THE NATIONAL INFORMATION INFRASTRUCTURE: INFORMATION MYTHS, INFORMATION POLICY AND ADULT EDUCATION

Bruce Woll
Northern Illinois University
Spring 1994

ABSTRACT

The first question addressed is whether we are justified in speaking of an information myth in the national information infrastructure policy-making discourse. Three arguments are made to support the claim. First, the hearings are about the future, a future which no one would claim to be able to predict with scientific certainty. "Information" is deployed in the hearings as a rhetorical device for integrating past, present and future. Second, information is the defining category in structuring social and cultural space. Third, information infrastructure is about human nature and human society. I would argue, therefore, that the weight and scope of the issues envisioned justifies the use of the category of myth.

On the other hand, there is still something that seems to be lacking. The information myth has a "thin" quality to it. A myth featuring "information" is thin, bland, lacking in heroes, inglorious. Such a myth is highly appropriate for a society which defines itself precisely as beyond myth, a society in which the denial of myth is the myth. What could be more appropriate for an age which denies myth than a vehicle like information which, by its very connotation of univocality, camouflage's its mythic, multivalent function.

In the second part of the paper I argue that the function of the information myth is to legitimate the growth imperative. Three positions on the government role in building the information infrastructure are outlined. The free marketeer takes the position that government should take hands off, except to protect the financial infrastructure. The other two positions advocate a government/private sector partnership, but one emphasizes the dangers of government whereas the other emphasizes the benefits of government. All agree that the Internet should be commercialized. None make mention of dangers from the private side of the partnership. All three support the priority of economic growth and draw on the information myth to legitimate the imperatives of growth. All three appear to agree that everyone wants and needs the kind of information access that the NII represents. In Gore's words, there is a "hunger for information," information which is stacking up unused, "silos of data rotting," like the huge silos of grain rotting while people starve to death by the millions (U.S. Congress, 1991, 21).

All three support the priority of economic growth and the information myth as spelled out in the first part of this paper is used to legitimate the growth imperative assumed by all of the supporters of the administration's NII policy. However, the

legitimacy it offers is "thin," that is, it papers over contradictions and recasts complex and serious policy issues in trivial terms.

William Connolly proposes that theories of legitimacy that cannot comprehend the "internal structure" of a social order will of necessity be thin, or inadequate. Internal structure has to do with the interrelationship between self and society, personal identity and the social order. Any healthy order imposes limits. But if limits are viewed as necessary to the common good, the social order will still command allegiance. Personal identity is bound up with the social order, so that attitudes to the social order and attitudes to the self are intertwined. It is personal identity that provides one with the density needed to maintain social relations, to form practical judgments, and to criticize specific features of the common life. A theory of legitimacy that takes into account this internal structure of the social order will pay attention to the symptomatic, the covert, the indirect, the unarticulated clues to disaffection, will have room for ambiguity in the relationship of self and society.

There is nothing about the self, the interrelationship between self and society, in the information story, no "social ontology," no density. It is thin, both as a theory of legitimacy and as myth. It represents "encircled" thinking, which sees the solution to the problems caused by the introduction of new technology within the very same technology, tends to an uncritical acceptance of growth for growth's sake, an inability to think critically of direction, ends, purpose, to nourish a kind of fatalism, or technological determinism, or "studied innocence" about our historical course.

Information policy discussion needs to break out of the circle of technicist thinking. It needs to go beyond the information myth. It needs to be grounded in a social ontology that makes room for ambiguity and an epistemology that does justice to the denisty of persons, that insists on ambiguity, mystery, that insists that there is always more beyond any articulation. And hence the need to recover tools of articulation, such as myth and symbol, which make room for multivalence.

