

**The Technological Sublime vs. The Frankenstein Complex:
Utopia, Dystopia, and Christianity in the Great Internet Debate**

by

Samuel R. Smith

B.A., Wake Forest University, 1984

M.A., Iowa State University, 1989

**A thesis submitted to the
Faculty of the Graduate School of the
University of Colorado in partial fulfillment
of the requirement for the degree of
Doctor of Philosophy
School of Journalism and Mass Communications
1999**

Abstract

Smith, Samuel Random (Ph.D., Communications)

The Technological Sublime vs. The Frankenstein Complex: Utopia, Dystopia, and
Christianity in the Great Internet Debate

Thesis directed by Professor Willard Rowland

The decade of the 1990s has seen the rapid rise of the Internet as a technological, social, economic, and cultural phenomenon. The medium's development has generated significant debate over its potential to reform Western, and especially American, society. An extensive review of claims made in popular media both for and against the development of the Internet reveals a distinctly polarized utopian versus dystopian character, a dichotomy that is in keeping with the historical reception of technological development in the West. The roots of the technotopian impulse are traced back through the Enlightenment (where it finds its most eloquent expression in the writings of Francis Bacon) to the latter stages of the first millennium; the dystopian response, which has roots at least as old, is cast as a central element in the Romantic era of the 19th Century (where it manifests in literary critiques like Mary Shelley's *Frankenstein* and the essays of Emerson). Deeper analysis situates the ethical origins of both impulses in the formative moments of Christianity. These theological underpinnings are demonstrated by a close reading of an important public debate recorded in *Harper's Magazine* in 1995.

Dedication

This project is dedicated to the memory of my grandparents, Samuel Linville and Helen Marshall Smith. Though not highly educated people themselves, they understood that their grandson's best hope in life depended on higher education. I wish they could be here to see how right they were....

Acknowledgements

I would like to begin by offering my deepest gratitude to the members of my thesis committee, each of whom provided a perspective essential for the completion of a project as broadly focused as this one. Wick Rowland, my chair, helped me understand the deep intellectual history attending technological development in America; Michael Tracey served as a persistent reminder that our work as scholars always has implications for real-world policy; Jan Whitt supported my long-held conviction that culture is best understood through art and literature; Erika Doss provided me with the opportunity to extend my study into areas of visual culture about which I previously had no understanding; and Michael Preston validated my desire to address this research question through more “traditional” textual approaches. Additionally, I would like to thank Eric White, who served on my comprehensive examination committee; while the literature on Chaos and Complexity I studied under his guidance did not figure directly into the final thesis project, the structures of thought and analysis I developed studying with him were of critical importance in my attempts to understand the development of technotopian and techno-dystopian ideologies.

A great debt is owed to a number of my fellow doctoral students. Classmates Lynn Clark and Peter Vassiliev were important intellectual foils as well as cherished friends, and the work of Geoff Rubinstein, Kris Ross, Jan Fernback, and Brad Thompson helped inform the study undertaken here.

Most importantly, though, I want to acknowledge the immeasurable contributions of my roommate of two years, Greg Stene. The hours upon hours we spent bouncing ideas off one another benefitted my work in ways I can’t begin to enumerate. Perhaps moreso than anybody else during my stay at CU, Greg helped me develop my ability to *think*. To Greg and the others named here, thanks.

Contents

Introduction	1
Chapter 1: The Great Internet Debate	15
Chapter 2: The Technological Sublime	96
Chapter 3: The Frankenstein Complex	176
Chapter 4: “What are We Doing On-line?” The Harper’s Forum	263
Conclusion	281

INTRODUCTION

*If you at last must have a word to say,
Say neither, in their way,
“It is a deadly magic and accursed,”
Nor “It is blest,” but only “It is here.”*

– Stephen Vincent Benét

The Internet has, through the 1990s, been a source of extensive discussion and debate in the popular sphere. The participants have come from all walks of life – politicians, business leaders, former hippies, computer professionals, religious leaders and adherents (and detractors), students, educators, neo-Luddites, publishers, and librarians, to name a few, have weighed in with opinions based on research, personal experience, or simply preconceived notions. The Net, also known as cyberspace, the National (Global) Information Infrastructure (NII/GII), and the Information Superhighway, has been seen as a great social equalizer, a boon to our economy, a tool for the furtherance of democracy, the last nail in the coffin of literacy, a wall between haves and have-nots, and more (and less).

Whatever the perspective, however, the Internet has sparked impassioned debate around every claim made for its potential. Where some see the Information Superhighway fostering ubiquitous prosperity, others see it exacerbating an already-too-wide rich-poor gap. Where new communitarians see the online world enabling a resurgence of genuine civic spirit and human connection, detractors point to the

medium's tendency to isolate people from each other, addicting them to impersonal interactions with photons on a screen, not real human beings. And so on. If we examine the popular discussion across a series of issues, we slowly begin to see this dynamic – a utopian vision on the one hand, opposed by a dystopian vision on the other – reproduced over and over again. Whether the debate covers economic, educational, communal, or democratic dimensions, the Internet seems inherently to engender strong disagreement regarding the medium's supposed utopian qualities.

A key booster of the Internet during the '90s has been the Clinton Administration, which made Internet development one of its highest priorities from the outset. In Buenos Aires in 1994, speaking before the International Telecommunications Union (ITU), Vice President Al Gore articulated the Administration's vision for a Global Information Infrastructure, and in doing so offered a utopian vision for the new technology as concise as it was sweeping:

These highways – or, more accurately, networks of distributed intelligence – will allow us to share information, to connect, and to communicate as a global community. From these connections we will derive robust and sustainable economic progress, strong democracies, better solutions to global and local environmental challenges, improved health care – and, ultimately – a greater sense of shared stewardship of our small planet.

The Global Information Infrastructure will help educate our children and allow us to exchange ideas within a community and among nations. It will be a means by which families and friends will transcend the barriers of time and distance. It will make possible a global information marketplace, where consumers can buy or sell products.

And the distributed intelligence of the GII will spread participatory democracy...I see a new Athenian Age of democracy forged in the fora the GII will create (2).

The Vice President offers a compelling vision. Virtually no realm of human life is

left untouched and, presumably, unimproved by this revolutionary new technology.

However, these kinds of arguments aren't new, nor are they unique to the Internet.

Cisler, in commenting on David Nye's *The American Technological Sublime*, argues that

As Internet fever sweeps across America and around the world, we would do well to remember that the promises made for the technology and the excitement felt by Presidents and school children alike has had parallels in American history all the way back to Thomas Jefferson. Just as we are trying to leverage the Internet-NII/GII-“Cyberspace” for political and economic gain, others hope it will bind groups together, perhaps even make nations more cohesive, and this is very similar to what American Presidents, captains of industry, and even poets tried to do throughout our history (Cisler).

Gore's rhetoric above perfectly reflects the ideological tradition noted here by Cisler, and is typical of the enthusiasm with which Westerners, and Americans especially, have historically received new technologies. Great faith is placed in the ability of the scientific community to solve problems and develop innovations which make life more convenient and productive.

A brief look at history reveals that Europe and the Americas have over the past 200 years been responsible for an almost unfathomable level of technological innovation. Focusing on the American part of the equation, Neil Postman says in *Technopoly* that

...in cultures that have a democratic ethos, relatively weak traditions, and a high receptivity to new technologies, everyone is inclined to be enthusiastic about technological change, believing that its benefits will eventually spread evenly among the entire population. Especially in the United States, where the lust for what is new has no bounds, do we find this childlike conviction most widely held. Indeed, in America social change of any kind is rarely seen as resulting in winners and losers, a condition that stems in part from Americans' much-

documented optimism (11-12).

Early on in the American experience de Tocqueville observed that the American character associates newness with improvement, and nothing is beyond the power of human endeavor (Postman 53). David Nye agrees, arguing that American culture is uniquely material and technological.

A decade of living in Europe, with frequent visits to the U.S., has convinced me that a core American culture exists, even if it is not fashionable to admit that this is so. The commonalities of this national culture are rooted in material life, notably in large systems such as the form of cities, the dependence on the automobile, the massive distribution of handguns, and the centrality of television (Nye *American Technological Sublime* 297).

Perhaps the American character helps explain a part of the question expressly concerned with the utopian receptivity to technological progress, but the ideological forces at work in the public consideration of the Internet, and technology generally, are far older and more complex. For starters, we might wonder how America, a nation of immigrants, came to reflect this “American character.” What intellectual and popular traditions in the Old Country inform this character, and what about the New World caused those traditions to change and evolve into something different? And what about the dark side of the debate, the dystopian reaction to technological progress? What are the characteristics and origins of this apparently healthy ideological strain? Perhaps most importantly, how is it that these two impulses co-exist?

This dissertation will address these questions, although the vastness and complexity of the topic will prevent anything like definitive conclusions. Still,

certain observations can be made. First, the utopian/dystopian conflict in the Internet debate, as we have seen it manifested in the last decade or so, reflects a longer cultural debate over technology generally. Second, the utopian, or technotopian, strain is the older and more powerful ideology, and stands as the dominant mode of thought in Western culture today. Third, the techno-dystopian view, while subordinate, is nonetheless a healthy and persistent force in the popular mind. Fourth, despite their overwhelming power to influence cultural belief and activity, these ideologies remain more or less invisible in the daily life of the society. Fifth, both views, while tracing their modern incarnations to comparatively recent historical moments (the Enlightenment and the Romantic Period, respectively), have roots that trace back millennia. And sixth, both streams of thought issue from more or less theological headwaters.

We should pause here to introduce and define some terms. The first category of terms relate to the first element of the dissertation's title, the "Technological Sublime." The terms "technotopian," "Internetopian," "technophilic," and "messianic" all refer to the utopian vision of technological development, innovation, application, and progress. Utopian tropes traditionally signify "a place of ideal perfection," especially as relates to social organization. A utopian believes in the perfectibility of society, and inhabitants of the utopia "share most values and consent to whatever degree of social control they experience. Nevertheless, the inhabitants of utopias are portrayed as free and they have transcended contemporary problems in society such as poverty, sexism, war..." (National Library of Canada). George Kateb,

in *Utopia and Its Enemies*, says Utopia is “a world in which individuals and groups [have] the freedom, will, energy, and talent to make and remake their lives unencumbered by insufficiency and the fear of violent death” (Targowski). Oscar Wilde sees the quest for this social perfection as an inherent function of human nature.

A map of the world that does not include Utopia is not worth even glancing at, for it leaves out the one country at which Humanity is always landing. And when Humanity lands there, it looks out, and seeing a better country, sets sail. Progress is the realisation of Utopias (quoted in Targowski).

Anatole France argues that without the utopian impulse, “men would still live in caves, miserable and naked. It was Utopians who traced the lines of the first city.... Out of generous dreams come beneficial realities. Utopia is the principle of all progress, and the essay into a better future” (quoted in Targowski). “Technotopian” and the other derivatives noted above represent applications of the ethos of perfectibility and progress to technologies specifically.

The extreme idealism of the pure utopia is rare, of course, as even the most over-the-top proponents of a given technology probably wouldn’t suggest that it could lead to a perfect society (although some do come remarkably close). Instead, the technotopian impulse depicted here sees technics resulting in a dramatic, rather than incremental, improvement in the human condition – what is suggested is often on the order of a paradigm shift.

The technotopian urge also manifests itself within pronouncements that are openly self-dismissive. These arguments make clear that the technology would, *put*

to best use, result in significant improvements in the cultural condition, but point to various factors that insure such events will not be effected. Most such arguments fault policy-makers for being unable to see the utopian benefits accruing from an appropriate mode of (de)regulation, and as such contain elements of both technotopian (lost possibility) and techno-dystopian (regulatory reality) within them. Of course, this built-in irony is consistent with what the originator of the term had in mind. Lewis Mumford explains that

The word “utopia” stands in common usage for the ultimate in human folly or human hope – vain dreams of perfection in a Never-Never Land or rational efforts to remake man's environment and his institutions and even his own erring nature, so as to enrich the possibilities of the common life. Sir Thomas More, the coiner of this word, was aware of both implications. Lest anyone else should miss them, he elaborated his paradox in a quatrain which, unfortunately, has sometimes been omitted from English translations of his *Utopia*, the book that at last gave a name to a much earlier series of efforts to picture ideal commonwealths. More was a punster, in an age when the keenest minds delighted to play tricks with language, and when it was not always wise to speak too plainly. In his little verse he explained that utopia might refer either to the Greek ‘eutopia,’ which means the good place, or to ‘outopia,’ which means no place (*The Story of Utopias*, quoted in Targowski).

The term “Technological Sublime” itself refers to the awe and euphoria technical promise engenders, as innovation breeds not critical thought, but celebration of achievement and hope. In the American character, mechanical triumphs, as well as natural wonders, are seen as elevating “the moral character of the people” (Nye 40).

The [technological] sublime is “a way to reinvest the landscape and the works of men with transcendent significance.... When experienced by large groups the sublime can weld society together.” It is a kind of religious feeling in a secular time (Cisler, quoting Nye).

“When Internet enthusiasts write that the Net is the most significant development

since the discovery of fire, we have only to read the awe with which observers described the telegraph,” says Cisler. What the telegraph promised – the severing of language from physical proximity – was so radical and patently unbelievable that witnesses were required “to authenticate the act of communication by wire.”

The term “dystopian” and its derivatives (“techno-dystopian,” “technophobic,” “technoresistant,” “demonic,” and “technodemonic”) not surprisingly signify more or less the opposite of utopian, indicating a place or circumstance of horrific conditions, poverty, squalor, hopelessness, oppression, and despair. As with the technotopian, we rarely see the pure strain reflected in popular commentary (although at least one will go as far as to predict complete social and economic collapse). Instead, these contributors to the public debate see technologies doing wholesale damage to the society and its citizens. Again, we are referring to change along orders of magnitude, not minor or incremental changes.

In dystopias...an agency or authority (often the government) is frequently shown to be in total control – the consent of citizens is irrelevant. Chaos and total social breakdown with no form of social control or human security is another form of dystopia (Canadian National Library).

The dystopian impulse also manifests in pastoral tropes, which are not obviously technological at all. These views, elaborated on in Chapter 3, react against the technological not by depicting its dark underbelly, but instead through lush portrayals of natural harmony resulting from the absolute absence of technics.

The term “Frankenstein Complex” takes its name from Mary Shelley’s novel, *Frankenstein, or the Modern Prometheus*, and signifies society’s persistent fear of

scientific hubris. Few questions remain as to the inventive power of the human mind, but many critics suggest a that a widening gap between knowledge and morality plagues technological development in the West. A few years ago when England's Prince Charles delivered the commemoration address at Harvard University's 350th Anniversary celebration, he lamented that humanity's intellect had advanced so tremendously while its ethical capacities had evolved so little. "In the headlong rush of mankind to conquer space," he said, we must teach our children "that to live on this world is no easy matter without standards to live by" (quoted in Safire). In a 1996 speech devoted to the wisdom of genetic engineering, Prince Charles invoked Shelley's monster in opposing human intrusion into areas properly left to the Divine.

I believe that we have now reached a moral and ethical watershed beyond which we venture into realms that belong to God, and to God alone. Apart from certain medical applications, what actual right do we have to experiment, Frankenstein-like, with the very stuff of life? We live in an age of rights – it seems to me that it is about time our Creator had some rights, too (Prince Charles "Lady Eve Balfour").

Prince Charles is describing a yawning gulf between our minds and our souls, and it is the magnitude of this gulf which feeds, if not defines, the Frankenstein Complex.

Parameters: Culture, Ideology, the "West" and the Popular Sphere

This dissertation is mostly about the Internet and technology in the United States.

The focus on America isn't intended to indicate that equally compelling studies of technology can't be made in other cultures (in fact, the dispersal of the Net through "developing" cultures over the next few years promises to be a fascinating subject for analysis), but it does acknowledge that the Internet owes its current place in the

global consciousness largely to American programs of development. Contrived by the U.S. military, fostered by the American research establishment, and popularized throughout the decade of the '90s by legions of "cybercolonists" throughout the States, the Net has been to this point in history a very American enterprise technically, economically, and culturally. However, the traditions and ideological strains addressed are far older than the European presence in the New World. Therefore, this study of technology and America necessarily involves the study of technologies in the Western Hemisphere generally, and will take as its focus "the West, and particularly America"¹.

The study will be primarily concerned with these ideologies as they manifest within popular culture, but the terms "popular," "culture," and "ideology" are all potentially problematic. It is not the intent here to engage in minute examinations of these concepts – all have been addressed at length elsewhere – but a brief explanation of the terms is probably in order.

Storey situates the study of popular culture in Williams' "particular way of life, whether of a people, a period, or a group." Other dimensions of Williams' definition speak to "intellectual, spiritual, and aesthetic development" and "the works and practices of intellectual and especially artistic activity" (Storey *Introductory Guide* 2), and all of these facets are implicated in the analysis at hand. Technology, for instance, is in some historical moments an intellectual undertaking, an aesthetic and

¹In reality, we're talking almost exclusively about the northern half of the hemisphere, and even more specifically, "the West" will usually indicate North America and Western Europe.

artistic statement, and a mode of worship of spiritual transcendence, and in all phases reflects the character of the people who comprise the society.

A simple definition of “popular culture” is “the way of life we inherit from the generations before us, use ourselves, and pass on to our followers.” It encompasses “attitudes, habits, and actions,” food, clothing, architecture, infrastructure, politics, leisure, religion, medical practices, belief systems and “what shapes and controls them”: “It is, in other words, the world we live in.” It is the “culture of the people, of *all* the people, as distinguished from a select, small elite group” (Browne “Popular Culture” 13). This definition seems broad, as it leaves us wondering instead what *isn’t* popular culture, but it serves a valuable purpose in emphasizing material culture – the artifacts which fill our lives, from fashion to art to books to music to furniture – and in its inclusion of the ideologies and practices of the middle and lower classes, as well as minority groups.

Carey suggests that culture is centralized in the communications function of a society. His “ritual” mode of communications acknowledges motifs of shared experience and association, arguing that communications is less about conveying information from one place and one person to the next (the “transmission” mode) than it is bonding and reinforcing shared values within a community. He notes the shared origins of the words “communications,” “commonness,” “communion,” and “community,” and says the archetypal case of communication in the ritual view “is the sacred ceremony that draws persons together in fellowship and commonality” (Carey “Cultural Approach” 18). In this view, then, we might see communications as

the cement of a culture, because it is through the communications function that belief systems are taught, socialized, and reinforced; that assessments of cultural practices and material artifacts are evaluated and valorized; and that cultural boundaries are established and negotiated. The examination of technological ideologies in popular culture therefore centralizes the role of popular media: magazines, movies, novels, television, radio, the Internet – these are the water in which values and ideologies swim, the communicative environments without which belief systems could not thrive.

Ideology, like culture, is a more complex concept than it might seem at a glance. In popular use the term indicates obvious and conscious values that are usually of an overtly political nature. Eagleton, in an attempt to demonstrate how broad and diverse a term ideology really is, begins his *Ideology: An Introduction* by tossing off at least 16 definitions “in current use.” Several of these definitions inform our present discussion: “ideas which help to legitimate a dominant political power,” for instance, and “(c) ideas which help to legitimate a dominant political power” aptly describe the historical case of technotopianism in American policy considerations, although “(d) false ideas which help to legitimate a dominant political power” might come closer to the truth in many cases (Eagleton *Ideology* 1-2).

Storey examines several possible definitions, noting that ideology can be seen as “a systematic body of ideas articulated by a particular group of people. Ideologies may be distorted, he says, leading to the possibility that people can be misled by their beliefs. This view, manifested in the Leftist conception of “false consciousness,”

argues that these distortions are necessary for the maintenance of the current social order (Storey 3-4).

With these views serving as a backdrop, this dissertation will employ the terms in question more broadly than narrowly, and will rely on historical and linguistic contexts to create something like “operational definitions.” Briefly, then:

“Culture” will broadly reflect Browne’s notion of “popular culture,” signifying the practices, belief systems, and material artifacts which comprise the lived experiences of the society. “Popular” will indicate “the people,” writ large, the mass rather than the elite, keying on the impulse of inclusion by virtue of commonality rather than exclusion by virtue of supposed superiority. The role of communications in establishing and maintaining cultural links will be central. “Ideology” will be taken simply to indicate the ideas, values, and structures of belief, both conscious and unconscious, which shape and motivate social and political activity.

With these few things indicated, the first chapter will examine popular perceptions, discussions, and debates surrounding the Internet as it has developed through the 1990s. There are other topics that could have been included with equal effect, but we will here examine just four dimensions: the economic, the educational, the communitarian, and the democratic. The second chapter will examine the dominant impulse driving development of the NII/GII, situating it within an older and firmly established ideological context stretching back hundreds of years or longer. The third chapter will likewise explore the origins and characteristics of the technodystopian reaction. And the fourth chapter will briefly study a roundtable discussion

involving four of the voices that have defined the rhetoric of the Net this decade.

This encounter, recorded in the pages of *Harper's Magazine* in 1995, represents a nearly-allegorical encapsulation of some of the main ideological tensions we see swirling around the Internet, and as such serves to illuminate and highlight the nature of the debate.

CHAPTER 1: THE GREAT INTERNET DEBATE

The real revolution of the Information Age will not be one of hardware, but of the human spirit. It will be the chance to be more than human.

– Frank Herbert, for Pacific Bell

In launching the premier issue of *Wired*, publisher Louis Rossetto accused the computing industry press of being too busy pushing product “to discuss the meaning or context of social changes so profound their only parallel is probably the discovery of fire.” His new magazine, he asserted, was “the soul of our new society in wild metamorphosis” (10).

We might well accuse Rossetto of being insufficiently critical in his exultation over the coming of the “digital generation,” but we should also acknowledge that the sorts of electronic technologies central to the *Wired* crusade – and the Internet in particular – have in fact become hugely important to our culture and our economy at the Millennium. For its part, *Wired* responds to the charge of cheerleading by saying its view is optimistic, but not uncritical. “The best way to prepare for the future is to have some optimism about it. Doomsayers don’t prepare for the future well” (Kelly “The Saint” 158).

As of June 1998 over 70 million Americans – or 35 percent of the 16-and-over demographic – were online (Associated Press), and a Computer Industry Almanac report in February 1999 placed the number by year’s end at over 76 million. The Almanac indicated that “the number of people who accessed the Internet at least once a week from their businesses and homes grew to 147 million worldwide in 1998, up

from 61 million in 1996.” That number “is projected to rise to approximately 320 million by 2000 and 720 million by 2005,” said the report, and the “U.S. will grow to over 207 million Internet users in 2005” (Paquet “Report”). A Nielsen/CommerceNet survey last year predicted that “50 percent of adults in America and Canada will use the Internet by late 1999 or early 2000 ” (Associated Press). The Commerce Department indicates that “more e-mail than snail mail was sent in 1997, and that U.S. consumers bought more computers than automobiles” (Gehl & Douglas 1999). These people use e-mail to correspond with friends and family; Usenet to debate religion, politics, conspiracy theories and sports; listserves to network and advance professional and academic careers; and the World Wide Web (WWW) to research topics of interest to them², to purchase consumer goods, and simply to amaze themselves at the sheer coolness of the technologically-facilitated human imagination.

The magnitude of the medium isn’t the question, however. The Net is big, and unless something unfathomable happens, it’s going to get bigger. At issue is the *character* of this new technology, its potential to transform human life and culture, either for good or ill, and the ideologies of science and technology that frame our popular debates over it. To one side, the technotopians³ argue that this emerging electronic medium will allow Western culture to construct a new, more prosperous and enlightened civic realm. A smaller, but aggressively vocal body of techno-

²Some of them even use the Internet for dissertation research.

³Some have attached to this word more complex shadings, but the term “technotopian” here will simply stand as a contraction for “technological utopian.”

dystopians refutes each utopian claim in turn and offer dire predictions touching on everything from exacerbated economic class divisions to the death of literacy to the extinction of spiritual actualization.

We have at least anecdotal support for each of these claims, but nothing like conclusive evidence has emerged, nor is it expected anytime soon. In all likelihood history will remember that the Internet, like so many new technologies before it, was a mixed blessing – a boon to some and bane to others, giving with the left hand and taking away with the right. Rossetto was certainly correct in his estimation that society will be transformed by the emergence of electronic communications technologies and their attendant cultural practices, although we might be suspicious of the “discovery of fire” part. But the debate itself, cast in some places as literally a *spiritual* struggle, with rhetoric suggesting an almost archetypal conflict between the forces of light and darkness, remains important because of what its very existence reveals to us about our cultural subconscious.

In short, Western society – and American society in particular – simultaneously holds two apparently contradictory beliefs: first, that science and technology have the power to deliver us from the evils of the human condition and into a vastly improved state of existence; and second, that sci/tech has the potential to destroy us utterly. The modern form of this debate traces to the dawn of the Enlightenment (and has roots millennia old), and is being played out once again around the emergence of online culture.

The pages that follow will outline the popular Internet debate as it has emerged

through the decade of the 1990s, centering on the most prominent claims pro and con and focusing primarily on some of the more visible personalities in the rhetorical back and forth. The utopian/messianic/technophilic view, given voice by the likes of Howard Rheingold, John Perry Barlow, Vice President Al Gore and Mitch Kapor, holds that the Net will enable greater, if not ubiquitous economic prosperity, enhancing access to financial opportunity for all citizens; that vastly improved education, knowledge and literacy will arise from the interactivity and sheer magnitude of information represented by emerging electronic media; that Western, and especially American, culture can recapture its lost sense of civic life through a new virtual communitarianism; and that the Net will usher in a new age of participatory democracy. The opposed dystopian/demonic/technophobic view argues in turn that instead of ushering in an age of general prosperity, the Net both aggravates existing economic inequities and creates a new breed of information rich-poor gap; that the only effect the medium has on literacy is to hasten its demise; that the Internet is isolating and atomizing, inhibiting real community instead of fostering it; and that instead of enhancing participatory democracy, the Net will have the effect of further empowering an already unresponsive autocracy.

The first of these claims – that the Internet will foster an age of unprecedented prosperity for America and the world – is of paramount importance in a culture built so thoroughly on the ideologies of capitalism. As such, we shouldn't be surprised by the enthusiasm with which government and business leaders tout the potential of the "Information Superhighway" to deliver us from poverty and economic inequality.

The Info Superhighway and the End of Poverty

On September 15, 1993 the National Information Infrastructure Task Force (NIITF) issued its landmark “Agenda for Action” report. The Agenda, arguably one of the most utopian documents in the history of Western culture, laid the foundation for the Clinton Administration’s Internet development policy. Among its sweeping claims, the report suggested that the Information Superhighway could “ameliorate the constraints of geography and economic status, and give all Americans a fair opportunity to go as far as their talents and ambitions will take them” (CPSR).

The National Information Infrastructure will help create high-wage jobs, stimulate economic growth, enable new products and services, and strengthen America's technological leadership. Whole new industries will be created, and the infrastructure will be used in ways we can only begin to imagine (NIITF).

Drawing on a variety of public and private resources, the report estimates that the NII will “create as much as \$300 billion annually in new sales across a range of industries” and concludes that accelerated deployment of the NII will increase Gross National Product by \$321 billion and increase productivity by 20 to 40 percent. The Personal Communications Services industry alone is seen creating as many as 300,000 jobs by 2008 (NIITF). Eighty percent of the new jobs created by Net development, the report predicts, will be in information-intense sectors of the economy. “[T]hese new jobs are well-paying jobs for financial analysts, computer programmers, and other educated workers” (Gore).

The President told the NAACP National Convention in 1996 that the culture is “moving away from the industrial age into a new era dominated by information and

technology” (Clinton). Knowledge and information are “the most important commodity of our time,” and “our national health depends in large part on...our collective economic productivity, which is increasingly based on information” (Billington). By harnessing the National Information Infrastructure, factory workers, teachers, physicians, children, and civil servants will spur growth in the U.S. economy and increase national competitiveness. Information will become the accepted currency of Western society (Benhamou, quoted in Malhotra *et al*), as previously unempowered underclasses find that lack of access to capital, to the means of industrial production, no longer constitutes an absolute barrier to fruitful participation in the economy.

International economic theory is obsolete. The traditional factors of production – land, labor, and capital – are becoming restraints rather than driving forces. Knowledge is becoming the one critical factor of production.... Knowledge has become the central, key resource that knows no geography. It underlies the most significant and unprecedented social phenomenon of this century (Drucker 80).

Unlimited access to information is not only critical to individual members of society, but is also essential if we are to “keep America competitive and to foster creativity in the Information Age” (Billington).

Some experts predicted that the Information Superhighway will become a trillion dollar business by the turn of the century (Chevreau), and recent figures showing that \$561 million worth of venture capital was invested in Internet companies during the second quarter of 1997 year alone (Treese 1997) indicate that many investors are convinced of the medium’s potential. As of February 1999, 25 percent of all retail stock trading was taking place online (Treese 1999).

According to Commerce Department reports the administration was right about the growth of the Net boosting the economy, with results showing that “computers and electronics manufacturing accounted for 1.7 million of the country's jobs at 17,000 locations” as of 1997 (Gehl & Douglas 1999). In 1993 6500 U.S. firms were using the Internet, including over half of the Business Week (BW) 1000 (Poole 1993). Presently over 875,000 companies maintain a Web presence, and the number of Web sites overall is doubling every 90 days (Trujillo “Announcement”). All or nearly all of the BW 1000 use the Internet, with most boasting significant Web efforts increasingly geared toward electronic commerce. Evidence indicates that consumers are migrating into the medium in increasing numbers. The Nielsen/CommerceNet survey estimated last year that 44 million Americans use the Web to make purchases or compare products (Associated Press), and e-commerce, estimated in 1998 to be an \$8 billion industry (Trujillo “Announcement”), fairly exploded at the end of the year, with U.S. consumer spending on online retail purchases during the holiday season alone estimated at \$8.2 billion (Treese 1999). A recent survey found that “over 3/4 of respondents say they have ‘ordered a product/service by filling out a form on the web’.” Respondents who say they don’t use the Internet to make purchases most frequently cited concerns over security and product/service quality (Kehoe & Pitkow 1998), fears we might reasonably expect to be addressed as corporate e-commerce initiatives develop.

More important, though, is the degree to which this technology-driven windfall is seen as transforming our culture. Predictions of a financial boom, taken alone, don’t

comprise a utopian vision – it is essential that the rhetoric of prosperity account for a broad distribution of the wealth and a significant improvement in the quality of the lives led by the middle and working classes. Given the consumerist bent of American culture, we shouldn't be surprised by the fierceness with which both technophiles and technophobes line up to take their swings on this question. As we see in the opening passage of this section, the Clinton Administration charged into the fray almost immediately upon assuming power, and while plenty of others have echoed the optimism expressed by Gore and the NIITF, the grandeur and sweep of the vision set forth in the "Agenda for Action" and in the Vice President's subsequent promotional efforts both at home and abroad has rarely been matched. "All Americans have a stake in the construction of an advanced National Information Infrastructure," we're told. "Development of the NII can help unleash an information revolution that will change forever the way people live, work, and interact with each other (NIITF). The section of the report entitled "The Promise of the NII," assures us that the Net

will help U.S. businesses remain competitive and create challenging, high-paying jobs. They also will fuel economic growth which, in turn, will generate a steadily-increasing standard of living for all Americans.... By encouraging private sector investment in the NII's development, and through government programs to improve access to essential services, we will promote U.S. competitiveness, job creation and solutions to pressing social problems.

Gore's 1994 speech to the International Telecommunications Union made clear that the Administration's vision for America was also a global one – in a very real sense, the platform he offers for the Global Information Infrastructure is merely a larger version of the NII. It's argued that "underdeveloped" status by industrial

standards isn't necessarily a barrier to advanced standing in an information culture because "countries lacking heavy industry can leapfrog into technological sophistication. It isn't necessary to repeat every step and every mistake of the U.S. and Europe to participate in the computer revolution" (Collins)⁴. In the case of some private sector commentators, the messianic global vision strains credulity. "Futurist" Peter Schwartz believes that "[t]hanks to big satellite projects, connections for high-speed Internet, telephone and video will be commonplace in six years or so. The world will be wired, inexpensively. By 2005, teen-agers in villages in developing countries will be chatting on video phones as they surf the Net" (Lohr). Schwartz asserts that within seven years everyone on the globe – *everyone* – will have Net access. Robert Stearns, Compaq Computer's vice president for Technology and Corporate Development, agrees:

"As [computers] become increasingly important, everyone who needs access will have access, except perhaps in the most extreme cases of homelessness." Those who don't own PCs, he says, will learn how to use them through public kiosks scattered in a panoply of places: grocery stores, restaurants, post offices, libraries. In essence, they'll be forced to: In the near future, everything will be based on "electronic commerce" – buying groceries, paying bills, banking, clothes shopping, everything (quoted in Stoeltje).

"The Long Boom," as Schwartz calls this dramatic trend, is the genesis "of a global economic boom on a scale never experienced before,' driven by waves of fundamental technological change and free-market economics." And Stearns "envision[s] the computer as an equalizer of society, creating a world where a child

⁴This assertion echoes Bruce Sterling's near-futurist conception in his insightful *Islands in the Net*, where some cultures are portrayed as proceeding directly from agrarian to information economies, bypassing the age of industrialism altogether.

tapping on a federally subsidized laptop in a housing project will hold the same advantages as an affluent child pecking on a parent-purchased Pentium” (Stoeltje). “The hallmark of our competitive economy, up to now, has been win or lose, depending on who has access to capital,” say the technotopians. But “[t]he information age will be different.... If our youth are our future, then the prospect of what the new technology might accomplish in our poorest neighborhoods is little short of breathtaking” (Klein *et al*).

Clinton Administration pronouncements make explicit that this universal level of public access to Internet services is not only a high priority, but a policy mandate essential to the moral value of the whole program. As Consumer Professionals for Social Responsibility (CPSR) put it, “Universal access to the NII is a necessary and basic condition of citizenship in our information-driven society. Guaranteeing such access is therefore an absolute requirement for any degree of equity” (CPSR).

Over the next decade, the goal is to enable every individual to have access to the NII, with basic level of access and services capabilities (*sic*) and the deployment of an interactive, multimedia infrastructure. By the end of this century, the goal is to have the deployment of the NII access and services capabilities to all community-based institutions serving public, such as schools and libraries. All Americans would be able to act both as consumer as well as producers of information and services on the NII. Disabled would be able to access the NII without much inconvenience or expense. All public information from all levels of Government will be readily accessible to all individuals. Wherever necessary, Government incentives and subsidies will be provided for accomplishing these goals (Malhotra *et al*).

To this end the “Agenda for Action” calls for an extension of the universal service

mandates codified in the Communications Act of 1934⁵.

As a matter of fundamental fairness, this nation cannot accept a division of our people among telecommunications or information “haves” and “have-nots.” The Administration is committed to developing a broad, modern concept of Universal Service – one that would emphasize giving all Americans who desire it easy, affordable access to advanced communications and information services, regardless of income, disability, or location (NIITF).

The ideology of rugged American individualism driving this mandate insists that in an environment of freedom and competition anything can be accomplished by anybody willing to work hard, but it is incumbent upon the government to assure as level a playing field as possible.

The wonderful thing about cyberspace, goes the reasoning, is that there’s something inherently fair about it, ensuring that all who come will receive grace of a sort. Solomon Trujillo, president and CEO of U S WEST, calls technology “the great equalizer,” suggesting that it possesses the power to help those who embrace it overcome nearly every structural obstacle that has historically afflicted underclasses and racial minorities – “access to capital, access to markets and access to information” (“Technology”). Gender inequalities also disappear in the online environment – a 1998 press release from MCI Communications trumpeted the idea that “Men and Women are Equal in Cyberspace” (MCI).

Unlike its predecessor, the industrial/manufacturing economy, the information economy is more dependent on brains than brawn. It runs on brainpower. And brainpower has no gender, no race, no religion, no ethnicity, and no national origin. And if programs like the two we are talking about today are successful, we can help ensure that

⁵Universal Service ideals are actually much older, tracing to the early 1900s.

brainpower has no economic barrier (Trujillo “Announcement”).

The chairman of the Language and Literature program at Rochester Institute of Technology sidesteps the hyperbole, but agrees that the Net can be a boon for women, potentially “reaching a vast, untouched audience: women who had young children and no day care, people who worked irregular shifts, women whose movements were restricted because their cultures discouraged them from appearing in public.”

[T]he Internet is a powerful tool for bringing people together over common concerns. I see the power in my classes; I saw it in operation at the U.N. 4th World Conference on Women in Beijing last September. I see its potential to link women across geographic, linguistic and cultural boundaries as never before (Collins).

In speeches to both the Latin Business Association and the National Center for American Indian Enterprise Development, Trujillo told minority audiences that the key to success in the digital age was to learn a new language – the “language of cyberspace” (“Technology”). Michelle Fisher of Microsoft agrees, saying that for small minority-owned businesses, “technology – particularly the Internet – can give you a larger-than-life presence that maybe a small business can't have otherwise.... Because the opportunities for African Americans in general are limited, particularly with corporate downsizing coupled with cutbacks in education and affirmative action, the only way that we're going to have a chance to stay a part of this game, is by embracing technology” (Black Enterprise).

The economic technotopia isn't just the product of direct electronic commerce and an apparent shift to what we might call “infocurrency.” A number of other

claims made on behalf of the Internet suggest, in addition to their direct benefits, substantial peripheral economic benefits for the culture. For example, in asserting that the Internet can play a substantive role in relieving America's "health care crisis," the NIITF report clearly implies that one of the major problems with the health care industry, if not *the* major problem, is financial.

Since 1980, our nation's health care costs have quadrupled. Between 1980 and 1992, health expenditures shot up from 9 percent to 14 percent of GDP; under current policies, they will hit 19 percent by the year 2000. Health care cost increases will eat up more than half of the new federal revenue expected over the next four years.

Twenty-five cents out of every dollar on a hospital bill goes to administrative costs and does not buy any patient care. The number of health care administrators is increasing four times faster than the number of doctors (NIITF).

Information technology is seen holding the key to productive reform within this industry.

Experts estimate that telecommunications applications could reduce health care costs by \$36 to \$100 billion each year while improving quality and increasing access....

By using telemedicine, doctors and other care givers can consult with specialists thousands of miles away; continually upgrade their education and skills; and share medical records and x-rays (NIITF).

As an example, the report cites the Texas Telemedicine Project, which is credited with increasing "the quality of care in rural areas and providing at least 14 percent savings by cutting patient transfer costs and provider travel." Part of the solution is the Internet's capacity for promoting "self care" by providing people with the information they need to become "active and informed participant[s] in their own health care."

[F]ar too many people (estimates range from 50 to 80 percent)

entering the health care system do not really need a physician's care. Many improperly use the system by, for example, using the emergency room for a cold or back strain. Many of those who end up with serious health problems enter the health care system too late, and thus require more extensive and costly therapy. Michael McDonald, chairman of the Communications and Computer Applications in Public Health (CCAPH), estimates that even if personal health information systems were used only 25 to 35 percent of the time, \$40 to \$60 billion could be saved (NIITF).

The cynic can be forgiven for wondering whether the Task Force is more concerned with the health of the citizenry or the medical industry's bank account – a great many of the health care benefits envisioned do seem to be attached to dollar figures, either directly or by happy coincidence. But the report insists that the “benefits of the NII extend far beyond economic growth.” In one of the more ironic passages of the document, it then quotes the Center for Civic Networking:

A country that works smarter; enjoys efficient, less costly government, guided by a well-informed citizenry; that produces high quality jobs and educated citizens to fill them; that paves a road away from poverty; that promotes life-long learning, public life and the cultural life of our communities. This is the promise of the National Information Infrastructure” (NIITF).

To be fair, the Task Force goes on to offer examples of Net benefits that are not immediately concerned with the bottom line. Still, in its most overt attempt at non-materiality, the NIITF is reduced to imagining that “less costly government,” “high quality jobs,” and “a road away from poverty” are somehow concepts of a non-economic character. Perhaps in a consumer society we'd be foolish to expect more, but it seems worth noting that the technotopian economy sees conditions like the health of its citizenry through a decidedly monetary looking glass. A healthy population, the critic might argue, is apparently a value not because health is an

intrinsically good thing, but because a healthy citizen is financially productive and constitutes less of a drain on the medical care system. Nonetheless, the technotopian vision here sees the Internet enabling both greater health and substantial economic gain – cynicism over motivation notwithstanding, it's a nice picture that the NIITF has painted.

Info Gap: The Expanding Gulf Between the Haves and Have-Nots

One of the greatest sources of consternation among those who challenge the idea of the Internetopia is the assumption, now beyond any reconsideration, that the National (and Global) Information Infrastructures will be built and maintained by private interests. The Clinton Administration insists that “the government has an essential role to play. In particular, carefully crafted government action can complement and enhance the benefits of these private sector initiatives” (NIITF). But its own guidelines make clear, in fact if not in rhetoric, exactly how limited this role will be.

The private sector will lead the deployment of the NII. In recent years, U.S. companies have invested more than \$50 billion annually in telecommunications infrastructure – and that figure does not account for the vast investments made by firms in related industries, such as computers. In contrast, the Administration's ambitious agenda for investment in critical NII projects (including computing) amounts to \$1-2 billion annually (NIITF).

Governmental action will include, but not be limited to: promoting private sector investment through tax and regulatory policies; promoting technological innovation and new applications; ensuring information security and network reliability; protecting intellectual property rights; and “coordinating with other levels of

government and with other nations” to “prevent unfair policies that handicap U.S. industry” (NIITF).

The prospect of handing over near-total control of a tool as powerful as the Net’s proponents claim it will be to private interests makes even some of the more starry-eyed utopians a bit uneasy, and the reasons are fairly obvious – a Net built around economic and functional concerns may fail to reflect the public interest (CPSR). Gore worried aloud in his ITU speech that the world’s governments will need to construct policies to safeguard competition and market entry by new players, apparently concerned about monopolistic practices of the sort that eventually launched the Justice Department’s sweeping investigation and prosecution of Microsoft. And Mitch Kapor himself, a key player in the development of the NII policy, admitted as early as 1994 that he was “becoming less and less optimistic that the private sector will, left to itself, build the kind of infrastructure that’s best for the citizens of the country (Brody).” Industry analysts expected from the outset that defining the NIITF’s critically important “universal service” mandates, which eventually found expression within the Telecommunications Act of 1996, would be a headache for government regulators: “the market’s going to decide on what universal service means,” said one (Taylor).

If the *champions* of the Information Superhighway are this nervous about the specter of a monopolizing and profiteering private sector acting in the best interest of nobody but itself, imagine the discomfort of those who approach the question from a more critical quarter. In one view – ironically, a utopian perspective of another sort –

the Net has the potential to be one of history's greatest public institutions.

[T]he Net follows in the great tradition of other public institutions, such as the public library or the principle behind public education. The Net shares with these institutions that they serve the general populace. This data is just part of the treasure. Often living Netizens provide pointers to this digitized store of publicly available information. Many of the network access tools have been created with the principle of being available to everyone.... [T]he Net has reached a point of general usefulness no matter who you are (Hauben).

The primacy of commerce, however, threatens the civic morality of the medium.

Once commercial interests gain control, the Net will be much less powerful for the ordinary person than it is currently. Commercial interests vary from those of the common person. They attempt to make profit from any available means. Compuserve is an example of one current commercial network. A user of Compuserve pays for access by the hour. If this scenario would be extended to the Net of which I speak, the Netiquette of being helpful would have a price tag attached to it. If people had had to pay by the minute during the Net's development, very few would have been able to afford the network time needed to be helpful to others (Hauben).

In this instance, we see not a utopian vs. dystopian tension, but rather a conflict between competing technotopias – Hauben's Netizen model is much akin to Rheingold and Barlow's portrayals of virtual community (to be detailed later in this chapter) in that it idealizes human behavior within the online sphere. In much the same way Rheingold and Barlow argue that the Net can only thrive if it is kept free of uninformed regulation, so Hauben argues that Internetopia can only occur in the absence of the profiteers. The consumerist's utopia is the Netizen's nightmare, apparently – commenting upon President Clinton's signing of the Telecommunications Act of 1996, a writer for *Investor's Business Daily* worried that “so-called ‘universal service’ mandates and paying for those mandates through

‘cross-subsidies’ may create distortions in the telecom marketplace. And that may undercut the benefits from competition” (Taylor).

Others, of a purely and aggressively dystopian bent, see no good at all, economic or otherwise, coming from computing or Internet technology. Kirkpatrick Sale refers to all things computer-related as “the enemy,” and on the question of potential economic benefits he argues that these technologies have cost 20 million people their jobs (CNN). Generally speaking, he says, material gains from industrialism⁶ are always accompanied by a common set of evils – “incoherent metropolises, spreading slums, crime and prostitution, inflation, corruption, pollution, cancer and heart disease, stress, anomie, [and] alcoholism” (“Lessons”). The “computer revolution” has dramatically widened the have/have-not gap, not only between rich nations and developing ones, but also between the haves and have-nots within both rich and poor nations alike (Robin “Technology”).

More immediately, there is a concern over the ability, if not the political and economic will, to make Net technologies available to all citizens.

[W]e still do not know how the cable-TV and telephone companies will be dissuaded from not catering only to the rich neighborhoods to derive the fattest profits from the customers. Unless such practices could be avoided, there is possibility of increasing disparity between the “haves” and the “have nots.” The endorsement of equal access

⁶Many promoters of electronic technologies appear to see the Internet age as “post-industrial,” but Sale makes no such distinction in anything I have yet read – in one place, he actually appears to dismiss the concept out of hand (“Lessons”). Correspondingly, Sale’s views on the Net specifically are often hard to sift out by virtue of the fact that he tends to see all technology as more or less identical – if he draws a distinction between a cotton gin and a Pentium Pro he does so privately. As such, this analysis will attempt to tread carefully where he appears to be talking about the Internet, lest the discussion at hand should become too broad to manage.

implies that a broader reach would benefit everyone, but policy-makers need to pay attention to the hard facts about poverty and communications in the U.S. today. Poor households are already spending too much on basic communication services, such as long-distance phone calls (Elmer-Dewitt).

Early experience with the culture's push toward something like universal access bore out this fear.

[I]n 1994 consumers bought \$8 billion worth of PCs – almost the same amount as spent on TVs – yet the disparities between the haves and have-nots are becoming increasingly distinct. Wealthy and upper middle-class families form the majority of the 30 percent of American households that have computers. Similarly, wealthier school districts have access to more and better resources (Malhotra *et al*).

Computer user research through the middle of the decade consistently supported a conclusion that seemed obvious enough to many: a strong positive correlation between income and computing/Internet access persisted despite significant increases in the numbers of people online. “Households with incomes under \$15,000 account for only five percent of Internet users, according to one survey. Another shows that families with incomes over \$50,000 are five times more likely to own a computer and 10 times more likely to have access to online services than their low-income counterparts” (Creedy). A 1995 Commerce Department study found that the have/have-not divide traced predictable racial lines. Poor inner-city and rural blacks and Hispanics are least likely to own home computers. “Also, not surprisingly, the less education you have, the less likely you are to own a computer” (Stoeltje).

More recent demographic and statistical research indicates that the gap is holding and even widening. A 1998 report from the National Telecommunications and Information Administration found that “households earning more than \$75,000 a year

were seven times more likely to own a computer than those earning \$5,000-\$10,000, and white households were twice as likely to own computer as black” (McConnaughey & Lader), and a Department of Commerce study released in July of 1998 said that while “PC ownership among all Americans grew by 52 percent between 1994 and 1997,” the disparity between blacks and Hispanics and white households actually widened during that period.” More importantly for the present discussion, the study found that “whites were much more likely to subscribe to an online service than either blacks or Hispanics.” Stating the obvious, Commerce Secretary William Daley said, “The study exposes a growing problem in our economy, one that must be taken seriously: too many Americans are not able to take part in the growing digital economy. The growing trend of information 'haves' and 'have-nots' is alarming” (Gehl & Douglas 1998).

Government efforts toward promoting the growth of the Net are also seen as working against some of the very people universal access is designed to help. The Administration committed in the Agenda for Action to promote “private sector investment through tax and regulatory policies.” However, the Center on Budget and Policy Priorities says that one such measure, the Internet Tax Freedom Act, would shift an undue tax burden onto the society’s poor, who for the moment have less access, if any, to tax-free online commerce opportunities.

If the moratorium continues for a number of years or ultimately is made permanent, a likely outcome of this legislation, revenue losses would grow. Projections suggest that in future years a significant proportion of consumption will shift from “Main Street” businesses to purchases over the Internet. The inability to tax such purchases under state and local sales taxes – which account for nearly one-quarter of all

state and local tax revenues – could significantly impair the ability of some states and localities to meet needs fully for education funding and other traditional state and local government functions along with their new responsibilities for devolved health and welfare programs (Mazero and Lav).

The CBPP study concludes that “higher-income households that can afford computers and modems – the disproportionate users of the Internet – would be the major beneficiaries of the tax reductions.” Affected states and localities would be obliged to raise taxes to replace revenues lost to e-commerce, resulting in a revenue structure which saddled low- and moderate-income households with a disproportionate share of the tax burden (Mazero and Lav). It’s safe to assume a double-barreled effect on the poor from this policy. First, their lack of access denies them the opportunity to participate in the booming online economy which is the basis for so much of the Administration’s utopian vision. In a very real sense this undermines the moral foundation of the NII – the universal access mandate was explicitly couched in the language of “fundamental fairness.” Second, if barriers to access are economic – that is, cheaper access results in more poor migrating into the virtual environment – then it seems evident that a higher tax burden would eat up financial resources that might otherwise enable, or at least encourage, these poor to get online.

The information rich-poor gap is seen as being progressive by nature – that is, the techno-economic structure of information access is such that it inherently tends toward an ever-increasing gap between info haves and have-nots. An information systems and library administrator at Rutgers explains that

...there's also the ongoing connect fees to on-line services and the cost of upgrading to new technology. Experts say the processing power of

computers doubles about every 18 months. That growth results in fancier programs and new trends that leave older machines wallowing in the dust.

Such rapid change...could mean that only the more wealthy among us will be able to stay at the cutting edge.

"So when we talk about the information have-nots, it's really a wider group than one might suspect and I think that will continue to widen as we get further along in this telecommunication endeavor," she says (Creedy).

Power and knowledge are implicated in the complex infocurrency formula which undergirds the wired society promoted by the Administration and the information/communications industry. Information is currency is power, we're told, and if so the failure to deliver on the promises of universal access could potentially hold grave consequences.

"There's this sort of dystopian nightmare vision of the future in which society divides in half, with one side having all the information, power and knowledge and the other side being kept down," says David Donnelly, a University of Houston assistant professor who teaches a course on the social impact of technology.

That vision may be an exaggeration, he says, but it shouldn't be dismissed too quickly. After all, it's not like there aren't plenty of precedents: In America some people have cars, some don't; some people have education, some don't; some people have health insurance, some don't (Stoeltje).

The economic structure to bridge this gap simply doesn't exist at present, it is argued. The computer revolution's biggest victims to date are "low-skilled employees who've lost their jobs to automation or to companies moving operations overseas to exploit cheap wages." This segment of society has no access to even rudimentary training with computer technologies; "they're not in school, and there's no computer in the home. A typical two-day computer training seminar can cost \$600...and what minimum-wage employee can afford that?" (Stoeltje). The

technology from which they are excluded by these financial conditions is “so important to so many jobs and pursuits of different kinds that it’s creating a doubly disadvantaged class who are living in poverty and, because of their condition, are unable to take advantage of the new computer technologies” (Bunnell).

If the information gap is bad and worsening in the United States, prospects for the sort of boom abroad predicted by Gore and Schwartz look absolutely abysmal. A Panos Institute study found that about 70 percent of the five million “host” computers connected to the Internet worldwide (as of 1995) were in the U.S., and it identified a “new information elitism which excludes the majority of the world's population.” For one thing, at least 80 percent of the world's population have no access to the basic telephone service required to connect to the Net. In 49 countries, there is less than one telephone per 100 people – 35 of those nations are in Africa. Whereas telecommunications development was once seen as something of a luxury compared with higher priorities like better roads, international analysts now contend that a telecommunications infrastructure is essential to a nation’s economic prospects (Litherland). The Southern Hemisphere is especially vulnerable, said the Panos report, which warned of an increasing “information poverty” as “more information about scientific and technological developments is made available only on the Internet.” The Center for Development Information in Zambia worries that “information-based production processes” will “elude developing countries,” excluding them from “advanced manufacturing and world trade – thus further exacerbating their poverty” (Litherland).

Most dystopian voices stop short of suggesting that computing/communications technologies are inherently evil in all conditions, but the consensus clearly seems to be that within our current socio-economic structure the medium is bound to do more harm than good. Surely some people will benefit in exactly the ways described by technotopians, but on the whole those gains are likely to be overshadowed by losses among the poor and minorities, as well as by those who live in developing nations around the globe. Also distressing is the moral question associated with widening an already-too-wide rich-poor gap. In the ethical framework established by the Clinton Administration itself, failure to make the benefits of the Internet available to all – poor as well as rich, racial minorities as well as the white majority – is by definition fundamentally unfair, a heavy charge to answer in a culture which believes that “all men are created equal.” If the trends described by the dystopian camp prove reflective of the permanent character of these technologies within our society, the medium’s proponents will find themselves in the position of addressing not only an info rich-poor gap, but a crushing rhetoric-reality gap as well.

✱ ✱ ✱

Electronic Communication and the Renaissance of Education and Literacy

One of the most compelling stories told by the utopians predicts that new electronic communications media will educate the public and usher in a new age of literacy, fostering unprecedented levels of enlightenment and intellectual achievement. The NIITF report says that electronic networks are completely revising the educational process, and asks us to imagine the dramatic changes in our lives if “[t]he best

schools, teachers, and courses were available to all students, without regard to geography, distance, resources, or disability.”

The United States has just begun to exploit the educational applications of computers and networks. Students and teachers can use the NII to promote collaborative learning between students, teachers, and experts; access on-line “digital libraries”; and take “virtual” field trips to museums and science exhibits without leaving the classroom (NIITF).

Al Rogers of the Global SchoolNet foundation says, “Telecomputing may be the last frontier of writing that will incite students to traditional literary skills.” Networks will provide students with an audience that will help them “become eager, conscientious writers in every content area, including science, math, geography, history, and current events” (Stoll 25). New computing and network technologies will, in the NIITF’s estimation, enable an astonishing (and astonishingly quantifiable) “30 percent more learning in 40 percent less time at 30 percent less cost” (NIITF).

