computers which collect a lot of information about you” posed a threat.⁴¹³ Less than one in five persons felt threatened by computers as a practical concern. This suggests that when viewing computers as tangible artifacts with specific functions (e.g. data management) the people participating in the survey were not as alarmed as members of the media. They were interested in threats to their privacy, but less concerned with the computer’s role in their lives.

In 1973, the Richardson Committee, after several years of study and collected

⁴¹² Ibid.

⁴¹³ Louis Harris, "1 in 3 Feels Privacy Invaded," Chicago Tribune, August 3 1970, A1.

testimony, issued a set of recommendations on the status of computer databases and privacy, as well as proposals for the rights of the public to know the details of the information the government had gathered. The recommendations were summarized in the report's executive summary as follows:

1. There must be no data record-keeping systems whose very existence is secret.
2. There must be a way for an individual to find out what information about him is in a record and how it is used.
3. There must be a way for an individual to prevent information about him obtained for one purpose from being used or made available for other purposes without his consent.
4. There must be a way for an individual to correct or amend a record of identifiable information about him.
5. Any organization creating, maintaining, using or disseminating records of identifiable personal data must assure the reliability of the data for their intended use and must take reasonable precautions to prevent misuse of the data.⁴¹⁴

The recommendations reflect the change in emphasis away from computer technology as inherently suspicious, and identify instead the focus of suspicion as inherent within government. The recommendations, with their emphasis on personal privacy and personal access to information stored in their name, effectively position the American public, as a set of individuals, as owners of information. This active relationship to information signals a shift away from the more passive relationship with computers as artifacts in the 1950's.

By the spring of 1974, the proposals of the Richardson Commission were used as ammunition to quash the Government Accounting Office's new attempt for a National Data Center. Rechristened as FEDNET, the data center was intended to bring together

⁴¹⁴ Welfare.

the data from disparate agencies within the Federal government, as well as the military. By the end of the year, the recommendations were codified and signed into law as part of the Privacy Act of 1974.

What Happens to Machines?

The FBI is gearing up to create a massive computer database of people's physical characteristics, all part of an effort the bureau says to better identify criminals and terrorists.

"It's the beginning of the surveillance society where you can be tracked anywhere, any time and all your movements, and eventually all your activities will be tracked and noted and correlated," said Barry Steinhardt, director of the American Civil Liberties Union's Technology and Liberty Project.⁴¹⁵

The debates that generated the anxieties placed upon computer technology by writers (and audiences) suspicious of the new machines in their midst are, of course, still with us and, not surprisingly, we respond to these anxieties by displacing them onto a new set of perceived intruders and interlopers. As the 1960's came to a close, anxiety concerning sentient computers faded from the popular cultural landscape and was replaced by a more tangible concern about the data housed within the machines, and the power of information as a means of social control. If the 1960's brought into sharp relief the disjuncture between the state and its citizens, the distrust engendered by this disjuncture was layered into the American cultural landscape of much of the 1970's and provided the subtext, if not outright subject of countless cinema and television artifacts from the 1970's.

⁴¹⁵ Kelli Arena and Carol Cratty, F.B.I. Wants Palm Prints, Eye Scans, Tattoo Mapping(CNN, 2008, accessed February 9 2008); available from <http://www.cnn.com/2008/TECH/02/04/fbi.biometrics/index.html>.

The conflation of the state and the machine that preoccupied the counterculture of the 1960's became hegemonic in the 1970's with the political crises of Watergate, the end of the Viet Nam War, and economic recession. The suspicion and resentment that the anti-war left felt toward the American government was widespread, and disenchantment with the political process extended into the middle-class and into middle-America. At the heart of much of this distrust was the power of information and the shadowy, unaccountable organizations that seemed to control it. Science fiction films from the 1970's that anthropomorphized computer intelligence and prophesied totalitarian dystopia at the hands of machines appear, by this time, quaint and outdated. Films like *THX-1138* (Warner Brothers, 1971), *Westworld* (MGM, 1973), *Futureworld* (American International Pictures, 1976), *Logan's Run* (MGM, 1976), and *Demon Seed* (MGM, 1977) approached computer technology as sinister and conniving entities consciously seeking to destroy and control in ways that seem more at home a decade before. Conversely, films from the 1970's that focus on information and data manipulation as central to the plot seem more a part of the decade. *The Conversation* (Paramount, 1974), *The Parallax View* (Paramount, 1974), *Chinatown* (Paramount, 1974), and *Nashville* (Paramount, 1975), all contain elements of paranoia, but more importantly, they all reflect anxieties concerning the control of data, how it can be manipulated, and how it can be used to wield power. The decline of computer anxiety in the 1970's goes along with the rise of information anxiety.