THE NATIONAL INFORMATION INFRASTRUCTURE: INFORMATION MYTHS, INFORMATION POLICY AND ADULT EDUCATION

Bruce Woll
Northern Illinois University
Spring 1994

TABLE OF CONTENTS

THE NATIONAL INFORMATION INFRASTRUCTURE: INFORMATION MYTHS AND INFORMATION POLICY

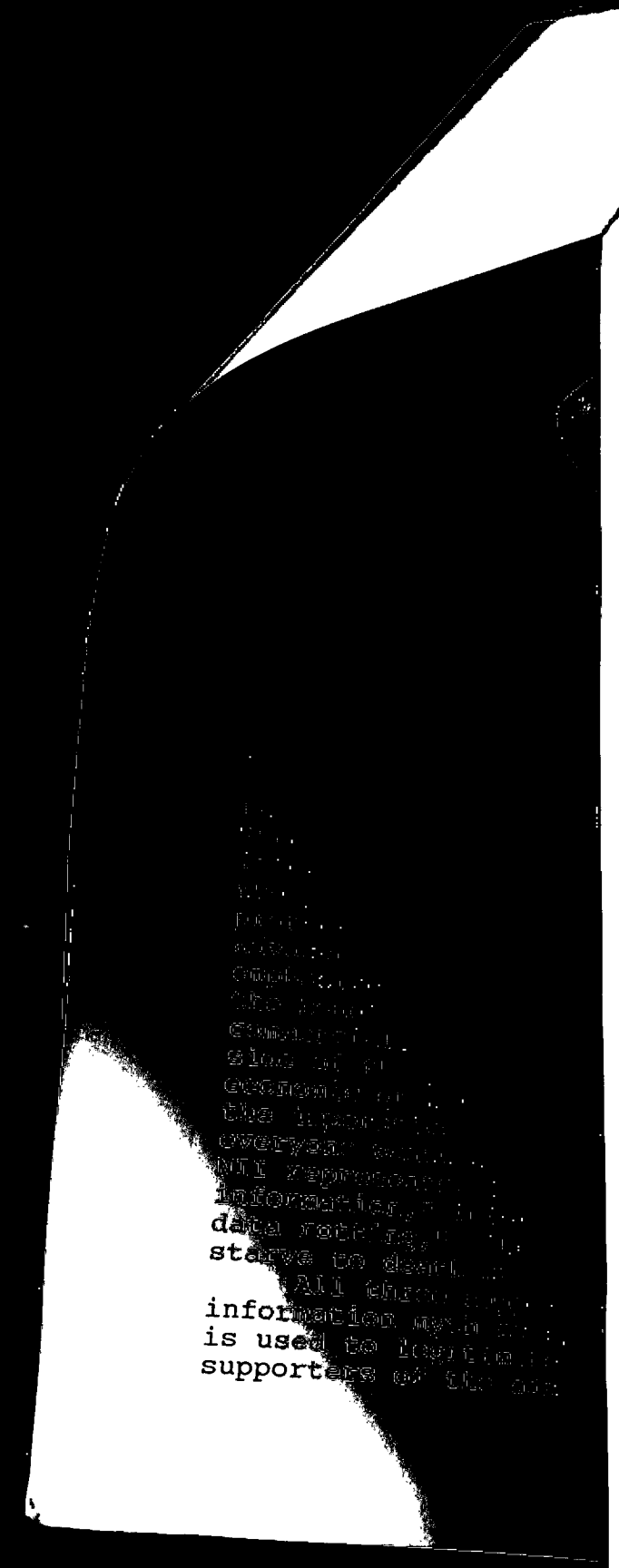
"Myth and tool mutually constitute each other" (Haraway, p. 164).

"... the government will have to make definitions..." (U.S. Congress, House, 1993a, 135).

INTRODUCTION

A new excuse for a bad report card made its appearance in 1994. "I was zipping along nicely on the information highway when, pow, I had a major blowout!" a boy says to his frowning father in a cartoon in the Chicago Tribune (Stayskal, 1994). The "information highway," has captured front page media attention and become an item of popular culture. The official name for the "information highway" is the National Information Infrastructure (NII). What is the NII? Why is it getting attention just now? Where did it come from? Is it important for adult education? If so, in what ways? In this paper I want to approach these questions by way of the notion of information myth. I want to argue for the presence of such a myth at work in the policy-making discourse as a legitimating device. And I want to take first steps towards a critique of it.

The NII can be described as policy in the making. The development of a high-speed, universally accessible national information network is a centerpiece of Clinton Administration policy initiatives. For instance, the budget proposal submitted by the Administration in February 1993 included nearly $5 billion over the next four years to enhance the "information highway"

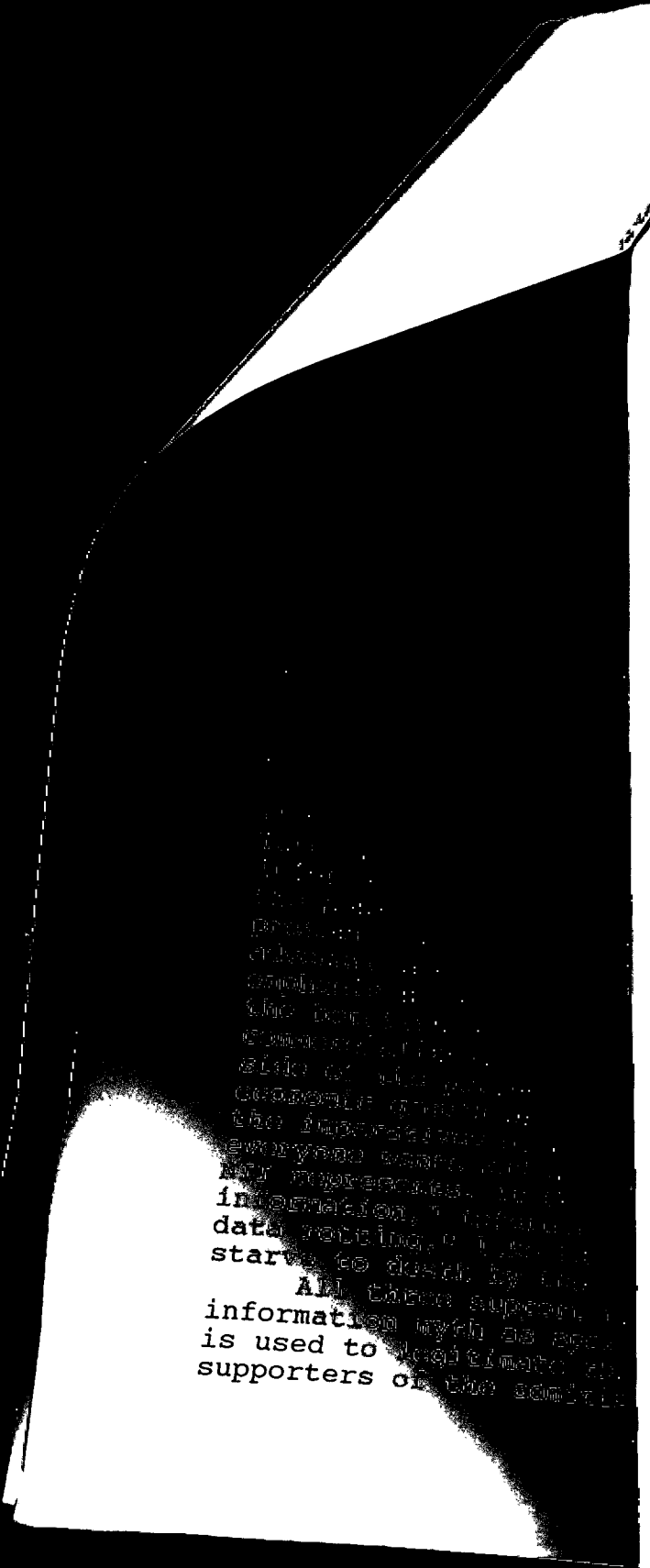


(Elmer-DeWitt, 1993, p. 53).