Paul Starr, in an expansive *American Prospect* review of the benefits of wired education, details the findings of the “Kickstart Initiative,” the final report by President Clinton's Advisory Council on the National Information Infrastructure.

“[Studies find that] technology supporting instruction [has] improved student outcomes in language arts, math, social studies and science”; that “multimedia instruction – compared to more conventional approaches – [has] produced time savings of 30 percent, improved achievement and cost savings of 30 to 40 percent” and demonstrated “a direct positive link between the amount of interactivity provided and instructional effectiveness”; and that “remedial and low-achieving students” have registered “gains of 80 percent for reading and 90 percent for math when computers were used to assist in the learning process” (Starr).

Utopian claims for networked educational approaches identify a variety of

progressive trends found in the wired classroom.

Other trends...include shifts “toward more engaged students,” “from a competitive to a cooperative social structure,” “from all students learning the same things to different students learning different things,” and “from the primacy of verbal thinking to the integration of visual and verbal thinking” (Starr).

It is also suggested that wired education technologies will spur a move toward smaller classrooms, encouraging student participation in more school activities and facilitating higher standardized test scores. Such an environment also “permits closer relations among administrators, teachers, and students and thereby fosters the kind of unified educational vision that researchers have repeatedly identified as a key to successful schools” (Starr). Even students who are uninspired by traditional teaching methods are attracted to the Internet when it functions at “a high speed and degree of sophistication.”

There's no proof that kids adept at using the Internet will get any better at the basic skills of reading, writing, and arithmetic. But they might. Moreover, studies show that television watching declines in two-thirds of the families with computers and that the children in such families are more likely than others to become involved with art, sports, and volunteer activities (Klein *et al*).

In some circles, then, the possibility that the Internet *might* result in improved education is sufficient justification to invest billions of dollars in a complete overhaul of the current learning system. We ought to suspect at this point that the rush to wire the American classroom is driven by something more than the pragmatic expectation of superior teaching capacity, by more than the simple belief that our culture should be better educated as an end in itself, by more even than the idea that a wired learning initiative will drive economic productivity. At stake is America's manifest destiny,

its place as the undisputed world leader.

Bill Clinton's challenge to connect all of America's schools to digital networks by the end of the 1990s is the only initiative today that echoes, if only faintly, John F. Kennedy's call to put an American on the moon by the end of the 1960s. Like the moon shot, linking America's classrooms to computer networks appeals to a technological nationalism that seems beyond partisan politics: Everyone – almost everyone – likes the idea of putting the U.S. first in the race to the future (Starr).

Anticipating the dystopian resort to the failings of past technologies, the utopian line asserts that this technology is different in critical ways, making paramount its application to education.

The computer revolution of earlier decades has now turned into a communications revolution and opened up important new possibilities for learning. The new media, moreover, are becoming essential to intellectual and artistic expression and scientific work. As the entire world of communication and knowledge is transformed, it becomes inconceivable to leave education out (Starr).

The *American Prospect* review argues that the new electronic learning environment is more flexible and responsive than past technological experiments. It is bound to succeed where film failed for example, due to its interactivity, hypertextuality, and sheer volume as an information resource.

The transformation of computers into a medium of two-way communication also advances the creative and exploratory uses of the technology. Access to the Internet and the Web puts students in reach of resources and people that schools could never before provide. Even if the Internet consisted only of texts and images, it would be of immense value as it becomes the world's largest library. But it also increasingly provides access to audio and video archives, which conventional libraries generally do not offer. Hypertext links offer pathways that allow the novice to find connections among different sources, and the growing search capacities on the Web make it an increasingly powerful instrument of research (Starr).

Much as Trujillo and others envision that Internet technology will serve as “the great equalizer,” removing the barriers normally associated with various minority statuses, Starr sees computing/communication technologies as leveling the playing field in the classroom.

Computers and computer communications may also have particular value for alleviating some sources of inequality. Computer communications enable people with disabilities to gain access to resources otherwise unavailable and to take part in groups without hindrance or stigma.... Members of racial and ethnic minorities may learn more through interactive software or online services because they sense no stigma or disapproval. Social psychologists Lee Sproull and Sara Kiesler have found in experimental research that lower-status participants in electronic discussions are less inhibited and more likely to speak up than when communicating face-to-face. Thus, the very groups that now lag in the use of computers and computer communications may especially benefit from access to them (Starr).

As Klein (1996) puts it, “On the Internet, I can't tell someone's ethnic group, class, or gender, so all I'm paying attention to is the ideas.” A 1995 American Journal of Physics study concurred, finding that “the medium is largely race-neutral, location-neutral, status-neutral, age-neutral, income-neutral, disability-neutral, and would be gender-neutral except for the clue of first names (Starr).

Most of these claims for the efficacy of Net-enabled teaching assume a more-or-less evolutionary advance in the culture's educational structure. Computing and networking technologies are introduced into existing school settings, or perhaps classrooms are modified slightly to account for the new technology, and the forecasted benefits accrue from these incremental upgrades to the system. Others argue for more dramatic changes to the society's educational institutions, in some cases predicting or calling for the outright destruction of what they see as an

educational system that is outmoded, ineffective, and inefficient in its attempts to prepare young people for the new Millennium. From the right, Lewis Perelman offers the Hyperlearning Revolution, a panacea for “solving some of the world's most critical social problems, building the key industry of a new age, opening the floodgates to a worldwide economic boom, and, in the process, creating billions of dollars in new sales and profits for your stockholders” (Perelman). He argues in the premier issue of *Wired* that

...schools are one of the principal barriers to the growth of not only [the telecomputing] industry, but the whole world economy. Replacing the bureaucratic empire of educational institutions with a high-tech commercial industry will pull the cork out of the knowledge-age bottleneck – opening up an annual market worth \$450 billion in the U.S. alone (Perelman).

The conventional classroom is “a thousand-year-old invention initially adopted to discipline an esoteric cadre of acetic monks,” says an uncharitable Perelman. “The institution of contemporary, ‘public’ education is a 19th-century innovation designed as a worker-factory for an industrial economy. Both have as much utility in today's modern economy of advanced information technology as the Conestoga wagon or the blacksmith shop.” The co-founder of MIT’s Artificial Intelligence Laboratory charges that “thanks to an archaic school system, many children lose the taste for immediate exploration long before they acquire the mastery of book skills needed to find that extended immediacy. This is the real tragedy of dropping out: Whether or not they put in the requisite number of years in the classroom, many (or even most) children emerge without the intellectual spark with which all are born” (Papert).

[S]chooling has become an obstacle to the kind of learning the modern

workforce needs. Much of what the public widely believes about the function and value of schooling is not only wrong, but often the opposite of reality. Humans are genetically designed to be active learners; passively absorbing knowledge from an “expert” teacher just doesn't work. Research proves that the most effective human learning actually takes place in the context of real-life experience, not in classrooms. More than 99 percent of what the average American now learns in a lifetime is not learned in any classroom (Perelman).

Papert says a major problem with the educational system is that its emphasis on basics is never examined, but is instead taken as gospel. “Thus the most important consequences of new technologies are not recognized by education policy-makers. Perelman’s criticism goes further, faulting the academic obsession with “credentialism” – traditional education’s primary focus isn’t learning, “it is screening out; maximizing failure in the name of ‘standards’ in order to label the minority of surviving students ‘excellent’.” He details the declining productivity of the system in the face of sweeping global economic changes and concludes that contemporary education is in need of drastic reform.

At the same time America is barely scrounging up the capital to afford the \$80 billion to \$100 billion it will take to replace the national telecommunications infrastructure with fiber-optics, hundreds of billions of dollars are being shoveled annually into the black hole of education's socialist economy. America's biggest and most technologically archaic information market is squandering a treasure equivalent to the world's eighth-biggest national economy on the feckless paper chase for academic diplomas (Perelman).

Fortunately, new media technologies comprise a powerful solution to the culture’s failed teaching systems. Hyperlearning (HL), he says, is a “universe of new technologies that both possesses and enhances intelligence. The ‘hyper’ in hyperlearning refers not merely to the extraordinary speed and scope of new

information technology, but to an unprecedented degree of connectedness of knowledge, experience, media, and brains – both human and non-human. The ‘learning’ in HL refers most literally to the transformation of knowledge and behavior through experience.” One key element of the HL paradigm which echoes the language of the NIITF report in emphasizing the “‘telecosm’ – the growing broadband communications infrastructure that makes all knowledge accessible to anyone, anywhere, anytime. For both human and non-human learning, the telecosm makes the ‘best and brightest’ available everywhere” (Perelman).

Books once hoarded in subterranean stacks will be scanned into computers and made available to anyone, anywhere, almost instantly, over high-speed networks. A researcher in San Francisco might, without leaving the desk, reach into the database of the British Library to grab a copy of the Lindisfarne Gospels, while another researcher in London rummages through the collections of the Library of Congress trying to find various Federalist Papers. Instead of fortresses of knowledge, there will be an ocean of information (Browning).

In order to facilitate the HL revolution, the culture must demand “the commercial privatization of the entire education sector, based on a strategy of microchoice using a financing mechanism of microvouchers.”

Using modern electronic card-account technology, microvouchers can allow individual families or students to choose specific learning products and services not just once a year or once a semester, but by the week, day, or hour. Unlike vouchers for school or college tuition, microvouchers will create a true, wide-open, location-free, competitive market for learning which has the elasticity to efficiently and quickly match supply and demand (Perelman).

Another, strikingly similar, model calls for “education brokerages” to “play a major role in the re-engineering of academic education and corporate training by providing value-adding services to both the customers and the suppliers and by enabling the

efficient integration of different types of learning.”

Rigid traditional boundaries will lose their importance, allowing new forms of cooperation and collaborative alliances to be formed among educational institutions, training companies, in-house training departments, and product vendors. Education brokerages will...match customer needs with existing and prospective courses available from any number of educational suppliers. They will also be able to accommodate requests outside the mainstream by bringing in educators with special expertise or through customized combinations of course elements (Hamalainen *et al*).

The HL/Education Brokerage revolution offers many benefits, one of which is the elimination of traditional modes of certification like degrees and diplomas. These meaningless artifacts of an antiquated system will be replaced with “precise instruments that certify attainment of competency.” For “corporate teams linked by ‘groupware’ networks” what a student accomplished in the classroom in the past will be of no interest. But the corporation “will be quite interested in what knowledge, skills, and talents you can bring to solving specific problems right now. The new, high-tech processes of certification will identify the nature and degree of specific abilities a worker may have, and then offer the most efficient learning resources needed to address any shortcomings” (Perelman). One international research team says the basic technology for “transforming education in this direction” is already available. “Access to learning resources has never been as easy as it is via the Internet. And worldwide collaboration is a reality through the World-Wide Web (*sic*), creating unprecedented flexibility in time, location, content, and form of instruction. Students are potentially able to learn what they need when and where they want to and in the format most appropriate to their needs (Hamalainen *et al*).

As we might expect, these privatized educational models are seen as saving literally billions of dollars (Perelman, Hamalainen *et al*). Even more importantly, though, HL facilitates, within the new “knowledge sector,” the advent of literally unlimited economic growth potential. Intellectual property is the currency of the knowledge sector, says Perelman, and “unlike energy and materials, information is practically boundless. So in theory, the software-based knowledge sector need never run into ‘limits to growth’.” In the Knowledge Age, “the value of physical goods, as well as services, depend increasingly on their knowledge content.”

As a result – and this is a critical issue for capitalist technotopian rhetoric – the building block of the information economy becomes not capital, not inherited wealth, not control of the means of production, but intelligence. The idea that the culture has escaped the powerful gravity of the industrial economic infrastructure serves a powerful political objective by freeing right-wing commentators from the obvious and damning critiques of the left, which hold that wealth tends to be insular and works to exclude the working classes. In the HL paradigm, no such structural prejudice exists – circumstances of birth may have determined a great deal in the Industrial Age, but no class, creed, race, or gender is inherently more intelligent than another, so by virtue of this new technology we have arrived, finally, at the gates of a genuinely egalitarian utopia. All classes, if not all individuals, are equal in this view.

Such a condition can hardly help but set the right to celebrating – what wealth they accumulate under the “knowledge sector” paradigm can be enjoyed without guilt, and as an added bonus it should be noted that the end of structural economic

inequity also suggests the death of the left. Perelman's backhanded swipe says as much: "Ownership of capital, particularly in the form of intellectual property, from now onward will be progressively more important to personal and family income than the performance of 'labor'." The corporate trend toward outsourcing those portions of the business which can't be automated becomes a positive development, as well, as these workers – contractors, consultants, part-timers, and temps – will eventually demand (and receive) payment in points and residuals: "that is, a share in the ownership of capital."

It is predicted that the massive education establishment will do all it can to impede the hyperlearning revolution. In an ironic twist, Perelman argues that the failure to adopt the HL paradigm will further widen the rich-poor gap discussed above.

While the HL revolution is inevitable and the HL industry is already developing today, its advance will be hampered and distorted by the massive waste of resources tied up in the academic empire. In particular, the well-off will continue to afford access to HL tools at work and at home no matter what public policies we pursue. A business-as-usual policy will only continue to isolate the poor, minorities, and disadvantaged from the HL revolution, further aggravating the economic polarization of our society (Perelman).

Papert's approach to education in the Information Age is comparatively milder than Perelman's, but nonetheless stands as a radical post-literacy challenge to the academic establishment. He acknowledges the importance of the "3 Rs" within their proper context, but argues that the time when education had to adapt to a limited range of communications and teaching media is being replaced by a new era where a dramatically larger range of media can be adapted to the particular educational need.

The “Knowledge Machine (a metaphor for much more varied forms of media) will provide easier access to richer and fuller bodies of knowledge than can be offered by any printed encyclopedia,” he says, and will lessen the importance of reading and other traditional curricular basics for students of the future.

What follows from imagining a Knowledge Machine is a certainty that School will either change very radically or simply collapse. It is predictable (though still astonishing) that the Education Establishment cannot see farther than using new technologies to do what it has always done in the past: teach the same curriculum. I have suggested that new media radically change the concept of curriculum by demoting its core elements. But I would go further: The possibility of freely exploring worlds of knowledge calls into question the very idea of an administered curriculum (Papert).

He decries the academic establishment’s slavish devotion to a traditional view of literacy – which he calls “letteracy” – and argues that emerging network technologies offer the promise of a “smoother transition to what really deserves to be called ‘literacy’.”

Literacy should not mean the ability to decode strings of alphabetic letters. Consider a child who uses a Knowledge Machine to acquire a broad understanding of poetry (spoken), history (perhaps relived in simulations), and art and science (through computer-based labs), and thus draws on this knowledge to conduct a well-informed, highly persuasive campaign to preserve the environment. All this could happen without being letterate. If it does, should we say that the child is illiterate? (Papert).

The child produced by the knowledge machine was born with the innate desire to learn, like the child born to the age of letteracy. But thanks to the massive technotopian possibility – the storehouses of the world’s libraries available instantly to anyone via the Net – the child never encounters Perelman’s “thousand year-old” educational artifact, which seems to have been crafted for little more than to teach

children mindless quietude and slavish devotion to the assembly-line demands of the industrial economy. The result is a person for whom learning has always been a dynamic and exciting prospect – an “intellectually awake adult” (Papert).

Even beyond the boundaries of the educational environment, the Internet is seen as promoting a resurgence of intellectual growth and, Papert’s *revisio* notwithstanding, literacy, with a broad range of attendant political and social benefits.

In fact, the written word doesn't just remain; it is flourishing like kudzu vines at the boundaries of the digital revolution. The explosion of e-mail traffic on the Internet represents the largest boom in letter writing since the 18th century. Today's cutting-edge infonauts are flooding cyberspace with gigabyte upon gigabyte of ASCII musings (Saffo).

The new boom in correspondence happily represents no threat to the world’s forests, as all this writing is carried on with electrons, and text’s disconnection from the necessity of paper has afforded it an immortality it never had before.

E-mail passed between Oliver North and his Iran-Contra conspirators survived numerous attempts at expungement, and now resides in the National Security Archives for all to inspect, even as historians naively lament that the switch to electronic media is depriving them of important research fodder. They needn't worry; paper may be on the skids, but text is eternal (Saffo).

Text is seen as more trustworthy than video, thanks to advanced image-enhancement technologies, and possesses the power to resonate in the mind: “Of course words can be as false as images, but there is something to text that keeps our credulity at bay. Perhaps the intellectual labor required to decode words keeps us mentally alert, while visual stimuli encourage passivity. Studies conducted during

the Gulf War hinted at such a possibility: Researchers found that citizens who read about the war's events in daily publications had a far better grasp of the issues than avid real-time TV news junkies” (Saffo).

A Samuel Johnson scholar at the University of Chicago says that e-mail is fostering a revival of “the familiar letter.” Researchers claim e-mail “flattens hierarchies, promotes teamwork, and increases involvement of peripheral workers within organizations.” Political organizers “herald its usefulness in mobilizing support for campaigns around the globe.” The simplest of the Internet applications, e-mail, is credited with helping prevent dissident Chinese students from being shipped back home after the Tiananmen Square massacre and with facilitating the release of political detainees in the wake of 1993 unrest in Russia. Corporate consultants see it as enabling organizational reform, “linking employees and information so efficiently that the ranks of middle managers can be dramatically thinned.” And an e-mail system designer asserts that its teleworking applications enable remote labor, representing “the next quantum step towards human freedom” (Leslie).

The High-Tech Idiot: A Dystopian Cautionary

Those who find something sinister in the rhetoric of the wired classroom come in two distinct varieties. One camp, focusing on the importance of universal access and assuming a direct link between technology and learning, is disturbed by economic and policy conditions that result in an ever-widening gap between information haves

and have-nots. In their view, the system has failed to provide all students with equal access to learning technology and there is little hope that the problem will ever be remedied. In essence, this argument is identical to the dystopian rich-poor gap argument outlined in the economy debate earlier. The second view is less concerned with these economic-related issues, arguing instead that universal access, even if it were achieved, would fall far short of solving the nation's educational problems since technology does *not*, in fact, improve teaching and learning. The critics associated with this view say the wired classroom is in and of itself a bad thing because advanced telecomputing technologies are inherently incompatible with the true goals of education. They argue for limiting (or eliminating entirely) technology's presence in our schools.

The first view – the have/have-not critique – doesn't address the concerns raised by the "anti-tech" camp, but instead takes the utopian assumption of universal access at more or less face value and seeks to evaluate the Net's potential for education according to the criteria established by the technotopians themselves. The dystopian twist on this argument arises from the expectation that the Net will not only fail to achieve the educational goals its promoters establish, but the medium and the policies surrounding it will make matters worse by exacerbating the inequities associated with an information rich-poor gap. This position so closely mirrors the dystopian economic stance because both value notions of infocurrency and the idea that wealth in the information age will accrue from knowledge, not access to the means of production. While one commentator may see the issue as economic and another may

see it as educational, in effect the positions are identical.

As noted, then, substantial evidence indicates a significant and growing information gulf hindering the ability of the poor to participate in the emerging knowledge economy. Some research addresses the ways in which the same dynamics occur specifically in the educational realm. The Department of Education, for example, has found that “minority and low-income students are less likely to have classroom access to the Internet than wealthier students” (Hundt). The results of this condition are potentially devastating to the have-nots. A Houston elementary school coordinator says a child in school right now who doesn’t have access at home will be “educationally disabled” in five years. “Dabbling on a keyboard a couple of times a week in computer lab” isn’t sufficient remedy because it fails to breed the familiarity necessary to true computer fluency. “And children who own computers don’t have to work as hard as their non-digital peers, she adds – a kid with Spell Check is working smarter than a kid with a dictionary – and they also have access to a much broader range of resources” (Stoeltje).

Jerry Willis, who directs the University of Houston Center for Information Technology in Education, compares the child who does a book report with a pencil, a Big Chief tablet and a World Book Encyclopedia and a computer-powered child who has access to electronic encyclopedias and the World Wide Web, who creates a multimedia book report with voice and image that is organized on a disc. That kid is getting prepared for the way the world will be in 2015. The kid with the Big Chief tablet is getting prepared for America as it was in 1925 (Stoeltje).

Anecdotal evidence confirms not just the lack of access, but the lack of hope for future access, and paints a bleak picture of a segment of society that loses critical

ground in the struggle for access with each passing day.

One administrator, whose campus sits in economically depressed Southwest Colorado, said that one of the public school districts in his area had managed to scrape together enough money to build a new high school, but that the school wouldn't be wired for the Net. Worse, the district's financial situation was such that the building wouldn't even be designed to account for the possibility of future connectivity – this new school will, in their best estimation, *never* have the resources needed to build its own onramp to the Information Superhighway.

The libraries in the town can't afford to connect, either. And so, for the students in this region, and for all the students there in the foreseeable future, universal access is fantasy, and a distant one to boot (Smith).

In a perverse way, this may not be as bad as it looks, because the notion of a widening information gap is disturbing only insofar as the technotopians are correct in their predictions about the rise of infocurrency and the Net's power to overcome economic inequality. Some argue that the edict "information is power" is "patently false."

The powerful aren't informed. And who has the most information? Librarians. Hardly a powerful group.

The Internet, the great digital Dumpster, confers not power, not prosperity, not perspicacity (Stoll 194).

A champion of the "anti-tech" view, Clifford Stoll offers in *Silicon Snake Oil* a broad indictment of the wired education/literacy ideal⁷. He begins by noting several areas in which the reality fails to match the hype. "One of the most pernicious myths of the online world is that of a literary revival," he says, and points to "plenty of schools" that are "promoting this myth." Since the Net is heavily textual, relying

⁷Stoll, unlike many technoresisters, is actually quite well versed in the Net and Net culture. A "cheerfully eccentric astronomer and computer whiz," Stoll "cracked an international computer spy ring in the 1980s after noticing a 75-cent billing discrepancy in a university computer system" (McKenzie).

almost exclusively on the written word, the medium “should be a garden for literate, well-trained users to take advantage of a new mode of communications.... The result should be the honing of literary skills and a new wave of creative literature” (25).

But instead of an Internet-inspired renaissance, mediocre writing and poorly thought-out arguments roll into my modem. E-mail and postings to network newsgroups are frequently ungrammatical, misspelled, and poorly organized. After trolling up and down the Usenet, from alt.best-of-usenet to zer.z-netz.telecom.modem, I rarely find prose that’s articulate and creative (Stoll 26).

Postman argues that the rage to wire education has already had sweeping effects on education at both the teaching and learning ends of the spectrum. “The books professors write aren’t any better than they used to be, their ideas are slightly less interesting; their conversations definitely less engaging, their teaching about the same.”

As for students, their writing is worse, and editing is an alien concept to them. Their talking is about the same, with perhaps a slight decline in grammatical propriety. I am told that they have more access to information, but if you ask them, in what year American independence was proclaimed, most of them do not know; and not many can tell you which planet is the third from the sun. All in all, the advance in thought and teaching is about zero, with maybe a two or three yard loss (Postman “Is Education”).

Author Sven Birkerts, in his 1994 *The Gutenberg Elegies*, says that a transition from print to electronic media necessarily requires a “reweaving” of the “entire social and cultural web.” The effects of this shift are already becoming evident, he asserts, and he blames electronic communications media for a host of crimes against literacy.

We can begin with the newspaper headlines and the millennial lamentations sounded in the op-ed pages: that our educational systems are in decline; that our students are less and less able to read and comprehend their required texts; and that their aptitude scores have

leveled off well below those of previous generations. Tag-line communication, called “bite-speak” by some, is destroying the last remnants of political discourse; spin doctors and media consultants are our new shamans. As communications empires fight for control of all information outlets, including publishers, the latter have succumbed to the tyranny of the bottom line; they are less and less willing to publish work, however worthy, that will not make a tidy profit. And, on every front, funding for the arts is being cut while the arts themselves appear to be suffering a deep crisis of relevance (Birkerts 123).

Cyberspace threatens “a very precious, indeed a defining part of our experience,” suggests Birkerts, who intimates that the “fundamental nature” of these technologies “is opposed to the inward orientation of all true art” (193-194).

Besides, argues Postman, there’s ample evidence suggesting that all the money proposed for wiring our educational system might be better spent elsewhere.

School boards throughout America are in the process of spending, in the aggregate, billions of dollars to wire classrooms so that will have access to the Internet. Why? Is there clear evidence that children learn better when they have access to the Internet? The answer is “no.” Is there evidence that children learn better when a school has plenty of well-paid, underburdened teachers? The answer is “yes.” Why, then are we proceeding with such a costly investment in technology? (Postman “Is Education”).

The extended critique of the various wired visions outlined above often aims for the heart of *what it means to be educated*. In the HL/education brokerage, or consumerist, model we are presented with the notion that knowledge is a commodity, that it can be purchased according to a consumer’s perceived need in much the same way a person who finds the cupboard bare can go to the supermarket and choose between brands and varieties of soup. Of course, such a conception of education and knowledge assumes much: for starters, it assumes a close correlation between information and knowledge, and by the authors’ failure to discuss deeper concepts

like *wisdom* or *enlightenment*, we're left with no choice but to assume either that information equals wisdom and enlightenment or that wisdom and enlightenment are of no importance (either generally, or specifically within a discussion of education).

But information is not knowledge, says Stoll.

There's a relationship between data, information, knowledge, understanding, and wisdom.

Our networks are awash in data. A little of it's information. A smidgen of this shows up as knowledge. Combined with ideas, some of that is actually useful. Mix in experience, context, compassion, discipline, humor, tolerance, and humility, and perhaps knowledge becomes wisdom (194).

The second assumption made by the consumerist model is that the information/knowledge/ wisdom important to the student/consumer can be known almost *a priori*, and that educational systems therefore have no need for serendipity-generating processes. It is easily argued that a significant portion of what eventually proves meaningful in a student's education was not discovered as a result of direct pursuit of curricular goals, but instead emerged happenstance. In fact, goes the argument, many students look back on their schooling and discover that a majority of the true value of their educational processes resulted from side-trips into the periphery, from excursions into areas of inquiry which had no relationship at all to the learning goals they were ostensibly pursuing⁸. As Stoll says, "[a]ll of us want to experience warmth, human interaction, the thrill of discovery, and solid grounding in essentials: reading, getting along with others, training in civic values. Only a teacher,

⁸And this just addresses the portions of the educational experience which have to do, more or less, with the acquisition of knowledge. The totality of education is far broader than the mercenary models would have us consider.

live in the classroom, can bring about this inspiration. This can't happen over a speaker, a television, or a computer screen" (116).

Pre-emptive assertions that the Internet is different notwithstanding, this isn't the first time schools have experimented with media as a teaching tool, and critics such as Stephen Talbott suggest that our experience with the Internet is likely to be in line with previous technological experiments in the classroom. At various points in history radio, television, film, and pre-Internet computer-related experiments have been lauded as the keys to dramatic improvements in education. "The history of education in the twentieth century is littered with mistaken forecasts of technological revolutions in education," says Starr. "In 1913, Thomas Edison predicted that books would "soon be obsolete in the schools" because of motion pictures. Similar predictions of epochal change in education accompanied the diffusion of radio in the 1920s and '30s and television in the 1950s" (Starr). In 1923 the New York Times said of radio that

The Hertzian waves will carry education as they do music to the backwoods, isolated farms and into the mountains of Tennessee, Kentucky and West Virginia. The limitations of "the little red schoolhouse" will pass away; the country schoolteacher will be reinforced by college professors and other specialists. Radio will be an institution of learning as well as a medium for entertainment and communication (Talbott).

Two decades later, David Sarnoff said of television that

While children may be bored and restless when merely listening to a speaker [on radio] without seeing him, living talent or motion pictures broadcast at a certain time to all schools in a given area will capture and hold their interest. The fascination of television for children has already been demonstrated in the homes of those now possessing television receivers in the New York area (quoted in Talbott).

Talbott acknowledges the claims made by the technotopians, who argue that the Net is different because, among other reasons, it is active and interactive where previous technologies demanded not engagement, but passivity. However, in his view the technological tail is wagging the educational dog.

The proponents of these new technologies have taken their eyes off the educational ball. They have not first identified an educational problem and then gone out and determined that, yes, computers do indeed look like the best of all possible solutions to this problem. Instead, bedazzled by the technology, they simply assume its necessity and try to figure out how it should be used. Absolutely convinced that they have an answer, they set about looking for the question – upon which they are convinced their children's future must hang. Unfortunately, they never seem quite able to locate the question, which is forever shifting (Talbott).

Stoll, reflecting upon his own educational experience, suggests that wired education is more likely by nature to distract than teach.

And for all the many, many hours that I've spent on-line and on computers, seems to me that most of the important work that I've done has happened independent of the hours that I've spent on-line. When I think of the skills that I need as an astronomer, they're skills like knowing mathematics, understanding physics, being able to manipulate a telescope, being able to write a paper, being able to read analytically and understand what someone else has written. Being able to poke holes in arguments. To be able to stand up in front of a meeting and present my ideas (McKenzie).

While admitting that there might be good reasons to have computers in classrooms, Talbott asserts that most of the reasons actually invoked for doing so are bad. For instance, the idea that the Internet provides students with a world of information is not a good reason to wire a classroom because, as Postman says, information is not in short supply.

Our most serious problems are not technical, nor do they arise from

inadequate information. If a nuclear catastrophe occurs, it shall not be because of inadequate information. Where people are dying of starvation, it does not occur because of inadequate information. If families break up, children are mistreated, crime terrorizes a city, education is impotent, it does not happen because of inadequate information. Mathematical equations, instantaneous communication, and vast quantities of information have nothing whatever to do with any of these problems (Postman “Technopoly” 120).

The challenge instead is how to make productive use of the comparatively minuscule amount of information that can actually be brought into the class in the first place.

The informational content of our learning is almost never as important as the intensity and qualitative vividness with which we work over this content as we bring it to life within us, or as the degree to which we exercise and extend our capacities in doing so. How do we gain this intensity and vividness? Most of all with the aid of a teacher or mentor who brings those qualities to our shared experiences (Talbot).

To those who argue that the wired classroom is essential if we are to prepare children for the jobs of the future, Talbot responds that their argument is “fatally off-target.” Instead, children have to learn intellectual depth and critical thinking skills that will allow them to reflect and adapt in the future. Failure to cultivate this brand of intelligence in these students will leave them tragically unprepared for the world the technotopians are talking about. “Adapting kids to existing technology is not the first priority; the first priority is to enable them to stand above all technology, as its masters rather than its tools” (Talbot).

In the end, it all circles back to the importance of the teacher/mentor, who appears to personify the enculturation process represented by schooling. Stoll argues unambiguously that the teacher is the single most important thing in school.

The computer is a barrier to close teaching relationships. When students receive assignments through e-mail and send in homework

over the network, they miss out on chances to discuss things with their prof. They don't visit her office and catch the latest news. They're learning at arm's length (Stoll 118).

The migration of the child's mind into the wired medium leaves more than just the teacher at arm's length, too, says Stoll – computing is every bit as “nonholistic” as television, he argues – “a motionless consumption of the mind” (137). The NII initiative, he suggests, is driving education into an electronic nonplace that does not foster citizenship, as so many of its promoters claim, but instead acts to remove the child from the physical contexts essential for true civic involvement.

Alone behind a computer, a user needn't interact with anyone in the room. Since keyboards can't be shared, social interactions increasingly take place over the wires. In turn, children feel less connection to their neighborhoods. Hardly surprising that a generation of network surfers is becoming adept at navigating the electronic backwaters, while losing touch with the world around them (137).

So what do children learn in the wired educational environment? According to Stoll:

The main thing the computer is teaching...is that if you want to learn, you sit behind a screen for hours on end, that you'll accept what a machine says without arguing, that relationships that develop over e-mail, Web pages and chat rooms are transitory and shallow. That if you're ever frustrated, all you have to do is pull the plug and reboot the machine. On the surface, all of these wonderful teaching machines are teaching reading, writing, arithmetic, physics, science, history, but...the reality is they're teaching facts, but not skills (McKenzie).

Stoll specifically addresses Papert's “knowledge machine,” calling it a “myth.”

Despite the magic of such technology, “learning is slow and difficult,” he says.

Technology can teach “reactive thought,” Stoll admits, but is incapable of inculcating “reflection” or “cogitation.” At best the sort of wired teaching technology Papert describes lacks the capacity for insight – most importantly, it is a poor substitute for

teaching (144).

Postman and Stoll both assert that wired technologies, when introduced to the educational environment, either encourage or enable varieties of intellectual sloth. Postman puzzles as to why certain professors would prefer that a school spend money on computing and Internet technology than on improving faculty salaries, and concludes that there are “always some professors who have run out of ideas, or didn't have any to begin with, and by spending their time talking about how their computers work, they can get by without their deficiency being noticed” (Postman “Is Education”). Stoll, citing the “principle of least effort,” says that even serious scholars will be more drawn to easily accessible sources of information in their research, even if such information is of inferior quality. If a system, then, makes some sources more readily available than others – especially if the more accessible sources are inferior – the system can do serious damage to the quality of research being produced. He is inherently suspicious of the Internet for this reason, intimating that it is capable of, if not prone toward, favoring the easy answer over the best answer (187-188). The computer, he says, degrades the commitment necessary for real learning.

Am I the only person in North America who feels that learning requires discipline, responsibility you have to do your own homework, that learning demands commitment? That learning requires a sense that there's no shortcut? There's no fun, happy, easy way to get a quality education. The payoff in a quality education is not the energy rush of shooting down flying saucers but rather deep satisfaction that happens weeks, months, years down the road. What good is a multimedia Internet feed to a child who can't pay attention in class? To a kid who will not read more than one paragraph? To a student who is unable to write analytically? Why feed these kids more

television? Why not instead encourage them to read books. To write. To think. To pay attention in class (McKenzie).

In the end, Stoll finds himself staunchly defending the value of the traditional classroom, which Perelman called a “thousand-year-old invention.” In essence, he suggests that wired education allows us to bypass the hard part, where education’s real value lies.

My high school English teacher forced us to read Shakespeare. Forced us to write an essay every Thursday. Forced us to argue and stand up in class and state exactly what we'd read. We didn't like it; we'd much rather have just played Nintendo. I'd rather play with the computer. What was the result? I wrote two best-selling books. Last week I spoke before an audience of 3,000 people. If you want to be able to write, if you want to be able to speak out in public, if you want to be able to cogently put arguments together, you don't do it by fooling around on computers. You do it through taking tough classes. By having committed, inspired teachers (McKenzie).

One of the big claims made for the Net by the Administration’s Agenda for Action is that wired education initiatives will eliminate the traditional disadvantages associated with distance from major learning centers. Telecomputing technology will enable distance learning programs that will allow citizens in even the remotest reaches of the nation and world access to the very best teachers at the best schools on the planet, “ameliorat[ing] the constraints of geography” (NIITF). The dystopian view counters by saying that, for starters, distance education isn’t especially rewarding to start with because of the inherent lack of contact between the teacher and the student. As suggested by Stoll and others, education is about the mentoring process associated with close student/teacher interaction, and while a remote Net-mediated class is probably better than none, by definition it allows for no in-class

engagement and even less out-of-class contact, which is essential to the school's sense of community and shared intellectual vision.

But the Internet's inability to foster strong student/teacher relationships pales beside the sinister implications distance learning has for the teaching profession. A small satellite campus in a remote region of a sparsely-populated Western state, for example, might find attractive a program allowing them to uplink with a class offered by a world-renowned professor on the faculty of the big state university's flagship campus. The benefits are obvious: Rural State can offer its less affluent student population the chance to study with a famous authority, and in doing so it cultivates the innately positive technochic associated with an advanced telecomputing-enhanced curriculum.

Such programs have significant implications for Rural State's bottom line. At first glance, the infrastructure needed to make the distance link work looks expensive. But when compared against the cost of employing a professor, all of a sudden the wired classroom begins to look like a bargain. In salary and benefits, a junior professor might cost a peripheral campus or a small teaching college a minimum of \$35,000-40,000 per year, an amount that translates into an extremely serviceable distance learning budget. Even assuming the rapid obsolescence of hardware and software associated with this kind of program, replacing a prof or two with wired teleconferencing has to be an attractive temptation to a budget-strapped administrator (Smith "Posthumanities").

The two-tiered distancing of the student from the intimacy of the teaching

relationship has a profound impact on the quality of education, for all the reasons suggested above. First, the distance-ed classroom is a lot like the huge lecture hall environment encountered on most large university campuses today, only worse. Intro-level students especially are herded into amphitheaters which seat upwards of 500, and there they sit quietly (or often noisily, if they show up at all) while the professor lectures for an hour. The environment allows for precious little interaction, and in many cases the student never even gets to meet the professor in person. The professor, often an expert on whatever subject is being taught, might as well be a rock star for all the chance a student has of forming a meaningful mentoring relationship with him or her. The difference between the big lecture hall experience and the distance education experience, in most cases, is the difference between being in the back row of a live concert and watching it on television (Smith “Posthumanities”).

The second element to be considered is the necessarily negative effect this dynamic has on the work students are asked to do. A distance environment could not manage as many assignments – tests, quizzes, reports, presentations, and papers – as are probably healthy in an era where reading comprehension, writing, thinking, analysis, and organizational skills are slipping as badly as we are routinely told they are. At a time when students are in desperate need of *more* engagement, according to the dystopians, the Internet promises less and looks like a good bet to deliver.

* * *

Tales of the Virtual Community

Of the four parcels of disputed ideological terrain examined in this chapter, the idea of the virtual community is the most complex. The utopians are frequently circumspect in their pronouncements, painting lush portraits of a new collective that evokes nostalgia for the communal intimacy associated with idealized 19th and early 20th Century small towns. At the same time, they routinely express grave misgivings about whether the dream can or will be realized, commonly blaming uninformed or unsympathetic public policy. Of all the utopians the world has seen, these are certainly among the most cynical. Their detractors, while insisting that the virtual community is empty and/or sinister in its effects, frequently acknowledge that new forms of human association are being formed, in some cases with meaningful and productive results for the participants. As we read the exchanges between the camps, we are often struck by just how much utopians and dystopians can agree upon.

The standard-bearer for the technotopians, Howard Rheingold, popularized the term “virtual community” in his book of the same name. In that book he offered the most compelling view to date of what the new medium *could* be.

We temporarily have access to a tool that could bring conviviality and understanding into our lives and might help revitalize the public sphere. The same tool, improperly controlled and wielded, could become an instrument of tyranny. The vision of a citizen-designed, citizen-controlled worldwide communications network is a version of technological utopianism that could be called the vision of “the electronic agora.” In the original democracy, Athens, the agora was the marketplace, and more – it was where citizens met to talk, gossip, argue, size each other up, find the weak spots in political ideas by debating about them. But another kind of vision could apply to the use of the Net in the wrong ways, a shadow vision of a less utopian kind of place – the Panopticon (Rheingold 14-15).

The idea of virtual community has exerted a more powerful pull on the public imagination than any other claim made for the Internet⁹. Since the case was first stated by Rheingold in *The Virtual Community: Homesteading on the Electronic Frontier*, the idea of a new, utopian online communitarianism has spurred lively debate about the Internet's socio-cultural potential¹⁰. While the concept has generated extensive examination and critique in scholarly circles – books, journals, conferences, listserves and Usenet groups have dedicated substantial time and energy to the dialogue – the validity of the idea seems generally accepted in the public/popular sphere. Whether or not virtual communities are “real” communities, in the sense that they mirror the physical, geographically-bounded communities our culture historically associates with civic life, they are taken more or less seriously by millions of Internet users, a substantial number of whom probably see the experiences described by Rheingold as being very similar to their own.

Rheingold's virtual community was The WELL, a California-based bulletin board system (BBS). One of the Internet's first and most famous BBSs, it was founded in

⁹What follows is at best a cursory look at the issue of community. For a comprehensive treatment of the subject, see Fernback's *The Wired Community: An Exploration of the Cultural Practices of the Citizens of Cyberspace* (1998).

¹⁰To be fair, it must be said that Rheingold's thesis is easily oversimplified. While his conception of the virtual community is certainly utopian, his examination of the phenomenon is not without nuance, and he admits that “it's unreasonable to expect the electronic world to be any more perfectible than the physical world has so far proved to be” (McCreary). Further, his more recent writings have acknowledged and engaged critiques of his work (Fernback and Thompson, for example). As he himself notes, “it will take some more years before we are clear on how a virtual community is and is not like a real community. When we have a clearer model of what virtual communities are, in terms of their impact on people's real lives, and their political impact, if any, then that will create a sufficient cloud of associations that people will know exactly what you mean and what you don't mean when you call something a virtual community” (Feed).

1985 by Stuart Brand and Larry Brilliant. The WELL's Web site describes the BBS as

“a cluster of electronic villages that live on the Internet, with denizens from all over the globe.... Over the years, WELL members have made friends, created enduring traditions, gathered casually face-to-face in cities 'round the world, provided support and mentoring to strangers, done traditional business networking in an untraditional environment, gone into business, fallen in and out of love.... They have also founded organizations like the Electronic Frontier Foundation and The River, and documented what was emerging in books like Howard Rheingold's *The Virtual Community*, John Seabrook's *Deeper*, and Tom Mandel and Gerard Van Der Leun's *Rules of the Net*” (WELL).

Rheingold tells a compelling story, and insists that “[t]he WELL felt like an authentic community” from the outset because it was “grounded in [the] everyday physical world” (*Virtual Community 2*).

It became clear to me during the first months of that history that I was participating in the self-design of a new kind of culture. I watched the community's social contacts stretch and change as the people who discovered and started building the WELL in its first year or two joined by so many others. Norms were established, challenged, changed, reestablished, rechallenged, in a kind of speeded-up social evolution (*Virtual Community 2*).

The author's language in this passage signals some of the key themes of the communitarian case. The term “community” is assumed, not interrogated, and the descriptions clearly assert the spatiality of the online environment. The WELL's founders don't see themselves as developers of a text-based telecommunications conferencing, but instead as discoverers and builders, as cultural pioneers and settlers. Rheingold invokes the concept of the social contract, understanding that physical communities depend on cultural norms and bodies of law, both explicit and implicit.

The place is global – one encounters people from “the next block or the other side of the planet” (1) – but the culture is far from monolithic. The Internet is “more like an ecosystem of subcultures,” he says.

People in virtual communities use words on screens to exchange pleasantries and argue, engage in intellectual discourse, conduct commerce, exchange knowledge, share emotional support, make plans, brainstorm, feud, gossip, fall in love, find friends and lose them, play games, flirt, create a little high art and a lot of idle talk. People in virtual communities do just about everything people do in real life, but we leave our bodies behind (3).

Rheingold acknowledges that things can get acrimonious at times, but comparatively little energy is devoted to the dark side of human culture. In the passage above people argue, feud and lose friends, but the tone of the description marks these activities down as part of the wonderful circle of life. But if, as he says, people online can “do just about everything people do in real life,” we might point out (since Rheingold doesn’t) that people in real life (IRL) engage in slander and character defamation, lie, swindle, cheat, backstab, conspire, commit adultery, betray friendships and concoct trite, soul-numbing drivel. Certainly these things are parts of the lives that most human beings lead, but there’s little in them to recommend Lake Wobegon-style nostalgia. As the publisher of *WebMaster Magazine* says, however, “one of the more alluring visions of the Net has been fueled by the restless Utopian notion that it represents a clean slate from which certain forms of decay might be excluded” (McCreary). For whatever reason, the dark side of virtual community fails to frighten the new communitarians nearly as much as the bright side excites them.

Perhaps part of the reason for this phenomenon is that the real, physical world is

implicated in the decay to which McCreary refers. Even the possibility of human relationships has decayed, and many new communitarians see the Net as providing a channel through which people can recover interpersonal connections that have been lost as a result of contemporary urban life. While, as Rheingold admits, bad things can happen online, there seems to be a sense that the purity of the virtual experience goes a long way toward excluding the evils of the flesh from human interaction, leaving instead a rarified connection of minds, which is presumably less prone to the dark side of human interaction.

Following Ray Oldenburg's thesis of the "third places" of civic life, Rheingold argues that "the automobilecentric, suburban, fast-food, shopping-mall way of life" has eliminated many of the culture's "third places" – the places "we gather for conviviality"¹¹.

The world of the geographic community has been assaulted for this century, long before computers came along, by communications and transportation technologies. The automobile, the telephone, and the elevator, fueled by a petroleum-sucking industrial economy, paved over an extraordinary amount of the natural world that had existed up until our grandparents' time. Like it or not, we have cities in which millions of citizens are afraid to go out at night. Instead, they stay inside and watch the tube. Compared to staring at the television, even the most insipid communication on the Internet is marginally more animated, at very worst (Feed).

Electronic Frontier Foundation (EFF) co-founder John Perry Barlow condemns television and suburbanization, calling them "toxic to the soul," and notes how dramatically economic shifts during this century have affected "real places" like his

¹¹Oldenburg's *The Great Good Place* identifies the places people live, work, and gather for conviviality as the three essential spaces in human lives.

hometown in Wyoming.

At the dawn of the 20th Century, over 40 percent of the American work force lived off the land. The majority of us lived in towns like Pinedale. Now fewer than 1 percent of us extract their living from the soil. We just became too productive for our own good.

Of course, the population followed the jobs. Farming and ranching communities are now home to a demographically insignificant percentage of Americans, the vast majority of whom live not in ranch houses but in more or less identical split-level “ranch homes” in more or less identical suburban “communities” Generica (52)¹².

Oldenburg’s physical “third places” are informal and recreational, and are “essential to a vital informal public life” (quoted in Rheingold 25). Rheingold admits that cyberspace may not be exactly what Oldenburg had in mind,

...but so many of his descriptions of third places could also describe the WELL. Perhaps cyberspace is one of the informal public places where people can rebuild the aspects of community that were lost when the malt shop became a mall (26).

MIT Architecture and Media Arts and Sciences Professor William Mitchell argues that virtual environments, like real-life architectural places, “must be understood in context – as parts of larger systems of places – and their role and importance is easy to misunderstand if we forget this.”

Another characteristic of successful urban environments is that they provide ranges of settings appropriate to different stages in human relationships, and so support progression in those relationships. A standard boy-meets-girl story, for example, involves meeting in a work

¹²Barlow, like Rheingold, is less wide-eyed about the Net than his detractors often argue, especially in his more recent writings. Even in a piece as optimistic as the 1995 *Utne Reader* essay cited here, he says, “My enthusiasm for virtual community has cooled. In fact, unless one counts interaction with the rather too large society of those with whom I exchange electronic mail, I don’t spend much time engaging in virtuality at all. Many of the near-term benefits I anticipated from it seem to remain as far in the future as they did when I first logged in. Perhaps they always will.” What the Internet is missing, he says, is *prana*, “the Hindu term for both breath and spirit.”

setting, getting to know each other better by going to places like restaurants and movie theaters, and eventually going home together. Cyberspace settings can clearly play a role in such progressions. The risk-free, arm's-length, largely free-from-age- and-gender-markings, settings currently common in cyberspace provide a new and useful kind of starting point. When connections are established there, as Stacy Horn observes, they can and often do progress to another level in physical space. Or they can be abandoned fairly quickly and painlessly (Feed).

Rheingold and Mitchell seek to establish a cultural role for virtual spaces within the larger context of real-world social interactions, but while these virtual spaces are new, they fill a very old and critically important role – that of social bonding. In an urbanized world whose very character is alienating and anti-communitarian, virtual spaces are seen as resurrecting the lost civic art of neighbor-building. EFF Staff counsel Mike Godwin says,

The Electronic Frontier Foundation is living proof of the existence and effectiveness of virtual digital communities. Not only did EFF arise from the interactions of citizens who were, and are, “neighbors” in electronic communities, but the EFF has also gone on to establish its own communities, not the least of which is the EFF conference on the WELL. The WELL was a key community from the beginning. The way communities normally shape their responses to outside events is for neighbors to chat – perhaps even gossip over the fence. It was this kind of informal exchange of information that led to two crystallizing events behind EFF's formation (1994).

The founders of the EFF, Barlow and Mitch Kapor,

had become next-door neighbors, although Barlow lived in Pinedale, Wyoming, while Kapor lived in Brookline, Massachusetts. Says Barlow: “There was a sense that what was going on was a threat to our community.” So Barlow and Kapor did what neighbors often do in response to a neighborhood problem – they formed a citizens' group. In this case, the citizens' group was the EFF (Godwin).

The vocabulary here is similar to what we see in Rheingold: people living across

the country from each other are “neighbors,” and in response to a shared threat they formed a “citizen’s group,” which is made to sound a great deal like a neighborhood watch operation. Like Rheingold, Godwin asserts the co-primacy of the virtual and the physical, saying that “current networks and BBSs don't simply create community; instead, they amplify it. Or, to be even more accurate, the two phenomena exist in a complex state of coevolution, with face-to-face contacts fueling the electronic relationships (and vice versa).” Says Rheingold, “If there is any community at all in a virtual community, it happens between the people. The many-to-many public conversations and private e-mail dialogues facilitated by computer networks are human relationships” (Feed). Mitchell says “bodily presence and telepresence now play differing, and potentially complementary roles in sustaining the connections that matter to us” (Feed).

Barlow, for all his indictments of virtuality, still manages to find the utopian possibility in the medium’s capacity for enabling human connection. When the woman he describes as “the great love of my life” died suddenly, he found that the necessary solace of community was only to be found online.

On the WELL, there was a topic announcing her death in one of the conferences to which I posted the eulogy I had read over her before burying her in her own small town of Nanaimo, British Columbia. It seemed to strike a chord among the disembodied living of the Net. People copied it and sent it to one another. Over the next several months I received almost a megabyte of electronic mail from all over the planet, mostly from folks whose faces I have never seen and probably never will.

They told me of their own tragedies and what they had done to survive them. As humans have since words were first uttered, we shared the second most common human experience, death, with an open-heartedness that would have caused grave uneasiness in physical

America, where the whole topic is so cloaked in denial as to be considered obscene. Those strangers, who had no arms to put around my shoulders, no eyes to weep with mine, nevertheless saw me through it. As neighbors do (“Is There...”).

He says that cyberspace is an inevitability, and that if it is approached with “groundless hope” the result might not only be productive community, but also a greater appreciation for physical reality.

When we are all together in Cyberspace then we will see what the human spirit, and the basic desire to connect, can create there. I am convinced that the result will be more benign if we go there open-minded, open-hearted, excited with the adventure, than if we are dragged into exile (“Is There...”).

If Rheingold is right in theorizing that virtual communities can help replace our lost “third places,” Mitchell is willing to envision the possibility that the virtual – in the form of telecommuting – might also spur the reestablishment of physical communal spaces.

And contemplate the following (I think plausible, if a bit optimistic) scenario for urban restructuring as telecommuting takes hold on a large scale. The old downtown gradually loses its role as a concentration of workplaces, and is refashioned as an entertainment and cultural center. Simultaneously, the former bedroom suburbs get higher daytime populations as former daily commuters stay at home to work. This makes local service institutions – lunchtime restaurants, health clubs, etc. – more viable. And people flock to these institutions because they find that they miss the social milieu that the downtown workplaces once provided. So we get a kind of rebirth of Main Street – re-nucleation of small neighborhoods around local service institutions. Once again, it's a combination of spatial organization and telecommunication that delivers what's needed (Feed).

Recall the thesis from the introduction that utopianism reflects not just demonstrable outcomes or the belief in them, but rather ought to also account for the potential benefits of technology *put to best use by humanity*. Rheingold, like Barlow,

makes clear his anxiety regarding the future of virtual community, but his unease issues not from anything inherent to online community itself. Instead, the force threatening full realization of the medium's potential is uninformed public policy.

[B]ased on my own experience, let me voice my neutrality regarding the long-term viability of virtual communities. Right now, I think the power of virtual communities is very much in question. Onerous and ignorant legislation by would-be censors in Congress and insidious legislation by surveillance-positive legislators have been vigorously opposed by millions of netizens. The jury is still out on whether this loud opposition has had any effect (Feed).

By implication, we understand that judiciously employed, virtual interaction can be expected to foster all manner of productive interpersonal engagement; replace the culture's lost "third places," thereby fueling a rejuvenation of our sense of neighborliness; enhance our appreciation of physical place; and perhaps ultimately even spur the renaissance of degenerated physical spaces such as urban downtowns.

I think there is time to prove the democratic potential of the medium by using it properly. Often, that means turning off the computer and visiting a friend, writing a letter, attending a meeting, braving the uncertainties of the offline world. When we are called to action through the virtual community, we need to keep in mind how much depends on whether we simply "feel involved" or whether we take the steps to actually participate (Rheingold "Are Virtual...").

The nostalgic vision the communitarians present, even in its most conflicted manifestations, is that of an idyllic, pre-industrial small town much akin to Grover's Corners in Wilder's *Our Town*, where everybody knows and nurtures everybody else; where conversations are daily held across the back fence; where, as the Stage Manager says, "This is the way we were in our growing-up and in our marrying and

in our doctoring and in our living and in our dying” (32)¹³.

Virtual Unreality and the Counterfeiting of Experience

The dystopians attack the communitarian ideal on a number of fronts, but underpinning most of the anti-communitarian arguments is the basic idea that *it isn't real* – or, if it is, its disembodied nature renders the associated human experience essentially incomplete. Clifford Stoll says computer networks “isolate us from one another and cheapen the meaning of actual experience” (3). Cyberspace, in his view, is “a non-existent world,” characterized by a basic tendency toward distracting people from real and meaningful interactions with other members of society.

It's an unreal universe, a soluble tissue of nothingness. While the Internet beckons brightly, seductively flashing an icon of knowledge-as-power, this nonplace lures us to surrender our time on earth. A poor substitute it is, this virtual reality where frustration is legion and where – in the holy names of Education and Progress – important aspects of human interactions are relentlessly devalued (4).

A surprising study by researchers at Carnegie Mellon University appears to bear out Stoll's suspicions. The 1998 report “found that people who spend even a few hours a week online experience higher levels of depression and loneliness than they would have if they used the computer network less frequently.”

Those participants who were lonelier and more depressed at the start of the two-year study, as determined by a standard questionnaire administered to all the subjects, were not more likely to use the Internet. Instead, Internet use itself appeared to cause a decline in

¹³Compare with Rheingold: “Do those virtual relationships lead to real friendships? Do people who meet electronically form bonds face to face? Do people you meet online end up visiting you in the hospital, attend your wedding or your funeral? I can point to real instances from my own life in which the answer to those questions is ‘yes’” (Feed).

psychological well-being... (Harmon)¹⁴.