James Beniger suggests at the conclusion of his book, *The Control Revolution*, that the information society, and with it computer technology, did not spring unannounced upon an unsuspecting public, but rather that the seeds of the movement

toward information control technologies were sown in the 19th century and were plain to see.⁴¹⁶ While Beniger's narrative of the control revolution as a reaction to the technological changes of the industrial revolution accounts for the antecedents to computer technology, he overlooks the importance of how this technology appeared to a public largely ignorant of the ramifications of information control, and the impact it would have on their lives. The American public, recovering from the Second World War and coming to terms with the idea of the atomic bomb, had reason enough to be anxious about another technology that promised to further impact their livelihoods and their survival. The general unease about the post-war economy and the return to depression-era job losses due to the introduction of automated control and computer technologies was fertile ground for imagining the worst aspects of potential change.

Computers did not maintain their status as icons of anxiety, arguably, because of both their demystification as artifacts and because the monolithic systemic threat that they had come to represent was seen to be rife with cracks, fissures and fault lines. The system implied by the military and economic juggernaut that was post-war America had, by the 1970's, morphed into an economy in recession, a failed colonial war, and breakdown in basic services. If the computer represented the victory of the control revolution that would undo American civilization, it would have to wait in line behind more immediate concerns. In a way, the displacement of social anxieties onto the computer was a luxury that 1970's America could not afford.

Throughout this project I have emphasized that metaphors concerning computer

⁴¹⁶ Beniger, 435.

technology were more than simple shortcuts to help lay audiences understand something new. From the earliest descriptions of computers found in the print media of the late 1940's, it was clear that our understanding of computers was shaped to fit the contours of post-war America. Fears of a return to the economy of pre-war, Depression-era America were emphasized by highlighting that computers were capable, like the machines that supplanted workers in the 1930's, of displacing a whole new class of American workers in the 1950's. The regimentation and routinization of work necessary to the successful integration of computers into American business reminded many reporters of the regimented world of the Soviet Union and Communist China.

For all the negative, if not hostile, rhetoric surrounding computers it is surprising that they were assimilated into the American economy as quickly as they were, without some public reaction reminiscent of the Luddites of 19th century England. It is here that another side of the framing of computers came to the fore. However computers were represented as job destroyers and implacable forces of control, there was a consistent counternarrative that successfully positioned computers as no more than any other natural force that was there to be tamed and brought to heel.

The challenge of computers was like the challenge of a sublime nature successfully harnessed by our ancestors, and the sublime forces of the 20th century, from atomic bombs and energy, to computer power, were there to be tamed by a new generation of men. This same formula applied to the metaphorical relationship of computers to women. Computers were linked to femininity so as to suggest that control of one would provide a key for controlling the other.

Computers, and our relationship to them were, from the outset, shaped by anxieties concerning control and power. The generation of students that came of age in the 1960's found themselves in the midst of power struggles with entrenched attitudes and conventions concerning race and gender, and faced with the prospect of fighting a war that was, from the outset, ill-defined and largely unwinnable. It is not surprising that their frustration would take the form of a critique of power and they would appropriate computers as potent icons of conformity and repression. Given the control that universities like the University of California at Berkeley had over students, it wasn't a terrific leap to conflate the student's experience with that of raw data waiting for processing by the university machine. Once students realized that the actual campus computers were often research tools paid for and maintained with money allocated by the U.S. military, the identification of computers with a corrupt system and a hated war was not far behind.

It is clear the violent actions against computer centers did not hasten the end of the war, but were instead acts of frustration against a hegemonic system that seemed to allow no challenge to the status quo. But the student movements were successful in using the iconic power of computers that had built up over twenty years of rhetoric within the culture of the media to garner a voice. If the computers represented power, then taking control of the computers was to demonstrate the limitations of state control. The breathless language used to describe computers in the post-war period seem more than a little quaint as that era fades farther into the past. The anxieties about control and power are still with us, however. Successful contemporary science fiction films like *The Matrix* Trilogy (Warner Brothers, 1999, 2003), *Minority Report* (Twentieth Century-Fox, 2002)

and I, Robot (Twentieth Century-Fox, 2004) to name a few, speak to the durability of the metaphorical weight still attached to computers and their iconic value in addressing contemporary concerns about information, privacy, and the rights of the individual in a climate of distrust and uncertainty for the future.