The NII has practical, policy-making, and theoretical relevance for adult education. In its current incarnation as the Internet it is being used as a powerful tool in a few formal programs of distance learning for adults. If we agree that research is a primary form of adult learning, then the Internet is also being used in a staggering diversity of ways as a tool of adult learning. Indeed, on this understanding of research, the Internet was created precisely as an "adult learning" tool, since it was created explicitly to support high-level research.

As policy makers consider the future of U.S. information networks there are momentous policy issues for organized adult education to address, issues which have scarcely begun to be identified, much less discussed. As Herbert Schiller has said, "the informational question, in all its dimensions - practical and theoretical - is an urgent political issue in America" (Schiller, 1989, 164). National information policy is of critical importance for adult education. The most important policy issues at stake, such as how to address growing educational inequities, have implications for how adult education as an organized enterprise understands itself and its mission and are therefore tied into fundamental theoretical issues. This study will focus first on theoretical issues and then take up policy implications.

I want to focus on the policy making process at work in the construction of national information networks. I am specifically interested in the opinions, beliefs, myths, theories, hopes,



ambitions, antipathies and visions of society that are being brought to the construction of the NII by participants in the policy making process. In other words, the subject matter of this paper is "the social relations of science and technology, including crucially the systems of myth and meanings structuring our imaginations" (Haraway, p. 165)

I want to focus attention on beliefs and ideas about information that are at work. To put it succinctly, I want to explore the role of information myth in the formation of information policy. National information networks are, at one level, technological artifacts, tools. At the same time, they are the creation of human society. We live in a society in which obsession with tools can blind us to the tool-maker. I want to explore how "myth and tool mutually constitute each other" (Haraway, p. 164).

NII policy is evolving rapidly. It therefore represents a moving target for study. I have chosen to focus on the enactment of the High Performance Computing Act of 1991 (HPCA) and its implementation up to and including the introduction of amending legislation in Congress in February 1993, specifically, H.R. 1757.

I want to begin my discussion by calling attention to an amendment to the HPCA that was submitted to the House Committee on Science, Space, and Technology in 1993.The HPCA represents the starting point for current information infrastructure policy. The amendment, H.R. 1757, proposed a new title for the HPCA, namely,

What is behind this belief that the nation as a whole needs high-performance information access? In the first place, this particular belief, the belief in our need for information on the scale envisioned by the national information infrastructure (NII), belongs to a set of beliefs about information that together form a global account of social, cultural, and economic change. In its broad outlines this account is very familiar.

We are living in a new age, the "information age." Or, we are living in a new society, the "knowledge society." This age represents a revolutionary break with previous history. The break is economic in that the primary source of economic value has become information rather than manufacturing. It is political in that expanded access to information supports democracy. It is cultural in that the benefits of global information access will improve the quality of life for all. The new age is characterized by a dizzying acceleration in the pace of change. It is characterized by a staggering increase in the sheer volume of information.

Each of the points in this particular version of the story can be found in the testimony of witnesses who appeared before the appropriate House committees on behalf of the HPCA or H.R. 1757. To cite one example, an industry representative, Bhatia, from BroadBand Technologies, made the following confession of faith:

> We essentially created BroadBand Technologies in an act of faith, faith in a vision, a vision that the Clinton administration and this subcommittee are now promoting, a vision that all Americans could be linked to the health

care, educational, and entertainment treasure troves of our information age via interactive broadband networks - faith in American policymakers here in Congress, and at the Federal Communications Commission, that they would clear the outmoded regulatory roadblocks to deployment of this network, and faith in ourselves, and in our ability to develop our good ideas into affordable products" (U.S. Congress, House, 1993, 171)

PART ONE: THE CASE FOR AN INFORMATION MYTH

The set of beliefs that make up this vision have been described as a myth, the "information myth." C. J. Hamelink, for example, in 1986 summarizes one version of the myth under three dimensions, economic, political, and cultural. Economically, the information society "will witness the end of the capitalist, industrial production with its inherent vices of centralization, expansion, standardization, synchronization, and exploitation. There will be a shift from industrial production to the provision of services in a de-monopolized and diversified market." Politically, the information society is participatory and decentralized. Culturally, "the misery of labor is taken away from the human being and appropriated by the electronic system; flexible and smart robots create unprecedented leisure time" (Hamelink, 1986, p. 8).

Hamelink summarizes the myth in order to expose its illusions. The same is true of Dupuy, another writer who describes the "myths of the informational society" in order to refute them. Dupuy's themes is that "the more we 'communicate' the way we do, the more we create a <u>hellish</u> world. I take 'hell'", he says, "in its theological sense, i.e., a place which is void of <u>grace</u> - the undeserved, unnecessary, surprising,

unforeseen" (Dupuy, 1980, 3). I will come back to this critique below in part three when I take up the need for ambiguity in the relations between self and society.