The researchers were stunned by the findings because they contradicted “what we know about how socially the Internet is being used,” said one of the study’s directors.

“We are not talking here about the extremes. These were normal adults and their families, and on average, for those who used the Internet most, things got worse.”

The study was portrayed by the press as raising “troubling questions about the nature of ‘virtual’ communication and the disembodied relationships that are often formed in the vacuum of cyberspace.” Despite using “inherently social features like e-mail and Internet chat more than they used passive information gathering like reading or watching videos,” participants reported “a decline in interaction with family members and a reduction in their circles of friends that directly corresponded to the amount of time they spent online” (Harmon).

...the researchers hypothesize that relationships maintained over long distances without face-to-face contact ultimately do not provide the kind of support and reciprocity that typically contribute to a sense of psychological security and happiness, like being available to baby-sit in a pinch for a friend, or to grab a cup of coffee. “Our hypothesis is there are more cases where you're building shallow relationships, leading to an overall decline in feeling of connection to other people,”

¹⁴The study was shocking less because of its findings than because of its sponsors.

The results of the \$1.5 million project ran completely contrary to expectations of the social scientists who designed it and to many of the organizations that financed the study. These included technology companies like Intel Corp., Hewlett Packard, AT&T Research and Apple Computer, as well as the National Science Foundation (Harmon).

Given that these corporations have an interest in promoting the technology, we can at least rule out bias in assessing the results.

Kraut said (Harmon)¹⁵.

Most dystopians believe that human relationships, in order to claim any measure of authenticity, must be physical and co-present. Mark Slouka, one of the new communitarians' most relentless detractors, declares "a fundamental allegiance to the physical world," saying:

[W]hat's locked out from the virtual community is enormously important: the physical touch, the eloquence of the unsaid, the wonderfully complex and valuable tissue of untranslatable "languages" by which we communicate as surely as we do via the spoken word. When I recall the virtual communities I entered, I remember (despite the mass of words) a world of enormous silence. Handicapped by the medium, our language (asked to do more than it can) grows strained and awkward. Like children trying to talk beneath the surface of a pool, we become all gestures and wildly exaggerated lip movements (Feed).

The virtual community, in Slouka's view, represents a repudiation of the "wholeness of human existence, the unity of body and the spirit" (Feed). Stoll seems willing to grant that new communities are formed by online activity, but sees them as "impoverished," lacking "a church, café, art gallery, theater, or tavern. Plenty of human contact, but no humanity. Cybersex, cybersluts, cybersleaze, but no genuine, lusty, roll-in-the-hay sex" (*Silicon Snake Oil* 43).

In his insistence on the primacy of the physical, Slouka folds back into Stoll's "non-space." The possibility of authentic human experience, Slouka suggests, has

¹⁵The study left ample grounds for challenge. However, the methodological and theoretical issues surrounding the research aren't the issue. The popular *expectation*, taken as an assumption by the spokesman here, is that the Net builds real relationships and is productive in fostering communal connections. The study received major media play upon release as a result of its findings, which no doubt shocked the researchers and the sponsors more than they did Stoll.

physical, IRL engagement as a prerequisite. What is at stake, he says, is humanity's connection with *place*, with the physical landscapes in which actual experiences occur.

[H]istory (and the hard wisdom we gain from it), is one of the things I find most conspicuously lacking in the evanescent, ever-unfolding world of the Net. As I see it (and it's a difficult subject to take up in a limited space), history, both personal and communal, is to a large extent dependent on our identification with the specific features of a particular landscape; that's the stoop my mother liked to sit on; there's the tree Betty-Sue fell out of when I was six. That sort of thing. Semi-nomadic, increasingly separated from place (for many of us, Rosanne's living room is as familiar as our own), we seem in danger of cutting ourselves off from place entirely, and thereby from our own history. Cyberspace, in this regard, represents the end of the road; a non-place populated by ghosts. The price of inhabiting it, I fear, will be an increasingly unmoored populace, a people severed from one of the fundamental roots of personal identity (Feed).

What's missing, says Stoll, is a "feeling of permanence and belonging, a sense of location, a warmth from the local history. Gone is the very essence of a neighborhood: friendly relations and a sense of being in it together" (43). Hordes of people argue that these very criteria are very much in evidence in virtual communities, but Stoll is unpersuaded. For him, physicality is an assumption of reality.

On my screen, I see several icons – a mailbox, a theater, a newspaper. These represent incoming messages, an entertainment video, and a news wire. But they're not the real thing. The mailbox doesn't clunk, the movie theater doesn't serve popcorn, and the newspaper doesn't come with a cup of coffee at the corner café.

How sad – to dwell in a metaphor without living the experience. The only sensations are a glowing screen, the touch of a keyboard, and the sound of an occasional bleep. All synthetic (43-44).

Dvorak likewise asserts the importance of physical place in the formation of the sorts

of bonds required to foster genuine community.

These communities are false because community requires close person-to-person contact over a period of time within a certain region. Genuine communities are not separated and fragmented. I've seen too many instances where an online community appears to be solid, like a little town, and then it deteriorates. It turns out that one member is a complete phoney, and another just got arrested, and one guy is really a woman. Too much lying goes on for the online community to exist except in this very shallow, weak form; it is unable to withstand the pressures that would be put on a real community. These are fake institutions (Dvorak "The Gadfly" 75-76).

Gelernter explains that the reason physical presence is so important to the development of community is that virtual media cannot convey the subtle emotional content crucial to meaningful interpersonal communication. "A community is not a community of disembodied spoken statements, in part because the most important aspect of the communication that people have is emotional, and one often communicates emotion not in terms of text but as subtext," he argues. "The physical body is not irrelevant to a human community.... In fact, there is no thought without emotion, and there is no real communication without emotion – subtle emotions that allow us to recognize another human being and understand the nuances of what is being communicated. This doesn't happen online" (Gelernter "The Conservative" 111).

Markoff espouses a similar view, although in doing so seems to leave the door slightly ajar for future technological advances. "The Internet as it is today lacks the necessary bandwidth to give you a real community," he says. "Communities are as much about smell and texture and touch as they are about intellectual content. The Net is not going to be a substitute for the family and the close-in community"

(Markoff “The Scribe” 190). While this passage is consistent with what Stoll and Slouka and many others insist about the need for physical contact in a real community, it can be taken to suggest that someday, if electronic media evolved to the point where they can communicate “smell and texture and touch,” then perhaps real community becomes a possibility. Still, such technology is hard to envision, short of a *Star Trek: The Next Generation*-style holodeck or the playroom in Bradbury’s “The Veldt.” Even the wildest utopian dreamer would have to admit that such technology is nowhere on the near horizon.

A basic dystopian assumption, then, holds that some type of physicality, geographic proximity, emotional intimacy (or at the very least, a close textural approximation thereof) is necessary for *real* community, and on this basis utopian claims for virtual community, both as actually realized and as envisioned, are rejected as artificial, as empty simulacra mimicking authentic human experience. In some cases, though, this placebo effect is seen as only the beginning – the lure of virtual community not only fails to nourish, but it seduces people away from the real-world activities and interactions which constitute the life-blood of genuine actualization.

Stoll accepts technotopian tales of true love and friendship sprung from the wires, but argues that the odds are long and the repercussions severe. He admits that he himself daily logs onto as many as 12 networks and bulletin boards. “I still love my networked community; the sense of belonging to a neighborhood where I recognize my friends,” he says. “Daily, I’m delighted to read e-mail from strangers and acquaintances, to chat online, and to explore the growing Internet (13). But while

acknowledging that people who meet online do sometimes become friends, and even establish romances and get married, he is not generally optimistic about the probabilities of such relationships versus relationships established IRL. “[L]ike the outlook for women in Alaska,” he quips, “the odds are good but the goods are odd.” He challenges the Net’s potential to cultivate the depth of real human experience, saying, “[e]lectronic communication is an instantaneous and illusory contact that creates a sense of intimacy without the emotional investment that leads to close friendships” (24). Stoll points to the emergence of cyberclubs as an example of the medium’s alienating power. “You sit at a table and talk over the Internet Relay Chat (IRC), read net news, or play Netrek. What a lonely way to spend an evening – surrounded by people, yet escaping into conversations with distant strangers” (24). This story echoes others circulating – in one scenario, a far-flung group of college students who routinely interacted via Internet Relay Chat (IRC) traveled to a central location to meet in person. The meeting was held in a campus computer lab. After the group assembled and met in person, they all sat down at terminals, logged in, and proceeded to interact via IRC.

The utopians – Rheingold and Barlow especially – insist that the essence of the Net’s role in evolving the virtual community is that it fosters (or can foster) *real world* engagement and activity. As Rheingold notes above, virtual community requires one to turn the computer off and actually go out into the real world to *do* something. But the dystopian slant, expressed in the following passage from Slouka, sees the Net as seducing people to inactivity, not toward real-world activity but

instead toward the plugged in anomie of Stoll's cyberclubs.

For every individual...strong enough and savvy enough to achieve a real balance (and maintain it over time), there will be a thousand who will uncritically buy into the digital hype and choose the path of least resistance; instead of chatting over the fence while watering the garden, they'll chat and make dates and tour Oregon and raise tomatoes in cyberspace, where they won't have to worry about offending someone they hardly know, being rejected, getting lost, or getting their hands dirty (Feed).

Where the technotopians indict mass suburbanization in the destruction of community in this century, Slouka sees the Net as worsening the problem, not solving it, by creating virtual gated communities that allow people to easily insulate themselves from the messiness of diversity.

Suburbanization? You can almost hear the gates slam. In the increasingly feudal (and insular) communities of suburbia, as in some of their virtual equivalents, the logic of exclusion is strikingly similar and utterly unapologetic: screw you, you're not exactly like me. You make me uncomfortable (Feed).

Recent Internet usage research provides at least modest support for this idea, finding that "45 percent of respondents reported that after coming online they have become more connected to people like themselves" (Kehoe & Pitkow 1998).

Self-proclaimed neo-Luddite Kirkpatrick Sale rejects all phases of the communitarian argument completely and broadens the discussion to include computing technologies generally. "[T]his techno structure that we've created is destructive both to human societies and to natural environments," he argues. "I don't see how objectively you could look around at what's been happening in the last 25 years in this society and say that the computer technology we have has produced anything but increasing social tensions and misery" (Robin "Technology").

In a sweeping, almost paranoid fashion, Slouka overtly implicates “the marketplace” in something like a conspiracy to peddle simulacra in the form of virtual experience.

[T]he marketplace stands to gain something by first isolating us from one another, then selling us simulated versions of the things we used to have available to us, for free. As life in the West collapses (with increasing speed), into a series of internal spaces (the home, the car, the office, etc.), we are reduced to peering through screens of one sort of another at the world we used to know (Feed).

The ultimate implication of this argument, in the view of Slouka (and others), is a degradation of the human soul. The Net does more than just waste our time – in a very real sense, it stands as a barrier between us and the higher realization of our spiritual selves.

* * *

A New Athenian Age of Democracy

Vice President Gore’s 1994 speech to the ITU boldly asserted that “the distributed intelligence of the GII will spread participatory democracy.” In explaining how and why, he compared democracy to a computing network, noting that once powerful, centralized mainframes comprised the bulk of our computing capacity, ticking through problems in sequential linearity. Now, though, “we have massively parallel computers with hundreds – or thousands – of tiny self-contained processors distributed throughout the memory field, all interconnected, and together far more powerful and more versatile than even the most sophisticated single processor, because they each solve a tiny piece of the problem simultaneously and when all the pieces are assembled, the problem is solved.”

Similarly, the GII will be an assemblage of local, national, and regional networks, that are not only like parallel computers but in their most advanced state will in fact be a distributed, parallel computer.

In a sense, the GII will be a metaphor for democracy itself. Representative democracy does not work with an all-powerful central government, arrogating all decisions to itself. That is why communism collapsed.

Instead, representative democracy relies on the assumption that the best way for a nation to make its political decisions is for each citizen – the human equivalent of the self-contained processor – to have the power to control his or her own life (Gore).

Gore makes a powerful claim here, and one which has well served the developmental goals of the Clinton Administration. The Internet is not merely a tool which can be turned to democratic purposes – it is an *innately democratic infrastructure*. If people are provided with the information they need to make informed decisions, and are allowed to express their will through a fair electoral process, what will emerge is an almost pure reflection of Jeffersonian principles. Gore prophesies a “new Athenian Age of democracy forged in the fora the GII will create,” and what becomes increasingly clear in the Administration’s rhetoric is that Jefferson was right all along – but we lacked the technology to turn principle into practice.

The Agenda for Action sets out to establish a framework for the creation of an “electronic commons,” which would “promote the public interest” by, among other things, supporting “grass-roots” community access networks providing “citizens with a wide range of information services. The NII should expand a citizen's capacity for action in local institutions” by enabling infrastructures which can convey useful information around the clock. Examples include community calendars, American Red Cross information, job service listings, local businesses listings and resources,

local government information, library interconnections, county extension services, women's centers, and hospital information services (NIITF). "Information means empowerment," says the report, and the NII must therefore promote the dissemination of government information. As the Agenda reminds us, "Thomas Jefferson said that information is the currency of democracy."

The free flow of information between the government and the public is essential to a democratic society. Improvements in the National Information Infrastructure provide a tremendous opportunity to improve the delivery of government information to the taxpayers who paid for its collection; to provide it equitably, at a fair price, as equitably as possible (NIITF).

The CPSR, which along with the EFF stands as one of the most important non-public, non-corporate Internet policy voices, sides with the Administration, saying that "the benefits of the NII...should reflect the values of democracy. Ultimately, the success of the NII program will be measured by whether it empowers citizens, protects individual rights, and strengthens the democratic institutions on which this country was founded (CPSR). In the end, says the NIITF report, "America's destiny is linked to our information infrastructure" (NIITF).

Much of the Administration's rhetoric is built upon the theorizing of Mitch Kapor, who served as a key member of the NII Advisory Council. Kapor, like Barlow and Rheingold above, presents a highly nuanced challenge for those who follow the Internet debate. In discussing what the Net – properly understood and managed – could become, he paints a landscape of pastoral community and democracy. When the conversation turns to an examination of what has actually happened, and what is likely to happen given the current state of NII development, he

is capable of sounding as critical as some of the medium's most vehement detractors. His position remains staunchly utopian, though, because whatever blame is due for the eventual failure to recognize the bounty of the Internet falls not on the technology, but on ignorant and ill-advised policy management.

In an important 1993 *Wired* article Kapor argues for the Net's essentially democratic character. His tone is more restrained than Gore's, but the core assertion is the same.

Life in cyberspace is often conducted in primitive, frontier conditions, but it is a life which, at its best, is more egalitarian than elitist, and more decentralized than hierarchical. It serves individuals and communities, not mass audiences, and it is extraordinarily multi-faceted in the purposes to which it is put.

In fact, life in cyberspace seems to be shaping up exactly like Thomas Jefferson would have wanted: founded on the primacy of individual liberty and a commitment to pluralism, diversity, and community (Kapor 53).

Even as he expresses "crucial doubts" about the eventual results of Net development, he remains steadfast in asserting that "the true promise of this technology" is "Jeffersonian networks promoting...openness, freedom, and diversity" (53).

The Jeffersonian actualization is achieved through a specific approach to network architecture.

The kind and degree of network openness will determine the likelihood that industry will choose the Jeffersonian path. Openness is either present or absent in every aspect of the network. A network is either open or closed with respect to who may have access to it, who determines its specific uses, who may supply content, who can provide the equipment used, how interfaces and standards are determined, and whether the technical details are public or private (57).

"In its fundamental architecture and, increasingly, in its policies, the Internet is an

ideal example of an open network,” says Kapor. The Net is an “interactive medium based on two-way communications,” allowing users to “fluidly shift from position of listener to that of speaker, from role of consumer to that of provider.” He argues that telephone networks are “substantially closed” architectures that are kept open through regulatory means.

The cable infrastructure is offered as an example of how information networks ought *not* to be constructed. Lacking the regulatory oversight present with the nation’s telephony operations, cable systems “exercise very tight control over both content and use” (57). As a result, the cable network operators also own the programming, an arrangement that provides a disincentive for them to encourage competitive content development. Such a model, were it to become the standard for the emerging Information Superhighway, would destroy the democratic potential of the medium (58).

“The Jeffersonian option requires a commitment to openness in all of its dimensions,” says Kapor – democratic ideals demand an infrastructure open to “new and potentially revolutionary services” (57-58). Under ideal conditions, the network should allow *any* user “to create and distribute programming from the home, not just receive it” (59). All of this is possible, if only the private developers and government policy-setters can muster the will to make it happen, and the perspective finds official support in the Administration mandate.

Because the NII will be a network of networks, information must be transferable over the disparate networks easily, accurately, and without compromising the content of the messages. Moreover, the NII will be of maximum value to users if it is sufficiently “open” and interactive

so that users can develop new services and applications or exchange information among themselves, without waiting for services to be offered by the firms that operate the NII. In this way, users will develop new “electronic communities” and share knowledge and experiences that can improve the way that they learn, work, play, and participate in the American democracy (NIITF).

If this blueprint is followed, nearly every benefit imaginable accrues to the happy denizens of Internetopia.

The Jeffersonian ideal – a system that promotes grass-roots democracy, diversity of users and manufacturers, true communications among the people, and all the dazzling goodies of home shopping, movies on demand, teleconferencing, and cheap, instant databases – is composed of high bandwidth, an open architecture, and distributed two-way switching. It's our choice to make (94).

This is the digital cornucopia: regardless of whether the utopian vision is economic, communitarian, or of the “Netizen” variety, the open technological architecture outlined by Kapor enables it. The beneficiaries of this deterministic technology are freer, more culturally diverse, and more connected to both their fellow citizens and a nearly unlimited range of information and entertainment options.

The CPSR agrees with the democratic rhetoric of the Clinton Administration, but appears in its 1993 white paper to chide the NIITF report for over-emphasizing the economic concerns of Net development. The paper stresses that the medium will only realize its true potential if it is “guided by a set of principles that reflect the importance of the public interest in communications and information technology.” Included among the CPSR’s fundamental principles for Internet development are universal access; the freedom to communicate (a stance which updates the 1st Amendment in asserting the online relevance of the “fundamental right to

communicate”); a “vital civic sector”; a “diverse and competitive marketplace”; an “equitable workplace”; privacy; democratic policy-making (“The public should be fully involved in policy-making for the information infrastructure”); and “functional integrity” (“The functions provided by the NII must be powerful, versatile, well-documented, stable, reliable, and extensible”) (CPSR). The CPSR echoes Kapur’s concern over the openness of the architecture, but argues that “too often, hardware considerations are allowed to dominate the initial design of such a project, to the point that the hardware choices end up placing severe constraints on what the software can achieve.” The more important issues relate to “the software that makes [the Net] both powerful and easy to use.”

The urgency of this mandate is paramount, because the emerging online sphere will be a prerequisite for democratic involvement, says the CPSR.

Because access to information is critical in the modern world, we believe that the NII will become the primary medium for political and economic participation. To limit people's access because they are physical disabled, economically disadvantaged, or geographically remote is unacceptable in a democracy (CPSR).

Education and the ability to participate are fundamental to true democracy, says Bunnell, and without access to this technology information have-nots simply cannot participate in their own government. And because the Internet represents such a powerful way to provide individuals a greater say in government affairs, the nation needs “a free, unfettered Internet.... The future of our democracy depends upon this” (Bunnell “The Seer’ 34-35).

Hive: The Dystopian Retort

The most basic dystopian challenge to the concept of electronic democracy emerges from the info have/have-not arguments we have already seen in the economic and education debates, and expresses itself implicitly through these rhetorics. Put simply, just as access to the technology is a prerequisite for participation in a booming new virtual economy or any of the educational visions outlined by the technotopians, so also is it essential for participation in the electronic agora theorized by Gore and Kapor. Pretty much by definition, if only a percentage of the population – the techno-elites – are duly equipped to contribute to the political process, then what you have is *not* a democracy¹⁶.

In *War of the Worlds*, Mark Slouka offers a perspective that is not only dismissive of the claims made on behalf of the impending technodemocracy, but that also suggests a homogenizing of experience resulting in a more oppressive autocracy. Of the Internet's liberating powers, he says that we've heard it before.

The claims being made for the digital highway...had been made for the automobile, the telephone, and the television, too. Had they worked? In the squatters' settlements in Mexico City, to take just one example, makeshift shacks with corrugated iron roofs now featured television antennae attached to iron pipes or odd pieces of lumber. This fact, curiously enough, hadn't convinced the reigning International Revolutionary Party (PRI) to relinquish its stranglehold on Mexican politics. Nor had it done much to end endemic official corruption, state control of the press, or the existence of "virtual" opposition parties manipulated by the regime (91).

¹⁶By contemporary understandings of the term, anyway. Both Jeffersonian America and the Athenian city-state owned slaves and excluded significant numbers of people from the democratic process, of course, but systems like this would hardly be taken as democratic today.

The Net represents not individuality, but sameness, says Slouka.

Where others saw the promise of America, I sensed a tremendous force for conformity – the dark side of *e pluribus unum*. The highway, to my mind, was a symbol less of the freedom and self-expression awaiting us in the digital future than of the homogeneity we had already achieved in the present (93).

Ironically, enough, he argues, the problems with the Information Superhighway mirror what happened to American culture as a result of the Interstate highway system, a project overseen by Al Gore, Sr.

For just as surely as Al Gore Sr.'s highway system had helped homogenize the American landscape, replacing the distinctive color and lingo of regional culture with the ubiquitous ugliness of the corporate strip, his son's electronic highway would make us blander still, sacrificing a *different* kind of regionality – the “regionality” of race and gender and age and opinion – to the needs of the all-blurring, eternally inoffensive Netsoul. And thus homogenized, our edges rounded and smoothed, we would fit more easily into the pegboard of authoritarian control (94-95).

Fueling Slouka's revulsion at the wired future is his perception of arguments made by Kevin Kelly, Martin Minsky, Gregory Stock and others heralding the coming of the “digital hive.” The hive, says Slouka, is “an unapologetically messianic, ferociously unsentimental prediction of what the human community will (and should) look like after the digital revolution has run its course” (95-96).

A passionate argument for the beauty of the mob, the virtue of the collective over the expendable individual, it is also one of the more stunning attacks on what we might loosely call humanist values to come down the pike in some time (96).

In essence, the hive argument (elaborately presented by Kelly in *Out of Control*) predicts that the Internet will wire humanity to such a degree that a higher collective consciousness will emerge – that in a profoundly new way, the whole will be

infinitely more than the sum of the parts. “Individualism will cease to exist,” melding into the “great truth of our collective identity, made clear and apprehensible through the offices of that ‘global mind,’ the Net” (96).

Which is not to say that in its purest form, the cyberists’ self-described in-your-face vision can’t also be quite entertaining. It can, indeed. At times, in fact, it offers as much fun – there’s no way to put this delicately – as some of the aphorisms of Pol Pot in the 1970s or Hitler’s more memorable pronouncements in *Mein Kampf* (*War of the Worlds* 96).

Having equated the hive-mongers with two of the century’s three greatest genocidal maniacs, Slouka sets about explaining that in their wired future, individualism will cease to exist.

Absorbed into “the anonymous nature of the mob,” we will quickly and gladly relinquish our will, our intelligence, and our beliefs to the glory of the hive. For its part, the hive will do what it has to; unknowable, godlike, a “global superorganism,” it will not consider our individual fortunes any more than we ourselves think of the many cells that die when we go for a hike and get a blister” (96).

Humans will become “the new drones,” says Slouka, “ignorant, docile, governed by ‘the Invisible Hand’ of the hive.” Still, he asks, since the idea is so patently silly on its face, why not give the hive the same treatment we give other ludicrous science fictions?

...the Invisible Hand, as corny as it may sound, is no less absurd (or mystical) than the icons of power used by authoritarian regimes in the all-too-recent past; because the digital hive, alas, does *not* hum in the minds of the digital elect alone; ...the whole elaborate metaphor of the global superorganism, like most monstrosities – like the Third Reich, say, or the utopia of the proletariat – is based on a solid foundation of reasonable premises and hard facts (98).

Paraphrasing Kelly, Slouka says the hive will eradicate the “myth of the

individual” and move us past concerns about “living things,” which are overrated. Life is a “*planetary-scale* phenomenon,” says Lovelock, “and any attempt to narrow the aperture to anything less than this godlike perspective is an exercise in self-delusion” (100-101). What is most disturbing is that the digerati are at least partly correct, Slouka notes, because thanks to technology – especially communications technology – humanity is bound together in a growing web of machinery. This technocolonization of human culture represents an evolution away from our individuality. The hive metaphor and the rhetoric attending it may be over the top, but underneath there’s a grain of truth to it (102-103).

Having agreed that we are “wiring ourselves up into a hivish network,” then, Slouka says that while the digerati think it’s a great thing, he’d “rather set up a good roadblock.” Ultimately his reasoning is beyond reason – without being able to articulate the point at a level deeper than his core cultural assumption, Slouka simply sees individuality as the highest human expression. Anything that impinges up individuality is by definition a bad thing. His best shot at justifying his faith in the individual is by negation – the collective is evil.

...all the worst we’ve been – from the Mongol invasions to Majdanek to My Lai – we have been as groups, and because the human hive, as a concept, threatens to destroy the great counterforce to these periods of mass psychosis, namely, the individual’s ability to feel compassion, loyalty, and love for others. For me, despite our viciousness, all hope – such as it is – is located in the individual man or woman; from the love that one person can feel for another, all the larger forms of love – the love of humanity, for example – derive (*War of the Worlds* 104).

Assertions are not proof, of course, and we might easily respond that Slouka has it all backwards. Ted Bundy and Jeffrey Dahmer acted individually, and Gandhi and

Martin Luther King, Jr. are remembered not for their love of individuals, but for their collective love and sacrifice. If we wanted to, we could suggest that the collective is the socializing force that makes individual expression possible, that the Bundys and Dahmers of the world would be more numerous if not for the civilizing effect of a collective which teaches values and mores and enforces them through subtle social forces as well as through overt laws and sanctions.

The important point, for the moment, is not the truth of the proposition so much as it is the *existence* of the proposition and its dialogic counter-value. Technology lies at the center of some of our culture's most powerful ideologies, and disagreements over these beliefs are profound and vehement. The next two chapters will seek to isolate the nature and origins of these beliefs.

CHAPTER 2: THE TECHNOLOGICAL SUBLIME

But if any Human being earnestly desire to push on to new discoveries instead of just retaining and using the old; to win victories over Nature as a worker rather than over hostile critics as a disputant; to attain, in fact, to clear and demonstrative knowledge instead of attractive and probable theory; we invite him as a true son of science to join our ranks.

-- Francis Bacon, *Novum Organum*

The utopian/messianic/technophilic view of science and technology outlined in the preceding chapter is consistent with an ideological bent that traces its lineage at least as far back as the dawn of the Enlightenment in Europe, and its conquest and assimilation of the collective Western psyche at the end of the millennium is utterly complete. Contemporary Western – and particularly American – culture is technological by definition, with some commentators going almost so far as to suggest that technology *is* our culture. A brief example illustrates the point: despite Chernobyl, Bhopal, the Exxon Valdez and Three Mile Island – three disasters and a near-cataclysm whose names have become synonymous with catastrophe – in general usage the English language has no pejorative connotations of the words “science,”

“scientific,” or “technology”¹⁷.

The valorization of science pervades our daily lives. Advertisers routinely employ both overt and subtle appeals to science when pitching their wares – perhaps “laboratory tests” show a product to be “20 percent more effective at killing germs,” or maybe the actor/spokesman is garbed in a white lab coat, the technotopian equivalent to the regalia of the professor or priest. The reports of market researchers, which daily shape (or dictate outright) the course of global commerce and affect the lives of billions around the world in ways too profound and numerous to consider here, are wrapped in the vocabulary and methodology of legitimate science. Even journalists, who are charged with the admittedly difficult task of converting complex scientific research findings into terms comprehensible to their lay readership, rarely question the right of Science to speak *ex cathedra* on the issues it chooses to address.

Whether or not the public buys the product or the pitch, the invocation of science is nearly always taken unwarily. Science and technology in the West enjoy an unparalleled ascendance, and their image is virtually immune to taint even in the face of their greatest failings. When scientific findings meet with popular resistance, it isn’t science *per se* that is questioned. Science remains our friend, and if it presents us with findings we don’t believe (or don’t want to believe), the resulting dissonance is almost always attributed to human error or perhaps the abuses of some person or persons pushing an unpopular political agenda.

Despite the fact that we’re usually uncritical about the effects of technology as

¹⁷One possible exception occurs when religious conservatives cast science as opposing the teachings of their faith. This issue will be addressed later.

realized in the daily lives of our citizens, we should understand that ideologies wholly contradicted by the experiences of the public tend not to survive. Postman observes, quite sensibly, that we think of science and technology as our friends and are uncomfortable questioning that friendship in large part because they *are* our friends – technology “makes life easier, cleaner, and longer. Can anyone ask more of a friend?” (Postman *Technopoly* xii). Where advanced health and medical technologies are available, birth rates and weights are higher, life expectancy is greater, and the overall quality of that life is spectacularly superior to what it would be otherwise.

The Ideological Structure of Technological Society: Postman’s *Technopoly*

Postman’s *caveat* – that technology has in fact been a good friend to humanity – is important to understanding his model of contemporary technological society, the *Technopoly*, and serves as a useful (if not necessarily definitive) starting point for discussion. Postman contends that cultures throughout history can be divided into three categories: tool-using, technocracy, and Technopoly. Tool-using cultures invented things either “to solve specific and urgent problems of physical life, such as in the use of waterpower, windmills, and the heavy-wheeled plow” or “to serve the symbolic world of art, politics, myth, ritual, and religion, as in the construction of castles and cathedrals and the development of the mechanical clock.” Tools were integrated organically into social, political, and religious traditions, which served to direct development and provide legitimacy for their employment. All tool-using cultures, whether primitive or sophisticated, are theocratic, or at least are “unified by

some metaphysical theory” (Postman *Technopoly* 22-26).

Citing the introduction of the rifle to the Ihalmiut tribe in the early 20th Century as an especially tragic example, Postman argues that the primacy of cultural tradition disappears, or begins to disappear, in the technocracy – in essence, technology becomes the enemy of received culture. In the case of the Ihalmiut, the rifle displaced the bow and arrow, resulting not in the “modification of a culture but its eradication.”

In a technocracy, tools play a central role in the thought-world of the culture. Everything must give way, in some degree, to their development. The social and symbolic worlds become increasingly subject to the requirements of that development. Tools are not integrated into the culture; they attack the culture. They bid to *become* the culture. As a consequence, tradition, social mores, myth, politics, ritual, and religion have to fight for their lives (28).

The West’s modern technocracies, Postman says, are characterized by the conflicts which arose from the invention of three devices: “the mechanical clock, which provided a new conception of time; the printing press with moveable type, which attacked the epistemology of oral tradition; and the telescope, which attacked the fundamental propositions of Judeo-Christian theology” (28-29).

Some of the technocratic impulses Postman describes are evident in the writings of Walter Lippman, who as early as 1922 actually made the case for something very like an overt technocracy in American governance. In his formulation, the drive toward technocracy was fueled by the sheer complexity of the modern world.

For the real environment is altogether too big, too complex, and too fleeting for direct acquaintance. We are not equipped to deal with so much subtlety, so much variety, so many permutations and combinations (*Public Opinion* 16).

What results from this vastness is that humans, lacking the ability to comprehend the detail and nuance of the actual environment, wind up constructing “pseudo-environments,” incomplete and sometimes inaccurate shadows of the complex world which lies just beyond the comprehension of the laity.

Unfortunately, the pseudo-environment produces “fictions” which “determine a very great part of men’s political behavior” (21). When we add to the general complexity of the world the intrinsic complexity of human nature, especially as acted upon by widely divergent social conditions, the result is a system of decision-making (an innumerable web of systems, actually) that is both uncertain and unreliable. Democracy is inherently confounded, Lippman contends, because it assumes “that somehow mysteriously there exists within the hearts of men a knowledge of the world beyond their reach.” He concludes that

representative government, either in what is ordinarily called politics, or in industry, cannot be worked successfully, no matter what the basis of election, unless there is an independent, expert organization for making unseen facts intelligible to those who have to make the decisions (31).

He elaborates on the specifics of how such an expert organization might be formed, and how it might function independently and efficiently to address the various problems of the society, including the shaping of a more educated public opinion. Many of these challenges are of a technical nature, but by this stage in American history the ideology of science was well on its way to colonizing the social sector as well. Ultimately, science had transcended its original bounds, permeating and informing every sphere of human activity (Aronowitz *Science as Power*). The

implication of Lippman's proposal is that science holds the key to a social and moral utopia – or at least to a society where the illusions of the pseudo-environment could be replaced by a world view more clearly illuminated by the light of technical expertise.

Lippman's concerns weren't unfounded, of course. As he made clear, the important decisions facing society and its elected representatives were increasingly technological and complex, and the average person could hardly be expected to cultivate the detailed and specific expertise necessary to reach an informed opinion on many issues confronting early 20th Century America. His insights were not only well-taken, they were prophetic – the technological questions facing the United States in 1922 were barely a decent warm-up for the innovations which would challenge the country during and after World War II.

However, Lippman was arguably as naive as he was insightful, because implicit in his proposal – the establishment of a technical bureaucracy, basically, which would guide lawmakers in their decision making – was the assumption that science and technology were immune to bias (a question that will be taken up in some detail later). He assumes that technical experts can be trusted to act purely on objective criteria, and the result, in his view, will be policy which issues from scientific truth, free from the taint of ideology and insulated from the influence of an ill-informed lay public.

Postman contends that the Western world, and especially the United States, has now evolved beyond technocracy into the third phase of his taxonomy, the

Technopoly. In the technocracy, the technological and traditional thought-worlds still co-exist, if uneasily – technology seeks dominance and diminishes the authority of cultural traditions, but these traditions continue to exist and exert some influence on the life of the culture. In Technopoly, though, the triumph of technology is complete.

With the rise of Technopoly, one of those thought-worlds disappears. Technopoly eliminates alternatives to itself in precisely the way Aldous Huxley outlined in *Brave New World*. It does not make them illegal. It does not make them immoral. It does not even make them unpopular. It makes them invisible and therefore irrelevant. And it does so by redefining what we mean by religion, by art, by family, by politics, by history, by truth, by privacy, by intelligence, so that our definitions fit its new requirements. Technopoly, in other words, is totalitarian technocracy (48).

Technopoly, as Postman describes it, fosters a powerful willing suspension of disbelief regarding the technical world, except that our credulity isn't confined to the screen, the stage, the television, or any other locus of entertainment – it instead generalizes to the society at large. The ability to see the world consistently and comprehensively has eroded to the point where no assertion of fact appears impossible or unacceptable. People are stripped of the “social, political, historical, metaphysical, logical, or spiritual bases for knowing what is beyond belief” (*Technopoly* 58).

Technopoly essentializes in typically Postmanesque fashion, but it isn't without historical grounding. Drawing on Frederick W. Taylor's 1911 book *The Principles of Scientific Management*, Postman insists that in the Technopoly, “the primary, if not the only, goal of human labor and thought is efficiency; that technical calculation is

in all respects superior to human judgment; that in fact human judgment cannot be trusted...; that subjectivity is an obstacle to clear thinking; that what cannot be measured either does not exist or is of no value; and that the affairs of citizens are best guided and conducted by experts” (51). Technological development demands that “people must sometimes be treated as if they were machinery,” Postman says,

[b]ut in technocracies, such a condition is not held to be a philosophy of culture. Technocracy does not have as its aim a grand reductionism in which human life must find its meaning in machinery and technique. Technopoly does (52)¹⁸.

But if Postman exaggerates for effect, he doesn’t exaggerate much, and if he fails to precisely describe where the technological world is at present, he at least has a good idea of which way it’s heading. The Technopoly model is not an unfair description of what our culture’s dominant utopian ideology of science strives for in principle, both in society generally and specifically in the case of the Internet debate. In the first chapter appeals to efficiency pervade all corners of the utopian case, with several commentators (Perelman being chief among them) couching their arguments in terms which explicitly or implicitly assert that the Internet is better (for education, for the economy, etc.) because it is more efficient. And where proponents of Net development suggest that online technology will remedy social ills by providing the populace with virtually unlimited access to the world’s storehouses of information, Postman replies that none of society’s problems are the result of an information shortage. Instead, he says, Technopoly is what happens to a society when its

¹⁸For a radical contemporary example of what Postman is talking about, see Kelly’s *Out of Control*, the source of the hive model described in the first chapter.

defenses against the “information glut” have broken down (72). Jonas concurs, arguing that if we do not effect vast improvements in the human condition it will not be a failure of knowledge, but a failure of will and morality (Jonas *Imperative of Responsibility*).

If Postman is at all accurate in describing contemporary technological society – and he appears to be on the right track, at least philosophically – it’s worthwhile to examine how we got here, how tool-using Western culture evolved into technocracy, and finally Technopoly. A powerful argument can be made for beginning the historical discussion in the first chapter of Genesis, where God is depicted as granting humanity dominion *over* nature and authorizing its vast exploitation. However, we will instead begin in the early days of the Enlightenment, for it was at this point that humanity began to see its way from a theoretical *dominion over* nature to a practical *domination of* nature. The Garden of Eden story will be taken up in the following chapter.

Bacon and the First Technotopia

Francis Bacon’s highly influential *New Atlantis*, first published in 1626, recounts the fictional discovery (*a la* Swift in *Gulliver’s Travels*) of Bensalem, a lost utopia, and offers one of the earliest testaments to the potential of applied science (Outhwaite & Bottomore). The Bensalemite nation, the ship’s crew discovers, is accomplished in all manner of advanced technologies: refrigeration and preservation, mining, agriculture, astronomy, meteorology, genetics, animal husbandry, desalination,

medicine, musicology, mechanics, air flight, and mathematics are literally only a few of the nation's advanced technological arts. The engine driving this vast knowledge is Salomon's House, a research institute similar in concept and purpose to the British Royal Academy¹⁹. A local merchant with whom the narrator becomes acquainted explains about the founding and charter of the order by an ancient king:

Ye shall understand, my dear friends, that among the excellent acts of that King, one above all hath the pre-eminence. It was the erection and institution of an order, or society, which we call Saloman's House, the noblest foundation, as we think, that ever was upon the earth, and the lantern of this kingdom. It is dedicated to the study of the works and creatures of God (Bacon *New Atlantis* 118).

The technologies developed by the scientists of Salomon's House provide the Bensalemites with a quality of life unimaginable to the denizens of the more scientifically primitive British Isles and European continent, and the members of the society of scientists are held in reverential esteem by the populace. The narrator's description illustrates the near-deific status held by the technologist in this utopia.

He was carried in a rich chariot, without wheels, litter-wise, with two horses at either end, richly trapped in blue velvet embroidered; and two footmen on each side in the like attire. The chariot was all of cedar, gilt and adorned with crystal; save that the fore end had panels of sapphires set in borders of gold, and the hinder end the like of emeralds of the Peru color. There was also a sun of gold, radiant upon the top, in the midst; and on the top before a small cherub of gold, with wings displayed. The chariot was covered with cloth-of-gold tissue upon blue. He had before him fifty attendants, young men all, in white satin loose coats up to the mid-leg, and stockings of white silk; and shoes of blue velvet; and hats of blue velvet, with fine plumes of divers colors, set round like hat-bands. Next before the chariot went

¹⁹For reasons not entirely clear, the name of the institute is spelled two different ways in the text – “Salom~~an~~’s House” and “Salom~~on~~’s House.” The variation could easily be the result of typographical error. Except where quoting directly, I will use “Salom~~on~~,” the spelling which occurs more frequently.

two men, bare-headed, in linen garments down to the foot, girt, and shoes of blue velvet, who carried the one a crosier, the other a pastoral staff like a sheep-hook.... Behind his chariot went all the officers and principals of the companies of the city. He sat alone, upon cushions, of a kind of excellent plush, blue; and under his foot curious carpets of silk of divers colors, like the Persian, but far finer. He held up his bare hand, as he went, as blessing the people, but in silence. The street was wonderfully well kept; so that there was never any army had their men stand in better battle-array than the people stood. The windows likewise were not crowded, but everyone stood in them, as if they had been placed (*New Atlantis* 127-128).

The narrator and other members of the crew are fortunate enough to gain an audience with the visitor from Salomon's House, and in the meeting they are instructed in the seemingly limitless bounty of the society's scientific expertise. The scientist begins with the institute's mission statement: "The end of our foundation is the knowledge of causes and secret motions of things; and the enlarging of the bounds of human empire, to the effecting of all things possible" (129). In sum, this is the utopian promise of science, seen from an idyllic Enlightenment perspective. In the last line – "the effecting of all things possible" – Bacon offers a concise statement of the Enlightenment's ideology of science, as the secrets of motion and even creation are apprehended and drawn under the umbrella of humanity's intellectual dominion.

Postman calls Bacon the "first man of the technocratic age," an assertion that manages to be simultaneously apt and unjust. The observation is accurate in acknowledging Bacon's place as the foremost apologist/propagandist for the emerging study of the applied sciences in the 16th and 17th centuries. While his contemporaries were "impressed by the effects of practical inventions on the conditions of life, Bacon was the first to think deeply and systematically on the

matter” (*Technopoly* 36). Postman credits Bacon with being the first to see, “pure and serene, the connection between science and the improvement of the human condition,” and David Noble says his writings “came to attain almost scriptural authority” (48).

...he continually criticized his predecessors for failing to understand that the real, legitimate, and only goal of the sciences is the “endowment of the human life with new inventions and riches.” He brought science down from the heavens, including mathematics, which he conceived of as a humble handmaiden to invention. In this utilitarian view of knowledge, Bacon was the chief architect of a new edifice of thought in which resignation was cast out and God assigned to a special room. The name of the building was Progress and Power (Postman *Technopoly* 35-36).

“Perhaps more than anyone else before or since,” says Noble, Bacon came to “define the Western project of modern technology.” In his view, technology provided the best means of “millenarian advance” because it was ever becoming “more perfect” (Noble 49). Bacon was well aware of the impact of technology on culture, says Postman, noting that in *Novum Organum* Bacon explicitly denounced “the infamous four Idols, which have kept men from gaining power over nature:”

Idols of the Tribe, which lead us to believe our perceptions are the same as nature’s facts; Idols of the Cave, which lead us to mistaken ideas derived from heredity and environment; Idols of the Marketplace, which lead us to be deluded by words; and Idols of the Theater, which lead us to the misleading dogmas of the philosophers (Postman *Technopoly* 37).

Postman is correct in saying that Bacon understood the powerful effect technology could have on culture, but two things must be noted in Bacon’s defense. First, he saw technology’s profound impact on culture as being altogether positive. The lives of most Europeans were, as Thomas Hobbes put it, “poor, nasty, brutish,

and short,” after all, and the sciences did in fact hold out the promise of a vastly improved quality of life. Nothing in our existing record indicates that Bacon ever envisioned the bleak desperation and degradation of life during the Industrial Revolution, child labor, pollution, toxic dumping, nuclear catastrophe, etc. Second, and most critically, while Postman’s analysis of the technocratic age casts technology as the enemy of the traditions which provided moral authority and context in the tool-using age, we must understand that in Bacon’s conception *science was the work of God*. The ship’s crew in *New Atlantis* were devoutly Christian men²⁰, and the circumstances surrounding the founding of Salomon’s House make clear the Christian context of its charter. In their audience with the esteemed visitor from the science institute, the narrator and crew are told:

We have certain hymns and services, which we say daily, of laud and thanks to God for His marvellous (*sic*) works. And forms of prayers, imploring His aid and blessing for the illumination of our labors; and turning them into good and holy uses (Bacon *New Atlantis* 137).

This passage illuminates two elements crucial to understanding Bacon, and ultimately, to understanding the place of science in Western culture generally. First, since the works of the brothers of Salomon’s House are in fact the “marvellous works” of God, humanism and human endeavor are contained within, rather than opposed to, the divine context. Second, the value of their works depends on whether the technologies produced can be turned to fruitful and practical use. Bacon saw

²⁰“Yet we did lift up our hearts and voices to God above, who showeth His wonders in the deep” (103); “And thereupon the man, whom I before described, stood up, and with a loud voice in Spanish asked, ‘Are ye Christians?’ We answered, ‘We were;’ fearing the less, because of the cross we had seen in the subscription” (105); “We gave him thanks with all affection and respect, and said, ‘God surely is manifested in this land’” (107); etc.

science as rightfully rooted in practical application, and explicitly said that truth and utility were one and the same thing (Mumford *Pentagon* 106). More to the point, scientific knowledge was essential to humanity's attempts to recover paradise – removal of the Idols paved the way so that “access to the kingdom of man, which is founded on the sciences, may resemble that to the kingdom of heaven” (Bacon *Aphorisms* #68).

Thus, at the onset of the Enlightenment, the technological pursuits were seen as inherently *sacred* and *utilitarian*, and these twin impulses have continued to serve as the foundations for Western culture's utopian ideology of science and technology, finding expression most recently in the ongoing Internet debate.

Postman clearly looks at Bacon's construction of the project of science and sees an attempt to disempower the moral traditions of pre-technocratic society. While this is an intriguing view, Postman's quest for symmetry sacrifices a great deal in nuance. The power of theological beliefs isn't necessarily linked to the culture's technical progress (that is, strength of theocracy does not vary inversely with strength of developmental impulse), for instance, but his assumption would lead us to expect greater technological development in cultures with weaker theocracies. This is a difficult proposition to demonstrate, especially given a) the overwhelming power of the Church during the period leading up to the Enlightenment in Europe, and b) how little effect it ultimately had in hindering scientific development. Most importantly, the powerful forces driving technological development in the West were themselves devoutly theological (if not conventional), and Bacon's writings, as innovative and

influential as they were, were thoroughly grounded in Christian traditions already several centuries old.

Perhaps the better interpretation is that Bacon did not seek to undermine *legitimate* moral foundations, but was instead bent on correcting “superstition, and a blind and immoderate zeal for religion” (Bacon *Aphorisms* #89) through a well-meaning revision of the place of human intellect in society. True science, he insists, reflects divine method: “...in the true course of experiment, and in extending it to new effects, we should imitate the Divine foresight and order. For God, on the first day, only created light, and assigned a whole day to that work, without creating any material substance thereon” (*Aphorisms* #70). Bacon criticizes those who fail to understand science and religion in this proper context, suggesting that God is not glorified by ignorance.

In short, you may find all access to any species of philosophy, however pure, intercepted by the ignorance of divines. Some, in their simplicity, are apprehensive that a too deep inquiry into nature may penetrate beyond the proper bounds of decorum, transferring and absurdly applying what is said of sacred mysteries in holy writ against those who pry into divine secrets, to the mysteries of nature, which are not forbidden by any prohibition. Others, with more cunning, imagine and consider that if secondary causes be unknown, every thing may more easily be referred to the divine hand and wand; a matter, as they think, of the greatest consequence to religion, but which can only really mean that God wishes to be gratified by means of falsehood. Others fear from past example, lest motion and change in philosophy should terminate in an attack upon religion. Lastly, there are others who appear anxious lest there should be something discovered in the investigation of nature to overthrow, or at least shake religion, particularly among the unlearned. The two last apprehensions appear to resemble animal instinct, as if men were diffident, in the bottom of their minds, and secret meditations, of the strength of religion, and the empire of faith over the senses; and therefore feared that some danger awaited them from an inquiry into nature. But any one who properly

considers the subject, will find natural philosophy to be, after the word of God, the surest remedy against superstition, and the most approved support of faith. She is therefore rightly bestowed upon religion as a most faithful attendant, for the one exhibits the will and the other the power of God (*Aphorisms* #89).

Properly understood, then, the institutions of science were not intended as a challenge to received cultural traditions in the way Postman imagines. The science which emerged early in the Enlightenment sought no quarrel with the Church, nor did the principle scientific minds of the time imagine that their pursuits were at odds with Christianity. Quite the contrary – these were devoutly Christian men and their programs of study were intended to *strengthen* the religious foundations of the culture by ridding it of ignorance, which went in service to evil. In the place of small-mindedness, petty superstition, and blind obeisance science meant to install knowledge and reason, which together represented the truest path to God.

Regardless of Bacon's intent regarding the place of religion in cultural life, however, he helped set the stage for one of Western culture's most titanic ideological battles – the 18th Century struggle over the secularizing of science. In Ziolkowski's view science remained largely subordinated to the authority of theology through the century (55), while Noble dates the "inevitable secularization" of science to the same period (*Religion of Technology* 4). Despite the early Enlightenment/Baconian notion that science went in service of the natural divine order, ultimately its work couldn't help posing a threat to the political primacy of the Church. Without the sanction of those charged with speaking for God, it was necessary that science evolve a non-theological foundation to govern its progress if it was to have any hope of surviving

in a culture that remained devoutly Christian. What emerged was the now-routine assumption of a value-free scientific method which produced results immune to bias and ideology. According to Ziolkowski, science “gradually liberated itself” from theological domination until, during the nineteenth century, it finally “attained the romantic goal of a value-free science” (55). Aronowitz argues that this increased autonomy owes in part to the corresponding ascendancy of Protestantism and the rise of capitalism, which were by nature more agreeable to the demands of science.

The great denominations of Protestantism relinquished that which Catholicism has struggled to retain: a claim on epistemological as well as ontological truth. However, in the nineteenth and early twentieth centuries the triumph of world capitalism over the remnants of the old feudal aristocracy in eastern and southern Europe forced even the recalcitrant Catholic and other orthodox churches to accommodate to the new order (*Science as Power* 9).

Central to this liberation project was the spread and entrenchment of the scientific ideology of truth, which spoke to the research industry's need for absolute independence in order that knowledge not be tainted by the demands of religious ideology (Ravetz *Scientific Knowledge* 1971).

Still, despite appearances, the ideological divide between science and theology was far from complete. While acknowledging that science underwent a dramatic process of secularization, spurred by the development of professional ideologies, Noble also reminds us that religion continued to play a crucial role in the development of technics early in the 19th Century, especially in the New World (*Religion of Technology* 1998).

In the United States...industrialization and its corollary enthusiasm for technological advance emerged in the context of the religious revival of the Second Great Awakening. As historian Perry Miller once explained, “It was not only in the Revival that a doctrine of ‘perfectionism’ emerged. The revivalist mentality was sibling to the technological” (5-6).



The Mechanical Arts and Christianity

Noble’s thesis argues that, in fact, science and religion never have been truly opposed, and the appearance of conflict between the two is more a temporary deviation driven by professional ideology than by any substantive differences²¹. In an elaborately detailed history, he examines the origins and development of the “mechanical arts” in the Middle Ages, establishing as he does the central role played by Christian theology in the early days of what we now call science. Contemporary science and technology, he demonstrates, trace their lineage back a millennium to the “formation of Western consciousness,”

to the time when the useful arts first became implicated in the Christian project of redemption. The worldly means of survival were henceforth turned toward the other-worldly end of salvation, and over the next millennium, the heretofore most material and humble of human activities became increasingly invested with spiritual significance and a transcendent meaning – the recovery of mankind’s lost divinity (6).

Early Christianity marveled at the mechanical arts, but prior to the Middle Ages technology was valued mainly for its worldly character. Augustine lauded “astonishing achievements” in “cloth-making, navigation, architecture, agriculture,

²¹This conception would seem to offer a strong indictment of Postman’s Technopoly taxonomy, which takes these ideological conflicts, especially as they are manifested in actual development, as reflecting genuine oppositions.

ceramics, medicine, weaponry and fortification, animal husbandry, and food preparation...mathematics, astronomy, philosophy...language, writing, music, theater, painting, and sculpture.” But in these observations he was “thinking only of the nature of the human mind as a glory to this mortal life, not of faith and the way of truth that leads to eternal life” (Noble 11-12).

Four centuries later, in what Noble calls a “turning point in the ideological history of technology,” philosopher John Scotus Erigena asserted a connection between the worldly and celestial, “technology and transcendence.” The “useful arts” were, in his view, part of humanity’s “original endowment” as a creation in the God-image. The technological character of humanity has been obscured by the Fall in Eden, but through study that innocent perfection could be at least partially recovered. The useful arts were, in Erigena’s view, “man’s links with the Divine, their cultivation a means to salvation” (Noble 14-17). The idea of perfect Adamic knowledge lost in the Fall would prove a powerful one, surviving at least as far into the Enlightenment as Newton and Boyle (Noble 59).

Due largely to the influence of the Benedictines, a “mechanism-minded” world-view which extolled a spiritualized conception of the useful arts became the norm during the 12th Century, a period which saw the development of awesome new technologies like watermills, windmills, advanced metallurgical technologies, and the mechanical clock. A Benedictine metallurgist and craftsman named Theophilus wrote a treatise which provided elaborate details for the construction and appointment of a church. For Theophilus and other artisans of the age, “the arts were exalted

because of their association with spiritual devotion.”

The monastic mechanization of the crafts, as well as major construction projects such as the building of churches and aqueducts, has indeed become, and was clearly recognized as, “holy labor” (Noble 18-19).

The application of technological arts to projects like church construction was important for its immediate value – in a real and profound sense technology became a process of worship, and the edifices themselves provided magnificent reminders to the populace of the grandeur of God – but in the 13th Century it began to more centrally reflect a millenarian sense of redemption, as the utilitarian impulse was subordinated to an artistic expression of spirituality. The “work of countless cathedral-builders, the most advanced artisans of their time,” produced “silent stone images” which suggested “a preoccupation with divine judgement at the world’s end” – which many, if not most, believed was near at hand (Noble 26-27). As Arnold Pacey notes, “they were reaching forward to meet an eternal order, a new Jerusalem, which the cathedral itself symbolized” (*Maze of Ingenuity* 58).

At the end of the 15th Century the theological impulse toward applied mechanical arts led directly to the discovery of the Americas. Christopher Columbus fancied himself a “divinely inspired fulfiller of prophecy,” and saw his voyages to the New World as part of a larger millennial mission that would eventually lead to the recapture of Jerusalem.