Throughout this history, computer technology was represented in the popular media with guarded optimism. While on the one hand computer technology was an example of American ingenuity and modernity, a leading technology for an advanced culture, the ramifications of this technology left writers and commentators uneasy. The implications of the technology revealed anxieties in the American culture of the 1950's and 1960's and then sublimated those fears within a naturalized discourse of technological determinism and American exceptionalism. The fear and anxiety produced by the encounter with computer technology was harnessed within media culture and recycled as evidence of the triumph of the American way as individualistic, capitalistic, and confidently masculine. The tactical logic of occupying computer centers to protest the use of college computers for war work was supplemented by the attack on computers as symbols of this relationship, and the relationship between the state, capital, and human beings. The symbolic value of computers in this context is evident in the coverage of occupations by the alternative press. What was once represented as an abstract source of anxiety and uncertainty was, by the end of the 1960's literally held hostage as a symbol of a corrupt and impotent system.

More importantly, the use of metaphor was not 'value neutral' but rather served to provide an outlet for anxieties that did not compromise the established order. Throughout the 1950's and early 1960's the metaphor of the computer 'naturalized' computer

technology and masked the real decisions behind its deployment. Decisions that were made to increase productivity, profitability, and to eliminate classes of jobs were screened from critique by the monolithic approach to the computer as akin to a force of nature, or something that was there and thus had to be used. In this way, the computer as a technological artifact resonated with its deadly sibling the atomic bomb. (It also resonates with the choice of a monolith as the fetishized object of *2001: A Space Odyssey*).

The naturalization of computer technology as an existential threat provided a surrogate victory over the Soviets in terms of the cold war. The totalitarian aspects of machine logic resonated with the machine-like personification of the Soviet system. The consistent victory over computers in the realm of chess was a metaphorical victory over the Soviet Union. Like the Soviets, however, the computers were never defeated totally, but rather vanquished to return stronger another day.

The symbolic relevance of the computer as an icon of conformity, totalizing systems, and dehumanizing processes was incorporated into the rhetoric of the Berkeley Free Speech Movement. As the student movement progressed throughout the 1960's the computer as metaphor was reinscribed upon the physical artifact of the computer as object. Computer centers on university campuses became targets for protesters as objects to be held hostage, vandalized, and destroyed as part of a larger movement against the Vietnam war, but also as part of the civil rights movement.

One of the results of the student movement's appropriation of computer technology as physical artifacts for political ends is the demystification of the computer

as an object. By seeing computers as hostages or bargaining chips, the radical left stripped the computer of agency and turned it back into a tool both symbolically and practically. The countercultural embrace of computers in the 1970s as a tool for liberation and self-realization owes a debt to the civil rights and anti-war movements that preceded for rethinking the antagonism between humans and machines and reemphasizing the significance of power derived from control. Computer technology was and remains a tool for managing information and data and it was the counterculture's understanding that information and data are required components of control and power. In this they shared an awareness and concern with earlier describers of computers as dehumanizing.

The metaphors used to describe computers were a means to assimilate a new technology and place it within an existing matrix of meaning along with countless other new objects that were developed and introduced to consumers in the years following World War II. But the metaphors were something more. The use of computers as icons of modernity allowed computers to be used as surrogates for other issues that were part of post-war American culture, and the anxieties latent in the Cold War, post-war unemployment, the role of women, and the rise of the military-industrial complex found a common shorthand in descriptions of computer technology as a repository for concerns about an uncertain future. And further, the use of these metaphors shaped the way we thought about computers as thinking machines and as electronic surrogates that in turn shaped the way we thought about the Soviet Union, feminism, corporate America, and individuality. As the development of personal and home computers brought about computers as an "object to think with," to borrow Sherry Turkle's definition, the artifact

had already existed in a metaphorical space for most Americans in the Cold War era.