It is clear that Hamelink's version of this "myth" is not the same as the beliefs about information summarized above which lie behind the NII legislation. None of the supporters of the NII envisions an end to capitalism, for one thing. Are there two myths, then? Or versions of a single myth? Is the term "myth" useful at all? To press this question a step further, the phrase "information myth" could be taken as an oxymoron in a highly specific sense. The term "information" connotes the univocal language of science, reason, and logic. The term "myth" connotes the multivalent language of symbol.[1] "Information" on the face of it appears to be an exceedingly bland phenomenon out of which to construct a myth. It would seem, then, that the phrase "information myth" is problematic, at best.

Mark Poster has proposed the concept of "mode of information" which he defines in such a way as to bring into clear relief two of the essential ingredients which belong to the 'information myth.' First, information can be used to periodize history. Second, information has become a "privileged term." The current culture "gives a certain fetishistic importance to 'information' (Poster, 1990. 6,7).

---

[1]Paul Ricoeur refers to language "reduced ... to the informative function" in contrast to the language of symbols and myth in a succinct, clear discussion of the interdependent relationship between philosophy and myth (Ricoeur, 1973, p. 344).

While Poster's concept is suggestive, I do not want to abandon the term "myth," for several reasons. First, I believe it has heuristic value as a device for helping to look for language and themes which may only be loosely linked. Second, its heuristic value extends also to the way in which the concept of "myth" holds together ideas in relation to feeling, position, power, and place, rather than separating them. In other words, while beginning this analysis at the level of "ideas" my intent is precisely not to detach ideas from the underlying power interests but to show the connection between them. Third, my intent in using the word "myth" is not to debunk but to suggest the seriousness of the issues. I do not write from a position above and outside the participants in the policy-making process but as a participant myself. Finally, by "trying out" the category with reference to a specific case example we will get a better idea of its possible utility as well as its limits.

I start, then, with words about information. The primary sources I have chosen to examine are, the legislation itself, in the case of the HPCA, the proposed legislation, in the case of H.R. 1757, and hearings on the legislation. To a lesser extent I will draw on other sources commenting on the legislation. There are three primary sets of hearings I have drawn on, first, hearings held October 3, 1989 on the HPCA, published as High Performance Computing (U.S. Congress, House 1989); second, hearings held March 23 and 25, 1993 on H.R. 1757, a proposed amendment to the HPCA, published as Technology Policy:

Information Infrastructure [Information Superhighways and High Performance Computing] (U.S. Congress, House 1993a); and third, hearings held on April 27, May 6, and May 11, 1993 on the same amendment and published as H.R. 1757 - High Performance Computing and High Speed Networking Applications Act of 1993 (U.S. Congress, House 1993b).

The reports on hearings are interesting to attempt to classify from the point of view of speech form. They are the official record of hearings before a congressional committee. They include speeches made by witnesses before the members of the respective committees and other witnesses. They include question and answer. They also include in many cases previously written text prepared by the witnesses and entered into the record side by side with the oral version presented before the committee. The whole is a kind of dialogue, or conversation containing arguments, charts, but also stories, letters, resumes, business histories, etc.

INFORMATION THEMES

In these texts, the word "information" is used as an adjective to modify a long list of nouns, including rich, poor, age, revolution, society, space, policy, infrastructure, highways, superhighways, networks, webs, companies, industries, marketplace, services, applications, devices, machines, appliances, providers, content, demands, needs, resources,

navigators, explosion.

As a noun, the word "information" is qualified as government, public, federal, digital, electronic technical, scientific, etc. Witnesses speak of exchanging information, networking, harvesting, moving, transmitting, accessing, providing, looking for, sharing, sending information. One observer speaks of the "granularity" of information, referring to access over networks of all or parts of, say, a book (Schwartz, 1993, p. 35)

A good place to begin exploring specific themes is with the references to the sheer quantity involved, the "billions of bits of information" that are being produced by an ongoing information explosion, the "enormous amount of" information, the "huge volumes of information." According to one witness, "we're swamped with mountains of data, whether it be from satellites, business sources, or whatever, and we don't have the computing power or the time to analyze it" (U.S. Congress, 1993a, 242). Another witness refers to the "oceans of information" that the user will need to be able to "navigate" (U.S. Congress, 1993b, 85). A third talks about "huge 'digital libraries' of information." Another refers to "Data Cities," that is, "large storehouses of valuable information" that need to be developed (Ibid., p. 329).

In the original Act, the data in view was defined first of all in terms of a fairly specific set of "Grand Challenges" including weather forecasting and the human genome project, to mention just two projects where specific data sets required are

themselves vast. The 1993 amendment, H.R. 1757, broadens the scope of information to universal dimensions.

A second theme is change. According to Kalos, representing one of the four national Supercomputing Centers, H.R. 1757 addresses the challenge of deciding "[h]ow to exploit the most striking technological revolution in history" (Ibid., 350). The changes are "explosive" as well as revolutionary. Masten, of the New York Public Library, holds that "[t]he changes brought about by the concurrent explosions in computing and communications technologies are for libraries no less important than the changes wrought by the printing press and the first cataloging systems; each holds the potential for vastly enlarging the availability of the world's recorded knowledge for an ever-widening circle of users" (199). The theme of change is, of course, related to the theme of information quantity. Masten suggests that "[f]rom now on, the amount of new information that will be available in digital form will grow exponentially" (Ibid., 198).

On the one hand there is an emphasis on the dizzying, accelerating pace of change that characterizes society, the economy, and technology today. On the other hand there is an equal emphasis on the need to speed up the pace of information access, the need for an information superhighway, a high-performance network. On the one hand society has already changed in revolutionary ways. On the other hand, what we have seen so far is only the beginning. "The pace of change..., dizzying as it seems today, is only accelerating" (U.S. Congress, 1993b, 74).