Columbus, master of the marine arts, thus identified his epoch-making technical achievement with the ultimate destiny of mankind. To his eyes, the discovery of the New World signaled the imminent End of the World, and hence the promised recovery of perfection (Noble 33).

Once the Americas had been discovered, paradise took on a new and more tangible sense of place – Columbus himself had decreed that the New World was the Garden of Eden, and this gave rise to “a new kind of apocalyptic vision of salvation that was as much the result of human ingenuity as faith: utopia.” *New Atlantis*, as well as the utopias of More and Cervantes, “had made their paradise themselves, through their piety, their monastic discipline, their fraternal communalism, and their devotion to the useful arts” (Noble 38).

Utopian ideologies found practical expression in the great scientific institutes of the age – especially in the Royal College of London, founded in 1660. For Robert Boyle, “the father of both experimental science and modern chemistry” and one of the most prominent leaders of the College, “empirical investigation was a form of spiritual experience, and knowing was at once a form of worship and an anticipation of millenarian resurrection.” Other founders of the Royal Society possessed similar beliefs. John Wilkens saw science as a means of recovering from the Fall, as did Robert Hooke. Thomas Sprat believed natural philosophy could help establish grounds for man’s redemption, and Joseph Glanvill’s writings expounded on the perfection of Edenic humanity (Noble 60-61).

The Christian Colonization of Science and the Continued Sway of Theology

Noble notes the emergence in recent years of a heightened technological “enchantment” in our culture and a simultaneous revival of religious expression, and points out that these phenomenon often go hand in hand: religious organizations use

the new technology to spread their message even as “scientists and technologists increasingly attest publicly to the value of their work in the pursuit of divine knowledge” (4).

What we experience today is neither new nor odd but, rather, a continuation of a thousand-year-old Western tradition in which the advance of the useful arts was inspired by and grounded upon religious expectation. Only during the last century and a half or so has this tradition been temporarily interrupted – or, rather, obscured – by secularist polemic and ideology, which greatly exaggerated the allegedly fundamental conflict between science and religion (Noble *Religion of Technology* 4).

In language that strongly echoes the writings of Bacon over three and a half centuries earlier, Noble says that

modern technology and modern faith are neither complements nor opposites, nor do they represent succeeding stages of human development. They are merged, and always have been, the technological enterprise being, at the same time, an essentially religious endeavor.

This is not meant in a merely metaphorical sense, to suggest that technology is similar to religion in that it evokes religious emotions of omnipotence, devotion and awe, or that it has become a new (secular) religion in and of itself, with its own clerical caste, arcane rituals, and articles of faith. Rather, it is meant literally and historically, to indicate that modern technology and religion have evolved together and that, as a result, the technological enterprise has been and remains suffused with religious belief (5).

By way of example, Noble argues that most of the cutting-edge technological development in the U.S. today is driven by people of pronounced religious faith. Religious concerns “pervade the space program at every level,” he says, while Artificial Intelligence researchers “wax eloquent about the possibilities of machine

based immortality and resurrection”²². More to the current point, he characterizes “the architects of virtual reality and cyberspace” as exulting in the “expectation of God-like omnipresence and disembodied perfection” (5).

The importance of religion to the scientific enterprise extends well beyond professions of overt theology, however. While 150 years of obscuring professional ideology may be but a blip when weighed against a thousand-year-old tradition²³, a great deal of internalization and rationalization can occur in seven or eight generations, and the simple reality is that the theological impulse within the technological community often seeks covert, even unwitting, means of expression.

Beyond the professed believers and those who employ explicitly religious language are countless others for whom the religious compulsion is largely unconscious, obscured by a secularized vocabulary but operative nonetheless. For they too are the inheritors and bearers of an enduring ideological tradition that has defined the dynamic Western technological enterprise since its inception (Noble 5).

These theological impulses have survived the secularization of science because of a subtly symbiotic ideological system within the Western mind. Recalling the words of the visitor from Salomon’s House in *New Atlantis*, we remember that science was measured largely by its utilitarian value. These devout brothers sought to glorify God by the good works of men – “the effecting of all things possible” – and a technology was valorized to the extent that it improved the lot of human society. With

²²One of the staff members working on the “COG” embodied AI project at the MIT Artificial Intelligence Laboratory, Anne Foerst, is also a post-doctoral fellow at the Harvard School of Divinity, and is part of the COG team expressly for her expertise in theology.

²³While the tradition may be roughly a thousand years old, the next chapter will argue that it emerges from roots that are centuries, if not millennia, older.

Christianity holding powerful sway over the public mind during the early phases of the Enlightenment, it was a relatively simple thing to associate “good works” with some divine undertaking; it’s comparatively more difficult to construct such associations in contemporary culture, where the dominant view of science remains ostensibly secular. Through the early Enlightenment, then, Christianity colonized science as thoroughly as the European monarchies of the day were colonizing new worlds around the globe, and Bacon’s *New Atlantis* and *Novum Organum* were like the standard of the One True King planted on the sandy beach of a newly discovered continent. Utilitarian resolve was a powerful tool in the colonization process, because science’s benefits were clear and immediate and its promise for the future seductive. As Postman says, science has been a good friend.

By the time the battle for secularization was fully joined in the 18th Century, the ideological marriage of utilitarian and sacred impulses was complete and thoroughly ingrained in the Western (sub)consciousness. The first and most obvious result was the powerful utopianism attached to the technological enterprise, a persistent irrationality surviving and thriving in what should have been an inhospitably rational ideological environment.

The legacy of the religion of technology is still with us, all of us. Like the technologists themselves, we routinely expect far more from our artificial contrivances than mere convenience, comfort, or even survival. We demand deliverance. This is apparent in our virtual obsession with technological development, in our extravagant anticipations of every new technical advance – however much each fails to deliver on its promise – and, most important, in our utter inability to think and act rationally about this presumably most rational of human endeavors (Noble 6).

The second result was more subtle. It can be argued that the secular contravention came too late – by the 18th Century the utilitarian and sacred impulses informing the scientific endeavor had become intertwined into something like a symbiotic system, leaving the secularists no effective way to completely extricate the idea of divine enterprise from the larger public idea of science. This is especially true given the broader Christian theology of the culture. While science was allegedly conquered by secularism during the 18th Century, Christianity remained (and remains) a powerful force in the West. As such, the popular tendency to associate “goodness” with “God” has remained strong. The overwhelming power of the Christian metanarrative, with its claim to creation, salvation, and eternity, provides a handy ability to co-opt perceived social blessings. Thus, if society benefitted from the bounty of science, then it was blessed *de facto* by God, secularizing rhetoric on the part of scientists notwithstanding. The authority of Christianity in the broader cultural sphere has therefore provided shelter for science’s theological urge. Applied to Noble’s thesis, what is suggested is that through 150 years or so of “secular cleansing” the sacred impulse of science has lain more or less dormant within the safe confines of our dominant utopian/utilitarian ideologies. The secularization process, then, was left with little way to root out the “disease” of theology infecting the body of science, and has had to settle for strategies aimed at suppressing the symptoms.

✱ ✱ ✱

The Utilitarian Character of Western Science

Whereas the theological component of Western science has in the last century or two

sought more covert means of expression, its utilitarian complement found in the popular mind a rich and fertile ground for the cultivation of utopian ideologies. In almost every way imaginable applied science appealed to the emerging culture of America, the continent which earlier European thinkers had identified as the Garden of Eden. And America courted the machine, says William Kuhns, giving industry “everything it needed to thrive: a sympathetic economic system, a period of inventiveness perhaps never before equaled in history, room to grow, and a cheerful willingness to adapt, within limits, to the requirements of new industries. By the turn of the [20th] century technology had become as deeply imbedded in the American mind as any of the earlier ideals” (*Post-Industrial Prophets* 1). Willard Rowland says that technology, for its part, promised progress and prosperity through individualism and free enterprise, the cornerstones of the American political/economic order.

A practical, applied science implied progress through invention and more sophisticated technology. Moreover, rising in the service of a free enterprise, commercial order, that science and its products were imbued with aspects of private property requiring both protection and promotion. Identified with a new style of intellectual inquiry, American science became as well a commodity and a form of industrial and political organization (Rowland “Politics of TV Violence” 35).

In “The Mythos of the Electronic Revolution,” Carey and Quirk situate the utopian character of this utilitarianism in a distinctly American Edenic theology. As we see above, Noble traces the “techno-Edenic” impulse to the latter part of the first millennium, but Carey and Quirk here describe a novel naturalistic component that only emerged upon arrival in the Americas, a land that dreamed itself outside history.

A vital and relevant tradition in American studies...has traced the

recurrent theme of “the machine in the garden.” This was a unique American idea of a new dimension in social existence through which people might return to an Edenic estate through a harmonious blending of nature and manufactures.... America was, in short, exempt from history: from mechanics and industrialization we would derive wealth, power, and productivity.... (Carey and Quirk “Mythos” 118-119).

These ideologies powerfully informed the emerging American character, at once influencing cultural development and being reinforced by it. No institution was exempt from the technotopian dream. The nation’s teaching and research systems, for instance, were and still are dramatically influenced by a utopian faith in the transformational power of applied science. To be sure, America developed and nurtured some of the finest Liberal Arts schools in the world: we think immediately of private schools like Harvard, but some of these schools were publicly funded (like the University of North Carolina, the first state-sponsored university in the country). But while the society tolerated the belief in education for its own sake, it also invested more heavily in the idea of applied education than perhaps any culture in Western history. John Dewey, one of America’s most insightful commentators on education, justifies the utilitarian approach, arguing that science is only honorable in application.

Since “application” signifies recognized bearing upon human existence and well-being, honor of what is “pure” and contempt for what is “applied” has for its outcome a science which is remote and technical, communicable only to specialists, and a conduct of human affairs which is haphazard, biased, unfair in distribution of values.... Science is converted into knowledge in its honorable and emphatic sense *only* in application. Otherwise it is truncated, blind, distorted. When it is applied, it is in ways which explain the unfavorable sense so often attached to “application” and the “utilitarian”: namely, use for pecuniary ends to the profit of a few (Dewey *Public and Its Problems* 174).

He contends that the split between pure and applied science is artificial, with the result being a damaging application of science *to* human affairs instead of an integration *within* them. This “knowledge divided against itself” fuels the “enslavement of men, women and children in factories in which they are animated machines to tend inanimate machines.”

The glorification of “pure” science under such conditions is a rationalization of an escape; it marks a construction of an asylum of refuge, a shirking of responsibility. The true purity of knowledge exists not when it is uncontaminated by contact with use and service. It is a wholly moral matter, an affair of honesty, impartiality and generous breadth of intent in search and communication. The adulteration of knowledge is due not to its use, but to vested bias and prejudice, to one-sidedness of outlook, to vanity, to conceit of possession and authority, to contempt or disregard of human concern in its use (175-176).

The ultimate institutional expression of utilitarianism in American education is found in the Morrill Land Grant Act. The original Act of 1862 initiated a movement which saw a second Act in 1890 and 1994 legislation aimed at developing educational resources on Native American lands, and has to date resulted in the chartering of over a hundred public universities in all 50 states and several territories (USDA).

In more complex terms, the land-grant movement is the expression and diffusion of certain political, social, economic, and educational ideals. The motives typically attributed to the movement involve the democratization of higher education; the development of an educational system deliberately planned to meet utilitarian ends, through research and public service as well as instruction; and a desire to emphasize the emerging applied sciences, particularly agricultural science and engineering (Williams *Origins of Federal Support* 1).

The Land Grant movement's ultimate goal, though, was far broader than the simple

production of technically expert farmers and engineers. Its early supporters were intent on shaping these institutions into comprehensive centers devoted to “the liberal, scientific, and even civic education of well-rounded men and women” (Williams 7). Land-grant colleges and universities were designed to be closely connected to the daily life of the communities they served. The scholars produced by these schools were groomed to be productive and pragmatically-minded members and leaders of the society, and to that end the schools’ research missions were unambiguously utilitarian.

We see the legacy of the Land Grant Act today in universities across the country, in programs designed for the application of science and technology to working class and community life, and we see the same ethic reflected at secondary levels of education in both vocational curricular offerings and the activities of pre-professional and pre-vocational societies such as Future Farmers of America, Distributed Education Clubs of America, and Junior Achievement. These curricular and extracurricular programs are consistent with the Baconian vision of a society built upon applied knowledge. They also strongly reflect American Protestant ideals, which instruct adherents with lessons such as the Parable of the Talents (Matthew 25: 14-30), making clear that knowledge is a divine gift to be used productively, lest it be rescinded by God.

Romanticism and the “American Ambivalence”

And the Iron Horse, the earth-shaker, the fire-breather, which tramples down the hills, which outruns the laggard winds, which leaps over the rivers, which

grinds the rocks to powder and breaks down the gates of the mountains, he too shall build an empire and an epic. Shall not solitudes and waste places cry for gladness at his coming?

– Statistics and Speculations Concerning
the Pacific Railroad

Leo Marx's expansive history of technology in the New World, *The Machine in the Garden*, notes the central place of technology in the American Eden. It also manages to capture the verve of popular rhetoric during the 19th Century.

It is technology, indeed, that is creating the new garden of the world. "The great Mississippi valley," says a writer in *DeBow's Review* in 1850, may emphatically be said to be the creation of the *steam engine*, for without its magic power...what centuries must have elapsed before the progress of arts and of enterprise could have swept away the traces of savage life. The railroad is the chosen vehicle for bringing America into its own as a pastoral utopia (Marx *Machine in the Garden* 225).

Popular rhetoricians weren't the only ones intrigued by technology, however.

The literature of American Romanticism reflected the same fascination with the machine (even if it was sometimes a morbid fascination), contributing to a view of technological development that we might call the "American ambivalence." The work of these writers – a company that includes figures like Walt Whitman, Ralph Waldo Emerson, Henry David Thoreau, and Nathaniel Hawthorne – shed light on a complex love-hate relationship with progress that shows no signs of fading even as we turn toward a 21st century fraught with technological uncertainty.

In essence, the New World Romantics wanted it both ways – the power of the locomotive, for instance, signified the innovativeness of the American mind and the grandeur of the frontier spirit. It was a machine as mythical as the land it was rapidly conquering, and even industrialism's harshest critics could hardly deny the

exhilaration aroused by the sheer might of the engine blasting its way across the landscape. However, there was likewise no denying the reality of technology's intrusion upon the pastoral calm of the countryside. Machines were usually noisy, often smoky and foul-smelling, and represented an unarguably alien presence in the garden that was 19th Century America.

The spirit of American Romanticism was thus besieged by conflicting impulses, torn between forces that each held a valid ideological claim on the popular mind. We can see this tension at work in a number of places. Whitman, who was noted for his enthusiastic celebrations of the natural world, illustrates the psychic conflict in one of his most famous poems, "To a Locomotive in Winter." In this short ode, the locomotive embodies modernism and progress in a patently transcendent vision – the engine is depicted as "the emblem of motion and power – pulse of the continent." Whitman is mesmerized by the workings of the machine, its "measur'd dual throbbing," its "ponderous side-bars, parallel and connecting rods," its "great protruding head-light." But despite his rapt awe at the thing, it remains alien, unnatural. His imagery throughout opposes the mechanics of the locomotive with the natural landscape in which it operates. He bids the machine to serve the Muse "For once," indicating how little inclined it is toward a natural aesthetic.

Fierce-throated beauty!
Roll through my chant with all thy lawless music, thy
 swinging lamps at night,
Thy madly-whistled laughter, echoing, rumbling like an
 earthquake, rousing all,
Law of thyself complete, thine own track firmly holding... (*Leaves of Grass* 362).

The machine is at first “lawless,” in this conception signifying its lack of harmony with and deference to the natural order. Almost immediately, though, it becomes a law unto itself; the locomotive’s power and momentum forge a new order, which is then imposed on the landscape. The train of cars (which the reader might presume to be loaded with people, the citizens of the culture in transformation, as well as the materials by which the industrial order will be constructed) trail “behind, obedient, merrily following.”

If we can read in the corpus of Whitman’s work a dismay with the course of progress, we must understand that the poet was equally sincere in his awe for the machine. In his last years Whitman observed:

I am not sure but the most typical and representative things in the United States are what are involved in the vast network of Interstate Railroad Lines – our Electric Telegraphs – our Mails (post office) – and the whole of the mighty, ceaseless, complicated (and quite perfect already, tremendous as they are) systems of transportation everywhere of passengers and intelligence. No works, no painting, can too strongly depict the fullness and grandeur of these – the smallest minutiae attended to, and in their totality incomparably magnificent (quoted in Nye *American Technological Sublime* 71).

Emerson, likewise, appears to have been torn between the pastoral and mechanical. His writing tended to credit the human genius behind the accomplishments of technology, but he also noted that progress characteristically took away with one hand as it gave with the other. In “Self-Reliance,” he astutely points to what humanity has lost in the wake of progress.

The civilized man has built a coach, but has lost the use of his feet. He is supported on crutches, but lacks so much support of muscle. He has a fine Geneva watch, but he fails of the skill to tell the hour by the sun. A Greenwich nautical almanac he has, and so being sure of the

information when he wants it, the man in the street does not know a star in the sky. The solstice he does not observe; the equinox he knows as little; and the whole bright calendar of the year is without a dial in his mind. His note-books impair his memory; his libraries overload his wit; the insurance-office increases the number of accidents; and it may be a question whether machinery does not encumber.... (Emerson 279-280).

Still, he firmly believed that the pursuits of science and technology would ultimately serve a higher, more transcendent calling. In the same series of writings, Essay XII (“Art”) argues that the sublime impulse isn’t restricted to the antiquities, but instead seeks to make holy the artifacts of progress as well.

It is in vain that we look for genius to reiterate its miracles in the old arts; it is its instinct to find beauty and holiness in new and necessary facts, in the field and road-side, in the shop and mill. Proceeding from a religious heart it will raise to a divine use the railroad, the insurance office, the joint-stock company, our law, our primary assemblies, our commerce, the galvanic battery, the electric jar, the prism, and the chemist's retort, in which we seek now only an economical use (Emerson 440).

He allows in “The Method of Nature” that “We hear something too much of the results of machinery, commerce, and the useful arts,” but admits that he is not unimpressed by what human technological endeavor has wrought:

I do not wish to look with sour aspect at the industrious manufacturing village, or the mart of commerce. I love the music of the water-wheel; I value the railway; I feel the pride which the sight of a ship inspires; I look on trade and every mechanical craft as education also (Emerson 115).

He noted the prophecy of progress bound up in the locomotive’s whistle, calling it “the voice of the civility of the Nineteenth Century” (Marx 17), but it isn’t the technics themselves that represent the true value of the enterprise.

There is in each of these works an act of invention, an intellectual step,

or short series of steps taken; that act or step is the spiritual act; all the rest is mere repetition of the same a thousand times (115).

Emerson's ambivalence toward progress is wholly Romantic, as Romanticism manifested itself within the American context. But the nature of that context insisted on a more optimistic (if we might cautiously use that word) reading of industrialism than we find among the Europeans of the era. While it sounds like a cliché to the contemporary critical ear, the "frontier spirit" permeating the settlement of the continent was, at least early on, more real than we might now imagine. Certainly Americans have always loved the image of the bold pioneer, the Columbuses, Davy Crocketts, Daniel Boones, Lewises and Clarks, and John Glenns of our history, but there is in fact a strong element of fact informing the myth of the frontier. The American character was a self-selected phenomenon, issuing from an obvious dynamic. Put simply, people who pull up roots and sail across a vast ocean to colonize a wild and largely untamed continent are *by definition* a very different breed than the sorts of people who consider their options and decide to stay put. Americans *were* pioneers, or at least the descendants of pioneers, and the ethos of the society was therefore inherently more open to new ideas and adventures. It also lent a characteristic euphoria to the tone of the age.

All of the writers of our first significant literary generation – that of Emerson and Hawthorne – knew this tone. It was the dominant tone of public rhetoric. They grew up with it; it was in their heads; and in one way or another they all responded to it.... In its purest form we hear the tone in Emerson's more exuberant flights; but it also turns up in Thoreau's witty parodies, in Melville's (Ahab's) bombast, in Hawthorne's satires on the age, and in Whitman's strutting gab and brag (Marx 193).

The British Romantics, by comparison, managed to overcome their momentary lapses into ambivalence quite effectively. William Wordsworth, for example, toyed with an American-like intrigue with the possibility of the machine, although his initial dystopian instincts eventually won out²⁴. He had explicitly “protested the building of a railroad through the lake country,” and wondered in a sonnet if “no nook of English ground” was “secure / From rash assault.” In fact, English revulsion toward the “ugliness, squalor, and suffering” of industrialism was evident as early as Blake (Marx *Machine in the Garden* 18), whose *Songs of Innocence*, published in 1789, sets in motion a critique of industrialism that reaches a crescendo in the subsequent *Songs of Experience*. *Innocence* poems like “The Chimney Sweep,” a dark portrait of exploitative child labor, and “Holy Thursday,” in which destitute children are scrubbed and paraded past the barons of industrialism who founded their schools (and who are largely responsible for the general economic condition), serve as early and keenly prophetic warnings about technology, noting not merely the direct impact on the human whose life is lived in close contact with the machine, but also intimating an economic corruption of a scope rarely seen in pre-industrial society. At this point in history, however, America remained a largely agrarian society, and even a century later Whitman lacked the first-hand experience with technology that drove his British contemporaries to a consistently darker view of the machine.

By the Victorian period of the late 19th Century, which corresponded to the literary heyday of Whitman, British writers like Tennyson had largely abandoned the

²⁴This will be addressed in greater detail in chapter 3.

High Romantic dream of natural transcendence, often finding their strongest voices in poems like “The Lady of Shalott,” a vignette where the dark and many-towered world of “Camelot” is central to the strife and degeneration of the culture. Innocence is impossible to maintain in the face of the industrial, which has destroyed the garden and slain the beauty of nature. In the Victorian industrial society, whatever happiness there is to be found must be attained despite the machine, not because of it.

The Persistence of the Sublime

American writers remained ambivalent about technologies, but the culture at large was positively agog, at first over the railroad, and later over the automobile.

The invention of the steamboat had been exciting, but it was nothing compared to the railroad. In the 1830s the locomotive, an iron horse or fire-Titan, is becoming a national obsession. It is the embodiment of the age, an instrument of power, speed, noise, fire, iron, smoke – at once a testament to the will of man rising over natural obstacles, and yet, confined by its iron rails to a pre-determined path, it suggests a new sort of fate.... Stories about railroad projects, railroad accidents, railroad profits, railroad speed fill the press; the fascinating subject is taken up in songs, political speeches and magazine articles, both factual and fictional (Marx *Machine in the Garden* 191).

The magazine articles to which Marx refers invest in the machine an ultimate faith “in the unceasing progress of mankind.” For the first time, the “dream of abundance” could actually be realized. Other hopes as well -- “for peace, equality, freedom, and happiness” – likewise came to depend upon technological progress (Marx 192). The Romantic era eventually waned and the nation grew more accustomed to the marvel of the railroad, but the turn of the century provided the nation with yet another artifact of progress to celebrate. The automobile, which was in the latter half of the 20th

Century to play a major role in the restructuring of public life, was a major hit from the start.

In 1899 an automobile trip from Cleveland to New York was such a novelty that it merited extensive daily press coverage, and crowds turned out all along the route. When the car arrived in New York, a million people turned out to see it (Nye 130).

It was against this popular backdrop that American writers of the late 19th and early 20th Centuries worked. The New World had been, by 1900, thoroughly conquered by technics, and just as the noise of the Iron Horse screeched through the pastoral trope of *Walden*, the presence of the machine now echoed through seemingly all the literature of the nation. American writers remained vividly aware of the fact that the machine was an intruder in the Garden.

The ominous sounds of machines, like the sound of the steamboat bearing down on the raft or the train breaking in upon the idyll at Walden, reverberate endlessly in our literature. We hear such a sound, or see the sight which accompanies it, in *The Octopus*, *The Education of Henry Adams*, *The Great Gatsby*, *The Grapes of Wrath*, “The Bear” – and one could go on. Anyone familiar with American writing will recall other examples from the work of Walt Whitman, Sarah Orne Jewett, Henry James, Sherwood Anderson, Willa Cather, Eugene O’Neill, Robert Frost, Hart Crane, T.S. Eliot, John Dos Passos, Ernest Hemingway – indeed it is difficult to think of a major American writer upon whom the image of the machine’s sudden appearance in the landscape has not exercised its imagination (Marx *Machine in the Garden* 15-16).

Despite its intrusions upon the serenity of the garden, though, the machine is often received with a wide-eyed wonderment by American writers, both during the Romantic period and after.

Still, America continued to want it both ways, continued to be a culture caught between two powerful world views, and we would eventually see romanticized

technics somehow emerging unscathed from the ugliest technological moment in the world's history to that point, the first World War. Hart Crane's epic verse effort, "The Bridge," published in 1930 as a rebuttal to T.S. Eliot's "The Waste Land," illustrates the essential hopefulness of the technological vision in the early stages of the new century. From the opening stanza the poem bursts with technological imagery and allusion: the Statue of Liberty, elevators, cinemas, traffic lights, subways, piers, and finally, towering above it all, the Brooklyn Bridge. In the "Waste Land" of American expatriate Eliot, London Bridge was "falling down falling down falling down," bespeaking the age, infirmity, and decay of the old country.

Unreal City,
Under the brown fog of a winter dawn,
A crowd flowed over London Bridge, so many,
I had not thought death had undone so many.
Sighs, short and infrequent, were exhaled,
And each man fixed his eyes before his feet (Eliot 53).

Europe had declined as industrial modernism fed on the eroding moral authority bound up in the institution of the Church. Across the Atlantic, however, Crane saw the Brooklyn Bridge as a metaphor for a culture destined for salvation. Technology was a bridge from the old world to the new, from degeneration to redemption, from this world to the next. In the section entitled "The River," the railways flow seamlessly into the eternal waters of the Jordan.

And Pullman breakfasters glide glistening steel
From tunnel into field – iron strides the dew –
Straddles the hill, a dance of wheel on wheel.

.....

Oh, lean from the window, if the train slows down,
As thought you touched hands with some ancient clown,
– A little while gaze absently below

And hum *Deep River* with them while they go (Crane 60).

“Patience! And you shall reach the biding place,” we’re told, and where the train/river meets “the Gulf, hosannas silently below” (61).

Crane’s ambitious attempt to integrate the machine seamlessly into the garden is sometimes regarded as a “grand failure” as poetry, but as ideological project it stands as a remarkable artifact. If nothing else, “The Bridge” realizes Crane’s desire to cement the symbolic relationship between the nation, technology, and destiny. The writer himself described the book-length ode to the bridge as “a mystical synthesis of ‘America.’”

The initial impulses of “our people” will have to be gathered up toward the climax of the bridge, symbol of our constructive future, our unique identity, in which is included also our scientific hopes and achievements of the future (Crane 124-125).

He was perhaps more successful than either he or his critics might have imagined, because the poem thoroughly embodies the American Technological Sublime. Its very enthusiasm, its gushing tone and uncritical celebration of the utopian spirit, inadvertently illustrates the true character of the technophilic impulse. If it fails as poetry, it succeeds admirably as what we might term “cultural meta-auto-psychoanalysis.”

Thus, while the messianic ideology of technology, of science destined to deliver humanity through the gates of the millenarian shining city, New Jerusalem, was succored in Europe, it found new life and vitality in the terminally Romantic public (un)consciousness of the New World, a culture still too young to be much concerned with the darkening history of the Old World.

The Electrical Sublime

A particular fascination has historically surrounded the technologies of electricity and power, and in many ways the utopian rhetoric of electricity typifies the American view of technologies generally. Carey and Quirk's extended analysis of the rhetoric surrounding the electronic revolution²⁵ examines a diverse collection of contemporary thinkers and artists. McLuhan, Brzezinski, Teilhard de Chardin, Fuller, Cage, Toffler and Feigenbaum

all convey an impression that electrical technology is the great benefactor of mankind. Simultaneously, they hail electrical techniques as the motive force of desired change, the key to the re-creation of a humane community, the means for returning to a cherished naturalistic bliss. Their shared belief is that electricity will overcome historical forces and political obstacles that prevented previous utopias ("Mythos" 115).

Carey and Quirk's thesis contends that the messianic language attending our latest technological revolution – the electronic age, illustrated in the preceding chapter – represents nothing new, and as such there's no real reason to expect significant improvement in the human condition as a result of these technologies. To illustrate the point, they backtrack into the 19th Century and analyze the public pronouncements accompanying the development of electrical power. This view of power Carey and Quirk call "the electrical sublime," and in it they see the reformulation and reapplication of the Edenic impulse.

"Electricity promised, so it seemed, the same freedom, decentralization, ecological harmony, and democratic community that had hitherto been guaranteed but left undelivered by mechanization"

²⁵In this essay, Carey and Quirk use the term "electric" very broadly, signifying by it not just electrical machinery, but also technologies more commonly referred to as *electronic*.

(“Mythos” 123).

The Industrial Revolution had offered its own technophilic vision, of course – the “mechanical sublime” promised abundance and freedom but delivered instead “overcrowded cities, industrial pollution, social fragmentation, and a growing division of labor” (Kester). Electricity would deliver us from these evils, though, by providing

universally high standards of living, new and amusing kinds of jobs, leisure, freedom and an end to drudgery, congestion, noise, smoke, and filth. It can overcome the objections and problems of a steam civilization. It can bring back many of the mourned virtues of the handicraft age without the human toil and curse of impending scarcity that marked the age (“Mythos” 130).

By way of example, the authors cite a 19th Century author for whom electricity became a metaphor for democratic society itself:

The actual relation of each and every member of a community as giver and receiver, teacher and learner, producer and consumer is positive and negative by turns and relatively to every difference of function and force in his associates, the whole mass constituting a great electric battery to which each individual contributes his pair of plates. Perfect circulation being established as a consequence of perfect development of all individualities, the economic force flows smoothly through every member of the body politic, general happiness and prosperity, improved mental and moral action following in its train.... (*The Unity of Law*, cited in Carey and Quirk “Mythos” 122).

Echoing Rowland’s observations on applied science and the American character,

Kester explains that the electrical metaphor is strongly linked to several facets of the Liberal tradition which informed the American character.

Electricity here functions as a kind of Adam Smith-ian “invisible hand” providing a providential coordination of the otherwise disparate and self-interested actions of individual citizens. This statement is emblematic of the close relationship between free-market ideologies

and notions of individualism and democratic freedom in the American liberal tradition. It is also significant because of the curious relationship these first two have with technology. A technological form, in this case, electricity, takes on a metaphoric relationship to systems of economic value and to a model of democratic will formation (Kester).

It seemed like the ones who benefitted the most from electricity were the power and light companies, the authors argue, and when utopia failed to emerge, it was the corporatizing influences and not power, *per se*, that got the blame.

The Great Depression witnessed a dramatic resurgence of the electrical sublime, as President Franklin Delano Roosevelt, a devout technotopian, saw power as the key to a new age of social prosperity. His New Deal “seized upon the motif of a ‘New Power Age’” to justify its creation of the Tennessee Valley Authority (TVA) and the Rural Electrification Administration (REA). In a 1936 address to the World Power Conference, Roosevelt asserted that electrical energy could lead to an industrial and social revolution that “may already be under way without our perceiving it,” and he once went so far as to call the TVA a “social experiment” (Carey and Quirk “Mythos” 130-131)²⁶. Whether Roosevelt was aware of the sophistication of this statement or not, the idea that technics are inseparable from their cultural and administrative dimensions (Pacey *Culture of Technology*) was insightful. As will be discussed later, the concept of technology as value-neutral pervades the popular mind, and Roosevelt’s words acknowledge what certainly the poets Whitman and

²⁶It’s worth noting here that while F.D.R.’s remarks at the Conference were substantively consistent with *LIFE*’s characterization of his vision in its famous Grand Coulee photo-essay (see below), his actual words were decidedly more reserved than the starry-eyed rhetoric employed by the magazine’s editorial staff.

Crane recognized – that far from being value-neutral, technologies are instead powerful physical manifestations of a culture’s values. A society’s machines are, in a very real way, its values incarnate.

The Informational Sublime – A Brief Note on “Post-Industrial” Society

We hear the term “postindustrial” tossed around quite casually these days, so much so that journalists, pundits, and public semi-intellectuals seem to take the passing of industrialism as a given. Daniel Bell pronounced industrialism dead over 25 years ago (*The Coming Post-Industrial Society*), arguing that the contemporary age was marked by shifts in certain axial principles – that, in essence, the rules which historically applied to industrial society were no longer applicable. The Federal Government has now institutionalized the concept.

Replacing an industry classification that has existed for 60 years, the U.S. Commerce Department has introduced a new system that recognizes this leap into the information age.... The government developed the new classification system because “in an information-based economy, the quality of information determines the quality of policy” (Gehl & Douglas 1999).

We see this thinking broadly reflected in the technotopian rhetoric from the previous chapter, and merely pause here to note that the euphoria surrounding the information economy is not confined to the popular sphere.

Among Bell’s more powerful claims was the assertion that growth in the information sector resulted necessarily in prestigious knowledge-based employment. Information sector jobs were depicted as better-paying and more fulfilling. Kester implicates Bell in his critique of current Net-related technotopianism (Kapor,

Perelman, Rheingold, etc.), highlighting the info-centric belief that capital will “cease to play a central role in shaping social or economic conditions.” Of interest is the point where the

...Silicon Valley anarcho-liberalism of publications such as *Mondo 2000* meets Daniel Bell's vision of a postindustrial society in which the industrial working class is entirely supplanted by cadres of highly-trained "knowledge workers." The traditional limitations of industrial capitalism; oppressive working conditions, chronic unemployment, poverty, pollution, class conflict, etc. will disappear in the clean, post-industrial information economy. As for those who seem to be left out of this utopia (the poor, displaced industrial workers, service workers, and the global labor force), we need only provide them with the proper "information environment" to ensure their economic "empowerment" (Kester).

Vice President Gore and the NIITF reports examined in the preceding chapter seem informed by Bell's claims, at least indirectly. The informational sublime is certainly in evidence when Gore asserts that “approximately 60 percent of all U.S. workers are “knowledge workers” and that eight out of 10 new jobs created by the Administration's policies will be in “information-intensive sectors of our economy” (Gore 1994).

If the Internet seems to represent possibilities that are profoundly and generally unprecedented, our attempts to explain the disconnect should note that there are two layers of insulation between America's technotopian idealism and the socio-economic realities of history. First, as Carey and Quirk note above, the perception that we are “exempt from history” is fundamentally American, and while America isn't the only nation online, it is the *predominant* nation online. Our embrace of the Net, then, is characteristically unconditional, appealing as it does to so much we already hold dear.

Second, information itself is portrayed as transcending some of the most the basic assumptions of history by rendering obsolete concepts like class and capital. It's as though Marx never existed. Writers like Bell no longer have to argue over what really happened historically – they can simply say that whatever it was, it's not that way *now*, thanks to information technologies.

The Myth of Value-Free Science & Technology

At a glance, the conception that science and technology are value-free propositions appears to dismiss the technotopian/dystopian dialogue as irrelevant. If we accept the popular premise that scientific method produces results that are truly free from the biases of human researchers, and if machines themselves are simply inert things whose ultimate value to society depends on how they are used by (inherently fallible) humans, then the question of utopian or dystopian technology is a phantasm. However, if we dissect the neutrality argument, we ultimately reveal it for a technophilic misdirection. Only by understanding the structure and power of the idea of value-neutrality can we fully appreciate its central function: the maintenance of technophilic ideology in Western culture.

Technology's full impact in shaping society is obscured if we consider only its technical dimension – that is, if we equate *technology* with *machines* – and see human agency as being distinct from the technics themselves. This is precisely what commonly happens, however, and it's a requisite condition for the idea of value-neutrality. As Mumford points out, there exists in our culture a powerful “tendency

to identify tools and machines with technology; to substitute the part for the whole” (*Myth 4*). David Sarnoff, in accepting an honorary degree from Notre Dame, offered a striking example of technology/technics conflation when he told the audience that, “We are too prone to make technological instruments the scapegoats for the sins of those who wield them. The products of modern science are not in themselves good or bad; it is the way they are used that determines their value” (McLuhan *Understanding Media* 11)²⁷. What Sarnoff fails to perceive is that technics and human agency are extensions of each other – instead of being *separate things*, they are *related dimensions of the same thing*.

McLuhan rebuts this notion in his famous “The Medium is the Message.” In McLuhan’s formulation, any new medium – that is, any technological extension of humanity – inevitably alters the pre-existing “patterns of human association.” Some of these alterations are positive, others negative, but the critical piece of the equation is the understanding that the change issues not from the “content” of the technology, but from the technology itself (*Understanding Media* 7-8). He dismisses Sarnoff’s assertion that technology is neither good nor evil in itself, arguing that the notion ignores the power of the medium to do more than simply *add* to the existing sum of culture (*Understanding Media* 11). In fact, new technologies often result in massive revisions of cultural structures, practices, and relations.

Drawing on the perspective of de Tocqueville, McLuhan explains how

²⁷Sarnoff’s perception of the cultural reaction to technology doesn’t mesh with a substantial majority of the research unless the “we” in his sentence refers specifically to Critical schools of thought. The popular perception has always pretty clearly agreed with his view.

understanding the difference between the United States and the English hinges on the different places typography occupied in the histories of the two countries. The printing press exerted comparatively little influence on the English, who clung to “the power of the ancient oral traditions of common law,” whereas the effect of print on the United States was so profound that, if one could merely find “the center” – the single principle from which all laws emanated – everything else would be “revealed at a glance” (*Understanding Media* 14-15).

The grammar of print cannot help to construe the message of oral and nonwritten culture and institutions. The English aristocracy was properly classified as barbarian by Matthew Arnold because its power and status had nothing to do with literacy or with the cultural forms of typography (15).

Any medium “has the power of imposing its own assumption on the unwary,” he says, and we must understand “that the spell can occur immediately upon contact, as in the first bars of a melody” (15). The medium is thus invested with a supremely organic character, and its effect on the human audience functions quite differently from the corresponding effect of content. Whereas the audience’s reaction to the medium is autonomic, the impact of content, or message, requires introduction into and presumably consideration by the mind, resulting in a slower and more conscious interaction than is described relative to contact with the medium.

The effects of technology do not occur at the level of opinions or concepts, but alter sense ratios or patterns of perception steadily and without any resistance (*Understanding Media* 18).

In McLuhan’s formulation, the idea of value-neutrality is rejected because it hinges on the distinction between tool and user, with agency invested in the user.

The neutrality construction makes the user synonymous with message, while medium is envisioned as a mere conduit for action and effect. As he demonstrates, however, the medium exerts a powerful agency which is entirely independent of the intent of the user or the content within the channel. It matters not what message the user attempts to pump through the medium – the revision of cultural practice and pattern is already effected. Since agency and effect therefore reside beyond the bounds of the user/message dyad, the medium is implicated in all the larger value issues attending technological development.

In *The Culture of Technology*, Pacey begins his consideration of sci/tech's presumed neutrality by examining the history of the snowmobile, a machine whose varied uses vividly illustrate the multiple dimensions comprising technology in contemporary society. In addition to the several recreational functions with which Americans usually associate the machine, Pacey notes that it has served significantly different purposes in other cultures: reindeer herding in Swedish Lapland, fox trapping by Canadian Banks Island tribesmen, prospecting by multinational oil companies, and hunting by Native Americans. In some respects, the case of the snowmobile seems to support the idea that the technology is neutral – regardless of how it's used, it remains essentially the same machine, he notes, and in the case of the Lapps its use seems to have had no effect on basic cultural values.

So is technology culturally neutral? If we look at the construction of a basic machine and its working principles, the answer seems to be yes. But if we look at the web of human activities surrounding the machine, which include its practical uses, its role as a status symbol, the supply of fuel and spare parts, the organized tourist trails, and the skills of its owners, the answer is clearly no. Looked at in this second way,

technology is seen as a part of life, not something that can be kept in a separate compartment. If it is to be of any use, the snowmobile must fit into a pattern of activity which belongs to a particular lifestyle and set of values (*Culture of Technology* 3).

“Technology,” then, actually represents substantially more than the popular understanding of the term, which Pacey calls the “restricted” sense. Essentially, the machine itself – the technical dimension, is only a part of the whole picture. He advances the concept of “technology-practice” as a way of distinguishing the application of technology from the science which underpins its development. Using the field of medicine to illustrate the idea, he explains that medical *science* designates the purely technical considerations of medicine, while medical *practice* denotes the larger body of concerns relating to values, ethics, and culture. For example, while the Hippocratic Oath is of critical importance in the practice of medicine, it in no way touches on the actual science of healing. Pacey therefore defines “technology-practice” in terms which seek to understand technology not simply as technics, but as the larger web of concerns which surround the development, administration, and uses of the machine *per se*.

The model of “technology-practice” is expressed graphically as an inverted triangle. The bottom point Pacey calls the “technical aspect,” which includes “knowledge, skill and technique; tools, machines, chemicals, liveware; resources, products, and wastes” (6). This lower third of the equation, the “restricted meaning,” is what most people mean when they use the term “technology.” The “general meaning,” however, incorporates the top two corners of the triangle, the “cultural aspect” and the “organizational aspect.” The cultural includes “goals, values and

ethical codes, belief in progress, awareness and creativity.” The organizational signifies “economic and industrial activity, professional activity, users and consumers, trade unions” (6).

[T]echnology-practice is thus *the application of scientific and other knowledge to practical tasks by ordered systems that involve people and organizations, living things and machines* (6).

By this construction, Pacey distinguishes the *technological* from the merely *technical*, and in making clear that the technical aspect of technology is inherently bound up with the cultural and administrative aspects, he makes a powerful argument against the naive idea that technology is or can conceivably be taken as neutral.

In *The Technological System* (1980), Jacques Ellul goes well beyond Pacey and McLuhan, ultimately arguing not only that technology is a value-laden proposition, but that in the modern world the values of society *are direct artifacts of technology*. He contends, in a masterpiece of technological determinism, that there has arisen within society a technological system that has become almost wholly determining of the culture’s history. The system is *not* the society, but exists within and beside it. He details the ways in which technology has grown, diversified, and decentralized, to the point where it is so thoroughly integrated into society that, in practical terms, it cannot be separated from it. Even human agency is subsumed by the system.

[T]he system presupposes a more and more thorough integration of each element, including man, as an object. Man can no longer be a subject.... Nothing can have an intrinsic sense; it is given meaning only by technological application. Nothing can lay claim to action; it is acted upon by technological process. Nothing can regard itself as autonomous; it is the technological system that is autonomous.... (*Technological System* 12).

Even capitalism has been swallowed whole, and as a result questions of commodity have been rendered relatively unimportant. The “technicized object” has replaced the commodity as the important concept, and the term signifies anything which the system can appropriate and turn to its use, including humans.

All the things making up the societal life – work, leisure, religions, culture, institutions – all the things forming a loose, complex whole, enclosing real life and giving man both a reason to live and an anxiety – all these things were “torn apart and more or less irreducible to one another.” And it is easy to state that they are now technicized, homogenized, and integrated into a new whole, which *is not* the society. No more meaningful political or social organization is possible for this ensemble, every part of which is subordinate to the technologies and linked to other parts by the technologies. “All that reigns is the eternal substitution of homogenous elements” (Ellul 15).

The “megamachine” which results – the technological society, which is a society “in which a technological system has been installed” (18) – is a completely and totally deindividuating force, which, curiously, is the state of grace in the technological society²⁸. We assume that by this Ellul means it is this state of deindividuation which signifies perfect harmony and integration with the system, and we further presume that it is people in this state who receive the greatest blessings the system has to bestow²⁹. This is precisely consistent with all the utopias of the past, Ellul says, because each has “been an exact repetition of an ideal organization, a perfect conjunction between the various parts of the social body” (19).

²⁸If Ellul’s Technological System sounds a lot like Postman’s Technopoly, it’s no accident – Postman draws heavily on Ellul’s previous work, *The Technological Society*, in formulating his thoughts on the Technopoly.

²⁹Ellul doesn’t use Kelly’s hive metaphor, but he well might have; the boons of the system accrue as a result of the complete absorption into a new kind of super-collective.

Pacey, Postman, McLuhan, and Ellul leave us with no real footing from which to assert that technology (technics, the restricted sense in Pacey's model) can be abstracted from the social, political, economic, and cultural factors which attend its development and use. Still, development speeds ahead, mindful of little besides the promise of commerce. In the case of the Internet, we see occasional dissenters, but their cautionaries, even when voiced by a source as credible as Stoll's, have little noticeable impact on the pace of progress. Even less concern is given to the cultural and administrative issues associated with Pacey's expanded definition of technology or with the overwhelming implications of Ellul's *Technological System*, in which the system has stripped all agency and autonomy from the individual, the collective, and the economic base.

Pacey and Ellul may recognize the deeper concerns, but the developers of the Information Superhighway clearly do not. Tracey aptly characterizes the rhetoric of Internet development, noting a shallow and short-sighted obsession with

the market not the society, the consumer not the citizen, the want not the need, the quantity not the quality, the price not the value, the globe not the nation ("Whatever It Is..." 210).

What results is a myopic, almost pathologically commercializing development policy that punctuates Pacey's call for full-scale cultural revolution aimed at infusing public debates over technology with a critical discussion of basic societal values.

[T]he central preoccupation of any modern cultural revolution must surely be centered on what one university engineer has described as "the mainspring of technological misdirection." This is the impulse to go on inventing, developing and producing regardless of society's needs. The result is that we create systems of organized waste in electricity supply, consumer goods and food production, and above all,

in the arms race.

But conventional world views disguise much of this and make it seem logical and necessary; they hide the real nature of the technological imperative. Thus the most important part of any cultural revolution – the biggest shift in perceptions and paradigms – could be a reconstruction of world views so the irrationality of our present pattern of technological progress is no longer hidden (*Culture of Technology* 171-172).

In short, not only are the cultural and organizational dimensions invisible to the popular eye, the “technological imperative” depends on this invisibility for its continuation. The belief that technology is neither good nor evil, but is merely a tool in the hands of *people* who may be good or evil, is essentially technotopian – without it, the current mode of technological development would die.

Value-neutrality – the perceptual disconnect between technology and the sorts of cultural concerns noted by Pacey, Postman, and Ellul – results from two factors acting together. First, the association of mechanical arts with the divine has a history that’s over a millennium old, so Westerners have been long conditioned to associate technology with goodness. And, as Postman points out, our lives have in reality been significantly improved by the fruits of applied science, making the association an easy one to accept. However, this history of successes nurtures a feedback cycle. Jonas says that when we consider the successes of our technologies, we begin to see how there evolves a closed loop of perception and signification, of perceived necessity and technical success, where technological triumphs reinforce the messianic tilt of the culture and language, which in turn privileges the cause of further technological endeavor, and so on.

This positive feedback of functional necessity and reward – in whose

dynamics pride of achievement must not be forgotten – assures the growing ascendancy of one side of man's nature over all the others, and inevitably at their expense. If nothing succeeds like success, nothing also entraps like success (Jonas *Imperative of Responsibility* 9).

Second, the concept of human fallibility runs deep in Christian cultures – born in original sin and unworthy of grace, humans are inherently imperfect creatures, Christianity teaches. When machines fail, it's only natural that Westerners, socialized to a Christian world-view, look to the humans who build and operate them for the cause, especially given how commonplace technical functionality has become. The reliability of machines is such that, as Postman indicates, we have almost forgotten what it is to be amazed. Also, just as there is truth to the idea that machines have been our friends, there is likewise a basic truth to the proposition that technological disasters often occur in the presence of human error. In the popular view, Chernobyl wouldn't have happened had a plant employee not dumped a Coke on the control board, and we'd never have heard of the *Exxon Valdez* if the captain hadn't been drinking. The overtness of human fallibility effectively distracts the public from the deeper questions Pacey and Jonas would ask about the direction of our technology policies. Certainly human fallibility is an important part of the equation, but the sort of dramatic policy reformulation these critics call for requires that we re-envision human action and agency as indigenous elements of the system. If human fallibility is a problem, then perhaps the answer isn't training and safeguards. Perhaps the answer becomes a revision of policy to eliminate the development of technologies that allow human error to annihilate populations.

This disconnect, then, absolves science and technology of their sins, and serves a critical purpose for the utopian ideology of science and technology: by misdirecting blame aimed at the failings of sci/tech from policy to people, the doctrine of value-neutrality proofs the mechanical arts against any taint which would otherwise feed dystopian critiques and hinder development. If the public mind did see technology in the way Pacey says it must if there is to be a “reconstruction of world views” concerning wasteful and destructive technologies – if the concept of value-neutral sci/tech ceased to exist, in other words – then it’s likely the technophilic view would be far less powerful in contemporary America. Certainly we have seen countless technological failures of varying magnitude in our history, and if each one fed the technophobic plaint we might well live in a culture with far more thoughtful and balanced policies surrounding technical development.

Communication and Technotopia

The centuries-old utopian ideologies of technology are alive and well in the Information Age, as we see in the first chapter, but the attachment of these beliefs to communications technologies specifically also has a long history. As noted above, Lippman was concerned with how the press might be improved, in hopes of bringing public opinion more in line with the actualities of the complex world. Dewey, his contemporary, centralizes the role of communication technologies in the fostering of productive community relations (*The Public and Its Problems*). In his view, communications technology was the only thing enabling the existence of a republic as

racially diverse and geographically dispersed as the United States.

Our modern state-unity is due to the consequences of technology employed so as to facilitate the rapid and easy circulation of opinions and information, and so as to generate constant and intricate interaction far beyond the limits of face-to-face communities.... The elimination of distance, at the base of which are physical agencies, has called into being the new form of political association (*Public and Its Problems* 114-115).

However, Dewey saw the public as being “in eclipse” due to the sorts of massive complexities described by Lippman. The local community “has been invaded by forces so vast, so remote in initiation, so far-reaching in scope and so complexly indirect in operation, that they are, from the standpoint of the members of the local social units, unknown,” he argued. These conditions make impossible any kind of coherent, self-aware civic action by the citizenry (131). America had lost all sense of itself in the homogenizing forces of rapid growth and technology.

[T]he machine age has so enormously expanded, multiplied, intensified and complicated the scope of the indirect consequences, have formed such immense and consolidated unions in action, on an impersonal rather than a community basis, that the resultant public cannot identify and distinguish itself (Dewey *Public and Its Problems* 126).

The failure of self-identify gave rise to a number of maladies. The public was rendered unable to engage in productive political action, and the individual found the quest for meaningful expression increasingly difficult because such actualization could only occur within the workings of a healthy community. The key to the Great Community, which in turn keyed the Great Society, was communication technologies, which existed as never before.

Without such communication the public will remain shadowy and

formless, seeking spasmodically for itself, but seizing and holding its shadow rather than its substance. Till the Great Society is converted into a Great Community, the Public will remain in eclipse. Communication can alone create a great community. Our Babel is not one of tongues but of signs and symbols without which shared experience is impossible (*Public and Its Problems* 142).

The Great Community sounds a lot like Bensalem, but the key difference is that the Great Community emerges less from material wealth, the boon of production technologies, than it does from the sense of community resulting from communications³⁰. As we recall Dewey's thoughts on the application of science from above, we note that communication is essential to the formation of public opinion because of its role in transmitting the "results of social inquiry" (177). Communication is the conduit of the application of science and the means by which an informed public emerges from eclipse, gains a true sense of itself and its values, and becomes a Great Community.

In recent times communications has taken the central role in the "postindustrial revolution" as an increasingly large percentage of U.S. national income is devoted to the generation and dissemination of information (Christians "Communications and Technology" 233). Christians undertakes a detailed examination of the research surrounding communications technologies, and notes the ways in which these developments are linked to social change, both now and in the future. Almost exclusively, he notes, this work exhibits a "preoccupation with the hardware," rarely pausing for critical reflection.

³⁰Bensalem possessed communications technology ("We have all means to convey sound in trunks and pipes, in strange lines and distances" [*New Atlantis* 134]), but seems not to have deployed it for mass communications purposes.

Perhaps this phenomenon is to be expected. A culture rooted as deeply in the utilitarian as ours would be expected to produce pragmatic, rather than critical, analysis, especially in cases where research monies issue from federal agencies, which are practically-minded and often co-opted by partisan influences, and private foundations, which are often tied directly to corporations or which depend heavily on corporate giving for their budgets. Further, the tendency Christians portrays is probably worse now, several years after the publication of his review. During the intervening decade the Internet's potential to educate, enrich and empower has evolved from nifty idea to basic assumption, and while electronic R&D is being funded as never before, the monies nearly always go to projects expressly aimed at proving or expanding upon the benefits of the technology³¹. Chapter 1 shows us examples of the dystopian critique, but these voices issue from the periphery, not the mainstream, and they rarely attract significant federal or corporate research dollars.

Christians' conclusions are quite in line with the arguments Dewey made decades earlier. In lobbying for a normative theory of technology (*a la* Jonas and Pacey, whom he cites) he notes that these technologies are inextricably embedded in the very processes they are called on to interpret:

Communications technologies represent the meaning-edge of the technological process. While exhibiting the structural elements of all technical artifacts, their particular identity as a technological form

³¹The Carnegie-Mellon study noted in Chapter 1, which showed the Internet leading to depression and erosion of personal relationships, represents both the rule and the exception. It was clearly expected to find results precisely opposite to what it actually found (the spokesperson quoted in the newspaper story says so explicitly), but it was released anyway. We might well wonder how, since its findings mitigated against the profit potential of its sponsors.

inheres in their function as a bearer of symbols. Information technologies thus represent the properties of technology while serving while serving as the agent for interpreting the meaning of the very phenomenon they embody (249).

While Christians has before him a dramatically different technical terrain than did Dewey – who could scarcely have imagined the World Wide Web, let alone MUDs, MOOs, or *alt.sex.unnatural-acts.jesse-helms* – his centralization of communications technology to the cultural process could almost have been lifted directly from *The Public and Its Problems*.

...communications media are the connective tissue in human culture-binding, the territory where meaning and purpose are formed. The media sketch out our world for us, organize our conversations, massage our self-identity, and influence our decision-making (Christians 149).

In the end, while the players and the details of their pitches have evolved, moving from the industrial technologies of production to the electronic technologies of information, the essential commitment to better living through technology remains.