Computers, as technological artifacts, were (and still are) emblematic of technological society. The role of computers in military research into nuclear weapons, their adoption into business and accounting fields, and their representation as the most rational of technologies for a rational world created an environment where any anxiety about the modern world could be depicted by using the computer as icon. The computer as an icon of modernity symbolized both the aspirations of America's mastery of technology and our fear of what that mastery involved. But the anxiety concerning computers masks something else. Computer anxiety or discomfort toward the technologies embedded in the computer as an icon did not explicitly reveal a latent technophobia in American culture. To the contrary, Americans were no less enamored of technology in the 1950's and 1960's than they are now and, given the tenor of many of the articles and stories from the post-war era, perhaps were more so. But the approach to computer technology within the media was strangely schizophrenic. For all the celebration of the new and exciting 'electronic brains' and the self-congratulatory tone of writers reveling in ideas of post-war American exceptionalism, many, perhaps most, of the press of the day tempered their excitement over the promises of the technology and meditated as well upon the portentous aspects of computers as planting the seeds for humanity's downfall.

Appendix 1: Timeline of Events 1946-1970

Year	Computer Technology	Media	History
1946	Public announcement of the development of the ENIAC computer	War Department Bureau of Public Relations Press Branch: "Ordinance Department Develops All-Electronic Calculating Machine." Press release announcing ENIAC computer	
1947	Jay Forrester begins work on the 'Whirlwind' computer: MIT Harvard's Mark III computer goes online William Shockley, Walter Brattain, and John Bardeen develop the transistor	Theodor Adorno and Max Horkheimer: Dialectic of Enlightenment Jack Williamson: "With Folded Hands"	HUAC hearings begin
1948	Eckert-Mauchly Computer Corporation founded, Philadelphia IBM: Selective Sequence Electronic Calculator (SSEC) developed and put on public display at IBM's Manhattan headquarters	Norbert Wiener: Cybernetics: Or, Control and Communication in the Animal and the Machine W.H. Auden "The Age of Anxiety" Claude Shannon: "The Mathematical Theory of Communication"	Harry S. Truman elected U.S. president

Year	Computer Technology	Media	History
1949	EDSAC, the first practical stored-program computer developed, Cambridge University Claude Shannon proposes a theoretical chess playing computer	Edmund C. Berkeley: Giant Brains; or, Machines That Think	Soviet Union tests atomic bomb
1950	Alan Turing creates "Turbochamp" a paper program for chess playing machine The National Bureau of Standards develops the SWAC (Standards Western Automatic Computer) Engineering Research Associates of Minneapolis: ERA 1101, first commercially produced computer	Alan Turing: "Computing Machinery and Intelligence" paper proposes what will become known as the "Turing Test" for artificial intelligence	Korean War begins Joseph McCarthy 'Red Scare' begins <i>Time</i> Magazine puts an anthropomorphized Mark III computer on it's cover
1951	First UNIVAC computer developed and installed at the U.S. Census Bureau	MIT's Whirlwind computer debuted on Edward R. Murrow's "See It Now" C. Wright Mills: White Collar: The American Middle Classes	Computer Research Corporation's CADAC computer is challenges to a chess match, claims of its chess playing ability are never demonstrated

Year	Computer Technology	Media	History
1952	<p>Eckert-Mauchly Computer Corporation absorbed into the Remington Rand Corporation</p> <p>IBM: Arthur Samuel begins work on computer checker-playing program</p> <p>MANIAC I developed at Los Alamos Scientific Laboratory</p>	<p>First use of a computer to predict a presidential election. CBS used the UNIVAC computer, NBC used the "Mon-robot"</p> <p>Kurt Vonnegut: <i>Player Piano</i></p>	<p>Dwight Eisenhower elected U.S. president</p> <p>U.S. tests hydrogen bomb</p>
1953	<p>IBM's 701 computer developed-- first IBM computer for commercial use</p>	<p>Ray and Charles Eames: <i>A Communications Primer</i></p>	<p>George Kennan: "Communism and Conformity," Bulletin of the Atomic Scientists</p> <p>Josef Stalin dies: March 1953, Georgy Malenkov becomes premier</p> <p>Soviet Union tests hydrogen bomb</p>
1954	<p>IBM 650 magnetic drum calculator-- first mass-produced computer</p>	<p>UNIVAC used to predict 1954 congressional elections</p> <p>Norbert Wiener: <i>The Human Use of Human Beings</i></p>	
1955	<p>Soviet Chess playing computer reported.</p>		<p>Nikolai Alexandrovich Bulganin replaces Georgy Malenkov as premier of the Soviet Union</p>