According to Dr. Bromley, Director of OSTP in 1989, "[w]e really are at the beginning of a revolution" (U.S. Congress, 1989, 37). According to Rashid, of Microsoft, "[t]he digital information revolution is underway" (U.S. Congress, 1993b 81). As a result, "[i]n 25 years we will look back and ask how we ever got along when information was in analog form. In 25 years, the American economy will be as dependent on the information infrastructure we develop today for its economic well-being as it is on the electrical and transportation infrastructures we put in place during the last two generations" (Ibid., 82). Past, present, and future are viewed in terms of information. We are in the process of creating a dependency on the information infrastructure. This is a highly significant comment, but its significance is lost in the optimistic assumptions about the positive value of this dependency.

The change is not only quantitative, it is also qualitative. According to Gore nothing less than "a third branch of knowledge creation" has emerged as a result of high-performance computing and networking. His statement is worth quoting in full:

> Scientists are now saying that this development, our ability to use supercomputers in this form and share the data, is so important that it has actually led to a third branch of knowledge creation, the first two being, of course, inductive reasoning and deductive reasoning. You have a theory, you test it out. You look at the world and gather facts and try to explain it. Computational science is a third entry on that very short list. We can model versions of the way the world can work and learn from it (U.S.Congress 1991, 23).

So there are now three sources of knowledge, induction, deduction

and computational modelling, according to Gore.

The same theme, or variations, occurs several times in the hearings. Earlier, in the 1989 hearings, the Assistant Director of the National Science Foundation refers to computational science "as a fourth modality of doing science" along side observational, experimental, and theoretical science (U.S. Congress, 1989, 44). In 1993 the director of the San Diego Supercomputer Center, Dr. Sidney Karin, cites computational simulation as "a third way of doing science," joining theory and experiment (U.S. Congress, 1993a, 188).

These three variants are clearly reducible to a single version. But another example of the theme is at first glance a bit different. Edward D. Lazowska, professor of computer science at the University of Washington, asks rhetorically, "Who would have predicted that computation would join physical experimentation and mathematical analysis as a third basic paradigm for how to do science and engineering?" Who could have known that major areas of biology and computer science would converge with one another due to the digital nature of the human genome?" (U.S. Congress, 1993b, 295). Physical experimentation can clearly be viewed as 'inductive' or observational, experimental. Mathematical analysis is presumably a more rigorous reference to theory or deductive knowledge.

The point, in every case, is that computers have inaugurated a new epoch in knowledge creation. Lazowska's quote is part of an extended celebration of the phenomenal, astounding, revolutionary

advances that have been and that will be. The computer age confirms belief in progress, progress that includes the secrets of life hidden in the human genome. We will come back to the genome theme below.

It is important to register the fact that the hearings are very much about the future, 25 years from now, the 21st century, the "new millennium" (Ibid., 74), "a century hence," when "this era will appear a milestone to human progress." (U.S. Congress, 1989, 52).

"Vision" is a recurring word used that expresses this future orientation. Representative Boucher, opening the April 27 hearings on H.R. 1757 pays tribute to "the vision of Vice President Gore, who for more than a decade, has been advancing the deployment in this Nation of the world's most capable interactive tele-communications network" (Ibid., 1). Microsoft, for example, according to Rashid "is driven by the vision of 'information at your fingertips.' The idea is that all the data needed in business, school or at home should be instantly accessible from a personal computer" (Ibid., 83). Dr. Gibbons, President Clinton's appointee to the position of Director of the Office of Science and Technology Policy, the office charged with primary responsibility for implementing the HPCA, refers to "the vision work" being done by members of the private sector (Ibid., 34).

It would not be an exaggeration to say that the hearings are all about the future. The issues under discussion are about how

things should be, about the future of information, about the ways in which information will, should shape the future. The hearings give voice to conflicting visions about the direction we are going and the direction we should be trying to go. Gibbons's reference to vision work comes in the context of a question about private sector representation in decision-making, a question which reflects the fault line running through every page of the hearings. The issue is the role of the government versus the role of the private sector. How the issues are framed is itself an issue at stake, so any reference to the conflict should be considered as merely pointing in the direction of the conflict, not a useful description of the conflict.

One of the central questions I want to raise in this paper is how to think and talk about the future. How <u>do</u> we think and talk about the future? How should we do so?

We have introduced two themes, information as quantified and information in time. The next theme to consider is information in space. This brings us to the heart of the legislation, namely, the vital necessity of <u>networking</u> information, networking it faster, networking it more ubiquitously, networking more of it, networking it through more friendly interfaces. If "information" is the first major term in the new title proposed by H.R. 1757, "infrastructure" is the second.

INFRASTRUCTURE AS THEME

Information infrastructures refer to communication networks. The phrase "information infrastructure" links "information" to "communication." It points to the convergence of the fifty-year old computer industry with the communications industries, where revolutionary change goes back to the fifteenth century invention, in the West, of the printing press.

The idea of convergence is one key element in appreciating the concept of infrastructure. According to one witness, "[n]etworks and computers separately will have a substantial impact, but it is their synergistic interaction in a comprehensive information infrastructure exploited by a [sic!] educated cadre of scientists and engineers, that will have the most profound effects... on science, engineering, and society" (U.S. Congress, 1989, 49. Cf. p. 156).

Another witness, asked why, given that the computer age is about 50 years old, is it reasonable to expect striking advances now? answers in terms of a convergence of technologies. We are "at the convergence of thresholds" in video technologies, personal software, exponentially growing supercomputer technologies, and high-performance communications" (U.S. Congress, 1993, 354).