...while the symbols of technological progress have changed – satellites, spaceships, computers, and information utilities, having replaced steam engines and dynamos – the same style of exhortation to a better future through technology dominates contemporary life. This exhortation to discount the present for the future has therefore been a particular, though not peculiar, aspect of American popular culture (Carey and Quirk “History” 177).

* * *

Pictures of Technology: The Illustrative Case of *LIFE Magazine*

What should be emerging by this point in the discussion is a picture of a culture in psychic conflict. On the one hand the West is dedicated to the application of science to the improvement its physical world, if not the salvation of its collective soul. On

the other, it's prone to deep-seated, yet profound, misgivings about its ability to accomplish either, and in fact wonders if it might not be engineering the means of its own annihilation. In the first chapter we saw ample evidence of both tendencies extant in the Internet debate, and in this chapter we have seen the long histories from which the utopian contribution to that debate flow; the following chapter will be examining more deeply the traditions which fuel the dystopian reaction. The final section of this chapter will be devoted to a brief study of one of the 20th Century's most substantial popular records, *LIFE Magazine*.

An ambitious attempt to capture the richness of American society, *LIFE* succeeded so brilliantly because it refused to shy away from the complexities the culture faced during the middle of the century. While it routinely tackled events and issues which were more obviously controversial and divisive (Civil Rights, for instance), perhaps no topic ever presented more of a challenge than technological development. Just as America was a culture conflicted, negotiating its way back and forth between its utopian dreams and dystopian nightmares, so also were the editors of *LIFE* conflicted, as their portrayals of machinery wavered, celebrating in one issue and expressing subtle fears the next.

The following pages will examine the utopian portion of the *LIFE* equation, and a review of the dystopian counterweight will be undertaken in Chapter 3.

“...to see and be amazed”: The *LIFE* and Times of Technology in America

During its 36-year run, *LIFE* traversed a period of technological innovation and peril

unsurpassed in the recorded history of humanity (to that point, anyway). As the first issue was released in November 1936, a resurgent Germany was constructing the most awesome war machine the world had yet seen, a development that literally threatened the future of the hemisphere. *LIFE*'s final issue went to press at the end of 1972, roughly three weeks after NASA's last manned mission to the moon, Apollo 17, closed the books on a program that proved humanity was not inevitably bound to this planet. The technical distance between these two moments is mind-boggling. Nazi engineers working on the development of rocketry could perhaps, just barely, envision a trip to the moon, but for most everybody else such an idea remained the stuff of pulp science fiction. Nonetheless, human technology did traverse this distance, and it did so in the almost impossibly brief period of 36 years. *LIFE Magazine*, a publication designed to depict American life at this particular moment in history, could hardly have avoided becoming a mirror for our vast, and often troubled, technological agenda.

LIFE occupied a privileged place in the popular mind through the middle of this century. With an average circulation peaking at 8.5 million, it was the most widely disseminated publication of its kind in history (van Zuilen). *LIFE*'s pass-along rate is difficult to compute, but Kozol estimates its total reach in the 1940s and 1950s to have been around 20 million (*LIFE's America*). Figures compiled by van Zuilen afford a reach estimate that is a bit higher, perhaps even exceeding 25 million readers during the mid-1950s³². If accurate, these figures suggest that during its postwar peak

³²This number is speculative, and is based on the extrapolation of readership rates
(continued...)

LIFE probably reached better than 20 percent of the population aged 15 and older each week.

The extent of the impact *LIFE* exerted through its editorials and photo-essays is impossible to estimate, although ample evidence indicates that the magazine was influential among its readers. The editors and photographers employed by *LIFE* took their mission seriously, tackling the major issues and events facing the U.S., no matter how controversial, and often risking their lives in the process. We can safely assume that devoted readers of such a publication would share its ethic, and countless letters to the editors support this assumption. *LIFE* readers routinely took the editors to task for various decisions and policies, but the tone of such correspondence usually acknowledged, at least implicitly, the significance of the event in question. The essential concern was that the stories in question be covered “properly.” We have no way of knowing if the letters *LIFE* published constituted a representative sample of all the letters the editors received, nor can we assume that the letters written provided a fair sample of overall public opinion. However, a publication that didn’t fairly reflect the interests of its readership could hardly have posted *LIFE*’s three-and-a-half decade record of success, so a significant accord must have existed between the magazine and its readers.

Second, anecdotal evidence indicates the anxiousness with which subscribers anticipated *LIFE*’s weekly arrival and the degree to which they cherished its pictures.

³²(...continued)

from a decade earlier. There’s no evidence to suggest that these rates would have varied significantly – in fact, the numbers seem to indicate that the decades were demographically similar.

Former subscribers talk with fondness about specific issues they remember and the pictures they hung on their walls. Baby boomers recount photo-essays that helped attune them to the Civil Rights Movement or “The ‘60s” – and this seems especially true for those who grew up in “culturally remote” areas, far removed from places like Berkeley or Selma, the places where “things were happening.” Words like “community” are used to describe how the magazine drew people together, establishing through its words and pictures the centrality of particular cultural issues in the life of the society. Stories like these speak to a compelling mystique about *LIFE*’s relationship with its readers and the culture generally.

Finally, van Zuilen cites market research suggesting that magazines contributed significantly to overall knowledge and provided “usable ideas” to “the nation’s citizens and consumers” (74). These findings are of indeterminate value, though, since they seem to focus exclusively on the “consumer” half of “citizens and consumers.” Whether magazines were equally influential on political and cultural ideas remains unclear³³. Still, as with the anecdotal and speculative evidence above, a degree of influence is indicated.

***LIFE* at the Outset: The Construction of Technology**

Montana’s monolithic Fort Peck Dam dominates the cover of *LIFE Magazine*’s inaugural issue. This image serves as an apt and prophetic commencement, for over

³³Additionally, this research is the product of methodological approaches of which we ought to be suspicious. Add to this an explicitly stated marketing agenda, and there is ample reason to see these numbers as “optimized.”

the next 36 years *LIFE* would catalogue, through photographs, diagrams, technical drawings, artist conceptions, and editorial commentary the steady forward march of technology, both at home and abroad. Just as the Fort Peck Dam towered over the landscape and people beneath it, so would *LIFE*'s vision of progress tower over the imagination of wartime and postwar America.

Many readers may not even have initially recognized the picture for what it was – the rampart-like architecture is more suggestive of a citadel than any dam most Americans had ever seen³⁴. However, the perspective of Margaret Bourke-White's photograph powerfully conveys two important things. First, the minute human figures at the dam's base signal the immensity of the structure. The photo is intended to inspire awe, and probably succeeded. Second, the photo signals human agency. What the figures are doing is unclear, but their posture suggests that they are inspecting something at the base of one of the tower-like segments. They are bent at the waist, both to approximately the same degree, and would appear to be focused on the same point in the structure. Obviously the edifice is manmade, but the aspect of examination assumed by the two figures implies the act of construction, centralizing the role of the builders in the photo's narrative. Hence, in the most literal sense, *LIFE*'s very first impression on the American public was of the immensity and grandeur of technology, and the first humans depicted by the magazine, the two anonymous figures inspecting the Fort Peck Dam, were conspicuously dwarfed by their own (we presume) creation.

³⁴One elderly man vividly remembered the cover of the first issue, with its photograph of "that castle in Spain."

To what degree was *LIFE*'s use of this image deliberately geared toward the glorification of technology, and more broadly, to what extent were *LIFE*'s portrayals of technology and science through the years the result of an editorial agenda, either explicit or implicit? These questions, like those above concerning *LIFE*'s influence, are difficult to answer. As Kozol notes, *LIFE* defies categorization. Trends and tendencies can be identified and examples can be produced in support of countless hypotheses, but in the end the magazine's inherent heterogeneity confounds even the most patient scholar. Cultural truths and textual themes revealed in one issue and supported by close readings of several others are dispensed with the following week, almost as if the editors were intent on contradiction. And in a sense perhaps they were, for *LIFE* set out to depict American society, which is frequently self-contradictory. It is therefore with great trepidation that this or any other study of *LIFE Magazine* goes searching for overarching themes.

Still, some of *LIFE*'s identifiable tendencies are stronger than others, and despite the contradictions we occasionally find evidence of what might be characterized, if only cautiously, as an agenda. One such example occurs, appropriately enough, in the editorial introduction to the first issue.

Photographer Margaret Bourke-White had been dispatched to the Northwest to photograph the multi-million dollar projects of the Columbia River Basin. What the Editors expected – for use in some later issue – were construction pictures as only Bourke-White can take them. What the Editors got was a human document of American frontier life which, to them at least, was a revelation.

Having been unable to prevent Bourke-White from running away with their first nine pages, the Editors thereafter returned to the job of making pictures behave with some degree of order and sense (11/23/36, 3).

A clearer and richer statement of an editorial intent is hard to fathom, especially where the elusive *LIFE* staff is concerned. Several points are worth noting. First, before *LIFE* ever published a single page, it had assigned one of its crack photographers the task of shooting construction, indicating the exceptional newsworthiness of these projects in the minds of its editors. Second, the editors make clear that they dispatched Bourke-White with certain expectations – they knew what they were after, and were fully anticipating that she would deliver the goods. Significant here is the degree of preconception to which the magazine admits. Substantively, if not literally, a story has already been written about these construction projects, and the editors only need their photographer to fill in the pictorial details.

Third, while the real story Bourke-White encountered was, in the editors' estimation, a "human document," the cover nonetheless featured a technology photograph, one that was thematically at odds with the photo-essay inside the covers. That story concerns life in Roosevelt's New Deal boomtowns, an existence which the magazine depicts as dirty and degenerate, and which is typified (in the editors' view) by a toddler sitting on a bar as the Saturday night bacchanalia rages around him. The decision to put the dam on the cover despite its seeming irrelevance to the more compelling "human document" perhaps reflects the editors' willingness to privilege their admitted "expectations" over the substance of the field photojournalist's findings.

Still, what is intriguing is that *LIFE* does tell the human story, and in doing so

unwittingly (we assume) acknowledges the point Pacey, Jonas, McLuhan, Postman, Ellul, and others make about technology's inherently cultural character. The editorial expectation as they dispatched their crack photographer Westward was in line with Pacey's "restricted" view of technology – when they told Bourke-White to go photograph technology, they intended her to concentrate on the *technics* of America's vast project of progress. Instead, her camera insisted on a more critical and sophisticated view, instinctively seeking out the cultural dimension and documenting the ways in which social practices and patterns were being reinscribed in the looming shadow of technical development. The result, the editors admit, was a "revelation"³⁵.

Amidst the complexity and seeming contradiction that characterized the editorial process at the magazine from the outset, we're probably wise to pay special attention to the closing words of the passage above – "*making pictures behave with some degree of order and sense.*" The pictures can't be expected to make sense on their own, evidently, and it's the mission of the editors to make the pictorial record "behave." Despite the adage that "pictures never lie," the implication is that truth is not safely self-evident from the visual record. While the tone of the comment is light, almost joking, the words remain, and can be read as a surprisingly honest acknowledgment of the inherently constructive process involved in the production of a *LIFE*-sized photographic record.

The "later issue" in which Bourke-White's Columbia Basin construction

³⁵Of course, we might wonder where the editors learned their trade – students in journalism programs today, on the first day of Reporting 101, are taught that news is about *people*. If nothing else, the editorial decision to sidestep the people in favor of the technics for their cover photo illustrates the importance of technology in the public mind.

photographs were to be showcased finally arrived almost eleven months after the Charter Issue. Entitled “Roosevelt Builds the Biggest Dam And Envisions a New Society” (10/11/37, 34-39)³⁶, the photo-essay details the construction of the Grand Coulee Dam in central Washington. Roosevelt is called “one of the greatest builders of all time” and the dam, “his mightiest work,” is “the world’s biggest building job.” The essay is replete with specifications, capacities, dimensions, and six pages of majestic photography – as Bourke-White’s pictures stretch toward the horizon, they illustrate how aggressively technology is filling the landscape, leaving the reader little room to doubt the sheer magnificence of the undertaking.

The editors employ a startlingly utopian vocabulary in describing President Roosevelt’s project, centering on his “vision of the new society which he expects [the dam] to help create,” (35) and wondering aloud whether “Roosevelt the Builder laid in Grand Coulee one of the foundation stones of a new society, or left behind him a monument as colossally wasteful as Cheops’ pyramids” (39).

Immediate purposes of the Grand Coulee project are two. One is to generate nearly 2,000,000 kilowatts of power per year which, added to the production of Bonneville Dam further down the Columbia, will electrify the homes and farms of the Pacific Northwest, spur the industrial development of its vast natural resources. Other is to turn Grand Coulee into a 23-mile reservoir from which waters will sluice down on the 1,200,000 rich but arid acres of the Columbia River Basin to the south, creating new homes for 30,000 drought-stricken farm families.

Beyond these aims lies President Roosevelt’s long-cherished vision of a whole new U.S. society based on Power. For when drudgery-relieving Power is almost as cheap and abundant as sunlight, he believes, free citizens will have leisure and dignity enough to make

³⁶*LIFE* references will be denoted by parenthetical issue date and page number, as here.

democracy really work (35).

The Grand Coulee Dam was built to electrify the Northwest and spur industrial development, presumably resulting in higher employment and an improved standard of living; allow the irrigation of currently unproductive land, boosting agricultural output and providing work for thousands of Depression-sacked families; and most importantly, afford through “Power” the “leisure and dignity” necessary to engender a genuinely successful democracy³⁷. In short, the general condition of the nation would be improved as direct result of technology – here manifested in the dam project, which is depicted not as a panacea for the country’s ills, but rather as a representative piece of F.D.R.’s larger technological agenda³⁸.

There’s no mistaking the importance of the Grand Coulee project in the debate over technology or *LIFE*’s framing of that debate; note how in the passage above the mundane, lower-case “power” of line two has been mystically transformed by the second line of the following paragraph into the personified (deified?), upper-case “Power.” Even if this shift is read as sarcasm on the part of a conservative editorial staff that didn’t especially like Roosevelt or his progressive politics, it nonetheless acknowledges the reverence with which society viewed the electrical sublime.

³⁷Al Gore and Mitch Kapor, cited in the first chapter, suggest that the Internet is necessary to make true democracy possible, but this isn’t the first time technology has been linked to democracy. Here representative government is depicted as a function of leisure and prosperity, and the First Amendment’s protections of the press represent more than simply the right to speak – speaking isn’t normally a technological process, but publishing is.

³⁸If *LIFE* was willing to cast the project’s potential in grandiose terms, it also raised the specter of an equally grand failure. The invocation of Cheops suggests that if F.D.R. didn’t succeed in engineering his new society he would be branded one of the greatest wasters in recorded history.

Whereas “power” denotes the simple application of electricity, “Power” confers agency, imbuing applied electricity with will and purpose and charging it with the task of ending the Depression, providing for the economic welfare, advancing agricultural productivity, and enabling at last the full, utopian realization of democracy. This was the highwater mark of the electrical sublime in the 20th Century, the place where the rhetorical rubber met the road. Now we would see, *LIFE* suggests, whether electricity could deliver on its promises.

The centrality of technology to *LIFE*’s editorial mission was firmly, if implicitly, established in the first year of the magazine’s existence; the fact was made explicit by the editorial decision within a few months of the launch to offer a weekly Science and Technology section. *LIFE*’s treatment would not be unitary, predictable, or unproblematic, but it recognized the importance of technology to the country’s future. Founder Henry Luce recognized the critical place his new magazine occupied in the emerging technological order, noting that *LIFE* itself was “based on technology, paper technology, photographic technology” (van Zuilen 264). Once again, *LIFE* proved unusually sophisticated for a popular publication, as Luce here hinted at the point Christians’ would make over three decades later – to wit, that communications technologies “represent the meaning-edge of the technological process,” embedded as they are in the very processes they are here interpreting (Christians “Communications and Technology” 249).

***LIFE* and the Medical Morality Play**

LIFE's coverage of medical technology began early and covered, through the decades, the research, development, and application of treatments for a variety of diseases and disorders. Vivid, often grotesque photography illustrated everything from cancer treatment to brain and open heart surgery, but the magazine's 1937 photo-essay on cancer demonstrated the optimism with which *LIFE* viewed medical technology.

Entitled "U.S. Science Wars Against an Unknown Enemy: Cancer" (3/1/37, 11-17), the essay establishes in the first page the lush photographic techniques that would become the magazine's trademark method of illustrating complex technical issues in succeeding years. A 7"x9" photo of "Crocker Laboratory's 1,250,000-Volt X-Ray Machine" dominates the center of the page; like much of the emerging technology of its time, nothing in its design visually signals the method or purpose of its use. A huge, barrel-shaped machine with several cannon-like appendages extending in all directions, the "Biggest Gun in the War Against Cancer" could have been selected by the editors for the technomystical impact of its appearance alone.

The title of the essay reflects the status accorded science – "U.S. Science," personified like "Power" in the Grand Coulee photo-essay, is the subject, the agent of action. Science marches off to war against the enemy, cancer. Reinforcing the soldierly agency of inanimate science is *LIFE*'s mention, in the second sentence of the text, of the American Society for the Control of Cancer's U.S. Cancer Week motto: "Fight Cancer With Knowledge" (11). The photo-essay describes the work of human scientists, of course – *LIFE* wasn't consciously bent on dehumanizing the

process, and through the years would do much to deify the scientist-hero – but the editorial decision to lead with the archetype, couched in a metaphor of war, lends a certain epic character to the struggle, the language implying a timeless quality that transcends the mortality of human agency. The outcome of the battle is foreshadowed in the duality of the enemy, cancer, which is described both in terms focusing on its effectiveness as a killer and in terms emphasizing its curability, if found and treated in the early stages of development. Viewed from this perspective, *LIFE*'s portrayal of medical progress takes on the aspect of morality play. The triumph of Good/Science is prefigured, but the audience, socialized to the cultural beliefs and practices of the technocratic community, understands what awaits those who stray from the path of scientific righteousness.

In the following pages *LIFE* runs the gamut, valorizing the “Captains in the Cancer War”; showing microscopic photography of both healthy and cancerous cells; depicting scientists at work; describing the role of mice in laboratory research; illustrating the effectiveness of x-rays in finding cancer; and reinforcing the earlier assertion that cancer is curable if detected early. This last element is the key to the essay. Cancer, like science, has been personified – it is “the enemy.” Explicitly clear in the morality play is a convention of the culture: the Evil/Cancer enemy cannot stand against the ingenuity and integrity of the Good/Science hero. This is the moral end of the tale. But the intervening pages of illustration, explanation, and detail tell a story, and are essential means to the end, for it is in these characterizations that the utopian essence of science is to be found. Cancer research is highly technical, and

microscopic photographs of diseased cells alone would denote nothing to the lay reader. But contextualized within the frame of epic struggle – Science warring against the unknown enemy – the arcane clinicality of the photographs and accompanying text reassure the reader, who is socialized into a culture that has for centuries deified the applied arts.

Perhaps most important is the moral of the story, implicitly prescribed for the reader, who most certainly didn't want to be afflicted by a disease like cancer. If early detection promised curability, then the reader was well advised to get routine cancer checkups. Science, ever vigilant, could and would save the faithful from the unknown enemy within.

WWII and the Dawn of the Atomic Age

The war years and the coming of the atomic age highlighted the internal conflict surrounding technological development, for it was during this period that America finally saw the monster by the full light of day. Images of the German and Japanese war machines, and later of atomic bombs cracking the skies over Hiroshima, Nagasaki, and Bikini Atoll, established once and for all the existence of the monster – the task now was how to domesticate it.

LIFE's images of the pre-war and war years are among the most complex in our culture's visual record. Technology the demon, the physical manifestation of the Frankenstein Complex, appears side by side with technology the savior, and often the only way the reader could tell the difference was through subtle (and not-so-subtle)

cues introduced by the editorial staff. After all, a tank is a tank is a tank, a heavy armored track-wheeled vehicle whose purpose is the annihilation of the enemy force. But a tank could be either utopian or dystopian in the thematic narrative, depending entirely on whose tank it was. For this reason, *LIFE*'s depictions of the technology of war provided the reader with a plethora of contextual cues, a tactic which both illustrated and obfuscated the deeper cultural and organizational questions about the role of the machine in society. The point Jonas, Christians, and Pacey make about the invisibility of values in the formulation of our machine-centric development policies is illustrated here because of the very need to cue the viewer – the normative theory Christians calls for would respond to these images by wondering about the machine's role in a culture clearly devoted to war. However, the need for a critical reevaluation of development is obfuscated because the necessity to have good and evil visually or textually cued feeds the ideology of value-neutrality almost by design: If the machines are all more or less the same, then the only distinguishing factor remaining – the only locus of morality, as it were – is the agency of the humans who design, build, deploy, and operate them.

With this duly noted, the bulk of the magazine's coverage of World War II is better considered within the framework of the dystopian impulse, and will therefore be taken up in the following chapter.

***LIFE* and the Space Race**

LIFE's portrayal of the space race represented, in most respects, a logical extension

of its war coverage. Many of the space program's early goals were military in nature, and as in World War II, technology was once again both demon and messiah, depending on whether it was theirs or ours.

. . .Sputnik proved that there were great military, as well as scientific, advances in the U.S.S.R. Getting their heavy satellite up meant that Russia had developed a more powerful rocket than any the U.S. had yet fired and substantial Soviet claims of success with an intercontinental missile. Putting Sputnik into a precise orbit meant Russia had solved important problems of guidance necessary to aim its missiles at U.S. targets. The satellite could also be the forerunner of a system of observation posts which would watch the U.S. unhindered and with deadly accuracy (10/21/57, 24).

Space promised many nonmilitary boons, insisted the experts (10/21/57).

Satellites could answer questions about conditions in space that affected flight; about weather patterns, that could tremendously benefit agriculture; and about other planets, the sun, and the stars. Scientists also envisioned space-based communications, and to their credit, the space program's research mission has provided beneficial and applicable information on all these concerns.

Still, most of the compelling reasons to get into space were related to national defense, and as such space perhaps became a measuring stick for assessing where we stood in the Cold War. The race to get the first man into orbit was especially symbolic. When Yuri Gagarin accomplished this feat in April of 1961, it was a landmark event not only in human history, but also in the public relations war between the Soviet Union and the United States. Much was at stake geopolitically, as developing nations around the globe debated with which axis to align themselves. A Soviet victory in the race into space was viewed by many as a sign of Soviet

superiority in Science and Technology, a crucial factor for developing nations whose future well-being and viability often rested on the ability of technologies to improve the quality of their conditions.

Ultimately, then, the benefits accrued via the space program were many and varied, but were perhaps less defined than the sort of scientific goals attached to, say, cancer research. Some space program goals – astronomy’s interest in distant stars, for example – fell within the realm of pure research, and as knowledge for its own sake, its utilitarian benefits for society were difficult to describe in immediate terms. We also get the sense that many specific research goals, however well defined, eventually faded into the background of public consciousness: For many Americans, the goal became simply to win the race into orbit because it signaled our superiority, scientifically and culturally, over our enemy, the evil Soviet Union.

LIFE’s letters to the editor tended to support this idea. While not necessarily representative of the views of all Americans, the letter from one M.G. Butterworth concerning Gagarin’s historic flight summed up the sentiments of many: “In my opinion a Russian slave in orbit isn’t as wonderful as a free American walking in the street” (5/12/61, 8).

Nonetheless, *LIFE* assiduously chronicled both American and Soviet achievements and failures (although Russia’s refusal to acknowledge failures made reporting on them virtually impossible). *LIFE* photographed the heroes and their families; published detailed drawings and diagrams illustrating various elements of space missions and programs; eulogized the fallen, like Astronauts Grissom, White,

and Chaffee, who were incinerated in an accident aboard the Apollo 204 spacecraft on January 27, 1967; and aggressively criticized the government when it fell behind the Russians – which, in *LIFE*'s estimation, seemed to be most of the time. It celebrated the Apollo 11 mission with a special issue devoted to the moon's gravitational effect on both the human environment and imagination. Even when beset by contradictory, vague, and/or confusing technological developments, *LIFE* remained diligent in its coverage of these events.

“One last fiery hurrah”: *LIFE*'s Final Issue

How appropriate that a publication whose launch was dominated by photography of the technological wonder of the day should end its run with an equally impressive tribute to mankind's latest technological accomplishment. As noted earlier, *LIFE*'s final issue was released a scant three weeks after Apollo 17, NASA's last trip to the moon, and in the magazine's concluding essays it found a fitting kinship with that mission. Both *LIFE* and the Apollo program remained physically strong to the last – many regard Apollo 17 as the most successful of all the moon landings (12/29/72), and while *LIFE* was awash in red ink, its failures arguably related more to mismanagement than to substantive textual issues (in 1969 the magazine had reached an all-time circulation high of 8.5 million) (van Zuilen). Both were, in the end, overcome by financial difficulties and a lack of institutional will to carry on.

The Apollo program and *LIFE* each accomplished their final missions with distinction. The moon shot returned with a rich geological payload, and *LIFE* did a

remarkable job summing up THE YEAR IN PICTURES, deftly reviewing the Apollo program; a presidential election campaign that was addling enough to elicit Hunter Thompson's brilliant *Fear and Loathing: On the Campaign Trail*; and yet another year of pointless mayhem in Vietnam. Perhaps most daunting of all, the editors had to manage some concise concluding statement of *LIFE*'s own long and storied history.

The photo-essay on the end of the Apollo program asks a number of good questions, and as was so often the case with *LIFE*, comes tantalizingly close to broaching a deeper critical discussion of technology's place in American society. Four pictures of the mission's spectacular night launch dominate an across-the-fold spread, with the caption "One last fiery hurrah for Apollo" introducing these reflective comments:

In 1961, when President Kennedy launched a national effort to send a man to the moon, the goal seemed incredibly far away. But 11 years and \$26 billion later, the last chapter of man's spectacular first venture into space began in a blaze of glory as Apollo 17 left the earth and rose through the Florida night like a roaring beacon, lighting up the sky for hundreds of miles around. Over the years of Apollo, a dozen men landed on the lunar surface and returned safely to earth, and with such efficiency that moon travel had come to seem almost routine. Each mission added to scientific knowledge, and Apollo 17 turned out to be the most fruitful of all, with a professional geologist aboard for the first time and a homebound payload that will keep the experts busy for years. With the ending of the Apollo program, the moon will be left undisturbed for the next decades – at least by Americans. Apollo 17's splashdown prompted again an old question: Had the whole stupendous undertaking been merely an expensive digression from more pressing terrestrial concerns? Or was it justified by technologies learned, by knowledge gained and – as important – by man's inspiring urge, in Tennyson's words, "to strive, to seek, to find, and not to yield"? (7).

The editors fittingly invoke Kennedy, the man to whom the American space program owed its life. They note the cost and difficulty of the task, and the eloquence of the language employed pays fitting tribute to the grandeur of the accomplishment – whether we were being duly critical of technology or not, the simple fact remains that the Apollo program presented humanity with one of the most remarkable achievements in the history of the species. American expertise is praised, for what we once thought impossible came to be executed with such ease and efficiency that going to the moon and back became commonplace, routine (Apollo 13 notwithstanding, we assume). And of course, the quest for scientific knowledge is invoked, in true Baconian fashion, and then is questioned, in typical *LIFE* fashion. Not only have we gained knowledge, but the Apollo program has been so successful that scientists on Earth will be tied up for years trying to study it all.

Most fascinating, though, is this editorial question: “Had the whole stupendous undertaking been merely an expensive digression from more pressing terrestrial concerns?” Longtime *LIFE* readers had heard words like these before: they conjured images of a vastly expensive technological program initiated by a popular, progressive president, and the expenditures were questioned in light of other significant national priorities. Ironically, the final words of the passage appealed to antiquity, employing Tennyson in the construction of a standard by which the program might be judged. The editors’ technique is not unlike that used 36 years earlier by their predecessors, who shared similar concerns about F.D.R.’s Grand Coulee Dam. The latest crop of editors quote Tennyson, while the original staff

invoked the specter of Cheops, but in each case the point is the same: historians will revisit these moments, and the great decisions of great leaders will be judged, perhaps in ways we cannot fathom at present. To be sure, the Apollo program comes off better – *LIFE* liked the space program, even when its value was obscured by other national concerns. Tennyson's words are inspirational, while Cheops' ghost was intended as a cautionary.

From its first cover to its last, *LIFE* spent 36 years promoting the progress of science and technology as surely as any of its contemporary publications. That it did so as honestly and intelligently as perhaps any popular vehicle of its kind this century is to its eternal credit.

CHAPTER 3: THE FRANKENSTEIN COMPLEX

Some of us laughed, some of us cried, some of us fell silent. I was reminded of the Hindu scripture, "I am become Death, destroyer of worlds." That insight into the terrible power that was unleashed came too late...

– Robert Oppenheimer

Virek must have seen it too; he screamed, and Baron Samedi, Lord of Graveyards, the loa whose kingdom was death, leaned in across Barcelona like a cold dark rain.

– William Gibson

While the Technological Sublime comprises a several centuries-old tradition, the Frankenstein Complex is a comparatively recent development. The seeds of its expression have existed for centuries, but in latent form. Since it is by nature a reactive impulse, a proper set of circumstances was necessary to trigger its full manifestation.

While Blake's *Songs of Innocence* and *Songs of Experience* trace to the Complex's earliest days at the onset of the Romantic Period, the full terror of the techno-dystopian impulse probably didn't strike the popular mind until 1818, when Mary Shelley published her remarkable novel, *Frankenstein, or the Modern*

Prometheus. Her attempt to ground a horror story in scientific plausibility was unprecedented, and her monster, the spawn of scientific triumph, now stands as one of Western culture's most enduring symbols, an eternal caution against the arrogance of intellect.

In addition to being the older of the two opposed ideological strains, the Technological Sublime is by far the dominant, finding (as we have seen) a hospitable cultural environment in which to flourish. We see it boldly expressed in popular magazines, in the pronouncements of social, business, and political leaders, and in the laws and policies of Western nations. If we might momentarily exaggerate for effect, technophilia is the golden child of the popular mind, the principle in which the culture's best hopes and dreams are invested.

But where the technotopian walks the streets in the full light of day, the subordinate dystopian impulse is relegated to life in the shadows. Citizens who espouse anti-technological views rarely become respected social, business, and political leaders, and if a legislative body grants the technophilic perspective a hearing in the consideration of some important policy, it is usually a token hearing only, resulting from a sense of obligation to objectivity (or at least the appearance thereof). It is the weak sibling to the golden child, a creature characterized by fear and hesitancy. In a culture where the only thing we have to fear is fear itself, few things are more despised than timidity.

As a result, our review of the Frankenstein Complex in Western culture will cover substantially different terrain than did our examination of the Technological Sublime,

as the techno-demonic ideology is compelled to seek more subtle, covert means of expression. In whatever form the monster is encountered, its manifestation must always be “safe.” Like the popularized view of the Fool in the medieval court, whose manic half-wittedness allowed him to say more or less anything to anyone, including the King, the technophobic construction must somehow provide the means of its own dismissal, lest it pose a genuine threat to the dominant ideology and thereby risk extinction. Even the most ardent anti-technologists, if they’re honest with themselves, must acknowledge how little overt threat they now pose to the technophilic order:

Those of us who oppose may be easily accommodated by this society, since society has no fear that we're going to have the effect that we desire to have (Sale, in Kelly “Interview”).

If we look around Western culture at present for the technophobic, we find it in a variety of more or less harmless spaces. It has a powerful foothold in academic/critical spheres, which are safe largely because they are institutionally and ideologically insulated from the pressures of mainstream popular culture³⁹. We find it in genre literary forms, particularly in some strains of science fiction, which are socially constructed as fantastic and escapist (except in the case of “hard SF,” a heartily technotopian strain which emphasizes scientific accuracy). And where we

³⁹As we saw in the previous chapter, this isn’t universally the case, as political pressures from time to time exert influence on the awarding of research grants. Also, we must note that in the case of public universities, tenure and promotion decisions are usually subject to the review of popularly elected officials. However, the Humanities and social research departments are comparatively less affected by these pressures than the hard sciences. The advantage of this isolation is greater academic freedom, of course, but the trade-off is that distance from political pressure tends to correlate strongly with distance from political influence.

find the dystopian urge expressed in the mainstream, it's almost always obscured, symbolic and latent within overtly utopian or ostensibly neutral artifacts. Dramatic cultural reconsiderations *a la* Pacey or Jonas might not manifest in a Congressional debate over whether to build a new nuclear reactor, but the spirit of the monster is present in considerations of safety and environmental impact, for example; while these sorts of issues are certainly important in their own right, they are often code-speak for anti-development impulses.

Barring some unforeseen and unimaginable revision of Western culture, the Frankenstein Complex is fated to play catch-up forever. If we can express the Technological Sublime as saying, "let's do this," and the Frankenstein Complex as responding, "no, let's not," we immediately understand the structure of the conflict. The impulse *not* to do a thing inherently follows the impulse to do it, since any conception of negation has as a requisite condition the existence of affirmation. Adam and Eve could never have framed the intent not to eat of the forbidden fruit without first apprehending the concept of eating the fruit. The dystopian impulse, therefore, is innately reactive, not proactive, and as a result is doomed to trail the technotopian, making its case in response on terms imagined by and dictated by the technophilic impulse.

The Frankenstein Complex's strength and character are perversely dependent on the success of the Technological Sublime. We can't help noting that while the drive to development has been active for millennia, the monster was a long time being born. Two facts explain why the Frankenstein reaction trailed so far behind. First,

the social impact of the mechanical arts was generally positive up until the Industrial Revolution. We recall that in Postman's conception of the tool-using culture, social and theological traditions guided the development and integration of technologies, providing a context for their use. Second, while there were doubtless bad things which happened in the pursuit of technology prior to the Industrial Revolution, the magnitude and complexity of the tasks undertaken were insufficient to breed a strong reaction. For example, an accident might occur during the construction of a church, killing a worker, but the accident was localized and affected comparatively few lives; it's difficult to imagine such events inspiring a Frankensteinian tale of a pulley pursuing its maker across Europe seeking vengeance. The Industrial Revolution, however, provided humanity with the chance to execute its technophilia on an unprecedented scale, and the corresponding potential for harm was likewise unprecedented.

Technology, Commerce, and Cultural Leveling

Today, even society's most uncritical technophiles must acknowledge that, whatever we may have accomplished to date, we have not yet arrived in New Jerusalem, the Shining City on the Hill. Our world remains more dystopian than utopian, and many of our most memorable failures are directly due to the very scientific forces which were supposed to be our deliverance. Science, instead of being the "wind of truth to clear the air," has instead "polluted the air, helped to brainwash, and provided the weapons of war" (Goodman *The New Reformation* 21).

For some, Western science as a whole is profoundly suspect, embodying a form of rationality and an orientation to nature which is intrinsically destructive and oppressive with respect to both its natural and human victims. On this view, prevailing patterns of social and cultural oppression are rooted in a projected domination of nature which is implicit in the very rationality of science (Outhwaite & Bottomore *The Blackwell Dictionary* 571).

Others, such as Horkheimer and Adorno, lay the blame not on science itself, but rather on the Enlightenment in general, a project which they contend has wholly subjugated the program of science to the corporate demands of capital. Technology is inherently pragmatic, notes Winner (*Autonomous Technology*), and while “the growth of economic productivity furnishes the conditions for a world of greater justice,” it also “allows the technical apparatus and the social groups which administer it a disproportionate superiority to the rest of the population” (Horkheimer & Adorno *Dialectic of Enlightenment* xiv). “The gospel of the profit margin,” concludes Ross, “remains a more powerful doctrine than the gospel of efficiency. Capitalist reason, not technical reason, is still the order of the day” (*Strange Weather* 10)⁴⁰.

Strictly considered, then, the Critical scholars of the Frankfurt School and their intellectual progeny seem unconcerned with the idea that technology is primarily problematic⁴¹. What is dehumanizing, even evil, is the service to which capitalistic

⁴⁰Although, as noted elsewhere, the utopian view of the Internet merges technical efficiency and the profit margin. Capitalist reason and technical reason become one.

⁴¹Ellul’s critique of development, noted in Chapter 2, revises neo-Marxian theory, arguing that the technological system has now subordinated all other considerations, including capital, and established itself as the only meaningfully autonomous force in society. There are several ways of reading this dispute, but for present purposes we will simply note
(continued...)

enterprise puts science.

What men want to learn from nature is how to use it in order wholly to dominate it and other men. That is the only aim. Ruthlessly, in spite of itself, the Enlightenment has extinguished any trace of its own self-consciousness (Horkheimer & Adorno 4).

Technology becomes a metaphor for a deeper, more malignant circumstance – the inexorable dehumanization of the individual at the hands of capitalist cultural mechanisms (Jameson “Postmodernism”; Abbott “The Monster Reconsidered”).

Just as the previous chapter specifically accords communications technologies a pivotal place in the construction of the technotopian, as technology is called on to interpret technology, the commodifying machinery of communications is likewise associated with some of society’s dystopian developments. Innis, in demonstrating the “cultural disturbances” typically associated with “sudden extensions of communication” (*Bias* 31), notes that while the “application of power to the communication industries after 1800 hastened the spread of compulsory education and the rise of the newspaper,” it also “divided reason and emotion and emphasized the latter.”

Printing marked the first stage in the spread of the Industrial Revolution.... It became increasingly concerned with the problem of distribution of goods, and with advertising. Its limitations became evident in the decline of the book to the level of prestige advertising, in the substitution of architecture in the skyscraper, the cathedral of commerce, and in simplified spelling and semantics (Innis *Bias* 30).

⁴¹(...continued)

that neither view, while describing the technotopian urge, buys into it. Both economic or technical forces clearly interact, informing and being informed by ideological factors in a complex system of co-determination. As intriguing as the debate is, this project is unlikely to settle it.

Computer-mediated communications technologies project these commercial dynamics forward into the “postindustrial” age. According to Kirkpatrick Sale:

It is true that within the larger construct of contemporary computer technology there is room for decentralization, some irregularity... but that's not what the overarching character of this technology is about. It is designed precisely to create a uniformity of production, consumption, distribution – distribution of money or ideas or so-called information. If within it you can find these nuggets of the contrary, that doesn't change the overall nature of the industrial mechanism or the industrial civilization behind it (Kelly “Interview”).

As we see in the first chapter, many people insist that there's more to computer-mediated communications than commerce. It is instead seen fostering greater democracy, and some go so far as to intimate that the Internet may finally enable true Jeffersonianism in a way that has never before been possible. Sale expressly rejects this claim, arguing that, “You can't democratize – you can't control – a technology that was established for other reasons.” Created, as noted above, for control and consumption, “This technology does not come with democracy in it” (Robin “Technology for the Coming Millennium”).

Communications technologies have, in Innis' view, also fueled a leveling effect which has eroded our ability to comprehend our culture and all but destroyed the influence of the scholar. Ironically,

[e]normous improvements in communication have made understanding more difficult. Even science, mathematics, and music as the last refuge of the Western mind have come under the spell of the mechanized vernacular. Commercialism has required the creation of new monopolies in language and new difficulties in understanding. Even the class struggle, the struggle between language groups, has been made a monopoly of language. When the Communist Manifesto proclaimed, “Workers of the world unite, you have nothing to lose but your chains!” in those words it forged new chains (Innis *Bias* 31).

We should remember that Innis' critique of media in *The Bias of Communication* came in 1951, well before television began its wholesale revision of Western consciousness. It therefore hardly bears noting the extent to which his analysis challenges the technophilic assumption that ubiquitous Internet access will produce an educational revolution the like of which society has never seen.

Innis's remarks on the negative impacts of print technologies may seem odd, for they directly challenge the innate value of literacy. Westerners, of course, have come to take literacy as a prerequisite for knowledge, thought, and cultural achievement. We especially associate this view with the intellectual classes, so when we hear a learned scholar of Innis' stature appearing to question the value of mass literacy (in a *book*, no less) we're perhaps taken a bit off guard. But he's not alone in critiquing society's basic assumptions surrounding literacy. Sale, in an interview with *Wired*, argues that literacy came at the price of oral traditions which had bound cultures together for millennia and which instilled critical lessons which have now been lost, or at least misplaced.

[T]hese oral traditions were what kept these societies together for eons. If we lose oral tradition and all that goes with it, we lose a due regard for nature and the preservation of nature. The successive empires that have driven civilizations for the last 6,000 years have had, almost uniformly, no regard for nature. That's why they were as short-lived as they were: in addition to having very little regard for the majority of their own population, they had no regard for the rest of the living world. That is essential to the peril we're in today (Kelly "Interview").

Further, he appears to concur with Innis about the leveling effect of communications technologies.

...let's not simply say how wonderful is literacy, without saying what the price is for this literacy, without asking what is it that we are now reading with all of this fancy literacy. The truth is that we are reading little of merit (Kelly "Interview").

Luddites, Old and New

Few popular challenges to technological development have matched the English Luddite uprising in either intensity or insightfulness. The Luddites, who took their name from the mythical hero General Ned Ludd, revolted against technological advances in the textile industry from 1811 to 1816. While the term "Luddite" popularly connotes someone who is anti-technology⁴², the actual rebellion was more critically aimed at technology *which threatened the sanctity of culture* (Rybczynski *Taming the Tiger*; Pynchon "Is it O.K. to Be a Luddite?"). Their reaction was not against progress – they gladly used the newest weaving technology available, and were "interested in innovation and technical improvements to make their work easier" – but were instead opposed to the dehumanizing dislocations of the industrial economy.

At the turn of the 19th Century, factory looms were the latest innovation, and a factory job meant arriving at dawn for a 15 to 18 hour working day, and the door was locked behind you in the morning

⁴²A 1997 declaration by the "Humanist Laureates of the International Academy of Humanism" – a group of Nobel Laureates, Emeritus scholars, political leaders, activists, and authors which counts among its number such luminaries as Francis Crick, Richard Dawkins, Edward O. Wilson, and Kurt Vonnegut – vulgarly characterizes "the Luddite option" as historically seeking "to turn back the clock and limit or prohibit the application of already existing technologies." The statement comes no closer to acknowledging the critical social contexts surrounding the movement than lamenting the possibility that "ancient theological scruples should lead to a Luddite rejection of cloning" (International Academy of Humanism). Vonnegut, at least, should know better.

and not opened until the end of the shift. To the Luddites, the factory looms spelled the end of a way of life, of craftsmanship, of community and of family (Murphy “Are We the Neo-Luddites?”).

From the perspective of modern-day Luddites, the “original rebels against the future” reacted against technological encroachments on the natural order of human society.

The Luddites had no objection to many technologies such as the carding engine and the spinning jack that supplemented human labour, but were not a threat to their livelihoods. By contrast, the inhuman machines that characterised the Industrial Revolution were new and different in that they were independent of nature, of geography, and season and weather, of sun, of wind, or water, or human or animal power. They not only destroyed jobs, but marked the beginning of an environmental catastrophe (Ludd “New Luddite”).

Parliament, already fearing the spread of unrest from France to Britain, was persuaded that the Luddite uprising “signaled a population prone to revolution,” and dispatched the military to smash the rebellion in 1812. The size of the detachment – 14,000 soldiers – was “seven times as large as any ever sent to maintain peace in England” (Sale “Lessons”). The movement’s leaders were either executed or deported (Rybczynski; Ludd). Factories, it was assumed, along with the wider transformation to industrial society, “kept people in their place – passive, orderly and productive (Ludd). Perhaps even more important than the physical victory, though, was the linguistic and ideological victory.

The triumph of industrialism was such that Luddism could be reduced to a term of abuse by the new technocratic elite and politicians. Colonial powers imposed destructive innovations on much of the rest of the world’s population, and once their armies had left they re-named their exploitation development (Ludd).

Fueled by the growth of the Internet, Luddism has experienced a dramatic

resurgence in the 1990s⁴³. The movement's unofficial leader is author Kirkpatrick Sale, who has written widely on the original Luddites. He says "modern-day Luddites are not, or at least not yet, taking up the sledgehammer and the torch and gun to resist the new machinery," but instead focus their efforts on "the book and the lecture and organizing people to raise these issues." Most contemporary Luddites "confine their resistance, so far at any rate, to a kind of intellectual and political resistance" (Kelly "Interview"). They are more numerous than we might imagine, he says, and represent a broad sampling of the population.

These neo-Luddites are more numerous today than one might assume, technopessimists without the power and access of the techno-optimists but still with a not-insignificant voice, shelves of books and documents and reports, and increasing numbers of followers – maybe a quarter of the adult population, according to a Newsweek survey. They are to be found on the radical and direct-action side of environmentalism, particularly in the American West; they are on the dissenting edges of academic economics and ecology departments, generally of the no-growth school; they are everywhere in Indian Country throughout the Americas, representing a traditional biocentrism against the anthropocentric norm; they are activists fighting against nuclear power, irradiated food, clearcutting, animal experiments, toxic waste, and the killing of whales, among the many aspects of the high-tech onslaught (Sale "Lessons").

In addition, Sale says these technoresisters speak for many others, including

several million people in all the industrial nations whose jobs have simply been automated out from under them or have been sent overseas as part of the multinationals' global network, itself built on high-tech communications. They would include the many millions who have suffered from some exposure, officially sanctioned, to pollutants and poisons, medicines and chemicals, and live with the terrible results.... And they may include, too, quite a number of those whose experience with high technology in the home or office has left

⁴³Ironically enough, the movement boasts a substantial presence on the Web.

them confused or demeaned, or frustrated by machines too complex to understand, much less to repair, or assaulted and angered by systems that deftly invade their privacy, or deny them credit, or turn them into ciphers (Sale “Lessons”).

While readily acknowledging the damning economic consequences of new technologies, as evidenced here, the new Luddites ultimately dismiss attempts to center or limit the discussion of technology’s destructive impact to questions of jobs and income. Sale, in a marginally civil face-off with *Wired*’s Kevin Kelly, insists on the primacy of non-economic factors in considering the impact of technics.

There is no question that jobs are created, so long as an economy can keep growing. But it's not the technology, or it's only indirectly and accidentally the technology, that creates them. It's warfare, empire, government expansion, resources exploitation, ecological exhaustion, consumption, and the manufacture of needs. Today, in the second Industrial Revolution, it's just as it was back in the first. The technology itself simply does put people out of jobs. And anyway, the idea that the whole end of life is jobs and job creation is just pathological. The question is, What do those jobs achieve and at what expense? A job in itself is not a virtue (Kelly “Interview”).

The dynamics, in other words, are remarkably similar to those which gave rise to the Luddite movement of the early 19th Century.

Sale, like all technoresisters, finds himself perpetually on the defensive, but he nonetheless seeks to articulate a platform for the new Luddism. Drawing on the thoughts of like-minded writers, he identifies the following essential tenets of resistance: industrialism endangers “stable social and environmental existence,” and requires the opposed “values and techniques of an organic ethos” which preserves “the integrity, stability, and harmony of the biotic communities, and the human community within it”; anthropocentrism must be replaced by “biocentrism and the

spiritual identification of the human with all living species and systems”; globalism, “the guiding strategy of that civilization,” must be opposed by a localist principle “based upon the empowerment of the coherent bioregion and the small community”; and industrial capitalism, “built upon the exploitation and degradation of the earth,” must be replaced by “the practices of an ecological and sustainable economy built upon accommodation and commitment to the earth and following principles of conservation, stability, self-sufficiency, and cooperation” (Sale “Lessons”).

Thus expressed, Luddism – in both its original and modern incarnations – invites a broader contextualization within the Romantic tradition, which was in full swing at the time of the uprisings.

Romanticism and the Machine

Reveling in the transcendence of the pastoral and resisting the insinuation of technology into European life, the British Romantic critique of industrialism was well established by the time Mary Shelley published her groundbreaking novel. William Blake, who referred to the factories of London as “dark Satanic mills” even before the use of the internal combustion engine became commonplace (Blake 238) was well-known to the Romantics. His most familiar works, the *Songs of Innocence and Experience*, were among the earliest writings to offer a dystopian critique of the industrial beast which had been set loose on London. In tone, the *Songs of Innocence* were a candle which shed a clear, yet comparatively soft, light on the excesses of the Industrial Revolution. The *Songs of Experience*, though, were a flamethrower aimed

directly at those among the nation's power-elite who were responsible for the dehumanizing scourge industrialism had become. The opening verses of *Experience* find Earth personified and cloaked in "darkness dread and drear...her locks cover'd with grey despair." In bondage, she demands liberation (Blake 41). Revisiting the Holy Thursday ceremonies, the poet asks:

Is this a holy thing to see,
In a rich and fruitful land,
Babes reduced to misery,
Fed with cold and usurous hand? (42).

In "The Chimney Sweep," a companion to the poem of the same title in *Songs of Innocence*, the "little black thing among the snow" has been sold into labor by parents who have "gone up to the church to pray." His garments are the "clothes of death," and there is no ambiguity as Blake lays the blame on the culture's most powerful institutions:

"And because I am happy, & dance & sing,
They think they have done me no injury:
And are gone to praise God & his Priest & King
Who make up a heaven of our misery" (46).

On the face of things, the church and state are implicated in a horrific corruption – to tolerate exploitation and abuse is bad enough, but to sponsor its visitation on society's most innocent and helpless members is the height of corruption⁴⁴. These

⁴⁴The exploitation of innocents implies a corruption that runs deeper than simple greed – the church and state are conspiring to build a "heaven" on the backs of child labor. If we recall the discussion of the millenarian impulse from the previous chapter, technology was seen as the means by which humanity would attain the New Jerusalem and recover the grace lost in Eden. It's hard to imagine that Blake would be unacquainted with this intellectual tradition, even though it had been declared heretical (more on this later in the chapter). From this distance we can't be sure if Blake intended "The Chimney Sweeper" as a direct reference (continued...)

few examples barely serve as a decent introduction to Blake's writings on the subject of progress, and are only meant to illustrate that the foundation had already been laid by the time the Romantics came on the scene.

The exaltation of the pastoral was a defining theme for the Romantics, and the most important of the movement's early writers, Wordsworth, was tiring of the "barren leaves" of "Science and Art" and advising the reader to "Let Nature be your teacher" as early as 1798 (in Abrams *Norton Anthology* 1371). Science seems a very distant and abstract thing as the young poet revels in the majesty of undespoiled Nature, and throughout his career (and this is true of the Romantics generally) the indictment of industrialism manifested more in the celebration of the pastoral than in overt attacks on technology. In the ensuing decades, though, the machine would increasingly make a nuisance of itself. In 1833 he penned "Steamboats, Viaducts, and Railways," in which he seeks to accept the admitted ugliness of humanity's creations because "Nature doth embrace/ Her lawful offspring in Man's art" (in Abrams 1443). In retrospect this poem is probably best remembered as a badly failed attempt at rationalization – we can give Wordsworth the benefit of the doubt if we like, but even if his intellect was wholly committed to the effort, his heart certainly wasn't in it. He eventually seems to surrender the effort, though. As Marx notes, Wordsworth's 1844 rant ("On the Projected Kendal and Windermere Railway") portrays technology as a cultural pathology.

⁴⁴(...continued)

to (and renunciation of) this particular theological strain, especially given its lack of sanction by the Church, but it's worth noting the thematic accord.

By placing the machine in opposition to the tranquility and order located in the landscape, he makes it an emblem of the artificial, of the unfeeling utilitarian spirit, and of the fragmented, industrial style of life that allegedly follows from the premises of the empirical philosophy. To Wordsworth the new technology is a token of what he likes to call “the fever of the world” (Marx 18).

The “late Romantics” were likewise suspicious of technology, with the troika of the Shelleys – Mary and Percy – and George Gordon, Lord Byron, positioned at the center of what would become the defining moment in the young history of the technophilic impulse. Mary Shelley’s *Frankenstein* represents a seminal critique of industrialism, a point which will be elaborated on below, and Byron was a vocal supporter of the Luddites. His

maiden speech in the House of Lords in 1812 compassionately argued against a bill proposing, among other repressive measures, to make frame-breaking punishable by death. “Are you not near the Luddites?” he wrote from Venice to Thomas Moore. “By the Lord! if there's a row, but I'll be among ye! How go on the weavers – the breakers of frames – the Lutherans of politics – the reformers?” He includes an “amiable chanson,” which proves to be a Luddite hymn so inflammatory that it wasn't published until after the poet's death. The letter is dated December 1816: Byron had spent the summer previous in Switzerland, cooped up for a while in the Villa Diodati with the Shelleys, watching the rain come down, while they all told each other ghost stories. By that December, as it happened, Mary Shelley was working on Chapter Four of her novel *Frankenstein, or the Modern Prometheus* (Pynchon).

Percy Bysshe Shelley shared the concerns of his wife and his close friend, and in his famous “Ozymandias” he suggests that the arrogance of technology will outlast the artifacts themselves⁴⁵:

And on the pedestal these words appear:

⁴⁵Ozymandias was the Greek name for Ramses II, the 13th Century B.C. Egyptian pharaoh (Abrams 1741).

My name is Ozymandias, King of Kings,
Look on my Works, ye Mighty, and despair!
Nothing beside remains. Round the decay
Of that colossal Wreck, boundless and bare
The lone and level sands stretch far away (in Abrams 1741).

The ancient Egyptian culture's proficiency in construction was unrivaled in the ancient world. Here, though, nothing remains of what the pharaoh presumed would last forever – the only thing that survives are “Two vast and trunkless legs of stone” and, nearby, “a shattered visage.” The ruin of the ancient culture's technical accomplishment belies the pharaoh's boast. The implication, recalling *LIFE's* invocation of another Egyptian builder/monarch, Cheops, is hard to miss – will the works of Industrial Man outlive his hubris?

The Monster is Born

The most powerful techno-dystopian statement of the Romantic Period (and one of the most significant ever) is without question Mary Shelley's *Frankenstein*. While there's no indication she intended to write a Luddite novel, *per se*, Thomas Pynchon says, “if there were such a genre, [Frankenstein], warning of what can happen when technology, and those who practice it, get out of hand, would be the first and among the best” (“Is it O.K. to Be a Luddite?”). There's no doubt she was well aware of the revolt and the social issues which fueled it, and it's also likely she was at least sympathetic to the rebels, given that the movement's allies included her friend Byron.