Year	Computer Technology	Media	History
1956	<p>ERMA (Electronic Recording Method of Accounting) an automated check processing system developed</p> <p>IBM 704 computer capable of playing checkers is announced</p>	<p><i>Forbidden Planet</i> (Metro-Goldwyn Mayer)</p> <p>IBM's Military Products Division: <i>On Guard</i> film</p> <p>William H. Whyte: <i>The Organization Man</i></p>	Dwight Eisenhower re-elected U.S. president
1957	<p>MANIAC II developed at Los Alamos Scientific Laboratory. Computer plays simple chess game on 6x6 board</p>	<i>Desk Set</i> (20th Century Fox)	Soviet Union launches Sputnik
1958	<p>Alex Bernstein develops chess program for IBM 704 computer</p> <p>SAGE — Semi-Automatic Ground Environment — links hundreds of radar stations in the United States and Canada in the first large-scale computer communications network</p>	<p>Charles and Ray Eames: <i>The Information Machine (Man and the Data Processor)</i></p> <p>Arthur M. Schlesinger: "<i>The Crisis of American Masculinity</i>"</p>	<p>Nikita Khrushchev replaces Nikolai Alexandrovich Bulganin as Soviet premier</p> <p>Bobby Fischer wins US Chess Championship</p>
1959	<p>32 ERMA check processing system deployed to Bank of America</p> <p>IBM 1401 computer--first all transistor production computer developed</p>		

Year	Computer Technology	Media	History
1960		"The Thinking Machine" (CBS)	John F. Kennedy elected U.S. president
1961		Joseph Heller: <i>Catch-22</i> Charles and Ray Eames: <i>IBM Mathematics Peep Shows</i> (1961)	
1962		Eugene Burdick, and Harvey Wheeler: <i>Fail Safe</i>	Students for a Democratic Society (SDS): "Port Huron Statement"
1963		<i>Twilight Zone</i> : "The Old Man In The Cave" (CBS) Betty Friedan: <i>The Feminine Mystique</i>	John F. Kennedy assassinated. Lyndon Johnson becomes U.S. president
1964	CDC 6600 supercomputer developed by Seymour Cray MANIAC III developed at Institute of Computer Research, University of Chicago	<i>Fail Safe</i> (Columbia Pictures Corporation) <i>Twilight Zone</i> : "From Agnes with Love" (CBS) Herbert Marcuse: <i>One-Dimensional Man: Studies in the Ideology of Advanced Industrial Society</i>	Gulf of Tonkin incident triggers direct U.S. military involvement in Vietnam University of California at Berkeley: Free Speech Movement demonstrations Leonid Brezhnev replaces Nikita Khrushchev as Soviet premier

Year	Computer Technology	Media	History
1965		<p>“Logic by Machine” (Computer and the Mind of Man) (National Educational Television)</p> <p>Charles and Ray Eames: <i>IBM At the Fair</i></p> <p><i>Alphaville: A Strange Case of Lemmy Caution</i> (Athos Films)</p>	200,000 U.S. troops dispatched to Vietnam to begin U.S. ground war
1966	National Data Center proposed to congress		
1967		<p><i>Star Trek: “I, Mudd”</i> (NBC)</p> <p>Star Trek: "The Changeling" (NBC)</p>	University of California at Santa Barbara computer center seized by protestors
1968		<p><i>2001: A Space Odyssey</i> (Metro-Goldwyn Mayer)</p> <p>Charles and Ray Eames: <i>A Computer Glossary (or, Coming to Terms With the Data Processing Machine)</i></p> <p>Harvey Matsusow: <i>The Beast of Business</i></p>	<p>Vietnam Tet Offensive</p> <p>Martin Luther King assassinated</p> <p>Robert Kennedy assassinated</p> <p>Richard Nixon elected U.S. president</p>

Year	Computer Technology	Media	History
1969	First ARPANET link established	Star Trek: "Requiem For Methuselah" (NBC)	<p>University of Pittsburgh computer center occupied by protestors</p> <p>University of Maryland computer center occupied by protestors</p> <p>George Williams University- Montreal computer center destroyed by protestors</p> <p>Apollo 11 lands on moon</p>
1970	First ACM Computer Chess (computer versus computer) tournament is held	<i>Colossus: The Forbin Project</i> (Universal)	<p>U.S. bombing campaign in Laos and Cambodia</p> <p>Kent State University: four students killed by national guard troops</p> <p>New York University computer center attempted bombing</p> <p>Fresno State computer center bombed</p> <p>University of Wisconsin computer lab destroyed</p> <p>University of Kansas-Lawrence computer center bombed</p>

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