Information infrastructure has to do with information movement, with the distribution of information across space. We could say that it has to do indirectly with the location of information, the question of where it is and how to access it from diverse locations. In this sense, the term "infrastructure"

has a horizontal dimension.

The term also has a vertical dimension, referring to "underlying" structures. In this sense it is, of course, closely linked to revolutionary theory, Marxist theory in particular, where, in its classic form, infrastructure determines suprastructure and where true revolution requires change at the level of infrastructure. Ironically, that is exactly what is envisioned in this legislation, not, to be sure, a Marxist revolution but nevertheless a revolution in the sense of a change in infrastructure.

Dr. Wulf from the National Science Foundation, expresses the view clearly. "We are privileged to be involved in the development of this infrastructure. A century hence, this era will appear a milestone to human progress. We are developing tools that embody our knowledge and amplify our intellectual prowess. The industrial revolution, by contrast, was merely the culmination of experience with tools that amplify our physical prowess. ... Yet, since our intellectual capacity is the essence of what makes us human, tools to amplify that capacity cannot but have an impact beyond our ability to imagine" (U.S. Congress, 1989, 52). Here is the kernel of the information myth. We are living through a transition qualitatively different from the industrial revolution, a revolution that touches the essence of human nature, a transition that represents progress. And information is fueling this revolution.

The driving role of information in the new economy is

described in the strongest possible terms by Dr. Vincent Cerf, a spokesperson for the Internet community. "Information," he says,

> is, itself, an infinitely renewable resource to be harvested, shaped, applied and recycled. The products and services which can be built atop the computer and communication infrastructure simply have no logical limits. It is this ceaselessly changing, growing, transmuting information resource which will fuel the economic engine of the information infrastructure (U.S. Congress, 1993a, 64).

The picture of the information infrastructure as an economic "engine" powering society into the future is one of the more original metaphors for the NII, and goes well beyond the typical metaphor of "highway" or "superhighway" in its evocative power. It fairly shouts at us to ask, Where is this engine taking us? Who is at the steering wheel? What ends is all this power, energy, and motive force serving?

The picture of information as economic "fuel" expresses the central dogma of the information story. In other words, though the metaphor is fresh, the idea it expresses goes back to the beginnings of the myth, that is, back at least as far as Daniel Bell's concept of the postindustrial society in 1967 (Poster, 1990, p. 23, note 1, Cf. Dupuy, 1980, p. 4, note 1).

What is also striking about Cerf's description is the claim that information is "infinitely renewable" as a resource, that there are "no logical limits" to its productive capacity. In the paragraph preceding the one I have quoted, Cerf expresses this same point using a rich set of spatial images. He says,

> The Electronic Frontier Foundation speaks of computer and computer networking as a 'frontier in cyberspace.' This is an interesting and apt analogy, given the relative immaturity of both technologies. Despite the apparent

> sophistication of today's computers, networks and software, their application has barely scratched the surface of the latent possibilities. The notion of frontier raises images of boundaries and limits. But cyberspace is a virtual place. It is created out of software, making cyberspace an endlessly expandable environment (U.S. Congress, 1993a, 64).

Two new images, "virtual place" and "cyberspace" are here merged with two familiar spatial terms, "environment" and "frontier." The myth of the frontier, of course, is one of the central myths of the American (U.S.) experience. Cyberspace represents the renewal of the frontier, a frontier this time that will never close up. Likewise "environment" is currently a powerful symbol in its own right with reference to real place, not virtual place.

In this connection it is significant to cite the statement of another witness, Rashid of Microsoft, who refers to the "tyranny" of geography. Cyberspace and virtual place are both quintessential creations of computer technology, but they evoke more than a technology; they express a culture. The prefix, "cyber," and the adjective, "virtual," set this new culture apart from everyday space, the actual mountains and plains and rivers of the physical frontier, the oceans and air of the physical environment. This disjunction is expressed by Rashid of Microsoft who predicts that "tomorrow's information infrastructure will allow people to break the tyranny of geography and location" (U.S. Congress, 1993b, 86).

The idea that the National Information Infrastructure represents a culture, a way of life, has been elaborated extensively by, for example, Howard Rheingold, in The Virtual

Community: Homesteading on the Electronic Frontier. Rheingold early on marks the same basic disjunction between physical and virtual culture: "People in virtual communities do just about everything people do in real life, but we leave our bodies behind" (Rheingold, 1993, 3).

The culture that Cerf and Rheingold are referring to already exists in the form of the Internet. Cerf, in a section of his testimony entitled "Anecdotes from the 21st Century," points out to the House committee members that "[t]hose of us who have lived with the Internet since its inception have been living in what will be common in the next century" (U.S. Congress, 1993a, 65).

The Internet dates back to the 70s and is considered by many to be the foundation for future development of the information infrastructure. However, not all are equally comfortable with this assumption. Cynthia Braddon, for example, testifying for the Information Industry Association, calls explicitly for education and training to change the "Internet culture" on issues of privacy, security, and intellectual property rights (U.S. Congress, 1993b, 241). In her oral testimony she seems to imply that the Internet culture is one where "shoplifters are welcomed:"

> No supplier would be eager to showcase its wares in a marketplace where shoplifters are welcomed. Similarly, there are some technological problems--and some cultural predilections--that must be confronted if non-governmental information providers are to be fully comfortable with Internet and other huge computer networks as distribution channels for their products and services (Ibid., 219).

Whether or not this is what she intends, there is no

question but that her testimony reflects the profound differences among witnesses as to what the future information infrastructure should look like, differences reflecting the role of the government versus the role of the private sector, differences concerning public information and commercial information.