There's also no indication that Shelley intended to found a new literary genre, but she is nonetheless credited with having written the first science fiction (SF) story

(Alkon). The significance of this particular moment in literary history cannot be overstated, because in *Frankenstein* Mary Shelley helped establish one of the most important ideological safe harbors in Western cultural history. At the date of the novel's publication England was a mere six years removed from the violent put-down of the Luddite uprising, and the wounds were far from healed⁴⁶. The Parliamentary railings of Lord Byron notwithstanding, the government was clearly in no mood to argue the future of technological development. Science fiction, though, represented a safe outlet for the expression of anti-technological sentiments – while the state wouldn't tolerate the breaking of looms, it wasn't likely to mobilize troops against a horror story, even if it did detect a subversive thematic bent. The timing of these events is impossible to ignore – SF was born in the midst of Luddite unrest, and fulfilled a desperate cultural need to express, even if covertly, a profound theme of resistance. The essential role of literature in the larger societal debate reflects its power to intuit and represent the cultural mood and to exercise a certain degree of influence over the drift of that mood.

What Shelley *was* intent on was inducing horror, albeit in a way distinct from the “mere ghost stories” of the Gothic tradition. One of *Frankenstein's* most notable achievements was its success in conjuring the “pleasing terror” of the sublime without resorting to the unreality of the supernatural (Alkon 1-2). She accomplishes the effect through a clever juxtaposition of the cold, single-minded (and secular) pursuit of knowledge with the established pastoral and transcendent motifs of

⁴⁶In fact, the upheaval wasn't quite over yet. Farm workers were responsible for a separate uprising in 1830, which led to the destruction of threshing machines (Rybczynski).

Romanticism.

Shelley first determines to build the tale on as firm a scientific foundation as can be managed.

Mary Shelley based her novel on what she believed to be the most up-to-date scientific theories. To the extent that her narrative is consistent with, and a logical extension of, existing scientific cognition, it is an example of science fiction in the most rigorous sense of the word (Ziolkowski 38).

She does not intend scientific theory to be taken for medical reality, but the genre of SF has assumed, since Shelley, that scientifically grounded thinking is the appropriate jumping off point for credible fictive speculation (Alkon 5). Shelley herself

recounts listening to a conversation about Erasmus Darwin's biological experiments, about galvanism, and about possible ways of creating life by reanimating a corpse or else manufacturing "component parts of a creature" that might somehow be endowed with vitality (Alkon 4).

Shelley's protagonist, Victor Frankenstein, reflected her desire to depict not only scientific plausibility, but also scientific rigor. Victor was ideally suited to science – we almost hear the echo of Bacon's noble visitor from Salomon's House. Compare Victor describing his attraction to science with the scientist from *New Atlantis*.

Victor says:

It was the secrets of heaven and earth that I desired to learn; and whether it was the outward substance of things, or the inner spirit of nature and the mysterious soul of man that occupied me, still my inquiries were directed to the metaphysical, or, in the highest sense, the physical secrets of the world (Shelley *Frankenstein* 36).

The scientists he encounters upon arriving at the university "have indeed performed miracles. They penetrate into the recesses of nature, and show how she works in her hiding places. They ascend into the heavens.... They have acquired new and almost

unlimited powers; they can command the thunders of heaven, mimic the earthquake, and even mock the invisible world with its own shadows” (46).

And from Bacon:

The end of our foundation is the knowledge of causes and secret motions of things; and the enlarging of the bounds of human empire, to the effecting of all things possible (*New Atlantis* 129).

If Shelley doesn’t intend the connection, the similarity is nonetheless striking.

In contrast, the monster expresses the Romantic ideal (when left to his best instincts, that is). His appearance may be disgusting to the humans he meets, but his body is powerful and his mind keen. He’s an intellectual, having been nurtured by the writings of Milton, Göethe, and Plutarch, and his every intention regarding society is noble and beneficent. Aside from his physical appearance he is in every way the model Romantic man. His soul is enchanted by the pastoral, and at times we’d be hard-put to distinguish his words from those of Wordsworth or Percy Shelley.

The pleasant showers and genial warmth of spring greatly altered the aspect of the earth. Men, who before this change seemed to have been hid in caves, dispersed themselves and were employed in various arts of cultivation. The birds sang in more cheerful notes, and the leaves began to bud forth on the trees. Happy, happy earth! fit habitation for gods, which, so short a time before, was bleak, damp, and unwholesome. My spirits were elevated by the enchanting appearance of nature; the past was blotted from my memory, the present was tranquil, and the future gilded by bright rays of hope and anticipations of joy (112).

The importance of technical plausibility to the effect ultimately serves a cultural, not scientific, purpose. Alkon argues that “futuristic fiction” is distinct from other forms, in that it alone “can appeal to our hunger for the marvelous while also

remaining within the bounds of verisimilitude in a scientific age, thereby providing an artistically satisfying vehicle for rational speculation.” Shelley’s attention to theory in *Frankenstein* illustrates the point: the novel isn’t intended as a treatise on the science of resurrection, reanimation, and the creation of life. Instead, it affords a novel perspective on the consideration of the human condition in an increasingly technicized society (Alkon 3-5). Aside from its entertainment value, then, SF should be understood as serving at least one very important ideological function in Western society: it provides a space where speculation about technological development can be carried out free of the threat of retribution by the technocratic majority.

It’s perhaps too easy to see the message of *Frankenstein* as being anti-technological, in much the same way it has become too easy to dismiss Luddites as simply hating progress. Just as the Luddites weren’t anti-technology *per se*, neither was Shelley – her novel comprises a complex, yet clearly articulated set of cultural concerns relating to scientific responsibility. Victor Frankenstein’s monster does not signify that science is automatically bad – rather, science is corrupted when divorced from society’s moral context. The monster’s abandonment symbolizes moral decontextualization, a step out of Postman’s tool-using paradigm and into the technocratic. Scientific creation is possessed with the predisposition for good until corrupted by society (Ziolkowski 42), but its potential goodness depends on its harmonious integration within the ethical framework of the culture.

The blame for science run amok falls on society generally, but the bulk of the fault, Shelley suggests, lies directly with the scientist himself. Driven by the same

dynamic Pacey describes as the “mainspring of technological misdirection,” – the “impulse to go on inventing, developing and producing regardless of society’s needs” (*Culture of Technology* 171-172) – Victor never reflects during the process of planning and researching his grand experiment as to whether he *ought* to carry on. The thing should be done if it *can* be done. When he finally beholds the horror of his creation, his mind recoils. Victor’s blind pursuit of scientific achievement had led him to consider (and prepare for) only two possible outcomes – technical success, which would mark him as the greatest scientist of his time, or technical failure, which would presumably send him back to the drawing board. The possibility that technical success could result in a *moral* failure never occurred to him, despite Shelley’s matter-of-fact belief, expressed in her introduction to the novel, that “supremely frightful would be the effect of any human endeavor to mock the stupendous mechanism of the Creator of the world.” His rejection of the monster is instantaneous, instinctive, and irrevocable. Moral abdication leads Victor to loose his monster upon an uncomprehending world, and is the direct cause of all the terror which then ensues.

If Victor Frankenstein had not been overcome by his initial disgust, if he had responded to his creature with love and understanding, it might have become an instrument of good rather than evil.

It would be inconsistent with everything we know about European romanticism to think that Mary Shelley meant her novel as a blanket indictment of the pursuit of knowledge *per se*. Instead it is a cautionary tale against science divorced from ethical responsibility (Ziolkowski 43-44).

Kranzler and Ziolkowski rightly see *Frankenstein* as an attempt to rationally situate the quest for scientific knowledge within the moral context of an industrial society in

turmoil. Kranzler, noting the text's proximity to the Luddite uprisings, says the novel "is a direct warning in reference to these riots, and seems particularly prophetic in the modern world" (Kranzler 48).

It was one of the principal achievements of romanticism, and especially of the great reforms that established in early nineteenth-century Germany the first modern universities, to insist upon the right of scholarship in general and science in particular to pursue its free inquiry, uninhibited by any authority, spiritual or secular. Mary Shelley's *Frankenstein* expresses society's concern at what it perceived to be the mindless pursuit of knowledge with no thought for its political implications (Ziolkowski 40).

Victor Frankenstein's monster stands at the crossroads of the West's increasingly pressing technological question. He brilliantly reflects the subtleties of the Luddite reaction, condemning not technology itself but technology engendered without moral counsel; he embodies the complexities of Romanticism, at once natural, divine, intellectual, and innately prone to transcendence; and he marks the founding of a literary genre which has made possible a widespread consideration of technical development in the popular mind. In these ways Shelley's singular literary accomplishment insisted on asking of science the ethical question that, in its rage for secularization, it all too often did not want to hear. That question, of course, is the same one critics like Pacey and Jonas (and Stoll and Slouka and Postman, etc.) are still asking today.

To what can we possibly appeal, though, as we seek the ethics intimated by Shelley and expanded by the several critics noted here? For society's long term well-being, Jonas stresses the need for a renewed sense of the sacred, which will be necessary for the ordering of a truly ethical and responsible administration of

technological might. In the short term, though, he argues for the power of fear – a position we might call “Frankenstein’s-Monster-as-Ethicist-*pro-tempore*.”

It is moot whether, without restoring the category of the sacred, the category most thoroughly destroyed by the scientific enlightenment, we can have an ethics able to cope with the extreme powers which we possess today and constantly increase and almost compelled to wield. Regarding those consequences that are imminent enough still to hit ourselves, fear can do the job – fear which is so often the best substitute for genuine virtue or wisdom (Jonas 23).

Jonas’ call for a new morally-informed ethics finds its genesis in Shelley, where scientific hubris is contrasted with a sense of the sacred, of a divine order where humanity is best served by understanding and accepting that its rightful place lies *within* creation, not over it. God is present in the narrative, as Victor routinely invokes divinity in lamenting his misdeeds and resulting ill fortune, and Shelley’s own comments make clear that creation is the exclusive province of divinity. But God was nowhere present during the young scientist’s studies at Ingolstadt or during his creation of the monster, and when the narrator inquires after some of Frankenstein’s knowledge he is rebuked for desiring to know how to create “a daemoniacal enemy” (204). In this characterization Victor situates the scientific pursuit of creation within an explicitly theological context.

Jonas point is well-taken, if cynical, but in the end still fails to answer some of the concerns raised earlier in the discussion. To wit, if it remains the perception in the public mind that technology is neutral, which seems a given for the time being, then fear – the “monster-ethicist” – will not arouse a reformulation of public policies *toward technological development itself*, but will merely target the presumably

independent human factor. To a degree this will be a positive development – less human error would have been most desirable at Chernobyl in *all* stages of the plant's conception, construction, and operation – but in the end the focus on human fallibility leaves us ultimately committed to breeding and domesticating ever larger and more intractable monsters, without once asking the Luddite/Romantic/techno-dystopian question: On the whole, mightn't we be better off if we stopped breeding monsters altogether?

America and the Pastoral Eden

The American contemporaries of Wordsworth, Byron, and the Shelleys shared their European counterparts' essential idealization of the pastoral, a characteristic fully evident in the works of writers like Whitman, Emerson, and Thoreau. The previous chapter asserts that American Romanticism was more ambivalent about the machine than was its European cousin, but this shouldn't be taken to indicate that technology was less of a problem in the literature of the New World. The unique context of the Americas bred a peculiar perspective, to be sure, a novel way of viewing progress and technology. Any number of significant factors contributed to this American point of view: the sheer newness of the country, the Edenic baggage that attached to the continent early on in its settlement, the vastness and openness of the landscape itself, etc. Perhaps *most* importantly, though, was the distinct "frontier spirit" which permeated the character of the new nation, as noted in the preceding chapter. That discussion noted the sometimes curious ways in which the American character fostered the rise of technology. Here, we will examine the frontier as pastoral trope and consider the ways in which the garden sought to resist the machine.

Marx notes the frequency with which the cacophony of the machine intrudes upon the serenity of the American narrative.

We recall the scene in *Walden* where Thoreau is sitting rapt in a reverie and then, penetrating the woods like the scream of a hawk, the whistle of the locomotive is heard; or the eerie passage in *Moby-Dick* where Ishmael is exploring the innermost recesses of a beached whale and suddenly the image shifts and the leviathan's skeleton is a New England textile mill; or the dramatic moment in *Huckleberry Finn* when Huck and Jim are floating along peacefully and a monstrous steamboat suddenly bulges out of the night and smashes straight

through their raft. More often than not in these episodes, the machine is made to appear with startling suddenness (Marx *Machine in the Garden* 15).

Thoreau, famous for his devout naturalism, represents one of the more uncompromising critiques of progress in American Romanticism. In essence, he argues that society would be better served by a retreat from the trappings of technology.

Men think that it is essential that the *Nation* have commerce, and export ice, and talk through a telegraph, and ride thirty miles an hour, without a doubt, whether *they* do or not; but whether we should live like baboons or like men, is a little uncertain. If we do not get out sleepers, and forge rails, and devote days and nights to the work, but go to tinkering upon our *lives* to improve *them*, who will build railroads? And if railroads are not built, how shall we get to heaven in season? But if we stay at home and mind our business, who will want railroads? We do not ride on the railroad; it rides upon us (Thoreau *Walden* 66).

In the passage Marx alludes to above, Thoreau repeatedly laments that the train is not what it is supposed to be: “If all were as it seems...If the cloud that hangs over the engine were the perspiration of heroic deeds, or as beneficent as that which floats over the farmer's fields...If the enterprise were as innocent as it is early...If the enterprise were as heroic and commanding as it is protracted and unwearied....” (82-83). But all is not as it seems, and just as the rails have imposed their physical infrastructure on the countryside, so also have they imposed a psychic infrastructure upon the culture.

We have constructed a fate, an *Atropos*, that never turns aside. (Let that be the name of your engine.) Men are advertised that at a certain hour and minute these bolts will be shot toward particular points of the compass; yet it interferes with no man's business, and the children go to school on the other track. We live the steadier for it. We are all

educated thus to be sons of Tell. The air is full of invisible bolts.
Every path but your own is the path of fate. Keep on your own track,
then (84).

The result is more than a simple adjustment in the way life is lived, more than a minor revision in the daily routine. Instead, the machine has bored into the fabric of the culture a square hole, and somehow the round peg of life must be made to fit. “So is your pastoral life whirled past and away,” Thoreau concludes. “But the bell rings, and I must get off the track and let the cars go by....” (86).

Marx’s examination of the pastoral impulse focuses minutely on the morning of July 27, 1844, when Nathaniel Hawthorne “sat down in the woods near Concord, Massachusetts, to await (as he put it) ‘such little events as may happen.’” As he sits there, recording in his notebook the goings-on in the area known by the locals as Sleepy Hollow, he hears “the whistle of the locomotive – the long shriek, harsh, above all other harshness, for the space of a mile cannot mollify it into harmony.” The whistle signifies all manner of business and busyness, bringing “the noisy world into the midst of our slumberous peace (Marx 12-13).

The locomotive, associated with fire, smoke, speed, iron, and noise, is the leading symbol of the new industrial power. It appears in the woods, suddenly shattering the harmony of the green hollow, like a presentiment of history bearing down on the American asylum. The noise of the train, as Hawthorne describes it, is a cause of alienation in the root sense of the word: it makes inaudible the pleasing sounds to which he had been attending, and so it estranges him from the immediate source of meaning and value in Sleepy Hollow. In truth, the “little event” is a miniature of a great – in many ways the greatest – event in our history (Marx 27).

Hawthorne’s distaste for the fire-Titan was in place well before his morning in Sleepy Hollow. In his famous allegory, “The Celestial Railroad,” written a year

earlier, the train becomes the central symbol in a pilgrim's intended trek to the Heavenly City. The railway parallels the celestial footpath of Bunyan's *Pilgrim's Progress*, and the narrator delights in the comfort and modernism of the new mode of transportation. Despite their best intentions, however, the passengers are unwittingly bound for Hell instead of Heaven. The railway is run by Beelzebub and his minions, and the celestial guide, Mr. Smooth-it-away, is charged with the task of rationalizing progress as the path to salvation. Much has changed since Bunyan, the narrator learns, and a good-natured spirit of modernism has rendered pathetic the efforts of pilgrims who insist on sticking to the footpath.

However, during a layover in Vanity Fair, the narrator speaks with one of these reactionary souls, and is warned that the artifacts of progress are a chimera.

“The Lord of the Celestial City,” began the other pilgrim, whose name was Mr. Foot-it-to-heaven, “has refused, and will ever refuse, to grant an act of incorporation for this railroad; and unless that be obtained, no passenger can ever hope to enter his dominions (Hawthorne 224).

The warning proves apt, as the passengers are ushered not into the Celestial City, but are instead herded onto a ferry bound for Hell. Hawthorne's message is painfully obvious, especially given the transparent character of symbols in an allegory – the railroads may *look* like a fast track to salvation (recall Thoreau's question from above: “if railroads are not built, how shall we get to heaven in season?”), but are instead a deceptive and fleet means to the destruction of the soul.

“The Celestial Railroad” notwithstanding, we have to note that the Americans produced nothing quite like *Frankenstein*, despite the fact that by Hawthorne's day in Sleepy Hollow it had been available in print for over a quarter-century, and might

easily have inspired American writers to a similar effort, were they so disposed. Two observations may help account for the comparatively tolerant reception we mark in the Americans.

First, we have to remember that the machine's development in the New World lagged well behind its conquest of Europe. According to W.W. Rostow, the industrial "take-off" in America, the "watershed" where progress came to dominate the society (the moment we might associate, in Postman's taxonomy, with the passing of a culture from the tool-using phase into the technocratic) didn't occur until roughly 1844 (Marx 26), nearly a half-century after Blake's "Chimney Sweeper" wandered the streets of London and over three decades after the violent quashing of the Luddites. It's also worth noting that Byron, Percy Shelley, and Keats – the three most prominent "Late Romantics" – had all been dead for 20 years or more by this point in time, and England was past the highwater-mark of its own Romantic period and well into the Victorian Age, which traces to the passage of the First Reform Bill in 1832 (Ford "The Victorian Age" 1911)⁴⁷. As such, we should hardly expect the American experience of technology to parallel that of the English⁴⁸.

Second, the dystopian impulse, as it manifested in America, had to account for the unusual power of Edenic rhetoric that had attended the discovery and colonization of

⁴⁷This law "extended the right to vote to all men owning property worth ten pounds or more in annual rent," a move which essentially enfranchised the lower middle, but not the working, classes, who finally were granted suffrage with the Second Reform Bill in 1867 (Ford 1910).

⁴⁸As noted in the previous chapter, the American reaction to development didn't simply lag by a corresponding number of years, either – the utopian impulse remained powerful, even as American industrialization caught up to European levels.

the New World from the outset. Columbus portrayed his voyages as part of a divine prophecy that must in the end usher in the end of the world and the establishment of the New Jerusalem.

Identifying the Orinoco as one of the four rivers of the Garden of Eden, Columbus repeatedly insisted that he had indeed recovered the earthly paradise. "I am completely persuaded in my own mind," he wrote, "that the Terrestrial Paradise is the place I have said." And in the manner of a new Adam, he obsessively named all that he surveyed, confident in his expectation that mankind's original dominion might soon be restored (Noble *Religion of Technology* 33-34).

While Columbus is situated thoroughly within the technotopian tradition, as noted in the previous chapter, the popular conception of the Edenic image is not technological. After all, there are no machines evident in the creation stories of Genesis, and most Christians overtly associate the garden of Eden with pastoral, undespoiled nature. The result was that, where England produced some clearly dystopian visions, the Americans (at least early on) were more likely to couch the technological reaction within utopian/Edenic visions that traded on the pastoral, not the technological⁴⁹.

These motifs, as different as they may appear to be, are nonetheless manifestations of the same core impulse. If we compare a vision of the pastoral (the story of the Garden of Eden, for example, or any one of several dozen poems by Wordsworth) with an overtly anti-technological dystopian depiction (*Frankenstein*, or perhaps *Blade Runner* or *Max Headroom*) they certainly don't *look* much alike on the

⁴⁹Again, we see complexity, confusion, even contradiction swirling through popular perception. This particular point of convergence, where technotopian and pastoral theologies seem inseparable, if not identical, is essential to the discussion. It is suggested later in the chapter that the two urges are not only closely bound up with one another in the Americas, but that they share a common point of departure and have never been far apart in the Western mind.

surface. But both are products of resistance to technological progress (at least in the modern world) and are properly seen as technophobic. The pastoral, or positive critique, responds to technophilia by depicting that which is lost (or which is available as an alternative), while the darker, negative critique, addresses progress through depictions of the machine's ugliness and destructive capacity. In all cases, we must understand that the machine represents a threat to the pastoral, whether it is stated explicitly or merely implied.

The rhetoric surrounding early settlement of the New World relied heavily on a stock appeal to "Renaissance primitivism" (Marx). As naive as such depictions of human nature (and the natural order) may be, they nonetheless serve as a useful contrast with the implications of the Technological Sublime, which in its extreme manifestation literally threatens the existence of the quality of humanity. In Mumford's conception:

With this new "megatechnics" the dominant minority will create a uniform, all-enveloping, super-planetary structure, designed for automatic operation. Instead of functioning actively as an autonomous personality, man will become a passive, purposeless, machine-conditioned animal whose proper functions, as technicians now interpret man's role, will either be fed into the machine or strictly limited and controlled for the benefit of de-personalized, collective organizations (*Myth 3*).

News of the (New) World

Early reports back from the colonies reinforced the pastoral Edenic ideal in the imaginations of Europeans, and promised that the young continent would be the site of a new "golden age."

As every American knows, it [the North American continent] has been capable of carrying an immense burden of hope. That hope in turn has been encouraged, from the beginning, by descriptions of the New World as a kind of Virgilian pasture – a land depicted as if it might become the scene, at long last, of a truly successful “pursuit of happiness” (Marx *Machine in the Garden* 74).

The seductiveness of the message had its roots in long-established literary idiom, says Marx, who ascribes the Edenic urge infusing the colonial myth of the Americas to an ancient pastoral trope, which sought even in Classical times to assert the virtues of the rural and natural over the urban. But during the 18th Century the “great revolution in science and technology” initiated “a massive shift in prevailing ideas about man’s relations to nature.” An effort to “rescue the pastoral – the formal literary mode – from the confines of a decadent convention” failed utterly, however. The problem is that the pastoral story of the New World was greeted by a Europe longing for the “rural landscape and rural life.”

With this new feeling for the country came a fresh idiom, a vocabulary capable of investing the ancient ideal with a new vitality (Marx 75).

Robert Beverly, a Virginia planter and self-styled historian of the colony, was “[o]ne of the first colonial writers whose work reveals the affinity between the conditions of life in America and the pastoral ideal” (Marx 75). His work represents a potent vision of the New World as a sort of “anti-Bensalem,” a utopia where humanity’s spiritual actualization, its nearness to salvation, is measured by the absence, not the presence or magnitude, of technological achievement.

Beverly’s “lively, if artless” *History and Present State of Virginia*, published in 1705, described the new country as

so delightful, and desirable; so pleasant, and plentiful; the Climate, and Air, so temperate, sweet, and wholesome; the Woods, and Soil, so charming, and fruitful; and all other Things so agreeable, that Paradise it self seem'd to be there, in its first Native Lustre" (*sic*) (Marx 76).

In the pastoral vision, the utopian life is associated with the perfection and harmony of nature, of Eden before the Fall, and these themes are unabashedly presented throughout Beverly's work.

Even the name of the colony, he says, was selected as a tribute to the landscape (as well as the Queen). "Virginia" refers to a land that "did still seem to retain the Virgin Purity and Plenty of the first Creation, and the People their Primitive Innocence..." (Marx 76).

Beverly's narrative is exuberant and conventional, says Marx, and his enthusiasm "seems to endorse the simple logic of Renaissance primitivism." Still, his passion for the pastoral was the yardstick by which the New World was measured.

If unimproved nature is the location of all that we desire, then civilization as Europeans have known it can only signify a fall or lowering of man's estate (Marx 76).

It is this very quality – the sense that humanity's highest possible state is that of "unimproved nature" – which constitutes the ultimate value underlying the counter-technological theology of pastoral Eden. This is the principle upon which the technodystopian urge in Western thought is erected. The previous chapter documented the ways and degrees to which centuries-old religious ideologies informed intellectual pursuits associated with science and technology, but it is equally important to understand that equally old religious beliefs informed, and continue to inform, profoundly *anti-intellectual* impulses in Western thought.

“In the Beginning”: Conflicting Mandates In Genesis

The Holy Bible is perhaps the most read text in history, and the creation narratives which appear in the first two chapters of Genesis are among the most familiar stories in Western culture, probably ranking behind only the story of the birth of Jesus in the second chapter of the Book of Luke⁵⁰. These stories, which describe how God created the world, the plants and animals, and humanity, firmly establish from the outset the centrality of Judaism and Christianity in the terrestrial order by making clear that the god of the Hebrews isn't simply *a* god, but is instead *The One God*. As such, these narratives are essential components for asserting the moral authority of Judeo-Christianity not just over the ancient Hebrews, but over all humans. Debates over the history of these stories, over their accuracy, over apparent contradictions within them notwithstanding, they have proven to be of immense and lasting power, as the religion of a group of ancient Middle Eastern tribes has grown to become one of the most powerful belief systems on the planet. In sum, it matters not whether the stories are factual, accurate, enlightened or primitive: the only relevant concern here is that they have been taken for divine truth – the inspired Word of God – and as such have shaped the actions and beliefs of numerous cultures across a span of thousands of years.

A primary reason for the spectacular success of Christianity is the aggressiveness with which it has pursued domination over the physical world, a tendency that finds its thematic origins in the first pages of the *Bible*. Many, if not most, other world

⁵⁰The text of the King James Version, as well as several other translations, is available online at <http://www.biblegateway.com/>.

religions comprise value systems that encourage adherents to find meaning within the natural order – we see this ethic at work in Native American beliefs, in African animism, and in the numerous neo-pagan reconstructions gaining popularity in contemporary Euro-American culture. The Judeo-Christian ethic, though, explicitly commands man (and the masculine term is used advisedly) to exercise control *over* the creation.

26. And God said, Let us make man in our image, after our likeness: and let them have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth, and over every creeping thing that creepeth upon the earth.

27. So God created man in his own image, in the image of God created he him; male and female created he them.

28. And God blessed them, and God said unto them, Be fruitful, and multiply, and replenish the earth, and subdue it: and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth.

The dictate is unmistakable – the “have dominion over” construction is repeated eight times in these three key verses, and is augmented by the even stronger command to “subdue” the earth⁵¹. God reinforces the motif of ownership in verse 29, telling the man and woman that, “I have given you every herb bearing seed, which is upon the face of all the earth, and every tree, in the which is the fruit of a tree yielding seed; to you it shall be for meat.” The earth and all things on it are the express property of humanity, created for the sole purpose of exploitation. The humans stand at the center of creation, and we might easily infer from Genesis that they are the *purpose* of creation.

⁵¹The terminology is also consistent across all six translations available from the Bible Gateway on the World Wide Web.

Translated into the vocabulary of progress, what these passages from Genesis 1 represent are the seeds of the most sweeping project of development in recorded history. Genesis doesn't depict Adam and Eve as being an organic part of the natural order, but instead lifts them out and places them over that order. We might read into the creation story implications of stewardship if we're so inclined, but even if we do implicit concepts and explicit charges carry substantially different weights in the construction of belief systems. In the view of the ancient Hebrew stories which evolved into the opening chapters of Genesis, the natural order was a *resource*, in the most utilitarian sense of the word; despite the fact that Man was created of dust, and after the Fall fated to return to it, these stories nonetheless place him outside nature.

The emphasis on the useful arts that Noble traces to the first millennium, and the ontogenesis of the idea through the Enlightenment on into modern times, seems to reflect the Judeo-Christian ethic of dominion presented in Genesis 1. We should be cautious in drawing anything like a direct cause-effect relationship between the two, but the thematic accord is impossible to ignore. What we can safely say is that Judeo-Christianity, since at least its earliest recorded writings, has taken as a core value the right and responsibility of humans to exercise control over the natural world and to exploit it for their own good.

We might well take this as evidence of the intellectual/technotopian impetus within Western/Christian culture, but it was earlier asserted that this predilection has been paralleled all along by an anti-intellectual tendency. Curiously, we find the headwaters of both rivers flowing from the same Garden. As noted above, the very

image of Edenic paradise is a pastoral one – not only is the Garden of Eden free from mechanics of any sort, the place itself embodies such remarkable natural abundance it’s hard to imagine the need for technology, or even work. This vision of perfect leisure is reinforced in the third chapter of Genesis, where humanity’s punishment for eating of the tree of knowledge of good and evil includes manual labor – man is banished from the garden “to till the ground from whence he was taken” (Genesis 3:23). This passage represents the *Bible*’s first mention of work.

The image of pastoral Eden clearly wasn’t designed with labor or innovation in mind – rather, it seems to represent for the ancient Hebrews an idyllic escape from the harshness of labor. It signifies not the pursuit of progress, but release from worldly pursuits altogether. Dominion over the world remains an essential part of the vision, although it differs in character when considered from the pastoral context. In paradise, dominion simply reflects humanity’s default place in the great chain of being – while real, it bespeaks a more or less passive state of relations with creation.

What is opposed to the paradisaical state of grace in the Eden story is crucial, though: Man is forbidden the fruit of the “tree of knowledge of good and evil,” an image which is often interpreted to conflate “knowledge” with “evil.” Worldly knowledge, which the serpent says will make humans like gods, and which the woman desires because she wishes to be wise, is the alternative to innocence and passive dominion. In paradise, dominion is the birthright of humanity, but after the Fall it must be earned through the application of physical and mental craft – or, seen another way, through the sweat of one’s brow and the knowledge attained from the

forbidden tree.

There are at least two ways to interpret the conflict contained in the creation stories, and both inform our discussion of utopianism and dystopianism in the pursuit of technological progress. The first scenario theorizes that God's commandments to Adam and Eve in the Garden embody conflicting and mutually exclusive mandates. The command to "have dominion over" all creation amounts to, in the daily lives of Christians, a call to mechanical development, because only through the means of humanity's superior intellect can the vast, wild world be brought to heel. Human beings, minus the application of technical knowledge, are weaker and slower than many animals and are ill-suited for survival in many of the environments it now comfortably inhabits. Without the application of technical knowledge, human is little more than ape. However, the command to reject the worldly knowledge of the forbidden tree contradicts this charge, because the pastoral ethic associated with innocence is irreconcilable with the technical impulse. If Adam and Eve do not eat the fruit, they remain in paradise, but practically speaking, the human race remains naked and in a state of perpetual anti-progress.

The second scenario, which implicates the millenarian tradition that traces to the earliest days of the Christian era (Noble 23), argues that the pastoral and developmental impulses were united in the original Edenic paradise, and that Adam, created as he was in God's image, was possessed of vast technical knowledge that was lost as a result of the Fall. When Adam and Eve sinned, they simultaneously forfeited both the pastoral leisure of the Garden and the gift of divine intellect.

The new millenarian mentality...situated the process of recovery in the context of human history and redefined it as an active and conscious pursuit rather than a passive and merely blind expectation (Noble 22).

The doctrine of Adamic knowledge fueled the technotopian drive through the centuries, as the builders and craftsmen examined in the previous chapter pursued the mechanical arts in the belief that it was the path to the reclamation of paradise, which is to say the place where the pastoral and divinely-inspired intellect were one.

However, this reading isn't an especially obvious one. Noble's study finds it strongly informing "an elite revitalization and reinterpretation of early Christian belief" among the educated (22), but it does not appear to have been a staple of the commoner's spiritual diet. Instead, the conventional portrayal of the Fall has usually implicated Man's misplaced designs on knowledge not rightly his, and the Church, rather than encouraging inquiry into the mysteries of life, has often encouraged the acceptance of ignorance, teaching that Man simply isn't meant to know some things. We can briefly observe, without too much cynicism or analysis, that the Church had a vested interest in an acquiescent flock, and that fostering unquestioning acceptance of the wisdom of God's chosen spokesmen furthered that end.

For its part, millenarian dogma was not well-received by the Church, whose moral authority was challenged by its basic precepts.

In the early centuries of the Christian era, there were myriad millenarian voices heralding the imminent advent of the Kingdom of God, which drew their inspiration from biblical prophecy and mystical vision. But these voices were soon marginalized by the clerical caste, which embodied the power and authority of the Great Church. In the view of this emergent elite, the millennium had already begun with the establishment of the Church and they were the earthly saints. In their eyes, belief in a millennium yet to come was subversive, because it

suggested that the Kingdom of God had not yet arrived but belonged to a future time beyond the Church.... [in] 431, the Council of Ephesus formally condemned millenarian belief as heresy (Noble 23).

For the Church, which had the authority to decree truth and falsehood and the power to enforce its will through means up to and including excommunication, the outlawing of millenarian thought reflected a clear desire to discourage undue intellectual curiosity on the part of the non-clerical classes. Certainly the rise of science in the middle of the second millennium intensified the Church's consternation. Thanks to science's eventual drive toward secularization, the ancient suspicions emerging from the Fall found new life, as theologico-political concerns fostered the sense that religion and science were necessarily opposed.

Noble's observations on the longstanding relationship between religion and the useful arts is apt, but it also highlights again the complexity and confusion surrounding these ideologies. We see the anti-intellectual impulse at work still in cases like the famous Scopes Monkey Trial in Tennessee, and the fundamentalist reaction against secular knowledge is alive and thriving at the Millennium, evident in battles over the teaching of evolution versus "creation science." From this perspective, the ultimate expression of humanity would be the state of "unimproved nature" Marx refers to above.

These brief theories as to the origins of technotopian and technoresistant philosophies are far from definitive, and aren't intended as conclusive. Instead, they're meant to indicate that the seeds of our present ideological condition existed, if only in primitive or latent form, very early on in the theologies that have underpinned

European and American culture for millennia. The connections and lineages are imperfect, and the structures of thought asymmetrical, but given the scope of time separating Adam and Eve from Barlow and Sale (to say nothing of the curious and remarkable evolution of ancient Middle Eastern Judaism into contemporary North American Protestantism) we shouldn't be too surprised. While the subject probably deserves more attention than it gets here, present purposes are satisfied by the identification and brief explication of ideological ancestries.

Neo-Luddite vs. Neo-Baconian: A Brief Encounter

The dueling visions of Eden and of the road to human redemption are fully evident throughout the Internet debate, but are perhaps nowhere more starkly contrasted than in the June 1995 issue of *Wired*, when Kevin Kelly, the magazine's executive editor (and one of the world's most enthusiastically over-the-top technotopians) squared off with self-professed neo-Luddite Kirkpatrick Sale in "Interview with the Luddite."

The interview fairly sparked with tension, and ended in a wager over Sale's predictions of the future. Said Kelly:

I bet you US\$1,000 that in the year 2020, we're not even close to the kind of disaster you describe – a convergence of three disasters: global currency collapse, significant warfare between rich and poor, and environmental disasters of some significant size. We won't even be close. I'll bet on my optimism ("Interview")⁵².

Kelly, who has a pronounced talent for boiling positions down to their extreme

⁵²Of course, this is a sucker bet by Kelly. If he's right, he wins \$1000. If he's wrong, the global economic collapse upon which the wager is partially predicated will render *his* check valueless. Still, the stunt makes for good press....

expressions, is in his finest form here. In the following excerpts from the *Wired* interview, he and Sale take turns expressing technophilia and technophobia in terms so strikingly polarized it's like reading pure allegory. Both participants quickly establish the centrality of the technological question to the potential for ultimate human actualization. For Sale, the pastoral dystopian, cultural perfection depends on harmony with the natural order. For Kelly, whose comments here reflect something like a latter-day millenarian ethic, what Sale proposes affords humanity no opportunity to rise above the level of animals.

- Sale: But then how are we going use the computer?! What do you use that technology for?! Here's how: it's going to be used for the dominance and exploitation of nature for our benefit⁵³.
- Kelly: We dominate nature at first so that we can survive, but beyond survival I believe the focus of technology, culture and civilization is on human creativity, to allow humans to be creative, to allow every human born to have a chance to create, to write a book, to make a film, to make music, to love, to understand the universe. I think that's what technology is for. I think that's why we're here. It's not to worship nature.
- Sale: I'm not asking you to worship nature. I'm asking for a regard for nature.
- Kelly: So why are we here? What are humans here for?
- Sale: [Pauses.] To exist.
- Kelly: So, what would be a measure of a successful human culture?
- Sale: That it's able to exist in harmony with the rest of nature.
- Kelly: I totally reject that. It's not enough.
- Sale: Not enough?!
- Kelly: Yes. Naked existence is for animals. That's basically all animals do: they exist in harmony with their surroundings.
- Sale: And what's wrong with that?
- Kelly: Plenty. We left that phase eons ago.

⁵³While not expressed as such, Sale's remarks constitute a direct challenge to the mandates of Genesis 1.

- Sale: If you think that somehow now we are able to have a different mind-set that will suddenly transform us into being a due-regarding useful creature on the planet, I'd say that it is you who are talking utopian pipe dreams.
- Kelly: You're right. I have a vision of where we'd like to go, and this is more than just being an animal on Earth.

In a sense, we have the tension from Genesis 1, theorized above, reproduced here.

For Sale, the primitivist urge of the pastoral, reflected in Beverly's gushing over the Edenic New World, is more than enough. But for Kelly, the New Millenarian, technology is the key to human transcendence and redemption.

Interestingly enough, though, neither worldview is satisfied with where we are at present. For Kelly, the hope of humanity lies in evolution toward a new "hive mind" enabled by technological connectivity (*Out of Control*), while Sale longs for the collapse of technological society.

- Sale: Your optimism is contrary to all history up to the present, which suggests that given the values and norms of our particular civilization, we will perfect technology to the task of exploitation and destruction of nature. My optimism, such as it is, argues that because we know of previous societies that existed on every continent, and that existed far longer than Western civilization, and that have judged their technologies on other grounds than Western civilization, that it is possible to recover such societies in the future.
- Kelly: Even though we have no evidence of us ever retreating into the past and undoing technologies?
- Sale: History is full of civilizations that have collapsed, followed by people who have had other ways of living. My optimism is based on the certainty that this civilization will collapse (Kelly "Interview").

Both views – the technotopian and the pastoral/dystopian – are ultimately theological in nature, and both have clear manifestations within the Christian ethos

that has dominated the West for the past two millennia. By extension, then, the great public dialogue about the Internet, with its claims for new communalism, enlightenment through online education, enrichment via e-commerce, and the vision of the electronic agora; and its counter-claims of atomization, of virtual education that mistakes information for knowledge, of a dramatically widening rich-poor gap, and the abandonment of the self into the dehumanizing hive; this also is a theological debate. Despite its apparent novelty, it has at its core a profound argument about the nature of humanity, the nature of divinity, and about what means best serve our drive toward transcendence, toward Heaven.

Perhaps this realization, better than any other, helps explain the vehemence of our arguments over technology. We aren't arguing about machines – we're arguing about our souls.



Cyberpsychosis: The Frankenstein Complex in the Modern World

The Frankenstein Complex, the dark Romantic nightmare, is obviously far from being resolved in the collective psyche of the West. Kranzler, in fact, argues that “the problematics of technological development and application, initially codified in Shelley's work, correspond directly to modern society, imaged in the hydrogen bomb, the nuclear reactor, and the laboratory test-tube” (42). The monster, in its infancy during the early 19th Century, has grown to a horrible maturity as the Millennium approaches, and stands now as the archetype for contemporary angst over science and technology.

If we were to pile up all the newspaper clippings cataloguing the triumphs of sci/tech the stack might reach from here to the moon, but it would also cast a long and very dark shadow. The nuclear industry has for some decades been the obvious lightning rod for anti-technological protest: From its most apocalyptic manifestation as sky-splitting atomic weaponry down to the burgeoning, if unglamorous, problem of nuclear waste disposal, few of humanity's scientific pursuits have generated as overt and vehement a reaction as has the development of fission. Genetic engineering has given us the "shoat," a sheep-goat hybrid; Dolly, the sheep clone; and the International Academy of Humanism, a collective dedicated to preserving the right of researchers to freely pursue human cloning; it currently represents the cutting edge of science's exploration of our potential for *posthumanity*. However, those concerned with the technological efforts of untrustworthy institutions wonder about the correspondence between modern eugenics/genetics and Hitler's scientific attempts 60 years earlier to forge a master race (Kranzler 46). Biological research, which has cured countless diseases and saved millions of lives, is turned to the cause of advanced warfare, which some believe may have contributed to Gulf War Syndrome (Zimmer), and chemistry-intensive industries, whose abuses are too rampant to even begin naming – have disastrous, if not outright apocalyptic potential (Kranzler 47). Clearly, some argue, technology is out of control, and it is this element – control, and the ethics informing it – that lies at the core of what makes a monster of the machine. Worse, the loss of human autonomy Ellul sees in his "technological system" represents the critical difference between the monster in the Romantic world and the

monster in the contemporary world. *Frankenstein* is

an apt metaphor for the technological innovations of the twentieth century; divorced from affective responsibility, the monster devastates not only his creator, but Victor's family and friends as well. The monster is scientific invention run amok, the reversal of humanist intention, which destroys rather than facilitates populations (Kranzler 43).

Kranzler's observation is well-taken, but to understand how the monster has matured since Shelley we note that her monster quite expressly does *not* destroy populations (although the narrative makes clear how easily it could have were it so inclined). The damage he wreaks is all too real and is unarguably tragic, especially where Victor's innocent friends and relatives are concerned. But a society that has seen calamities like the oft-invoked Chernobyl knows all too well that the price of Victor's folly could have been far dearer. At the end of the novel the monster is dead, but more importantly it has destroyed all evidence that might help others replicate the experiment, including its own corpse. The tragedy has been localized, the damage contained, and the world is again safe. But in more recent Frankenstein tales – and the theme recurs with striking regularity – we're more often left with at least the haunting suspicion that the monster isn't as dead as we'd like.

* * *

The Monster and *LIFE Magazine*

As indicated in the previous chapter, *LIFE* represents such a fascinating case study because of the genuineness with which it reflects the complexity of technological America. *LIFE*'s depictions of the machine are therefore more optimistic than pessimistic, and when it does depict technophobia, it often does so covertly and

symbolically, making use of whatever means are available to make the depictions “safe” from the dominant technophilia of the society.

Although the following sections are presented as a counterpoint to the discussion of *LIFE* in the preceding chapter, they are not intended as a direct response to the those examples, nor should we take them as anything like a one-to-one correspondence. Instead, these photo-essays are some examples of how the magazine presented technology’s problematic dimension.

Storm Clouds Gathering: *LIFE* and WWII

The years leading up to America’s entry into World War II were troubling ones for *LIFE*’s editors, for during these tense years technology simultaneously represented both demon and messiah, apocalypse and salvation. Technology manifested in the German and Japanese war machines threatened the well-being, if not the very existence, of America; the same sort of technology – guns, ships, planes, tanks – at the same time signified the hope of the nation, for it was through such machines that we would survive the foreign threat to the American way of life. If the war was to be most disturbing technological moment of the century – and there is no real question that it was – then a significant portion of American anxiety had to result from the realization that machines would serve other masters than us, evil masters bent on world domination, and worse. The United States had encountered machines that did not love us before, but never had machines in service to the enemy been so awesome, so potent. Never had we encountered technology that posed such a legitimate threat

to our freedom, if not our very existence. It must therefore have been with great apprehension that American readers viewed *LIFE*'s pictures of Germany's mechanized military might.

LIFE had been hinting at war, in both words and pictures, since 1937, but they began depicting Hitler's armaments in earnest in early 1939. The March 6 issue featured a head-on, full-page shot of the launch of the *Bismarck*, "the biggest thing in battleships ever built by the Germans" (3/6/39). Swastikas flutter in the foreground as the assembled throng, arms extended in salute, reverence the awesome display of German engineering. The August 28 issue featured a photo-essay on Germany's artillery, "The Most Modern in Europe" (8/28/39, 11). Significant in this essay and a companion piece in the September 4 issue is the repeated assertion that technology had so far enabled Hitler to win without even fighting. So awesome was Germany's amassed might that none to date had dared even to challenge it, and *LIFE*'s pictures sold the assertion.

The September 4 photo-essay, one of the most impressive efforts in the magazine's 36-year run, seemed designed to scare America witless: row after row, column after column, thousands upon thousands of goose-stepping, jack-booted infantry equipped with advanced weaponry; hundreds of tanks parked in perfect lines stretching toward the horizon; a "secret" airfield, only one of the more than 700 scattered about the Reich; and one of *LIFE*'s all-time greatest photographs, the motorized parade through Berlin's Tiergarten, in which Germany arrayed its technological supremacy before the world with a mortifying sense of inevitability.

In these pictures the reader is bludgeoned with the scale of Hitler's destructive technology, but even more unsettling is the way in which the symmetry and regularity of the technology imposes upon the human element present. The German army seemed to have mechanized humanity – decades before there was cyberpunk, flesh and metal had been merged into something supremely unnatural and unholy. The consistency with which *LIFE* chose pictures that depicted symmetry must have been intended to convey this idea to American readers. For a culture conditioned to a utopian view of technology, seeing the machine in willing service to evil had to be profoundly frightening.

In these essays, and several others depicting the German military, we are seeing technology at its most problematic. The pictures convey the Technological Sublime, and if we set aside our knowledge of who the machines serve, the effect is similar to the awe inspired by pictures of the Fort Peck and Grand Coulee Dams. Of course, we *couldn't* set aside that knowledge – Dr. Frankenstein's monster was alive and well and looking dire in his new brown shirt and shiny jack-boots.

LIFE was doing its best to alert America to the threat of the monster run amok, and while it tried to avoid overt politicking, its stance was clear enough. The United States needed to gear up, and *now*, because this war was going to draw us in, one way or another (a view history certainly validated). The nation's entry into the war seems to have relieved *LIFE's* editors. For three or four years technology had been a troublesome subject for the magazine – technical supremacy was the birthright of America, and seeing it so misused by the Axis powers was more than the editors

could apparently stand. But once the Japanese bombed Pearl Harbor America could once again get back to the business of technological superiority, and *LIFE* could get back to the business of portraying science in salvational terms.

What is striking about the photos from the early days of the war is how completely mechanized the landscape was. The January 5, 1942 issue offers the “First War Pictures in Pacific,” and while the dozen or so pages that follow sought to highlight the preparations and activities of the heroic young sailors, what is inescapable is the omnipresence of machinery. At one level we can acknowledge that navies are inherently technological. But *LIFE* had depicted land forces, even infantry units, in predominately technological terms since before the war even began. What began to emerge was a cybernetic view of the warrior – war was not fought by men, it was contested by the harmonious admixture of man and machine. The pictures *LIFE* published, from the onset of America’s involvement in the war, reflected a merging of flesh and technology first intimated in the 1939 pictures of Hitler’s mechanized military, and which had been echoed in an August 14, 1939 pictorial on motorization and mobility in “The New U.S. Army Division” (8/14/39, 46-52).

Industry and technology remained central to discussions of the war effort throughout the conflict. Industrial chemistry’s role in winning the war was examined in great detail (3/23/42, 68-80), and *LIFE* routinely noted how far behind Japan the U.S. was in war readiness. It described how Japanese industry was geared toward war (1/5/42, 42-44) and devoted numerous pages to American industry’s retooling for war production (1/19/42, 18-19; 2/16/42, 19-25). In these photo-essays and their

accompanying editorial comment, one conclusion was inescapable: World War II would be won or lost by technology.

Even the wildest expert guessers never credited Nazi Germany with capacity to make more than 4,000 planes a month. Last week the U.S. learned from its President that this country must produce 5,000 planes a month in 1942 and more than 10,000 a month in 1943. "It will not be sufficient for us...to produce a slightly superior supply of munitions," said he. "The superiority of the United Nations...must be overwhelming." His figures were overwhelming, but they were not beyond the reach of a united, determined America (1/19/42, 19).

LIFE was right, although not in the sense they might have expected in early 1942, when everybody from the President to *LIFE*'s editors to, one presumes, most members of the citizenry, seemed to pin American hopes on its industrial capacity – we would simply outproduce the enemy, attacking on the ground with a column of tanks that would stretch from New York to Salt Lake City, and pounding them from the air with a blanket of bombers a mile wide and 117 miles long. To be sure, the U.S. did these things, but in the end it wasn't technology's industrial manifestation that finished the Japanese off, but rather its R&D wing's innovation in engineering and delivering two comparatively small atomic bombs.

The Nuclear Sublime

LIFE's coverage of the war's end trumpeted science's triumph over our enemies. Again, the editors' language assigns agency to technology, at times to the point where finding the hand of human action at all is difficult. In "The War Ends" (8/20/45, 25-29), the "Burst of Atomic Bomb" resulted in the Japanese surrender.

The cataclysmic bursts of two atomic bombs brought the war against

Japan to a sudden end. The first bomb fell Aug. 5 on Hiroshima, the second Aug. 8 on Nagasaki (25).

In the pages that followed, the ascendancy of technological over human agency was a recurrent theme. For instance, in the recounting of the Hiroshima bombing, it was “[a] B-29, laden with a new weapon of terrible but virtually untried destructive power” that attacked the city (26). Colonel Tibbets appears in the next sentence, almost as an afterthought. Three days later,

the second bomb was dropped on Nagasaki, shipbuilding port and industrial center. This bomb was described as an “improved type,” easier to construct and productive of a greater blast. It landed in the middle of Nagasaki’s industries and disemboweled the crowded city. Unlike the Hiroshima bomb, it dug a huge crater, destroying a square mile – 30% of the city (27).

Throughout, human agency is implied, rather than stated explicitly. Passive sentence constructions allow the editors to avoid what was undoubtedly a sticky issue – that is, the use such a horrific weapon against patently civilian targets.

The monster was still loose, although for the moment it was loose *in Japan*, and was therefore a good thing for Americans. The editors at *LIFE*, though, recognized this invention for the mixed blessing it represented, and in succeeding weeks and months devoted considerable space to the discussion of new atomic technology. On August 20, they called the monster by a familiar and altogether appropriate name, observing that “[if] rockets, whether propelled by chemicals or by atomic energy engines, can span the Atlantic and if their atomic warheads can destroy cities at one breath and if man can do nothing to prevent this, man has unleashed a Frankenstein monster.” The future would be a different place, with “push-button” wars perhaps

replacing “pilots, planes, ground armies, [and] surface navies” with “Robot planes, rockets, television and radar bombing and atomic bombs” (8/20/45, 18).

In the aftermath of Hiroshima and Nagasaki, though, the dire implications of nuclear power began to set in. An editorial noted that “In the third month of the Atomic Era the world still lacks a moral or political equivalent of The Bomb.... The American people, as they should, are doing a lot of public worrying about The Bomb. Unfortunately the tone of their worrying has degenerated into an abject mixture of shame, confusion and fear” (10/29/45, 36). Part of their worry no doubt resulted from the mortifying pronouncements of experts like Oppenheimer, who estimated that a nuclear attack on the U.S. could kill as many as 40 million (36), but also disturbing was the fact that the most hellish technology ever conceived had not yet found an ethical context to govern its development and use. By way of analogy, if we’re faced with a large, vicious-looking dog, we either want to know that it’s actually very nice and loves people or that it’s on a very strong leash. In the aftermath of Hiroshima and Nagasaki, though, the dog was standing in the front yard foaming at the mouth and there wasn’t a dogcatcher in sight.

The scientific community was up in arms because the military had taken control of atomics, and the editors appear to have shared the view of scientists, many of whom had threatened “to desert nuclear physics for the study of butterfly wings if science is not released from its bondage to war” (36). The answer to America’s dystopian fears rested with science and the openness of inquiry that produced the technology in the first place.

America's real military asset is not The Bomb; it is our share of that body of Western science which split the atom in the first place. European scientists had an even greater share in this discovery than our own. Its source was the habit and spirit of free scientific inquiry which pervades the Western world. America's stake in that source is greater than its stake in any quantity of blueprints. Thus, the release and encouragement of the scientists, not their control, should be the first goal of our atomic policy (36).

The editorial board then turned a few pages over to some prominent spokesmen from the scientific community – who better to speak to the issue than the scientist-hero? In an essay written by three University of Chicago atomic scientists, readers are told that the bomb had moved humankind “out of the old world – which we may call the world of electronics – into the world of nucleonics” (10/29/45, 45). They explain that the power of the atom, compared with simple electronics, was of another order of magnitude, and was attended therefore by another order of responsibility. In language reminiscent of Lippman, they assert that atomics represented a power perhaps too awesome to be entrusted to non-scientists.

...scientists have not heretofore felt that it was their responsibility to fight for this rational use of the products of their endeavor. This responsibility they willingly left to the governments of their nations (45).

In the case of nuclear energy, though, scientists feel an unusual responsibility because of the destructive power it represents. They say they “do not aspire to political leadership,” but say that the uninitiated need to be warned and advised until humanity has become aware of the technology's “perils as well as its wonders” (45). The authors undertake a thorough examination of the issue of nuclear energy, its potential benefits and probable drawbacks (especially as regards military application), and

conclude that no legislation of any sort should be passed until Congress could “be made fully aware of all the novel and complex implications of the new era” (48).

Of course, “nucleonics” never replaced electronics, and while atomic energy represented a difference in magnitude, it did not ultimately prove to be a difference of type. Atomics produce electricity, and the application of electricity in the lives of most Americans is substantially the same as it was before Hiroshima. The scientists’ language, though, reflects a tone that ought to be very familiar by now.

We must look confidently to benefits which the production of new radioactive elements will bring to science, industry and medicine, since small-scale atomic plants will be sufficient to provide an abundance of these invaluable tools for scientists, doctors and engineers (48).

Within months, then, America had turned to the task of housebreaking Frankenstein’s monster, and *LIFE* characteristically offered its resources and credibility to the debate.

Bikini Atoll: The Bomb as Spectator Sport

The terrible specter of nuclear annihilation was now clear in the American mind, a condition that *LIFE* acknowledged and addressed. But in the months that followed V-J Day an odd thing happened, as military testing of the new weaponry provided an opportunity for bomb-watchers to indulge their awe without having to confront the frightful context of war. In the estimation of President Truman, America was not only the most powerful nation on the planet, it was likely the most powerful nation in history (8/20/45, 32). If the bomb did possess apocalyptic potential, at least it could

now be addressed within the relative calm that attends triumph, peace, and unchallenged superiority.

In July 1946, the U.S. detonated a bomb over Bikini Atoll in the South Pacific, and the following issue of *LIFE* presented most Americans with their first images of the test. The five-page photo-essay, a marvel of symbolic complexity, begins in matter-of-fact fashion.

Just before “Mike Hour” on the morning of July 1, the time when the fourth atomic bomb was dropped over 73 old ships at Bikini Atoll, observers put on protective glasses or turned away and covered their eyes. Released from the B-29 *Dave’s Dream*, the bomb fell exactly on schedule. It missed the paint-splotted target ship *Nevada* by a few hundred yards but it fulfilled its purpose: to determine how much damage an atomic bomb exploded in the air could do to ships (7/15/46, 25).

The photo-essay’s first page is dominated by a shot of a cruiser’s foredeck, with several seated sailors faced away from the atoll, their heads and eyes covered. The text below the picture contains a brief and bloodlessly detailed accounting of the effects of the blast – initially, the impact appeared to have been “Not so much,” in the estimation of a Russian observer, but “later the details of destruction piled up.” Many of the “goats, pigs, rats and bedbugs which had been placed on the ships had died,” and in the end “man’s first estimate of the bomb’s frightening destructive power had merely been restated” (25).

The following three pages offer several spectacular pictures of the mushroom cloud and its aftermath, which the editors term the “feature attraction of Operation Crossroads” (26). The vocabulary of the editorial comment isn’t exactly festive, but neither is it as foreboding as we might expect in the aftermath of the carnage at

Hiroshima and Nagasaki. Each of the earlier clouds had been an “immense luminescent pillar which sprouted majestically after the bomb’s first flash.” At Bikini, though, “The height of the cloud was disappointing” (26). Apparently what the world wanted was a show, and while Bikini was a nice effort, the sequel failed to live up to the standard of the originals.

However, the following page contains photos of four scorched and mangled ships, and while the tone in the text remains clinical, the pictures themselves (especially the ones of the carrier *Independence* and the submarine *Skate*) quickly dispel the notion that the test was anything but dead serious. The page also shows some sailors bathing one of the surviving pigs “to remove possibly radioactive dust” from the explosion. “Pigs were chosen for the experiments because their skin is almost human,” the caption says (28). The final page shows a “battery of cameramen” inside “one of the 73 planes which were in the air over Bikini at the time of the explosion.” If not for the fact that almost all the photographers are in military or military-style garb, we might take the picture for a shot of a movie set. “Almost every conceivable kind of photographic equipment was used to record the effects of the test, from giant telephoto lenses to Fastax cameras which can make up to 8,000 pictures a second” (29).

The overall effect of the photo-essay is mixed – we begin with a scientific accounting of the test, then lapse into wide-eyed sensationalism, followed quickly by a series of sobering shots of devastation, and concluding with a picture that can be read as signifying the thoroughness with which the historic moment was recorded, but

which also perhaps attached a show-biz glamour to the proceedings. A brief follow-up in the following week's issue (7/22/46) shows three more pictures, taken at the moment of the explosion, and sticks to a straightforward, informational tone.

On July 25, another bomb was detonated at Bikini – this one underwater. Pictures from the August 12 issue of *LIFE* are remarkable in their beauty, a fact that owes at least in part to the main photo's vantage point from the island. The camera looks down across the beach, dotted with palm trees and thatched-roof huts, out across the water, where a spectacular column of water erupts 5,500 feet into the sky. The editors called the photos "strange and terrifying," noting that the battleship *Arkansas* "appeared to be lifted bodily out of the water, [and] sank before the clouds cleared away" (8/12/46, 30). They seem both horrified and mesmerized by the pictures: "In its effect, as well as in appearance, the second Bikini bomb was more impressive than the first" (31).

With the focus squarely on the splendor of the Nuclear Sublime, readers may not have noticed the second technological story being told through the chronicle of Bikini Atoll. *LIFE* founder Henry Luce had noted years earlier that his new magazine was itself based on technology, and the editorial staff rarely missed the chance to celebrate their *own* technical accomplishments. In just two pages, the August 12 issue made at least six references to photographic technique and technology – in fact, at times the photography seems to be the real story, and the nuclear detonation merely an excuse to take pictures.

The automatic cameras that took the pictures from towers on the atoll were the same ones that photographed the over-water explosion a

month before. This time, instead of showing the familiar pattern of a towering smoke column, they recorded a thick column of water, topped by a low, flat mushroom of steam. It was perhaps the most awesome man-made spectacle ever photographed (30).

In the last line, it is the perspective, the attention, of photography that lends the events their importance – in a culture evolving from text to image, visual communications technology becomes central to the construction of meaning.

This tendency that pictures seemed to have – to both awe and mortify, to depict the monster so that fascination overrides fear – is precisely the process Christians has in mind in the previous chapter when he notes communications technology’s place at the “meaning-edge” of technological critique. If, as McLuhan says, “the medium is the message,” then we must understand how *LIFE*’s critique of technology is ever and always more significant than its expressed coverage of technical events such as those at Bikini Atoll. Every picture its photographers take make technological even the simplest and most non-mechanical occurrences, and if this process manages to render the mundane extraordinary or the unspeakable majestic, then it engages in an ongoing meta-critique of the capacity for communications technologies not just to record the world, but to impart meaning, to interpret reality, and to revise truth.

Truly, the meaning is the message.

A “Monstrous Mistake”: *LIFE*’s Coverage of the Apollo Disaster

LIFE adroitly reflected the mixed messages of the dawning nuclear age and the Space Race, but on January 27, 1967, the highly successful American space program presented the nation with an unmitigated tragedy, as astronauts Gus Grissom, Ed White, and Roger Chaffee were incinerated in an accident aboard the Apollo 204 spacecraft.

LIFE devoted space to the tragedy three times in the following weeks and months, the first being in the next week’s issue (February 3), which featured a fairly predictable *memoriam* for three fallen national heroes. In the February 10 cover story, expansive coverage is given to the astronauts’ funerals, and in many respects the “state hero” format of the coverage is reminiscent of the magazine’s coverage of the John F. Kennedy funeral. This photo-essay is capped by a two-page NEWSFRONTS OF THE WORLD feature entitled “The Search Begins in the Scorched Capsule.” Finally, in the April 21 issue, a two-page SPECIAL REPORT (featuring only one small photograph) recounts the disaster as told by the eyewitnesses in the wake of the government’s investigatory hearings.

LIFE’s coverage of this technological disaster reveals a dire respect for, and perhaps an almost subliminal terror of, the power of progress. But it also reveals a profound and by now predictable need to drag these fears out into the light where they might be safely and confidently explained by Science.

February 3: Ghost in the Machine

The across-the-fold layout introducing the pictorial obituary is accompanied by a single paragraph of text, two pieces of which foreshadow the more harrowing and detailed testimony we will see in future issues.

Think about them, how they were always willing to force themselves past the point of danger and deep fatigue to perfect their understanding of the machines they flew. It is the coldest sort of irony that they must have known instantly the exact nature of the monstrous mistake that killed them (2/3/67, 18).

In the first sentence, “the machines they flew” are depicted as alien – the heroes had to transcend the normal bounds of endurance in order to comprehend the forces with which they were involved. The requisite level of superhuman determination indicates the immense power of the machines, as evidenced by the degree of danger involved in flying them. In the second sentence, the choice of words is intriguing – “monstrous” obviously conjures “monster,” and juxtaposed as it is with the powerful alien flying machines, the reader might readily sense in the technology which slew the astronauts a malevolence, even a sentience – it is as though Frankenstein’s monster himself were loose aboard the Apollo craft.

For a brief moment, *LIFE* has indulged, if only metaphorically, our culture’s deep fears about the awesome power of Science.

February 10: The Scientific Impulse

The photos in “The Search Begins...” offer stark testimony to the brute rage of the inferno which killed Grissom, White, and Chaffee. As we view the interior of the capsule, we understand that no one could possibly have survived such a fire. The accompanying text calls “[w]hat remained of the \$35 million Apollo spacecraft...a ravaged shell...” and notes, in ominous terms, the destructive capacity of the highly pressurized oxygen environment (2/10/67, 30). The investigators had not yet

determined the cause of the fire, but attention was focused on NASA's employment of a pure oxygen environment instead of the less volatile oxygen-nitrogen mix used by the Soviets.

The severity of the disaster is signaled several ways: first, the text notes that a special 15-man board of inquiry has been assigned the task of investigating the disaster – an overt appeal to technical/scientific expertise necessary in the quest for objective truth; second, the invocation of the Soviet space program could not be read as anything but a brutal reproach against American designers; third, the text makes clear that the U.S. doesn't use the safer mixed-gas environment for reasons of cost and convenience, a further reproach that implies the astronauts died, in part, due to NASA's cheapness and sloth; and finally, the photo bottom right on page 31 shows the capsule's exterior, with the American flag scorched by fire damage. In case the reader manages to miss the message, the editors reinforce it by noting in the text that the disaster had marred "the flag-emblazoned capsule" (31).

April 27: The Book is Closed

The Apollo 204 Review Board "was never able to pin down the precise origin of the fire." It concluded that the craft contained "critical flaws, that there had been incompetent handling of test procedure, and that at several points the electrical system invited fire" (4/21/67, 113). It should be noted that other popular and well-respected publications at the time were raising questions about the future of the space program: should we abandon the moon project?; is the space program worth the cost?

LIFE avoided any critical analysis of the space program's role in the American Project. We should remember the significance the space race held in Cold War

America and the priority assigned to it by the country's fallen former President, John Kennedy, a man whose legacy had by now attained the stature of cultural myth.

The April 21 SPECIAL REPORT makes painfully clear the extent of the errors, mechanical and human, which led to the deaths of the astronauts. It depicts, as best it can, the full scope of the tragedy, and it characterizes the heroism of the technicians who tried desperately to rescue the trapped astronauts. Blame is assigned, and praise heaped out by the bucketful. In the end, the reader is left with a stirring tale of human tragedy, and now, nearly three months later, all trace of that initial superstitious fear has been expunged.

In *LIFE*'s coverage of the Apollo disaster there seems to be a clear trajectory from darkness to light, from fear to hope, from confusion to certainty. In the magazine's initial acknowledgment of the tragedy it seeks, as always, to construct heroes. But in the process, it momentarily permits a deep, yet persistent, cultural fear to bubble to the surface. The Frankenstein Complex remains – no matter how much we revere Science, no matter what faith we put in its powers of discovery, of healing, of salvation, we cannot seem to shake a lingering suspicion that we, like Victor Frankenstein, have created something which now exceeds our control. This fear often festers just beneath the surface of our consciousness, but in times of crisis the doubt in the dark recess of our collective awareness leaps up and shouts "I told you so."

We are quick, though, to shove such superstitious nonsense back into the closet whence it sprang, because the modern ideology of science, first elucidated by Bacon and his peers, demands that we analyze, rationalize, and explain. The only acceptable method of knowing is intellectual, and in such a world we can ill afford the intrusions of intuition. By February 10, the shock has faded a bit and *LIFE* can begin to sort out

the events of January 27. Experts are convened, and we are able to commence with the project of taming, if not our creations, then our fears about our creations.

Finally, the evidence all in, *LIFE* offers one more tale of heroism in its April 21 issue. In focusing on the personalities in the story, the discussion moves away from the collective (un)conscious and toward the triumph of the various astronauts, technicians, scientists and rescue workers. Thus, latent anxiety has been exposed to the light of Science, and the end result is the empowerment of the individual – which, in the grand design of the Enlightenment Project, is the ultimate goal of knowledge.

* * *

Frankenstein in Mirrorshades: The New Dystopia

*I am the jigsaw man
I turn the world around with a skeleton hand
I am Electric Head
A cannibal core
A television said*

– Rob Zombie, “More Human than Human”

In the 1980s and 1990s the technophobic impulse surged with an intensity not seen for decades, and one of the most vital drivers of this movement was the science fiction sub-genre known as *cyberpunk*. The cyberpunks basically told the *Frankenstein* story over and over again, but in an updated form that was as critically self-aware as it was artistically innovative. While the core principles that informed Shelley’s horror story remained the same, the world and the technology that filled it had changed dramatically, so when the cyberpunks set out to write *their* horror stories, they had to account for the fact that Western society hadn’t paid much attention to *Frankenstein* the first time around.

It’s hard to say why the cyberpunk ethos emerged exactly when it did, but it’s worth noting that these writers were alive to see some of humanity’s greatest

technological failures and thus had ample opportunity to incubate technophobic sentiment. Born into a world where Hiroshima and Nagasaki were a given, they were among a generation of American school children who practiced the “duck and cover” routine that would help save them in the event of a nuclear attack. They saw the triumphs of the space program, but most of them were teens when three astronauts were burned alive in their Apollo capsule on January 27, 1967, and they were likely paying close attention three years later when the crew of Apollo 13 narrowly avoided becoming the first astronauts to be lost in space. During the same time period the American war machine was in high gear in Southeast Asia, a manifestation of the monster that held profoundly personal implications for many young Baby Boomers⁵⁴.

On March 28, 1979, “a series of mechanical, electrical, and human failures led to what has been described as the worst nuclear power plant accident in the history of the United States” (Johnson “TMI”), but Three Mile Island paled in comparison to the disaster at Chernobyl on April 26, 1986, where an estimated 50 tons of radioactive material, or 10 times the amount of fallout at Hiroshima, were released into the atmosphere. As many as 10,000 people had died by 1991 (LaMotte “Chernobyl”; Gamota “Years Later” 4).

Already the toll on living organisms has been grave. During the summer of 1987, over 800,000 individuals were given medical examinations as a result of Chernobyl-related complaints. Unofficial estimates report that an unusually high number of women in the 100-

⁵⁴All of the writers associated with the main body of the cyberpunk movement are Baby Boomers. Rudy Rucker was born in 1946, the first year of the boom; John Varley was born in 1947; William Gibson, the movement's most celebrated figure, in 1948; Greg Bear, a fringe member of the club, in 1951; John Shirley and Pat Cadigan, 1953; Bruce Sterling, the movement's critical voice, in 1954; and Neal Stephenson, the genre's newest phenom, was born in 1960, the final year of the boom. With the exception of Stephenson, all of these artists are what we might call "early" or "mid" boomers – people who would have been old enough to have participated in their generation's defining moments in the middle to late-1960s.

mile radius around Chernobyl feared delivering their babies and aborted their pregnancies.

Some areas near Chernobyl have even now reported the total absence of animal life. Dead rats, mice and other wild or stray animals have been found in massive quantities. Mutations due to the radiation have resulted in farm animals being born without heads or eyes or internal organs (Gamota “Years Later” 4).

Not long before the Three Mile Island disaster, America was confronted by what would become the best-publicized toxic waste case in history, as Love Canal, a neighborhood in Niagara Falls, New York, became synonymous with toxic dumping. The area “was used as a chemical dump site from 1942 to 1953 by the Hooker Chemicals and Plastic Company. An estimated 21,000 to 22,000 tons of chemical waste, much of it highly toxic, was dumped at the site.

The site eventually became the first federal environmental disaster area. In some instances, the EPA found the level of contamination to be 250 to 5,000 times the level deemed safe. In 1978, because of abnormally high miscarriage, birth defect, and cancer rates, New York State evacuated 240 families from the area, families with pregnant women and families with children under the age of 2 years. Later, over 500 homes near the dump site were also evacuated (Earthbase “Love Canal”).

An even more spectacular chemical industry disaster occurred in December of 1984 in Bhopal, India, when

over 40 tonnes of Methyl Isocyanate and other lethal gases, including Hydrogen Cyanide, leaked from Union Carbide's pesticide factory in the northern end of the city, killing over 8,000 people in its immediate aftermath and causing multisystemic injuries to over 500,000 people. The number of deaths has risen to over 16,000 in the subsequent years and there appears no end to the physical and mental suffering caused by exposure to the poisonous gases (Sarangi).

There were other, “lesser” disasters, as well. On February 26, 1972, “more than 125 people were killed and thousands more were left homeless when a coal company's refuse pile dam collapsed, dumping millions of gallons of water and waste

materials on sixteen small communities in Buffalo Creek Valley, West Virginia (Earthbase). On March 17, 1978, the Amoco Cadiz, a supertanker filled with 223,000 tons of crude oil, lost its entire cargo in the Atlantic Ocean, off Portsall, Brittany, “covering more than 130 beaches in oil up to a depth of 30 centimeters.” The immense oil slick, “almost eight times the size of the 1989 Exxon Valdez spill off the coast of Alaska,” killed over 30,000 seabirds, “along with 230,000 tons of crabs, lobsters and other fish. Moreover, the area’s prized oyster and seaweed beds, which provided income for many local inhabitants, were completely destroyed” (Earthbase).

It’s impossible to quantify the effect these events and others may have had on this generation of writers (or the generation generally), but certainly we can say that the cyberpunks were socialized within a context where technology’s dark underbelly was exposed. They were also members of the first American generation to truly reflect Postman’s observation that science has made the spectacular so routine we have lost our ability to be amazed.

The cyberpunks are perhaps the first SF generation to grow up not only within the literary tradition of science fiction but in a truly science fictional world. For them, the techniques of classical “hard SF” – extrapolation, technological literacy – are not just literary tools but an aid to daily life (Sterling *Mirrorshades* xi).

Given that they write about a “science fictional world” from the *inside*, the cyberpunks are perhaps in a better position than any previous generation of SF writers to understand and reject the link between the hard science party line of Hugo Gernsback, who founded the highly influential *Amazing Stories* in 1926 (Tardy), and the positivistic ideology of science – the “technolatry” which lies at the core of SF’s traditional messianic rhetoric (Ross 105; Sterling *Mirrorshades* x). Taken together, these factors at least begin to explain how the cyberpunks were less wide-eyed and

naive about technology than artists of previous generations.

Cyberpunk vs. the Gernsback Continuum: Recovering the Monster

One of the cyberpunks' first and most important tasks was to recapture the science fiction genre for the dystopian cause, as it had been largely appropriated by the technotopian urge. The symbolic first shot in the revolution was fired in 1981, when William Gibson published "The Gernsback Continuum" in *Universe 11*. This seminal piece of short fiction finds Gibson, the man who literally invented our conception of cyberspace, tackling head-on the technotopianism of the genre's pulp history, delivering a "devastating refutation of 'scientifiction' in its guise as narrow technolatriy" (Sterling "Preface" x).

Sterling argued that Gibson's commitment to portray a "credible future" exemplified a responsibility that SF writers, drawn in recent decades to the post-apocalyptic genre, to sword-and-sorcery, and to modern space opera, had been "ducking for years." Sterling argued that this "intellectual failing" to "tangle with a realistic future" was redeemed by Gibson's dedication to depicting "a future that is recognizably and painstakingly drawn from the modern condition" (Ross *Strange Weather* 151).

The Frankenstein Complex had always been latent within SF, Sterling suggests, and as such cyberpunk doesn't represent something new so much as it does something very old.

Cyberpunk is a natural extension of elements already present in science fiction, elements sometimes buried but always seething with potential. Cyberpunk has risen from within the SF genre; it is not an invasion but a modern reform (Sterling "Preface" xv).

He might well have characterized cyberpunk as reactionary or fundamentalist: While

he doesn't trace the history of the genre back through the 19th Century, cyberpunk is really about a return to the original purpose of SF as established by Shelley.

In the preface to *Mirrorshades: The Cyberpunk Anthology*, Sterling assigns himself the daunting critical task of situating cyberpunk relative to the longer history of the SF genre. He pays homage to the canon: Ellison, Delaney, Spinrad, Moorcock, Aldiss, Ballard, Stapledon, Wells, and Varley are noted, and Pynchon is described as “a writer whose integration of technology and literature stands unsurpassed (Sterling *Mirrorshades* x). Even as he catalogues their names and recites the litany of their significant contributions to the genre, however, we find ourselves waiting for the other shoe to drop. For no matter how much Sterling and Gibson and John Varley and Rudy Rucker may revere “the steely extrapolation” of Niven, Anderson, and Heinlein or “the reality games of Philip K. Dick,” their ethic, broadly considered, constitutes a clear and decisive break with the more messianic view of technology which dominated 20th Century science fiction B.C. (Before Cyberpunk)⁵⁵. The essence of cyberpunk's demonic aesthetic is found, Sterling intimates, in society's loss of control over its technological creations.

Science fiction – at least according to its official dogma – has always been about the impact of technology. But times have changed since the comfortable era of Hugo Gernsback, when Science was safely enshrined – and confined – in an ivory tower. The careless technophilia of those days belongs to a vanished, sluggish era, when authority still had a comfortable margin of control (*Mirrorshades* xiii).

Sterling offers an intriguing assessment of both cyberpunk and the “traditional”

⁵⁵It's probably not entirely fair to lump Dick in with the technophiles. His writing, especially in novels like *Do Androids Dream of Electric Sheep*, which gave birth to Scott's brilliant *Blade Runner*, actually helped pave the way for the cyberpunks.

mode of SF which preceded it. Science fiction, despite its overt futurism, is always more about the present than the future, and in depicting the world to come it usually appeals to either our brightest hopes or our darkest fears – in some cases both. In doing so, it must inherently come to terms with whatever angels and demons reside in the collective dreams of the culture. From the perspective of the SF writer/clairvoyant, whether or not there is *actually* a madman with his finger on the Big Red Button is of less importance than how the possibility, the fear of such a circumstance, resonates in the minds of the readers and the politics of the society. Thus, we might expand Sterling's edict to include not only “the impact of technology,” but also “the perceived impact of technology.”

Sterling's pointed rejection of Gernsback (for whom SF's highest award, the Hugo, is named) is intended to establish cyberpunk's mission as more than simply a literary critique. What is ultimately under revision is the fundamental technophilia surrounding science and technology. In praising colleagues like Gibson for accurately addressing the “wrongheaded” thinking of the past (*Mirrorshades* 1), we understand that this new movement constitutes, at least for the principals, a sounder and more accurate critique not just of technology, but of culture.

What is Cyberpunk?: Some Basic Tenets

Sterling asserts that cyberpunk constitutes a significant break with traditional, or conventional science fiction. To understand the specific nature of this revision and the essential crisis in the cultural psyche which necessitated it, we need to understand

what it is about cyberpunk that sets it apart from earlier modes of SF. As Csicsery-Ronay irreverently demonstrates, the genre is given to certain easily identifiable thematic tendencies.

How many formulaic tales can one wade through in which a self-destructive but sensitive young protagonist with an (implant/prosthesis/telechronic talent) that makes the evil (mega-corporations/police states/criminal underworlds) pursue him through (wasted urban landscapes/elite luxury enclaves/eccentric space stations) full of grotesque (haircuts/clothes/self-mutilations/rock music/sexual hobbies/designer drugs/telechronic gadgets/nasty new weapons/exteriorized hallucinations) representing the (mores/fashions) of modern civilization in terminal decline, ultimately hooks up with rebellious and tough-talking (youth/artificial intelligence/rock cults) who offer the alternative, not of (community/socialism/traditional values/transcendental vision), but of supreme, life-affirming hipness, going with the flow which now flows in the machine, against the spectre of a world-subverting (artificial intelligence/multinational corporate web/evil genius)? (Leonard).

Csicsery-Ronay's cynicism notwithstanding, however, we can safely observe the following about cyberpunk⁵⁶.

First, cyberpunk SF typically depicts Earth in the near-future. Unlike space operas, which are usually set long ago in a galaxy far, far away, cyberpunk is almost exclusively concerned with our planet (and sometimes its nearby neighbors), and a majority of the action occurs in a future that is near enough to be recognizable. The average setting is probably be 50-100 years hence, although Sterling sets his *Shaper-Mechanist* series several hundred years into the future and Neal Stephenson's *Snow*

⁵⁶It should be emphasized in advance that, despite these observations and characterizations of the writers who have been lumped under the category of cyberpunk, it's not a genre with clearly demarcated borders; Sterling cautions against overgeneralization, saying that "the 'typical cyberpunk writer' does not exist; that person is only a Platonic fiction" (*Mirrorshades* ix).

Crash occurs in an alternate present. Gibson and Sterling's co-authored *The Difference Engine* is even set in an alternate Victorian past.

Second, cyberpunk typically depicts a “dark future.” The hero may survive to fight another day, but the general condition of the planet and the human condition is decidedly bleak. We almost always find a tremendous gap between the haves and have-nots, and the reader usually finds that some large institution – governmental, quasi-religious, or corporate – has become immensely powerful, and is either overtly despotic and repressive or, at best, is completely unresponsive to the plight of the masses. Generally, there is no hope for a better future (Ross 150).

Third, cyberpunk is obsessed with the “technocolonization” of the human body (Ross 152). The genre repeatedly engages the “theme of body invasion: prosthetic limbs, implanted circuitry, cosmetic surgery, genetic alteration. The even more powerful theme of mind invasion: brain-computer interfaces, artificial intelligence, neurochemistry – techniques radically redefining the nature of humanity, the nature of self (Sterling *Mirrorshades* xiii). But the question of human-machine interface is not limited to the physical implantation of technological devices. Stephenson's Metaverse (*Snow Crash*), an obvious extrapolation of Gibson's cyberspace, is accessed not through neural interface hardware surgically implanted in the brain (a motif popularized by Gibson in stories like “Johnny Mnemonic” and *Neuromancer*), but rather through advanced Virtual Reality “goggles-n-gloves” innovations. Further, not all technology-induced human evolution is mechanical. One of the factions vying for control of the solar system in Sterling's Shaper-Mechanist series (*Schismatrix*;

Crystal Express) has concentrated on evolving the posthuman through a combination of genetic engineering and biochemical enhancement. Still, these stories depict an accelerated human-technology integration, despite of the absence of “conventional” cybernetics.

Fourth, in cyberpunk technology has literally escaped human control. In much of Gibson's work, people often find that they have less control over their lives at the end of the adventure than they did when they began (Ross 150). Sometimes we see a Frankensteinian lab experiment run amok, as in Crichton's *Jurassic Park*⁵⁷. In other narratives the bogey might be an Artificial Intelligence (AI) that has somehow slipped the shackles of human dominion, as in Gibson's cyberspace trilogy (*Neuromancer*, *Count Zero*, *Mona Lisa Overdrive*). Or maybe the problem isn't alive and/or sentient technology, but is rather a runaway effect of technology, such as the tornado-stripped wasteland of Texas and the lower Midwest in Sterling's *Heavy Weather*. Here technology isn't the direct problem – the immediate concern is the uncontrollable ecological hellspawn of poorly managed progress. In any case, the cyberpunks are fascinated by what Winner has called “autonomous technology” – technology that is no longer within the purview of human agency.

Cyberpunk and Autonomous Technology

None of the various tenets of cyberpunk noted above are more essential to understanding the genre than this final motif, the recurring question of control and

⁵⁷Crichton isn't usually associated with the cyberpunks, but his writing is consistent with the cyberpunk ethic as respects its critique of science.

autonomy. In traditional depictions of science, Sterling suggests, the scientist possessed the power to control technology, to harness its mystical powers and drive them toward beneficent ends. He refers to the historical moment “when authority still had a comfortable margin of control.” The term “authority” seems to signify the myth of the scientist-hero, the near-omniscient technocrat of the Gernsback era, and in “control” he challenges the notion of human autonomy, that technology can be subjugated to the will of its creators. In the end of these stories the audience knows that all is well, that the techno-priesthead has triumphed, and that our scientific pursuits are, in the main, a manifest blessing for society.

For the cyberpunks, however, the realities of technology and the institutions it serves provide ample cause for unease. Science may have produced boundless wonders for public consumption, but the creators of these inventions are most emphatically *not* in control – not anymore, at least. True to the ethic of Victor Frankenstein, creation in the age of cyberpunk does not automatically guarantee authority over that creation, nor does it appear to burden the creators with even the slightest trace of moral responsibility for their inventions. “The street finds its own use for things,” Gibson tells us (*Burning Chrome*), and at street level – the level of lived cultural experience – technology and culture are indistinguishable. The theme of lost control in cyberpunk is an artistic analogue to Ellul, who situates technology so deeply within the core of society that it usurps all autonomy, and of Jonas, who laments that technology has slipped its ethical leash and argues that only a profound and renewed sense of moral responsibility can again bring the monster to heel.

The examples mentioned above illustrate the point. In Gibson's *Neuromancer*, the defining technological tale of our age, the protagonists complete their mission, uniting the two Artificial Intelligences and loosing the most powerful daemon (to use Victor Frankenstein's term) humanity has ever known. It doesn't immediately seek world domination, but it's not for lack of power, and the implication for a human race whose collective autonomy is dwarfed by its own creation weighs heavily throughout the novel. In Crichton's *Jurassic Park*, it is evident at the close that dinosaurs, including the baby-eating dilophosaurs, have escaped from the island and are loose on the mainland. Malcolm, the chaos theorist (an ethical twist on scientist-hero stereotype of classic SF) was right: Once technology sets things in motion, it's beyond the power of the park's agents, who represent the agency of human technology generally, to control them. And Sterling's *Heavy Weather*, which is concerned more with the indirect eventualities of technological development, suggests that ecologically we are nearing, and are perhaps already past, the point of no return. Vast stretches of Texas and the lower Midwest have been turned, via decades of environmental irresponsibility, into a colossal tornado corridor. In the book's climax, the troupe of storm-chasers finally encounters the much-theorized Class 6, a torus so huge and calamitous it is without precedent in meteorological history.

Traditional SF, in cases of catastrophe, can't quite bring itself to face the question of lost autonomy (remembering here that the insistence on human autonomy is an essential element of the technotopian ideology). In Shelley, the evil lies not in the act

of science which created life, but rather in the irresponsible abandonment of that life by the scientist. We might infer, despite Shelley's note in her introduction that such an endeavor is inherent folly, that had Victor treated the monster differently, he would have proven a noble friend and ally. Even in *Blade Runner*, Ridley Scott's proto-cyberpunk adaptation of Dick's *Do Androids Dream of Electric Sheep?*, we are treated to the Shellean notion that the murder and mayhem visited on the city by the replicants was the fault of society and the corporate culture which created them (Abbott). The androids are beautiful, powerful, and brilliant, but they are programmed to live only a few years⁵⁸. They are in the city seeking the scientist who created them, in hopes that he can provide them with a means to live longer.

Just before he dies, the leader of the group, Roy, attains something like spiritual transcendence, becoming momentarily more human than his human creators⁵⁹. His words to the protagonist, Deckard, recall the monster's words to Victor. The monster, we know, sought kinship with humanity. The monster in *Blade Runner* embodies a spectacular experience that, even if the specific references are obscure, nonetheless evokes grandeur, and a corresponding sorrow at the loss his death represents.

I've seen things you people wouldn't believe. Attack ships on fire off the shoulder of Orion. I watched C-beams glitter in the dark near the

⁵⁸The replicants were created to meet expressly utilitarian (commercial) demands for labor and sex in off-world (asteroid belt) mining operations. Nowhere is there any sense of moral context for their creation, and their sheer amorality exposes the flaw in the technological program that spawned them.

⁵⁹In doing so, he ironically echoes the scientist's words from earlier in the film: the company's motto is "more human than human."

Tannhauser Gate. All these moments will be lost in time, like tears in rain. Time to die (Scott *Blade Runner*).

The dominant technophilia embodies a powerful faith in human agency and control. Technology may present some problems. We may have disasters and crises. But when the dust has settled, order has been restored. The monster is dead and disposed of, and the children are safe once more. That Shelley did not have to kill off the monster, but could easily have chosen to leave him alive and afoot, is beside the point. The thing we must understand is that, in reflecting the angst of her time, Shelley found it appropriate to reserve, in the end, a measure of autonomy for the scientist. The circumstances may have been dire, *but it was not yet too late*.

In the era of cyberpunk, however, technology and its consequences have escaped humanity's gravitational sphere, and from this point forward society is fated to deal with its creations as autonomous entities or effects.

One symptom of a profound stress that affects modern thought is the prevalence of the idea of autonomous technology – the belief that somehow technology has gotten out of control and follows its own course, independent of human direction (Winner *Autonomous Technology* 13)⁶⁰.

Wintermute and Neuromancer, Gibson's AI entities, are sentient and seem fully autonomous even before the protagonists succeed in joining the two to form a superpresence. Literally, the human actors in the story are at the mercy of the machine's goodwill, and in most incarnations of the AI-as-Monster story, machine intelligence is at best indifferent to the well-being of humanity (Gibson's AI, in fact,

⁶⁰It should be briefly noted that while Winner does an outstanding job of describing the theory of autonomous technology, he does not believe technology has literally escaped our control.

is perhaps the most benign AI imaginable – the computer in *Tron* was bent on world domination, and bears more resemblance to the power-mad evil scientist archetype than it does to Wintermute, which was interested only in seeking out others of its kind). For Crichton's reconstituted thunder lizards, humans are food. And in the path of Sterling's Class 6, humanity is simply debris.

The transformation of society through technology, as imagined by the cyberpunks, has a strong basis in real-world forces. Quantum physicist Werner Heisenberg argues that due to modern means of “communication and of traffic,” the “process of expansion of technological civilization” has been completed.

Undoubtedly the process has fundamentally changed the conditions of life on earth; and whether one approves of it or not, whether one calls it progress or danger, one must realize that it has gone far beyond any control through human forces. One may rather consider it as a biological process on the largest scale whereby the structures active in the human organism encroach on larger parts of matter and transform it into a state suited for the increasing human population (Heisenberg *Physics and Philosophy* 189).

The dialogic process between science, literature and culture is dynamic and evolutionary, and the cyberpunks are addressing themselves to a genuine concern of the culture, just as Shelley's novel served a significant cultural need during the early 19th Century. Sterling may be less restrained than Heisenberg, but the arguments advanced by the renowned physicist and the prominent novelist are substantively the same.

Technical culture has gotten out of hand. The advances of the sciences are so deeply radical, so disturbing, upsetting, and revolutionary, that they can no longer be contained. They are surging into culture at large; they are invasive; they are everywhere. The traditional power structure, the traditional institutions, have lost control of the pace of

change (Sterling *Mirrorshades* xii).

The cyberpunk theme of autonomous technology implies the death of utilitarianism. If autonomy over technology has in fact been lost, then “technology is neutral” is no longer an ideology – it’s a prayer. Further, if we have lost control of our technological destiny (which is certainly the argument made by Ellul, who believes we have lost even the ability to claim subjectivity for ourselves), then the question of utilitarianism also becomes moot. Utilitarianism by definition requires dominion, and we cannot use something which we are unable to control.

The technological neutrality/technotopia loop is closed, at this point. In the technological system that Ellul describes and which the cyberpunks illustrate, the ideology of neutrality not only enables the techophilic project, it obscures the true character of autonomous technology. When Pacey and Jonas argue for a new ethics of development, what they suggest begins by necessity with an awakening to the actual technological condition – human culture must first *realize* its loss of control, in other words, and must then be motivated to act to regain autonomy. In the West, this is unlikely to happen as long as the “false consciousness” of human agency survives.

The Dark Near-Future: Cyberpunk and Cultural Plausibility

Especially during the Gernsback era and the heyday of the “hard SF” of Asimov, Heinlein, Niven, and Pournelle, the credibility of the narrative often hinged on the author’s familiarity with science. For Gernsback, science fiction had to be grounded in the laws of science as they were understood, or in rational extrapolations of those

laws (Ross 108). The link between technical accuracy and cultural plausibility was perhaps assumed (and in some cases was probably assumed too easily).

The cyberpunks turn this dynamic on its head, because they aren't especially worried about scientific accuracy. The famous story that illustrates the point relates to Gibson's first encounter with a computer. He wrote *Neuromancer* the old-fashioned way – that is, on a typewriter, not a computer word processor – and used the proceeds from the novel to purchase his first computer. His reaction was one of abject disappointment – is this all there is, he lamented? The irony is that his vision of cyberspace became a metaphor that strongly informed the actual development by real scientists and engineers of the Internet. His prescience, which has now largely become (virtual) reality, resulted not from his acquaintance with technical fact – instead, technical fact could only have *hindered* his construction of one of the most influential metaphors of our time.

Instead, the cyberpunks assert the importance of *cultural* plausibility – in pondering what the world will be like *X* number of years down the road, they often seem to find their answers by imagining that current conditions simply continue unabated.

Cyberpunk's "credible" near-futures are recognizably extrapolated from those present trends that reflect the current corporate monopoly on power and wealth: the magnification of the two-tier society, the technocolonization of the body, the escalation of the pace of ecological collapse, and the erosion of civil society, public space, popular democracy, and the labor movement (Ross 151-2).

At a glance, it might seem odd that our most substantial contemporary mode of science fiction would be comparatively uninterested in hard science, especially in an

age as technologically accomplished as the present. But perhaps the very ubiquity of technical triumph lessens the interest in minute detail we see in past generations of SF writers. In a world where space flight is still a fantasy, a writer of SF would feel a strong compulsion to justify speculation with as much solid scientific theory as possible. But in a world where we've been to the moon several times, where life is extended through pacemakers and artificial hearts, where advanced prosthetics (which are beginning to make realities of neural-interface technology) and joint replacements are commonplace, much of cyberpunk's technological extrapolation seems hardly futuristic at all. We have seen enough miracles that we hardly need convincing. And Sterling's contention that the cyberpunks were part of the first generation to grow up in a science fiction world also figures into this equation.

Technology, Media, and Religion: A Closer Look at Gibson's "Winter Market"

The body of cyberpunk SF is rife with examples that address one or more of the substantive issues discussed to this point (technotopia/dystopia, electronic media, spiritual transcendence, etc.), but most of the key themes converge in Gibson's remarkable "Winter Market," a short story that appears in his *Burning Chrome* collection.

The narrative revolves around Lise, a young artist whose body has been ravaged by a crippling disease, rendering her incapable of independent activity. She is able to fend for herself due to a polycarbon exoskeleton – a sort of full-body prosthetic hot-wired directly into the motor skills center in the brain. As the narrative opens, her

editor/producer, Casey, has just received news that she has “crossed over” – has “died.” The dramatic tension lies in the fact that, before she “died,” the entertainment megaconglomerate with whom she was contracted financed the downloading of her brain into a gigantic ROM-construct – essentially an advanced hard drive – in Los Angeles.

Lise's value to the corporation depends on advanced mind-machine interface technology. She is, for lack of a better term, a dream artist. As Casey explains,

...we call the raw product dry dreams. Dry dreams are neural output from levels of consciousness that most people can only access in sleep. But artists, the kind I work with at the Autonomic Pilot, are able to break the surface tension, dive down deep, down and out, out into Jung's sea, and bring back – well, dreams. Keep it simple. I guess some artists have always done that, in whatever medium, but neuroelectronics lets us access the experience, and the net gets it all out on the wire, so we can package it, sell it, watch how it moves in the market (123).

Casey's job is to “produce” these dreams, to whip them into something more accessible for mass consumption. “The stuff we get out to the consumer, you see, has been structured, balanced, turned into art” (123).

Technology here provides the ultimate tap into the human unconscious, an unprecedented means by which culture can access pure psychic content. It enables telepathy, and more, because it takes people beyond rational thought and into the essence of emotion. This technology transcends all other possible modes of communication, for what is imagined is the supreme medium, a means by which we can know not just the words, not just the thoughts of others, but their very souls.

The question of the medium's utopian potential is an open one, however.

Technology is readily available that allows people to “jack straight across” – that is, to essentially hotwire their brains in a techno-telepathic mind-meld. Lots of kids try it when they’re in high school, we’re told, but since it never proves to be the spiritually bonding experience they expect, few try it again. And while the communications technology that produces Lise’s art allows for a hyper-sharing of cultural experience, the result is nothing like the Great Community as Dewey imagined it. Lise is the despair of the postindustrial age personified, and her dreams express that nihilism in a way that clicks with the kids living on the streets. Her immediate and monumental success, once Casey “discovered” her, was due to the purity of the hopelessness she felt. As Rubin, Lise and Casey's junk artist mentor, explains,

They know. Those kids back down the Market, warming their butts around the fires and wondering if they'll find someplace to sleep tonight, they believe it.... She was big because she was what they are, only more so. She knew, man. No dreams, no hope. You can't see the cages on those kids, Casey, but more and more they're twiggling to it, that they aren't going anywhere (134).

Communications technology thus *denies* Dewey’s vision – while it certainly fosters communal connection, it only leads to a dark, cynical hole in the shadows where the economic and cultural have-nots can better share their nihilism.

When Lise “crosses over,” has herself translated into a hardwired program so she can keep producing her art after her body dies, Casey has to confront the knowledge that eventually the downloaded Lise is going to call (he’s her producer, after all). In a question that cuts directly to the heart of technology’s utopian potential, he asks Rubin, “is it her?”

Gibson is posing an old question, one for which we apparently have not found a satisfactory answer: *What is life?* Further, *can the essence of life exist within the machine?* Casey and Rubin know that a few others have done what Lise has, and one, a French writer, is still writing a few years after his death. But Lise's talent is more essentially creative, more intuitive. Hence, the essential issue – is there a difference between “thinking,” processing information in a more or less linear, routinized fashion, and “dreaming,” the more creative, associative act of juxtaposing images and concepts? Rubin's reply is enigmatic: “God only knows.”

The central questions of the story revolve around our notions of the origins and nature of life, the character of the soul, and most directly the possibility of life after death. What is Casey asking if not “is there life after death?” If the answer is yes, if the ROM-construct calls and it *is* Lise, then the millenarian heretics of the first millennium were right – technology does lead to heaven, or at least to the afterlife. Given the misery of Lise's flesh-life, what would we expect to be the quality of the electronic hereafter, especially since spiritual peace would compromise the nihilism of the art which made her what she was to start with? The litmus test will be, it is implied, whether or not the ROM-Lise can touch her audience in the same powerfully authentic way she did in *Kings of Sleep*, her first “soft,” a release so popular that the owner of the local store says people steal more copies of it than they buy of anything else.

Gibson is not unaware of the religious implications in the story, his refusal to negotiate the question on institutional (or even recognizably Judeo-Christian) terms

notwithstanding. In Rubin we have not just the oldest and wisest character in the story, but also one of the most thoroughly actualized characters in the entire corpus of Gibson's writing. As an artist who has attained international acclaim, he occupies a privileged position as the cast's elder, and as a collector of *gomi* – or junk, he is an expert on both the intended and unintended uses of things.

Rubin, in some way that no one quite understands, is a master, a teacher, what the Japanese call a *sensei*. What he's the master of, really, is garbage, kipple, refuse, the sea of cast-off goods our century floats on. *Gomi no sensei*. Master of junk (118).

.....
He has nothing to say about *gomi*. It's his medium, the air he breathes, and something he's swum in all his life. He cruises Greater Van in a spavined truck-thing he chopped down from an ancient Mercedes airporter, its roof lost under a wallowing rubber bag half-filled with natural gas. He looks for things that fit some strange design scrawled on the inside of his forehead by whatever serves him as Muse. He brings home more *gomi*. Some of it still operative. Some of it, like Lise, human (120).

That Rubin can consider questions like those posed by Lise's situation without resorting to conventional religious dogma is instructive. He doesn't appear to dismiss the idea of God – his evocation of divinity in "God only knows" seems earnest. But whatever God he believes in is a distant one, and not one to whom he can appeal for answers in circumstances such as this.

So Rubin goes about weaving cultural myths out of found bits and pieces, and despite himself becomes the closest thing to the voice of God in a story that cries out for divine pronouncement. In the moment which comprises the story's thematic pivot, Rubin appears to draw a line between animation and life, and if we read it on its most obvious symbolic level we can't help reaching a dystopian conclusion about

Lise's impending phone call.

Once he was showing me a book of twentieth-century art he liked, and there was a picture of an automated sculpture called *Dead Birds Fly Again*, a thing that whirled real dead birds around and around on a string, and he smiled and nodded, and I could see he felt the artist was a spiritual ancestor of some kind (137).

The phone might ring, and it may or may not be Lise calling from the other side, but the dead birds whirling around, ever in motion, suspended and animated by mechanical device, yet ever stuffed and lifeless, hints at the ultimate soullessness of the machine⁶¹.

⁶¹ROM-Lise recalls the Dixie-construct from *Neuromancer*. Dixie had been a top-flight hacker, and his consciousness had been downloaded, much like Lise's. The protagonist, Case, uses the construct to hack some especially nasty electronic defenses. The construct tells Case that its condition doesn't feel right, and asks to be erased at the end of the mission.

CHAPTER 4: “WHAT ARE WE DOING ON-LINE?” THE HARPER’S FORUM

Reality is death.

– Michael Benedikt

By now, it is hopefully clear the degree to which the countervailing ideologies of science and technology govern the pace and character of cultural progress in the West. However, it is equally clear that despite their power and longevity (or perhaps as a *result* of their power and longevity) these ideologies are all but invisible within the daily life of technological society. This transparency is fundamental to the function of ideology – the more devoutly we believe a thing without being aware of its existence, the less likely the belief’s tenets are to encounter critical examination or challenge that would threaten their potency.

Occasionally, though, the curtains are pulled back and the mechanics of previously unnoticed ideological apparatuses are laid strikingly bare. Such a moment occurs in the pages of the August 1995 issue of *Harper’s Magazine*, which featured in its FORUM section a roundtable discussion between four men with pronounced opinions about the future of the Internet: technotopians John Perry Barlow and Kevin

Kelly and technoresisters Mark Slouka and Sven Birkerts⁶². Such a collection seems designed to produce a clash of extremes instead of a moderating dialogue, as only Barlow among the panelists has ever indicated willingness to engage in a moderate examination of the Net.

Barlow leads the roundtable off with a pronouncement that's anything but moderate, however. Despite his reputation as a visionary of the online world, his contribution to the technotopian cause here more resembles that of PR flak.

...I still believe, that with the development of the Internet, and with the increasing pervasiveness of communication between networked computers, we are in the middle of the most transforming technological event since the capture of fire. I used to think it was just the biggest thing since Gutenberg, but now I think you have to go back farther (*Harper's Forum* 36).

He cleverly allows that "trying to characterize [cyberspace] as a good thing or a bad thing trivializes it considerably," and says that it's coming whether we like it or not (36). Despite Barlow's attempt to bypass discussion of good vs. bad, we immediately note that his argument serves the technophilic cause in two ways. First, he is asserting the ideology of value-neutrality, which ultimately feeds the utopian urge (notwithstanding Barlow's claim a few paragraphs later that "I certainly don't claim we're creating a utopia"). Second, depicting the rise of the Internet as inevitable attempts to derail resistance to development through rhetorical fiat. For the forces of progress, winning the argument would be nice, but having their basic precepts granted without debate would be even better. Thus, the first shot of the battle is a

⁶²The article is drawn from a discussion that had taken place earlier in the year in Cambridge, Mass., and as such we're aware that the exchanges we're reading are distilled and framed, despite their apparent spontaneity.

wonderfully subtle piece of misdirection hiding within grand hyperbole.

Slouka ignores the feint, calls Barlow on the “inevitability” ruse, and insists that “whether this is good or bad...has to be *the* point.”

But it seems to me that “inevitability,” when it’s tossed around too lightly, is a way of declaring by fiat something that should still be open to discussion. We are entering uncharted territory. We have no idea what the health implications of these technologies are. And yet they are being embraced uncritically (36).

Slouka’s parry is every bit as accomplished as Barlow’s thrust, and in the first few paragraphs we have centuries of ideological tensions already being reproduced in microcosm. The technophobic comment here, for instance, illustrates a number of characteristics we’ve seen at work in previous chapters. It is reactive, responding to the technophilic initiative; it manifests fear of uncertainty, invoking the motif of “uncharted territory” as surely as if logging onto the Net called up a warning that “here there be monsters” – we are not told the Net is bad for our health, but we ought to resist because the unknown *may* be bad for us; and it seeks an established safe haven – in this case, the term “uncritically” asserts the cultural capital of the intellectual, whose challenge of dominant ideologies is socially sanctioned, even if it isn’t taken as seriously as it ought to be.

Barlow reasserts the assumption of inevitability, saying there is “very little economic room” left in the physical world, and that people are migrating toward cyberspace for this reason. Birkerts challenges Barlow to explain what underpins the “theme of invulnerability” – it seems motivated, to him, by a “self-perpetuating logic” (37). Birkerts is getting close to the curtains, here, because “self-perpetuating

logic” indicates that the movement is not driven by independent, “real” social forces, but is instead the result of built-in assumption and ideological reproduction – Pacey’s “mainspring of technological misdirection” manifested once again.

Barlow’s reply moves us closer still to the curtains, because he inadvertently acknowledges that the motivating force is cultural, not inherently human (even though he’s attempting to prove the precise opposite).

It’s the thing that sets human beings apart from all other species on this planet – a permanent hardwired dissatisfaction with the ecosystem they find themselves in. And a desire to adapt it to them, instead of to adapt to it. That itch is at the root of the human spirit (37).

Slouka replies that *he’s* not dissatisfied with his ecosystem, but somehow fails to notice the contradiction in Barlow’s own reasoning: Just two paragraphs earlier he was explaining how he longs for aboriginal simplicity.

There are times when I honestly believe that we would have been better off if we’d gone the way of the Aborigines, who have been sitting out in the Australian desert for the last fifty thousand years and have come up with precisely three tools.... As a result they are probably a lot more connected to the soul of the universe than we are at the moment (37).

Dissatisfaction with the ecosystem isn’t an inherently *human* trait, we realize, but is instead a product of Western ideological socialization – one that finds its ultimate expression in America. Barlow’s self-contradiction, then, can be construed as opposing eco-dissatisfaction and Western progress with an aboriginal ethic (consistent with many non-Christian cultural perspectives) that is more connected to the “soul of the universe.”

Slouka and Birkerts both implicate technological development in creating the

conditions that cyberspace now seeks to correct. Says Slouka, “every place I’ve loved in this world has been paved over, malled over, disappeared.” But their solutions to the problems they identify are reflective of the innate weaknesses of the technophobic stance. The pastoral ideal holds the key: “the only choice we have is to resuscitate our failed communities, to bring back Pinedale and Putnam Lake – to align ourselves with physical reality before it’s too late.” Regarding the Internet, Birkerts sums up his response in two words: “Refuse it.”

However, the pastoral isn’t structurally prone to proactivity, to *doing* – it is instead about *not doing*⁶³. If the initial conditions are satisfactory – which is to say, if the pastoral already exists and the goal is preservation, then “refuse it” is a sounder and more workable policy option, easily expressed, codified, and executed. However, once the pastoral ideal is lost, active, pragmatic engagement is required for its recovery, and put simply, the techno-dystopian urge is ill-equipped for such a task. Placed into the context of the “inevitable” ascendance of cyberspace, “refuse it” might be workable on an individual level for someone uninterested in participating in the popular culture and economy, but it most assuredly does *not* offer a tenable policy solution for society generally (especially one as thoroughly captive to the logic of technological progress as ours). Even if we agree that Slouka and Birkerts are possessed of noble ideals, we must acknowledge that “refuse it” isn’t especially realistic when set against the powerful ethos of dominion set forth in Genesis.

⁶³The Luddites sought to prove differently. Their courage and conviction notwithstanding, it’s important to recall how badly the movement was crushed. The Luddites mounted a spectacular failure, but it was failure just the same.

Barlow admits as much, saying that he's for the right to refuse progress "to the extent that choice is possible," but in the end the only real choice he sees is between becoming wired or living the life of a "determined Luddite."

Soul-Data

Birkerts offers some thoughts on how technologies invade his "very nineteenth-century, romantic views of the self and what it can accomplish and be." In his pursuit of this personal ideal, technologies of even the simplest sort are depicted as intruders, "as being in so many ways designed to pull me from that center of focus" (38).

Never mind the telephone or e-mail – even traditional mail "almost feels like too much." Barlow agrees with Birkerts almost completely, saying "if I were to describe my aspirations I wouldn't use many different terms from what you just did." He acknowledges that information, as applied by communications technology, has separated human beings from meaningful face-to-face interaction. This brief moment of accord establishes the basic assumption from which the most compelling phase of the debate issues – the core of the discussion, says Barlow, is "experience...the stuff of the soul" (38).

In tracing his own personal journey from info-refuser to info-disciple, Barlow maps a strikingly Dante-esque path through the wasteland.

...what I finally concluded was that there were so many forces afoot that were in opposition to that way of life that the only way around technology was through it. I took faith in the idea that, on the other side of this info-desert we all seemed to be crossing, technology might restore what it was destroying.... But if we're going to get back into an experiential world that has substance and form and meaning, we're

going to have to go through information to get there (38).

These few sentences are remarkable for the way they trade in unmistakably religious imagery, transforming the apparently secular discussion of the Internet into something with a sacred dimension. Barlow opposes the “info-desert” with the soul-data of experience, a construction that calls to mind the ancient Hebrews’ quest for the promised land. The journey is mythical and archetypal, with redemption awaiting those who triumph over hardship and tribulation. We also hear an echo of the *Inferno*, where the path to Heaven leads straight through the maw of Hell.

The word “faith” invokes the theological, but the *character* of the faith is likewise very Christian in its non-rationality – after all, the history of industrialism offers few examples of technology restoring what it has destroyed. We recall, though, that the ideology of information sees the industrial condition as obsolete – in fact, the notion that the information age overcomes the failings of the industrial is a key component of the Netopian urge. What Barlow has said, or at least intimated, in this passage, is that the only remaining path to salvation for most people is *through cyberspace*.

Departing from the purely pastoral view espoused by Sale, who sees human perfection lying in immutable harmony with the natural order, Birkerts (following Rilke) says that “The ultimate human purpose is to transform,” and that the world lies within humanity, not outside it.

I always read those two statements as saying that our collective evolutionary destiny is the conversion of contingent experience into soul-matter. But what I see happening instead is our wholesale wiring. And what the wires carry is not the stuff of the soul (38).

In this brief exchange between Barlow and Birkerts the whole of the Western debate

over technology, as manifested most recently in dialogues over Internet development, becomes manifestly theological. What is now evident is that the human purpose is spiritual actualization (whether seen as building New Jerusalem, recovering pastoral Eden, or converting “contingent experience into soul-matter,” the core issue is the transcendence of the human soul). All that remains is to figure out which path makes this possible.

Birkerts’ repeated assertion that “soul-data doesn’t travel through the wires” is Kelly’s cue to join the fray:

I have experienced soul-data through silicon. You might be surprised at the amount of soul-data that we’ll have in this new space (39).

The Internet is a “communications revolution,” says Kelly, and “communications is, of course, the basis of culture itself.” The Internet enhances communication, and therefore enhances culture by default. More essentially, cyberspace becomes the direct conduit to actualization because it’s the domain of the aesthetic.

At one point, in an essay on the experience of reading, you ask the question, “Where am I when I am involved in a book?” Well, here’s the real answer: you’re in cyberspace.... You’re in the same space you are when you’re in a movie theater, you’re in the same space you are when you’re on the phone, you’re in the same space you are when you’re on-line (39).