Other references to the Internet reflect this issue. For example, Dr. Weingarten, representing the Computing Research Association, describes the Internet as "an international seminar room in which any of us can talk with anybody else on any subject at anytime, exchange software, exchange data, exchange papers and ideas, and collaboratively work on research projects" (U.S. Congress, 1993b, 370). He recognizes the "deep differences of opinion" that exist between "the telcos and the research and education community;" that is, between the commercial network envisioned by the private information industry and the Internet.

At the same time, he stresses what he sees as common ground. In the prepared statement of the Computing Research Association, it is pointed out that:

> Federally-funded research and education networking is a customer for private sector services, not a competitor, and that this 'Internet community' has been responsible for creating both the technology and the applications of high performance communication! The Computing Research Association feels that attempts to legislate a strict separation between 'production networks' and experimental networks', and to place detailed restrictions on the use of the latter, are incompatible with the nature of the Internet and would paralyze future advances. As noted recently by Douglas Van Houweling, Vice Provost for Information Technology at the University of Michigan: 'The Internet is dynamic; today's 'experiment' is tomorrow's 'production'. ...It would be a shame to see legislation pass in Washington, supported by the RBOCs, that actually hurts the broader American community (Ibid., 300).

The reference here to production and experimental networks concerns Section 102(d) of H.R. 1757. This controversial provision would prohibit the use of the subsidized, experimental "test bed networks" for services "that could otherwise be provided satisfactorily using commercially available network services."

Witnesses for the private sector either strongly endorsed this provision or wanted to see its scope broadened and the restrictions made more categorical by imposing, for example, a specific time limit on the subsidy. Witnesses representing what we may call the "Internet" community were concerned that even this vaguely worded prohibition would threaten research projects underway.

According to the information industry viewpoint, as represented by Cynthia Braddon of McGraw Hill and the IIA, section 102(d) "embodies an important principle that was not as clearly recognized in the 1991 legislation: government-supported test bed networks should not be used to supplant or compete with privately operated commercial networks. ...Government should foster, not distort, that competitive marketplace" (Ibid., 217).

INFORMATION AND HUMAN SOCIETY

We have moved from abstract language about "information" in time and space, having volume and speed, for example, to the role of "information" in social and economic change, to information

and place, information and space, information and culture. In the process we have come upon some differences in the way the future is envisioned, differences centered around the appropriate role of government. I shall come back to these differences below, but before doing so I want to continue the train of thought which has led us from the language of information and networks to culture.

My concern here is with the use of the word "myth." If we say that a myth tells a story about human identity, about what it means to be human, can we find grounds for this usage in the legislative discourse.

To answer this question, I want to go back to the word "infrastructure," which launched the discussion of the themes of location and space. The term evokes not only a horizontal dimension but a vertical dimension. An infrastructure is a structure underneath something else, supporting something else. What is in view, in the HPCA legislation, is, in the first place, the technology of a national information network. However, if we continue to think in terms of levels, beneath the technology is society. The metaphor of levels here expresses a scale of priorities. Electronic networks are the tools and expressions of the more fundamental reality of social networks. Electronic communications are a tool for human transactions.

The interrelationship between technological infrastructures and the quality of future society is expressed with remarkable clarity by John Gage from Sun Microsystems addressing the issue of network security. The issue could be formulated in blunt terms

as how to prevent eavesdropping on a public data network. If the eavesdropper in view is the government then the issue is how to protect the private citizen from Big Brother. But the issue is much broader than that. One controversial proposal by the government would mandate the use of an encryption technology, the Clipper chip, which would allow the government a back door to decrypt traffic for law enforcement and national security purposes.

In testifying against this proposal John Gage starts by looking at "security" in daily life. I want to quote his testimony here at length:

> I'd like to suggest that you think about what are the most essential security mechanisms in your daily life and work. I believe you will realize that the most important things any of you ever do by way of security have nothing to do with guards, fences, badges, or safes. Far and away the most important element of your security is that you recognize your family, your friends, and your colleagues. Probably second to that is that you sign your signature, which provides the people to whom you give letters, checks, or documents, with a way of proving to third parties that you have said or promised something. Finally you engage in private conversations, saying things to your loved ones, your friends, or your staff that you do not wish to be overheard by anyone else.
>
> These three mechanisms lean heavily on the physical: face to face contact between people or the exchange of written messages. At this moment in history, however, we are transferring our medium of social interaction from the physical to the electronic at a pace limited only by the development of our technology. Many of us spend half the day on the telephone talking to people we may visit in person at most a few times a year and the other half exchanging electronic mail with people we never meet in person.
>
> Communication security has traditionally been seen as an arcane security technology of real concern only to the military and perhaps the banks and oil companies. Viewed in light of the observations above, however, it is revealed as nothing less than the transplantation of fundamental social

> mechanisms from the world of face to face meetings and pen and ink communication into a world of electronic mail, video conferences, electronic funds transfers, electronic data interchange, and, in the not too distant future, digital money and electronic voting.
>
> No right of private conversation was enumerated in the constitution. I don't suppose it occurred to anyone at the time that it could be prevented. Now, however, we are no the verge of a world in which electronic communication is both so good and so inexpensive that intimate business and personal relationships will flourish between parties who can at most occasionally afford the luxury of traveling to visit each other. If we do not accept the right of these people to protect the privacy of their communication, we take a long step in the direction of a world in which privacy will belong only to the rich.
>
> The import of this is clear: <u>the decisions we make about communication security today will determine the kind of society we live in tomorrow</u> (U.S. Congress, 1993b, 262. Emphasis added).