Birkerts rejects this claim, appealing to a McLuhanesque insistence on the shaping power of the medium. The words themselves carry vastly different meanings depending on whether they’re printed in a book, written above a stadium by a skywriter, or engraved on a tombstone. “The medium matters because it defines the arena of sentience,” says Birkerts.

We infer that the book inscribes an “arena of sentience” that is more susceptible to the existence and transmission of soul-matter than is cyberspace, which not only transmits words, but “also says that communication is nothing more than the transfer of evanescent bits across a glowing panel.” Slouka agrees, arguing that electronic communication lacks the permanence of the book, which is “something you can hold onto.”

There is something else going on here, too. And that is what happens in the process of reading. When you read a book, there’s a kind of silence. And in that silence, in the interstices between the words themselves, your imagination has room to move, to create. On-line communication is filling those spaces. We are substituting a transitional, impermanent, ephemeral communication for a more permanent one (40).

Intimations of Reformation

Metaphorically, at least, we notice an almost Catholic vs. Protestant divide between the participants. By “Catholic,” what is implied is a more institutional and hierarchical relationship between humanity and divinity, in this case signified by the quest for spiritual actualization noted in the *Harper’s* debate. The Catholic church, especially prior to Gutenberg, represented a powerful and meticulously defined structure of salvation, with the Great Chain of Being defining the ordained place of each member of society. A person approached salvation in an institutionally sanctioned manner, and revelation flowed from God to Man through organizational channels designed to establish, shape, and apportion Truth in a fashion deemed appropriate by the elect. In the FORUM, this structural philosophy is represented by

the technophobes, Slouka and Birkerts. All parties agree that the technology of print is highly institutionalized – “Sitting between the author of that word and the reader of that word is a huge mediating organism made up of organization and capital,” says Barlow, a proposition Birkerts acknowledges⁶⁴. And reading a book is a one-way channel of communication. Barlow tells Birkerts that with an interactive experience you can ask questions – “Sven, because you’re sitting here, I can ask you questions about your book. As a reader, I can’t.” Birkerts reply is swift and instructive: “But as a writer I didn’t want you to” (40). In the world of print, speaking to an audience of any size is a privilege, and requires that status be bestowed by a publisher.

The medieval Church didn’t especially want common worshipers asking a lot of questions, either – the organizational hierarchy was not established to promote egalitarianism and interactivity. The info-resisters in the Internet debate likewise hold out for a measure of elite control, for the right of the culturally sanctioned authority (in this case, the publishing establishment) to determine who speaks and who listens. This ordination establishes the author as occupying a place higher in the Great Chain of Being than the reader, just as the priest stands higher in the divine order than the parishioner. On the other end of the communications dyad, we note Slouka’s revealing reference to the “silence” in which reflection takes place. In his view, the ordained speak, and the populace listens. There is no question as to his sincerity in asserting the power of reflection, but it is also worth noting that his

⁶⁴If this forum is remarkable for its arguments, it’s also noteworthy for its *missed* arguments. While the publishing industry certainly represents an institutional establishment that restricts access to ordained loci of speech, the economic conditions surrounding the Internet often represent an economic barrier to speaking *and* reading.

cultural capital issues from the institutional authority of the publishing industry. In defending the traditional hierarchies of writing and reading, he is also defending his own privileged place as an ordained *speaker* of cultural truth.

Barlow, though, wants interactivity in the same way the Protestants wanted a personal relationship with divinity, and the Internet comprises a multitude of voices, all of which are ostensibly equal (at least, whatever hierarchies exist do not result from institutional structures). On the Internet, everybody is a writer, everybody is a publisher, and there are no artificial institutional sanctions which mark the words of one participant as inherently more valuable than the words of another. If a person *does* attain status online, it is assumed to be as a result of one's activities online. In this view – the communitarian and Jeffersonian ethics from the first chapter – the Internet represents the ultimate democracy of thought.

Barlow extends the relationship between communication, culture, and transcendence by asserting the importance of the *speed* of connection.

...in order to feel the greatest sense of communication, to realize the most experience, as opposed to information, I want to be able to completely interact with the consciousness that's trying to communicate with mine. Rapidly. And in the sense that we are now creating a space in which the people of the planet can have that kind of communication relationship, I think we're moving away from information – *through* information, actually – and back toward experience (39-40).

Barlow doesn't make the connection with Kelly's "hive" metaphor here, but the immediacy of wired humanity contrasts strongly with a more "Catholic" mode of monastic reflection, which Birkerts centers in linguistic immersion.

I would write very differently if I were typing on a terminal and my

readers were already out there asking me questions. Writing a book is an act of self-limitation and, in a way, of self-sublimation into language and expression and style. Style is very much a product of the print medium.... If we're going to engage the universe, comprehend it and penetrate it, it will be through ever more refined language. The screen is a linguistic leveling device (41).

Birkerts demands that we see the writer as the medieval monk archetype, preserving the sanctity of language through the Dark Ages, especially against the “leveling” effects of the Internet. The “deep tendency of the circuited medium is to flatten language,” he says, and his terminology is inherently bound up in an ethic of privilege which draws lines between the elite, entrusted with knowledge, and the popular, above whose level of comprehension that knowledge must remain.

Language does not exist in a vacuum, and no matter how Birkerts or Slouka (or Sale or Innis, for that matter) sanctify its role in facilitating evolution and actualization, the simple fact is that language is an extension of the human mind. Language, thus framed, is an innately political concern – if we speak of linguistic leveling in this way, we are in reality characterizing the intellect of Common Man in less-than-flattering terms. In the construction developing in the *Harper's* debate, the elect are the disciples of traditional print, while the masses are the denizens of the Net⁶⁵. Therefore, “Catholic” and “Protestant,” in the metaphorical sense employed above, signify a knowledge-exclusive elite ethic opposed by a populist, open-knowledge ethic that structurally mirrors the general character of the Reformation.

⁶⁵Ironically, as this debate took place, less than 30 percent of the American population was online, and the average Netizen reflected not the masses (the working classes, the “people,” etc.) but rather society’s better educated and more affluent members – the info-haves, in other words, whose economic status afforded them earlier access to the technology.

The Netopians celebrate this openness as democratic and empowering, but the elite response dismisses the popular discourse as noise. According to Slouka:

You can cut out the middleman – the publisher and the agent and everybody else. But when you open the floodgates entirely, you don't get egalitarianism. You get babble. My shopping list becomes as valuable as Cormac McCarthy's latest book. And then you go back to thinking, "Well, wait a minute, maybe those middlemen had some function, however flawed they were" (42).

Birkerts is only half-joking when he adds, "I want my hierarchy!"

The Problem of the Physical

The participants at this point turn their attention to physical embodiment and its role in spiritual enlightenment. Both sides have by now established the advancement of the soul as the highest of human questions, but all of a sudden the technophobes, whom we have elsewhere associated with anti-materialist sentiments, are insisting on the primacy of *physical* experience in attaining spiritual evolution. The exchange begins when Barlow asserts that the response of the online community in the wake of his lover's death (he eventually received a megabyte of e-mail from people all over the world, almost all of whom were strangers to him) made him feel a connectedness to the rest of the species (42). Slouka and Birkerts respond that a *real* (physical) community of friends could have provided a greater intimacy and more personal sharing of grief. Says Slouka:

My point is not that you can't find compassion and communitarian values on the net. You can. But you can find them just as well, and better, in a real community. One phenomenon I encountered on the Internet was that people would put words like "grin" or "smile" or "hug" in parentheses in a note. It's a code meaning cyberhugs,

cybersmiles, cyberkisses. But at bottom that cyberkiss is not the same thing as a real kiss. At bottom, that cyberhug is not going to do the same thing. There's a big difference (42).

In the techno-dystopian view, the virtual world seeks to replace the real, and Slouka wonders where the need for alternate spaces comes from. His answer: "to escape the problems and issues of the real world." If the goal is to sidestep reality, then cyberspace represents an abdication of responsibility for the "sexism, ageism, racism – all the collected "isms" that go along with life in the real world" (43). The human possibility, in Slouka's view, has as a prerequisite physical embodiment, and attempts to bypass the realities of the material world are escapist and damaging to the culture.

Kelly counters that escaping into cyberspace is no different than escaping into the unreality of a book, and Birkerts acknowledges that "reality often is not enough." The issue for him, however, is not whether humanity cultivates "auxiliary" spaces for intellectual reverie and escape, but rather whether the rise of the Net represents "a potentially all-transforming event" that will change not just the lives of current generations but also future generations. "I don't believe it's merely going to be auxiliary. I think it's going to be absolutely central" (43). Even the "determined Luddite" approach won't wholly suffice for those who want to maintain their real worlds.

But even if I've pledged myself personally, as part of my "refuse it" package, to the old here and now, it still impinges on me, because it means I live in a world that I find to be increasingly attenuated, distracted, fanned-out, disembodied. Growing up in the Fifties, I felt I was living in a very real place. The terms of human interchange were ones I could navigate.... More and more of the interchanges that are being forced on me as a member of contemporary society involve me having to deal with other people through various layers of scrim,

which leaves me feeling disembodied (42).

At this point, an odd reversal of perception and desire becomes apparent. Earlier in the debate the technophiles were celebrating the immediacy of interactive exchange online while Birkerts and Slouka were longing for the reflective spaces afforded by the hierarchy of publication institutions. Now, though, we find Birkerts promoting the virtues of immediacy in geo-proximate community.

I do believe that we gain a lot of our sense of our own reality and validity through being able to hear an echo, by getting our words back, by being mirrored. And community, in the old-world sense, was about being mirrored immediately. You know, you yell for Clem, and Clem yells back, and you understand the terms of your own world. Now you type something to, say, Kiichi in Tokyo, and it comes back a few hours later. You're being mirrored in another way. Maybe it's because I'm not on-line, but it seems to me, as an adult living in 1995, that the signal is getting weaker (43-44).

So, with respect to the migration of communications from traditional publishing hierarchies into the decentralized and egalitarian Internet, the technophobes value space and distance, but with respect to their physical lives, they value presence and immediacy. The technophiles, on the other hand, seem to be promoting the exact opposite: They're comfortable with the idea that community can span vast physical distances, easily accept Kiichi instead of Clem, but insist on immediacy and interactivity in intellectual spaces the pre-wired world reserved for silence and reflection. In this, they seem to be holding out for a concept of human identity with clearly defined physical and mental components.

The FORUM: Millenarians and Romantics?

The premise that intellectual and spiritual transcendence is grounded in the physical order is essentially Romantic, and the structure of enlightenment envisioned in the *Harper's* roundtable by Birkerts and Slouka place them squarely in line with Blake, Wordsworth, Byron and the Shelleys. For the Romantics, the natural order and change within it “serves only as stimulus to the most characteristic human activity, that of thinking.”

...Romantic poems habitually imbue the landscape with human life, passion, and expressiveness. In part such descriptions represent the poetic equivalent of the metaphysical concept of nature, which had developed in deliberate revolt against the world-views of the scientific philosophers of the 17th and 18th centuries, who had posited as the ultimate reality a mechanical world consisting of physical particles in motion (Abrams 1290).

The physical world represents a tactile link to the spiritual realm, giving “direct access to God, and even as itself possessing the attributes of divinity.” Wordsworth, for instance, asserted in *The Prelude* that “God’s creation constitutes a symbol system, a physical revelation parallel to the Revelation in the Scriptures” (Abrams 1290). For Blake, human imagination was necessary to elevate nature to something more than “dirt upon my feet, no part of me” (1291). Thus, for neo-Romantics like Slouka and Birkerts, spiritual transcendence has as a necessary condition a grounding within the physical world, and the degeneration of worldly experience, such as the Internet’s tendency to cause withdrawal from the physical into the virtual, would signal a degradation of spiritual possibility.

The technophiles, however, are the intellectual progeny of the millenarians, the

disciples of the House of Salomon, and cyberspace is a New Jerusalem beyond Bensalem's wildest dreams. For them, machinery doesn't impede the trek of the soul, it speeds it. Barlow concludes the debate by returning to his earlier invocation of Nietzsche, who said that sin is that which separates.

If it feels to me that technology separates me, I try to reject it. If it feels like it has within it the opportunity to bring me closer, on some spiritual level, to the rest of humanity, I accept it (*Harper's* 46).

But Barlow doesn't feel cyberspace separating him from humanity – instead he feels technology pushing the species toward spiritual transcendence. Stenger puts the vision this way:

On the other side of our data gloves, we become creatures of colored light in motion, pulsing with golden particles. Forget about Andy Warhol's petty promise of fame for fifteen minutes. We will all become angels, and for eternity! Highly unstable, hermaphrodite angels, unforgettable in terms of computer memory. In this cubic fortress of pixels that is cyberspace, we will be, as in dreams, everything: the Dragon, the Princess, and the Sword (Stenger "Mind is a Leaking Rainbow" 52).

Stenger associates the vision with Eliade, who sees the experience of the sacred as

a discontinuity in the sense of space and time: "For religious man, space is not homogenous, he experiences interruptions, breaks in it, some parts of space are qualitatively different from others." That we should have chosen to desacralize the world through modern science does for Eliade not change anything. For the Sacred is a dimension of consciousness.... Cyberspace creates a break in the plane of reality, one that seems to generate the ideal conditions for a "hierophany: an interruption of the sacred that results in detaching a territory from the surrounding cosmic milieu and making it qualitatively different" (Stenger 54-55).

In examining this definition of the sacred, we recall Kelly's assertion above that cyberspace is the domain of the aesthetic. This psychic space is inherently

disembodied, a condition which represents a technological channel by which we may approach the *viseo dei* – the perspective of God. The pioneers of cyberspace were self-consciously in the pursuit of divine oneness, and cyberspace researchers routinely take the Gibsonian approach that the body is “meat.” As a housing for consciousness it has served a purpose through the millennia, but once networks reach a certain critical level, flesh becomes obsolete as consciousness migrates into a more efficient environment. The cyberconsciousness is divinely at one with all information and is effectively immortal (Heim “Erotic Ontology”; Noble *Religion of Technology* 159).

In the end, reality is mortality and all it entails.

Benedikt argued that cyberspace is the electronic equivalent of the imagined spiritual realms of religion. The “almost irrational enthusiasm” for virtual reality, he observed, “fulfills the need “to dwell empowered or enlightened on other, mythic, planes.” Religions are fueled by the “resentment we feel for our bodies’ cloddishness limitations, and final treachery, their mortality. Reality is death. If only we could, we would wander the earth and never leave home; we would enjoy triumphs without risks and eat of the Tree and not be punished, consort daily with angels, enter heaven now and not die.” Cyberspace, wrote Benedikt, is the dimension where “floats the image of a Heavenly City, the New Jerusalem of the Book of Revelation. Like a bejeweled, weightless palace it comes out of heaven itself...a place where we might re-enter God’s graces...laid out like a beautiful equation” (Benedikt “Introduction” 14-15; Noble 159-160).

CONCLUSION

Without Contraries is no progression.

– William Blake

The history of technology in the West has been a rich and nuanced one, with ideologies that have informed centuries of tension and debate so thoroughly integrated into every dimension of culture that, as we prepare to enter a new millennium, some critics argue that technology has now *become* the culture. Even would-be technoresisters, neo-Luddites whose stated lifestyle choice is to “refuse it,” lament that technology is so ubiquitous its tendrils intrude into even the most non-technical spheres of human life.

Claims made for and against the Internet, as spectacular and seemingly novel as they often appear, are not new – in fact, we might well conclude that the Great Internet Debate is in essence the same argument we’ve been having over and over again for centuries. The rhetoric of Internet development is important to consider not because it’s new, but rather precisely because it *isn’t* new – the idea that the Internet is unprecedented, and represents revolutionary new possibilities for human society, distracts us from a meaningful evaluation of how we want to employ this new medium, and why. Even if we dismiss 90 percent of what the technophiles have to say in Chapter 1 as cheerleading and self-interested hyperbole, the remaining 10

percent probably indicates a productive role for cyberspace in any critically-aware model we imagine.

Of course, the Net is different from other innovations, just as TV was different from radio, and radio from the telegraph, and the telegraph from the railroad. But the failure to see how it is also *the same* locks us into the “mainspring of technological misdirection,” the almost pathological cultural addiction to progress for its own sake. Nobody outside of radical resisters like Sale is suggesting that progress *per se* is a bad thing, and most of the technophobes quoted herein situate their critiques less in an innate evil associated with the machine than they do in policy and practice divorced from ethics. What thinkers like Pacey and Jonas seem to want is a return to the ethos of Postman’s tool-using culture, where religious, political, and social traditions provided a context for the use and development of technics. Such a reform would likely satisfy the Stolls, Sloukas, and Birkerts who populate the dystopian side of the dialogue.

Despite the claims, counterclaims, and complexities associated with Internet rhetoric, there are some things we can conclude about technology in the popular mind. First, everyone associated with the debate shares the goal of elevating humanity, although how it is accomplished and what exactly comprises “elevation” may differ. Some views emphasize material improvement, as with the economic technotopians noted in the first chapter. Vice President Gore and the National Information Infrastructure Task Force take improvement of people’s financial condition as a self-evident boon, and one from which all manner of other

improvements issue. In their view, universal access to the mass of information online and the medium's power to connect resource-poor remote areas with resource-rich urban centers constitutes a bridge between haves and have-nots. The same assumptions underpin the reforms proposed by educational entrepreneurs like Papert and Perelman, as well – whatever other advantages accrue from the Internet, it all begins with material conditions: access to information, access to markets, access to communications.

For others the advancement of humanity hinges on communal and spiritual conditions. The new communitarians see human possibility in interaction. The Net overcomes industrialism, which isolated people from each other and paved over the common spaces where shared communal life once took place. Technology elevates humanity by resurrecting civic engagement and providing people with a means to connect, consider, and formulate action over the issues that affect their lives. Some see the wires as a new forum for the propagation of “soul-data”: The Net spurs reading, writing, and art, jump-starting cultural literacy and establishing a new realm for the development of the aesthetic. And in the most radical view, the metaphor of the hive, cyberspace is seen as the means by which humanity evolves into posthumanity, joining together in a collective intellect, the oversoul. We will be as gods, disembodied creatures of spirit and light, our virtual perception the *viseo dei*.

The utopians portray the Internet elevating humanity in these ways and more, but the dystopians who answer them likewise are concerned with the advancement of the human species, and their arguments usually fall along the same dimensions as the

utopian. The economic view, for instance, takes most of the technotopian assumptions regarding the relationship between material conditions and human possibility at face value, but sees the Net as structurally worsening an already bad situation. These technophobes want greater wealth spread among more members of the society as well. As the economic debate phases over into the educational, we find the dystopians valorizing learning on all fronts, seeing education as the cornerstone of all human possibility. However, the Internet hinders human development because it stands as a barrier between teacher and student, and it is this personal, face-to-face connection which fosters true learning. Furthermore, the Internet impedes actualization by fostering the incorrect belief that information equates with knowledge and wisdom. These critics would do away with or severely limit the influence of technology on the educational process, instead devoting the resources earmarked for wiring classrooms to more important things, like the hiring and training of more teachers.

Those who dismiss the new communitarian argument agree with the utopians that human interaction is a key to emotional and spiritual actualization, but see the Internet as preventing the development of real relationships. Instead of being out engaging in physical interactivity, Netizens are absorbed by the machine, interacting with photons on a screen, submerging themselves in shallow, chimerical pseudo-relationships with people who are often nothing like they portray themselves online.

What perhaps becomes clear at this point is that, our definitions of “utopia” and “dystopia” notwithstanding, *all* of these views are at once utopian and dystopian, and

further, that utopia and dystopia are merely flip sides of the same coin, *yin* and *yang* manifestations of the same primal human urge toward growth, actualization, and transcendence. Most, if not all, of the rhetoric we see on both sides of the Net question in Chapter 1 has in common a sense of society's perfectibility (if not literally, certainly in the sense that paradigm-level improvements, rather than incremental ones, are within our grasp).

If a pure utopia is a perfect place, and a pure dystopia is a place of abject misery, then we might best see the "utopian impulse" as comprised of: *a*) a dire sense of the present condition; *b*) a vision of the ideal (the pure utopia); *c*) a drive toward a wholesale narrowing or closing of the gap between the two. The "technotopian impulse" would add to the equation: *d*) the conviction that technology is the means by which the gap can be closed. The "techno-dystopian impulse" would add to the equation: *d*) the conviction that technology cannot close this gap; that in fact, technology (as currently conceived and controlled) can only widen the gap.

Eden and New Jerusalem

Theology, and especially Christianity, is implicated throughout this analysis of our technical ideologies, and its role is often confusing. For instance, during the Middle Ages we see two conflicting modes of thought – the conventional mode of the Great Church and the millenarian doctrine – within the same religion. American Protestantism is depicted as furthering technological progress early in the history of the U.S., but is also associated with fundamentalist dogma that sees science as

opposed to Christianity. We can observe certain tendencies in these arguments – divisions along intellectual class lines, for instance – but at a point the quest for definitives becomes counter-productive. We can observe with some clarity, though, that Christianity generally is built upon tenets that are distinct from those we find in other world religions, and these tenets – notably, the doctrine of dominion – feed a particular view of the afterlife that is relevant to our discussion of technologies.

The ideologies we see opposed throughout so much to the discussion – the pastoral/Romantic and the developmental/millenarian – have substantially different visions of what the perfect condition looks like, and these views have corresponding visions of Hell, as well. In the pastoral view, perfection is the garden, Eden before the Fall. The highest expression of humanity is the “renaissance primitivism” Marx attributes to early rhetoric surrounding the Americas, of unimproved and unimprovable Natural Man. If utopia is Eden in this view, then dystopia is the Tower of Babel, a world where the degenerate works of humanity, issuing from the arrogance of intellect associated with the Tree of Knowledge, have placed a world of physical barriers between sinful Man and the divine grace of God⁶⁶.

3. And they said one to another, Go to, let us make brick, and burn them thoroughly. And they had brick for stone, and slime had they for mortar.

4. And they said, Go to, let us build us a city and a tower, whose top may reach unto heaven; and let us make us a name, lest we be scattered abroad upon the face of the whole earth.

5. And the LORD came down to see the city and the tower, which the

⁶⁶We might also invoke this image of Babel/Babylon: “Babylon the great is fallen, is fallen, and is become the habitation of devils, and the hold of every foul spirit, and a cage of every unclean and hateful bird” (Revelation 18:2). As an image of the urban wasteland, the antithesis of the Garden, Babylon is archetypal.

children of men builded.

6. And the LORD said, Behold, the people is one, and they have all one language; and this they begin to do: and now nothing will be restrained from them, which they have imagined to do.

7. Go to, let us go down, and there confound their language, that they may not understand one another's speech.

8. So the LORD scattered them abroad from thence upon the face of all the earth: and they left off to build the city (Genesis 11).

This passage not only places the technological urge at odds with God's will, but it makes clear the faith the early Hebrews placed in the powers of intellect: verse six implies that success was a *fait accompli*, that humans *could* build their way to Heaven left to their own devices. The passage also implicates the communication process, associating it with the technotopian urge. Communication binds people and empowers them, and we can't help but hear in these verses the beginnings of a tradition that eventually involved John Dewey, Al Gore, and Kevin Kelly. Thus, the lesson of Eden is that basic acceptance of God's commands leads to paradise within the Garden; the lesson of Babel is that God's will opposes humanity's arrogant desire to build its way into Heaven.

The millenarian vision keys on the image of the Heavenly City, which in the popular conception is paved with gold and has fountains flowing with milk and honey. The image that inspired the original millenarians, though, springs from Revelation, and describes the most marvelous construction imaginable.

10. And he carried me away in the spirit to a great and high mountain, and shewed me that great city, the holy Jerusalem, descending out of heaven from God,

11. Having the glory of God: and her light was like unto a stone most precious, even like a jasper stone, clear as crystal;

.....

16. And the city lieth foursquare, and the length is as large as the breadth: and he measured the city with the reed, twelve thousand furlongs. The length and the breadth and the height of it are equal.

17. And he measured the wall thereof, an hundred and forty and four cubits, according to the measure of a man, that is, of the angel.

18. And the building of the wall of it was of jasper: and the city was pure gold, like unto clear glass.

19. And the foundations of the wall of the city were garnished with all manner of precious stones. The first foundation was jasper; the second, sapphire; the third, a chalcedony; the fourth, an emerald;

20. The fifth, sardonyx; the sixth, sardius; the seventh, chrysolyte; the eighth, beryl; the ninth, a topaz; the tenth, a chrysoprasus; the eleventh, a jacinth; the twelfth, an amethyst.

21. And the twelve gates were twelve pearls: every several gate was of one pearl: and the street of the city was pure gold, as it were transparent glass.

22. And I saw no temple therein: for the Lord God Almighty and the Lamb are the temple of it.

23. And the city had no need of the sun, neither of the moon, to shine in it: for the glory of God did lighten it, and the Lamb is the light thereof (Revelation 21).

For the millenarian tradition, Heaven is a city, with walls, foundations, buildings, streets, etc. Heaven was explicitly the product of construction and technology, and people who sought to emulate the form of God, in whose image they were created, could easily be expected to also emulate this vision of the afterlife as they prepared for the Second Coming.

The opposite for the millenarians, the antithesis of heavenly glory and perfection, would be the wilderness, a primitive state of complete undevelopment associated with punishment and torment. The ancient Hebrews wandered the desert for 40 years searching for the Promised Land (here the wilderness is expressly opposed to the gifts of God) and Jesus' time in the wilderness were associated with temptation and hunger.

The scriptures, then, contain two dramatically different pictures of Paradise, and through the ages these visions have informed distinctly opposed ethics among people whose ultimate goal was essentially identical – the advancement of humanity to spiritual bliss and perfection: Heaven. These ideologies have not always been expressed as neatly as they are here, but hopefully it is clear the degree to which they have always existed and the ways in which they have manifested. That we continue to see these themes at work in contemporary debates over the Internet tells us less about the Internet than it does the enduring power of the belief systems upon which American culture is built.

Bibliography

Abbot, Joe. "The Monster Reconsidered: *Blade Runner's* Replicant as Romantic Hero." *Extrapolation* 34.4 (1993): 340-350.

Abrams, M.H., ed. *The Norton Anthology of English Literature*. Third ed. New York & London: W.W. Norton & Co., 1975.

Alkon, P. *Science Fiction Before 1900: Imagination Discovers Technology*. New York: Twayne Publishers, 1994.

Arnold, Matthew. *Poetry and Criticism of Matthew Arnold*. Ed. A. Dwight Culler. Boston: Houghton Mifflin, 1961.

Aronowitz, S. *Science as Power: Discourse and Ideology in Modern Society*. Minneapolis: University of Minnesota Press, 1988.

Associated Press. "Study Says 70 Million American Adults Use the Internet." *New York Times* August 26 1998.

Bacon, Francis. "The Aphorisms." Trans. Basil Montague. *Novum Organum*. Ed. Basil Montague. Vol. 3. Philadelphia: Parry & MacMillan, 1854. 345-360.

Bacon, Francis. *Essays and New Atlantis*. New York: Walter J. Black, 1942.

Barlow, John Perry. "Is There a There in Cyberspace?" *Utne Reader* March/April 1995: 52-68.

Bell, Daniel. *The Coming Post-industrial Society: a Venture in Social Forecasting*. New York: Basic Books, 1973.

Benedikt, Michael. "Introduction." *Cyberspace: First Steps*. Ed. Michael Benedikt. Cambridge, Mass. & London: MIT Press, 1991. 1-26.

Benhamou, E. "NII Development." *Telecommunications* 28.1 (1994): 23-24.

Berger, Matt. "Cities Fight Web Sales Tax Break." *Chicago Tribune* July 16 1998: Sec. 3, Page 1.

Beverly, Robert. *The History and Present State of Virginia*. Ed. Louis B. Wright. Chapel Hill: University of North Carolina Press, 1947.

Billington, James H. "Prepared Statement: Fiscal 1997 Budget Request." Washington, DC: Senate Committee on Appropriations, Subcommittee on Legislative Branch, 1996.

Birkerts, Sven. *The Gutenberg Elegies: The Fate of Reading in an Electronic Age*. New York: Fawcett Columbine, 1994.

Black Enterprise. "Preparing for the Information Age." *Black Enterprise* March 1996: 66+.

Blake, William. *Blake's Poetry and Designs*. Ed. Mary Lynn Johnson & John E. Grant. New York & London: W.W. Norton & Company, 1979.

Brockman, John, ed. *Digerati: Encounters With the Cyber Elite*. San Francisco: Hardwired, 1996.

Brody, Herb. "Seven Thinkers in Search of an Information Highway: Interview." *Technology Review* 1994: 42+.

Browne, Ray B. "Popular Culture – New Notes Toward a Definition." *The Popular Culture Reader*. Eds. Christopher D. Geist and Jack Nachbar. Bowling Green, Ohio: Bowling Green University Popular Press, 1983. 13-20.

Browning, John. "What Is the Role of Libraries in the Information Economy?" *Wired* March/April 1993: 62-65; 110.

Bunnell, David. "The Seer." *Digerati: Encounters With the Cyber Elite*. Ed. John Brockman. San Francisco: Hardwired, 1996. 29-37.

Canada, National Library of. *Utopias and Dystopias*. June 17 1995. World Wide Web. Available: <http://www.nlc-bnc.ca/events/sci-fi/t3-1e.htm>. March 16 1999.

Carey, James W., and John J. Quirk. "The Mythos of the Electronic Revolution." *Communication as Culture: Essays on Media and Science*. Ed. James W. Carey. Boston: Unwin Hyman, 1989. 113-141.

Carey, James W., and John J. Quirk. "The History of the Future." *Communication as Culture: Essays on Media and Science*. Ed. James W. Carey. Boston: Unwin Hyman, 1989. 173-200.

Carey, James W. "A Cultural Approach to Communication." *Communication as Culture: Essays on Media and Science*. Ed. James W. Carey. Boston: Unwin Hyman, 1989. 13-35.

Charles, Prince. *The 1996 Lady Eve Balfour Memorial Lecture (excerpts)*. 1996. World Wide Web. Pest Management at the Crossroads. Available: <http://www.pmac.net/hrhchas.htm>. February 1 1999.

Chevreau, J. "Mapping out the High-tech Highway: While Political Action Is Lacking So Far, the Private Sector Is Eager to Start Moving." *The Financial Post* January 15 1994: S20.

Christians, Clifford. "Communications and Technology: an Assessment of the Literature." *Research in Philosophy & Technology* 9 (1989): 233-249.

Cisler, Steve. "Comments on *American Technological Sublime*, a Book by David Nye." September 28 1996. World Wide Web. Available:
http://mediafilter.org/ZK/Conf/Conf_Email/September.28.1996.18.20.53. March 17 1999.

Clinton, William. "Remarks by the President to the 87th Annual Convention of the NAACP." July 10 1996. World Wide Web. Available:
<http://www.pub.whitehouse.gov/uri-res/I2R?urn:pdi://oma.eop.gov.us/1996/7/11/1.text.1>. July 23 1998.

CNN. "Talkback Live." Atlanta, 1997.

Collins, Sarah. "Women of the World Build a Future in Cyberspace." *Chicago Tribune* May 19 1996: 6+.

CPSR (Computer Professionals for Social Responsibility). "Serving the Community: A Public-Interest Vision of the National Information Infrastructure." October 26 1993. World Wide Web. Available: http://cpsr.org/cpsr/nii_policy.

Crane, Hart. *The Letters of Hart Crane, 1919-1932*. Ed. Brom Weber. Berkeley: University of California Press, 1965.

Crane, Hart. *Complete Poems of Hart Crane*. New York & London: Liveright, 1986.

Creedy, Steve. "Information Have-nots; Libraries at Forefront of Drive to Widen Access to Internet." *Pittsburgh Post-Gazette* October 29 1995: C1+.

Crichton, Michael. *Jurassic Park*. New York: Ballantine Books, 1990.

Dewey, John. *The Public and Its Problems*. New York: Henry Holt and Company, 1927.

Drucker, Peter. "Post-Capitalism: A Conversation with Peter Schwartz." *Wired* July/August 1993: 80-83; 97.

Dvorak, John C. "The Gadfly." *Digerati: Encounters With the Cyber Elite*. Ed. John Brockman. San Francisco: Hardwired, 1996. 73-79.

Eagleton, Terry. *Ideology: An Introduction*. London: Verso, 1991.

Earthbase. "Environmental Disaster Timeline." 1996. World Wide Web. Available:
<http://www.earthbase.org/home/timeline/index.html>. February 21 1999.

Eliot, Thomas Stearns. *Selected Poems*. San Diego, New York, & London: Harcourt
Brace Jovanovich, 1930.

Ellul, Jacques. *The Technological System*. Trans. J. Neugroschel. New York:
Continuum, 1980.

Elmer-Dewitt, P. "Welcome to Cyberspace." *Time* 1995: 4-11.

Emerson, Ralph Waldo. *Emerson: Essays and Lectures*. New York: The Library of
America, 1983.

Feed. "Public Life in Electropolis: Dialog on Virtual Communities." November 4
1995. World Wide Web. *Feed Magazine*. Available:
<http://www.feedmag.com/95.08dialog/95.08dialog1.html>;
<http://www.feedmag.com/95.08dialog/95.08dialog2.html>;
<http://www.feedmag.com/95.08dialog/95.08dialog3.html>. July 2 1998.

Fernback, Jan, and Brad Thompson. "Virtual Communities: Abort, Retry, Failure?" 1995. World Wide Web. Available: <http://www.well.com/user/hlr/texts/VCcivil.html>. July 2 1998.

Fernback, Jan. "The Wired Community: An Exploration of the Cultural Practices of the Citizens of Cyberspace." Doctoral Dissertation. University of Colorado, 1998.

Ford, George H. "The Victorian Age." *The Norton Anthology of English Literature*. Ed. M.H. Abrams. New York & London: W.W. Norton & Co., 1975. 1907-1925.

Friedman, Edward A., Joshua D. Baron, and Cynthia J. Addison. "Universal Access to Science Study via Internet; Stevens Institute of Technology Promotes Internet Use in Science Education." *T H E Journal (Technological Horizons In Education)* 23.11 (1996): 83+.

Gamota, Alexander Peter. "Years Later, Chernobyl Victims Still Suffer." *The Tech* April 23 1991: 4.

Gehl, John, and Suzanne Douglas. "Edupage." August 2 1998. World Wide Web. Available: <http://webserv.educom.edu/edupage/98/edupage-0802.html#anchor3>. August 3 1998.

Gehl, John, and Suzanne Douglas. "Edupage." March 18 1999. E-mail Service.
March 18 1999.

Gelernter, David. "The Conservative." *Digerati: Encounters With the Cyber Elite*.
Ed. John Brockman. San Francisco: Hardwired, 1996. 105-112.

Gibson, William. *Neromancer*. New York: Ace Books, 1984.

Gibson, William. "The Winter Market." *Burning Chrome*. New York: Ace Books,
1986. 117-141.

Gibson, William. *Burning Chrome*. New York: Ace Books, 1987.

Gibson, William. *Count Zero*. New York: Ace Books, 1987.

Gibson, William. *Mona Lisa Overdrive*. New York: Bantam Books, 1988.

Godwin, Mike. "The Electronic Frontier Foundation and Virtual Communities."
December 20 1994. World Wide Web. Available:
http://www.nectec.or.th/pub/mirrors/eff/virtual_communities.eff. July 2 1998.

Goodman, P. *The New Reformation: Notes of a Neolithic Conservative*. New York:

Random House, 1970.

Gore, Al. "Remarks Before the International Telecommunications Union." Buenos Aires, Argentina: International Telecommunications Union, 1994.

Hafrey, Leigh. "At Cyberspace University Press, Paperless Publishing Looks Good." *New York Times* October 30 1994: 7:32+.

Hamalainen, Matti, Andrew B. Whinston, and Svetlana Vashik. "Electronic Markets for Learning: Education Brokerages on the Internet." *Communications of the ACM* June 1996: 51+.

Harmon, Amy. "Researchers Find Sad, Lonely World in Cyberspace." *New York Times* August 30 1998.

Harper's Forum. "What are We Doing On-line?" *Harper's* August 1995: 35-46.

Hauben, Michael. "The Net and Netizens: The Impact the Net Has on People's Lives." June 5 1996. World Wide Web. Available:
<http://www.columbia.edu/~rh120/ch106.x01>. June 30 1998.

Hawthorne, Nathaniel. *Hawthorne's Short Stories*. New York: Vintage Books, 1946.

Heim, Michael. "The Erotic Ontology of Cyberspace." *Cyberspace: First Steps*. Ed. Michael Benedikt. Cambridge, Mass. & London: MIT Press, 1991. 59-80.

Heisenberg, Werner. *Physics and Philosophy*. New York: Harper & Row, 1958.

Hirschkop, Ken. "Democracy and the New Technologies." *Monthly Review* July 1996: 86.

Horkheimer, M., and T. Adorno. *Dialectic of Enlightenment*. Trans. J. Cumming. New York: Herder & Herder, 1972.

Hundt, Reed. "Implementing the Telecommunications Law of 1996: The Real Work Begins." Washington, DC: Federal Communications Commission Newsweek Telecommunications Forum, 1996.

Innis, Harold. *The Bias of Communication*. Toronto: University of Toronto Press, 1951.

Innis, Harold. *Empire and Communications*. Toronto: University of Toronto Press, 1972.

International Academy of Humanism. "Declaration in Defense of Cloning and the

Integrity of Scientific Research.” *Free Inquiry* July 15 1997.

Jameson, Frederic. “Postmodernism, or the Cultural Logic of Late Capitalism.” *New Left Review* 146. July/August (1984): 53-92.

Johnson, Scott. “Inside TMI: Minute by Minute.” 1998. World Wide Web. Available: <http://www.wowpage.com/tmi/>. February 21 1999.

Jonas, Hans. *The Imperative of Responsibility: in Search of an Ethics for the Technological Age*. Trans. H. Jonas & D. Herr. Chicago & London: The University of Chicago Press, 1984.

Kapor, Mitch. “Where Is the Digital Highway Really Heading?: The Case for a Jeffersonian Information Policy.” *Wired* July/August 1993: 53-59; 94.

Kehoe, Colleen, and James Pitkow. “GVU's 7th WWW User Survey.” April 1997. World Wide Web. Available: http://www.cc.gatech.edu/user_surveys/survey-1997-04/. July 17 1998.

Kehoe, Colleen, and James Pitkow. “GVU's 9th WWW User Survey.” April 1998. World Wide Web. Available: http://www.cc.gatech.edu/user_surveys/survey-1998-04/reports/1998-04-Use.html. July 17 1998.

Kelly, Kevin. *Out of Control: The New Biology of Machines, Social Systems and the Economic World*. Reading, Mass.: Addison-Wesley Publishing Company, 1994.

Kelly, Kevin. "Interview With the Luddite." *Wired* June 1995.

Kelly, Kevin. "The Saint." *Digerati: Encounters With the Cyber Elite*. Ed. John Brockman. San Francisco: Hardwired, 1996. 155-161.

Kester, Grant. "Access Denied: Information Policy and the Limits of Liberalism." September 18 1996. World Wide Web. Available:
<http://www.rochester.edu/College/FS/Publications/KesterAccess.html>. January 23 1999.

Klein, Dennis, Neal Peirce, and Alex Marshall. "Where There's a Wire, There's a Way: Making Sure That the Poor Don't Get Left out of the Computer Revolution." *Planning* July 1996: 4+.

Kozol, Wendy. *LIFE's America: Family and Nation in Postwar Photojournalism*. Philadelphia: Temple University Press, 1994.

Kranzler, Laura. "Frankenstein and the Technological Future." *Foundation* 44. Winter (1988-89): 42-49.

Kuhns, William. *The Post-Industrial Prophets: Interpretations of Technology*. New York: Weybright and Talley, 1971.

Kumar, Krishan. *Prophecy and Progress: the Sociology of Industrial and Post-industrial Society*. New York: Penguin Books, 1978.

LaMotte, Larry. "Chernobyl 10 Years Later: a Threat to the Future." April 4 1996. World Wide Web. Available: http://www-cgi.cnn.com/WORLD/9604/04/cnnp_chernobyl/index.html. February 21 1999.

Leonard, J. "Book Reviews." *The Nation* November 15 1993: 580+.

Leslie, Jacques. "Mail Bonding: E-mail is Creating a New Oral Culture." *Wired* March 1994: 42-48.

Lippman, Walter. *Public Opinion*. New York: The Macmillan Company, 1956.

Litherland, Susan. "Communications: Growth of Internet Leaves Poor Behind." *Inter Press Service* October 12 1995.

Lohr, Steve. "It's Long Boom or Bust for Leading Futurist." *CyberTimes (New York Times)*. June 2 1998. World Wide Web. Available:

<http://www.nytimes.com/library/tech/yr/mo/biztech/articles/01futurist.html>. June 2 1998.

Ludd, Eliza & Ned. "New Luddite: Challenging the Legitimacy of Science and Technology." November 1995. World Wide Web. Available: http://www.wadham.ox.ac.uk/~rhouston/think/ludd_nov95.html. February 4 1999.

Malhotra, Yogesh, Abdullah Al-Shehri, and Jeff J. Jones. "National Information Infrastructure: Myths, Metaphors And Realities." 1995. World Wide Web. Available: <http://www.brint.com/papers/nii/>. July 19 1998.

Markoff, John. "The Scribe." *Digerati: Encounters With the Cyber Elite*. Ed. John Brockman. San Francisco: Hardwired, 1996. 187-195.

Marx, Leo. *The Machine in the Garden: Technology and the Pastoral Ideal in America*. New York: Oxford University Press, 1964.

Mazero, Michael, and Iris J. Lav. "A Federal 'Moratorium' on Internet Commerce Taxes Would Erode State and Local Revenues and Shift Burdens to Lower-Income Households." May 11 1998. World Wide Web. Available: <http://www.cbpp.org/512webtax.htm>. July 20 1998.

McChesney, Robert W. "The Global Struggle for Democratic Communication."
Monthly Review July 1996: 1+.

McConnaughey, James W., and Wendy Lader. "Falling Through the Net II: New
Data on the Digital Divide." July 28 1998. World Wide Web. Available:
<http://www.ntia.doc.gov/ntiahome/net2/falling.html>. August 3 1998.

McCreary, Lew. "The Virtual Delusion." November. 1996. World Wide Web.
Available: http://www.cio.com/WebMaster/110196_home.html. July 2 1998.

MCI. "America's Internet Skills Grow as Demand for Technoliteracy Rises; Men and
Women are Equal in Cyberspace, MCI Reveals." July 1 1998. World Wide Web
(Press Release). Available:
<http://www.mci.com/mcisearch/aboutus/company/corporate/community/news/98jul01.shtml>. July 17 1998.

McKenzie, Aline. "Voice of Experience Dissents." *Dallas Morning News* August 24
1998.

McLuhan, Marshall. *Understanding Media*. New York: McGraw-Hill, 1964.

Mumford, Lewis. *Pentagon of Power*. New York: Harcourt Brace Jovanovich, 1964.

Mumford, Lewis. *The Myth of the Machine: Technics and Human Development*. New York: Harcourt, Brace & World, Inc., 1970.

Murphy, Gary Lawrence. "Are We the Neo-Luddites?" February 1998. World Wide Web. Available: <http://www.mother.com/~dfleming/dmf02com.htm>. February 4 1999.

NIITF (National Information Infrastructure Task Force). *The National Information Infrastructure: Agenda for Action*. June 24 1993. World Wide Web. Available: <http://sunsite.unc.edu/nii/NII-Executive-Summary.html>. July 17 1998.

Noble, David F. *The Religion of Technology: The Divinity of Man and the Spirit of Invention*. New York: Alfred A. Knopf, 1998.

Nye, David. *American Technological Sublime*. Cambridge, Mass.: MIT Press, 1994.

Oldenburg, Ray. *The Great Good Place: Cafés, Coffee Shops, Community Centers, Beauty Parlors, General Stores, Bars, Hangouts and How They Get You Through the Day*. New York: Paragon House, 1991.

Outhwaite, W., and T. Bottomore, eds. *The Blackwell Dictionary of Twentieth-Century Social Thought*. Oxford, England & Cambridge, Mass.: Blackwell

Reference, 1994.

Pacey, Arnold. *The Maze of Ingenuity: Ideas and Idealism in the Development of Technology*. Cambridge, Mass.: MIT Press, 1976.

Pacey, Arnold. *The Culture of Technology*. Cambridge, Mass.: The MIT Press, 1983.

Papert, Seymour. "Obsolete Skill Set: The 3 Rs." *Wired* May/June 1993: 50-52.

Paquet, Cheri. "Report Counts 147 Million Global Net Users." February 12 1999.

World Wide Web. Available:

<http://www.cnn.com/TECH/computing/9902/12/globalnet.idg/>. February 12 1999.

Perelman, Lewis J. "School's Out: Public Education Obstructs the Future." *Wired* March/April 1993: 71-73; 104.

Poole, G. "It's Crunch-time in Cyberspace." *UnixWorld* 1993: 52+.

Postman, Neil. *Technopoly: The Surrender of Culture to Technology*. New York: Vintage Books, 1992.

Postman, Neil. "Is Education Spending Too Much on High-tech?" December 22

1997. *Nando Times*. World Wide Web. Available:

http://www.nando.net/newsroom/ntn/info/122297/info1_17751_noframes.html.

August 4 1998.

Pynchon, Thomas. "Is It O.K. to Be a Luddite?" *New York Times Book Review*

October 28 1984: 1, 40-41.

Ravetz, J. *Scientific Knowledge and its Social Problems*. Oxford: Clarendon Press,

1971.

Rheingold, Howard. *Virtual Community: Homesteading on the Electronic Frontier*.

Reading, Mass.: Addison-Wesley Publishing Company, 1993.

Rheingold, Howard. "Are Virtual Communities Harmful?" September 4 1995. World

Wide Web. Available: <http://www.well.com/user/hlr/tomorrow/vccivil.html>. October

2 1996.

Robin, Michael. "Technology for the Coming Millennium: Progress, Technology and

Society According to Kirpatrick Sale." *MicroTimes* March 4 1996: 138-144, 282-284.

Ross, Andrew. *Strange Weather: Culture, Science, and Technology in the Age of*

Limits. London: Verso, 1991.

Rossetto, Louis. "Why Wired?" *Wired* March/April 1993: 10.

Rowland, Willard. *The Politics of TV Violence: Policy Uses of Communication Research*. Beverly Hills: Sage, 1983.

Rybczynski, W. *Taming the Tiger: The Struggle to Control Technology*. New York: Penguin Books, 1983.

Saffo, Paul. "Hot New Medium: Text." *Wired* May/June 1993: 48.

Safire, William. "On Language." *New York Times* September 28 1986: Sec. 6, 8.

Sale, Kirkpatrick. "Lessons From the Luddites: Setting Limits on Technology." *The Nation* June 5 1995: 785+.

Sale, Kirkpatrick. "Unabomber's Secret Treatise: Is There Method in His Madness?" *The Nation* 1995: 305+.

Sarangi, Satinath. "The Union Carbide Disaster in Bhopal." February 1998. World Wide Web. Available:
<http://www.corpwatch.org/feature/india/profiles/bhopal/original.html>. February 21 1999.

Sarnoff, David. *Annals of the American Academy of Political and Social Sciences*.
January 1941.

Shelley, Mary. *Frankenstein, or the Modern Prometheus*. Cleveland, Ohio: World
Publishing Company, 1932.

Slouka, Mark. *War of the Worlds: Cyberspace and the High-Tech Assault on Reality*.
New York: Basic Books, 1995.

Smith, Samuel R. "Islands in the Net: Toward a Universalist Critique of Internet
Development." International Communications Association Annual Convention.
Albuquerque, New Mexico, 1995.

Smith, Samuel R. "Brand New Bag or Same Old Song and Dance: A Review of
Clinton Administration Internet Policy and Implications for the "Citizenry'." Boulder,
Colorado, 1997.

Smith, Samuel R. "The Posthumanities: A Blueprint for the Study of Arts and Letters
in the Emerging Age of the Cyborg." Popular Culture Association Annual
Convention. Orlando, Florida, 1998.

Smith, Samuel R. "'When it All Changed': Cyberpunk and the Baby Boom's

Rejection of Religious Institutions.” *Youth Culture: Identity in a Postmodern World*.
Ed. Jonathon Epstein. Malden, Mass. & Oxford, UK: Blackwell Publishers, 1998.
232-262.

Starr, Paul. “Computing Our Way to Educational Reform.” *The American Prospect*
July/August 1996: 50+.

Stenger, Nicole. “Mind is a Leaking Rainbow.” *Cyberspace: First Steps*. Ed. Michael
Benedikt. Cambridge, Mass. & London: MIT Press, 1991. 49-58.

Stephenson, Neal. *Snow Crash*. New York: Bantam Books, 1993.

Sterling, Bruce. *Schismatrix*. New York: Arbor House, 1985.

Sterling, Bruce. “Preface.” *Burning Chrome*. New York: Ace Books, 1986. ix-xii.

Sterling, Bruce, ed. *Mirrorshades: The Cyberpunk Anthology*. New York: Ace Books,
1988.

Sterling, Bruce. *Islands in the Net*. New York: Ace Books, 1988.

Sterling, Bruce. *Crystal Express*. New York: Ace Books, 1989.

Stoeltje, Melissa Fletcher. "Computer Friendly; or Phobic?" *Houston Chronicle*
October 22 1995: Lifestyle: 1+.

Stoll, Clifford. *Silicon Snake Oil*. New York: Anchor Books, 1995.

Storey, John. *An Introductory Guide to Cultural Theory and Popular Culture*.
Athens: University of Georgia Press, 1993.

Strategis Group. "Internet Users Spend Less Time Watching TV." June 29, 1998.
World Wide Web. Available: <http://www.strategisgroup.com/press/Internetuser.htm>.
August 18 1998.

Talbott, Stephen L. "Wired Classrooms: What You're Not Hearing." November 12
1997. World Wide Web. NETFUTURE. Available:
<http://www.oreilly.com/people/staff/stevet/netfuture/fwd/1997/1.html>. July 29 1998.

Tardy, David. "Hugo Gernsback: Un des Pères de la SF." 1997. World Wide Web.
Available: <http://services.worldnet.net/tardyd/gersnsba.htm>. March 16 1999.

Targowski, Henry W. "Utopia or Bust." January 1996. World Wide Web. Available:
<http://www.euro.net/mark-space/glosUtopia.html>. March 17 1999.

Taylor, Jeff A. "The Gray New World of Telecom." *Investor's Business Daily*
February 13 1996: A1+.

Tennyson, Alfred. *Poems of Tennyson*. Boston: Houghton Mifflin, 1958.

Thoreau, Henry David. *Walden, or Life in the Woods*. New York and Scarsborough,
Ontario: Signet, 1960.

Tracey, Michael. "Whatever It Is, It Is Ours to Think About." *Vision and Hindsight:
The First 25 Years of the International Institute of Communications*. Ed. R. Winsbury
& S. Fazal. London: John Libbey and Company Ltd., 1994.

Treese, Win. "The Internet Index." 19. September 10 1997. E-mail. Available:
<http://www.openmarket.com/intindex/>. September 1 1997.

Treese, Win. "The Internet Index." 22. May 31 1998. World Wide Web. Available:
<http://www.openmarket.com/intindex/>. June 30 1998.

Treese, Win. "The Internet Index." 23. February 28 1999. World Wide Web.
Available: <http://www.openmarket.com/intindex/99-02.htm>. March 4 1999.

Trujillo, Solomon D. "Technology, the Great Equalizer: Speech to the Latin Business

Association.” 1998. World Wide Web. Available:
<http://www.uswest.com/com/insideusw/speeches/032798.html>. March 26 1998.

Trujillo, Sol. “Announcement of U S WEST Support for Banneker Project and Widening Our World in Omaha.” July 2 1998. World Wide Web. Available:
<http://www.uswest.com/com/insideusw/speeches/070298.html>. July 2 1998.

Trujillo, Solomon D. “Introduction of U.S. Senator Ben Nighthorse Campbell: National Center for American Indian Enterprise Development.” April 7 1998. World Wide Web. Available: <http://www.uswest.com/com/insideusw/speeches/040798.html>. July 26 1998.

U.S. Bureau of the Census. “Historical Statistics of the United States: Colonial Times to 1970.” Bicentennial Edition, Part 1 ed. Washington, D.C.: U.S. Government Printing Office, 1975.

U.S. Department of Agriculture. “Land Grant Colleges and Universities.” May 26 1998. Department of Agriculture. Available:
<http://www.nhq.nrcs.usda.gov/land/meta/m2783.html>. January 30 1999.

van Zuilen, A. *The Life Cycle of Magazines: a Historical Study of the Decline and Fall of the General Interest Mass Audience Magazine in the United States During the*

Period 1946-1972. Uithoorn, Netherlands: Graduate Press, 1977.

WELL. "About the WELL." 1997. World Wide Web. Available:
http://www.well.com/where_well.html1998.

Whitman, Walt. *Leaves of Grass*. New York and Scarsborough, Ontario: Signet, 1955.

Wilder, Thornton. *Our Town*. New York: Harper & Row, 1938.

Williams, R. *The Origins of Federal Support for Higher Education: George W. Atherton and the Land-grant College Movement*. University Park, Penn.: The Pennsylvania State University Press, 1991.

Winner, Langdon. *Autonomous Technology: Technics-Out-of-Control as a Theme in Political Thought*. Cambridge, Mass. and London: MIT Press, 1977.

Wordsworth, William. "On the Projected Kendal and Windermere Railway." *The Poetical Works of Wordsworth*. Ed. Thomas Hutchinson. London, 1904. 282-283.

Zimmer, J. "Gulf Syndrome Puzzle Unlocked; Duke Research Team: Chemical 'Cocktail' at Root of Baffling Ailments from Gulf War." *Durham Herald-Sun* April 9

1995: A1.

Ziolkowski, Theodore. "Science, Frankenstein, and Myth." *Sewanee Review* 89.1 (1981): 34-56.

LIFE Magazine citations are noted by date and page number in the text.

Some sources cited here were drawn from the Lexis/Nexis periodicals database, which does not include full page cites. Pagination for these cites is noted in the bibliography by the first page number followed by a "+" symbol.