Recognition of a face, promises, personal relationships, intimacy, privacy, conversation in everyday life with loved ones, family, friends - what is the relationship between this everyday life-world, this social infrastructure, to the physical infrastructure? Can we say that social interaction is what the electronic network is all about? What does that mean? Can we say that the social relations underlie the technology? What does that mean? Surely they both reciprocally determine each other?

The inseparability of technology, especially communications technology such as networks, from human social relations is expressed in pointed fashion in a work that is not commenting directly on NII policy but is highly relevant. Cliff Stoll, in <u>The Cuckoo's Egg</u>, a highly readable account of his attempts to track down a hacker breaking into U.S. computer systems all over the country, has this to say.

> I learned what our networks are. I had thought of them as a

> complicated technical device, a tangle of wires and circuits. But they're much more than that - a fragile community of people, bonded together by trust and cooperation. If that trust is broken, the community will vanish forever (Stoll, 1989, 313).

The question raised here, concerning the relationship between technology and society, the social relations of technology, is a very large one. My immediate concern is with the concept of information myth. Myth is about human lives, society, community, not just inanimate objects or machines taken as detached artifacts. The quoted passages gives poignant expression to the fact that in talking about information network technology policy we are at the same time, in some way, also talking about human society. Hence, in that respect, at least, we are justified in using the word myth.

Earlier we cited testimony which sees the information revolution as based on tools that "amplify" human intellectual capacity, that capacity which is "the essence of what makes us human" (U.S. Congress, 1989, 52).

On a different level, it is worth noting that one of the "Grand Challenges" cited in support of government support for high-performance computing is the human genome project. On one level, this is a matter of horsepower. The genome project requires staggering computer and network power. On another level, the connections are more substantive, as one witness points out:

> Genetics and computer science are arguably the two most rapidly changing areas of human knowledge, and their potential for synergy is one of the great challenges to the human imagination. Perhaps the most important discovery in 20th century biology was not the discovery of the DNA double helix, but rather the realization that the double helix

> provides a common digital fabric on which all life is built... Biology has long been an information-rich field; the newly acquired digital information has the extreme virtue of being in a common language across all living systems. Biological research is becoming strongly driven by this growing digital data base" (U.S. Congress, 1993b, 298).

As a side note, fascination with the digital information homology between biology and computers accounts in part for a $12M endowment from Bill Gates, Chairman and CEO of Microsoft Corporation, to the University of Washington, to house the National Science Foundation Science and Technology Center in Molecular Biotechnology.

There is another fascinating shared use of metaphor growing out of shared structures in the case of networks, neural networks on the one hand, and computer networks on the other. On the technology side network structures are being deployed not only at the macro level, as in the case of the national and international networks that make up the Internet, for example, but also at the micro level, in the form of processors based on conscious imitation of neural network structures. This powerful convergence of biological structures and technological structures has not received as much attention as the digital example, but adds another layer of potential resonance to the myth of information in its network stage.

The comparison between computer networks and neural networks is not mentioned in the hearings I have read. The rich constructive potential of the network metaphor is suggested by Donna Haraway. She says, in an article intended as an explicit project in myth making, "I prefer a network ideological image,

suggesting the profusion of spaces and identities and the permeability of boundaries in the personal body ad in the body politic. 'Networking' is both a feminist practice and a multinational corporate strategy - weaving is for oppositional cyborgs" (Haraway, 1991, 170).

I will return to this theme in the concluding section of this paper.

SUMMARY OF PART ONE

I am ready to bring the first part of this paper to a conclusion. The question at the forefront has been whether we are justified in speaking of an information myth in the policy-making discourse. First, then, the hearings are about the future, a future which no one would claim to be able to predict with scientific certainty. Information is deployed in the hearings as a device for integrating past, present and future. Second, information is the defining category in structuring social and cultural space. Third, information infrastructure is about human nature and human society. I would argue, therefore, that the weight and scope of the issues envisioned justifies the use of the category of myth.

On the other hand, there is still something that seems to be lacking. Nothing we have said takes away from the bland character of the key term, information. Furthermore, the "story" as we have told it lacks heroes. Richard Mandelbaum, representing FARNet,

the Federation of American Research Networks, believes that the impact of a high-performance network will be "heroic" and that the NREN envisioned by the 1991 Act is a "glorious" next move, but such language seems somehow out of place (U.S. Congress, 1989, 140, 150). The information myth has a "thin" quality to it, after all is said and done, "thin" in the sense in which William Connolly uses it when he says that "[a] thin theory of legitimacy continues to inform most accounts of current politics" (Connolly, 1987, p. 74). We shall return to Connolly in the second part of this paper where I want to consider the legitimating function of the information myth.

In response to the objection that myth featuring information is thin, bland, lacking in heroes, inglorious, I would suggest that just such a myth is highly appropriate for a society which defines itself precisely as beyond myth. Peter Fitzpatrick, in The Mythology of Modern Law, points out that "modernity" defines itself in opposition to myth. Nevertheless, he argues, "myth is vibrantly operative in modernity." The denial of myth is the myth (Fitzpatrick, 1992, ix). We called attention earlier to Ricoeur's sharply drawn contrast between language "reduced ... to the informative function" and the language of myth (Ricoeur, 1973, p. 344). What could be more appropriate for an age which denies myth than a vehicle like information which camouflage's its mythic resonance by its very one-dimensional blandness.

My final comment before turning to consider the function of the information myth in the second part of this paper concerns

the conjunction of information and communication expressed by the phrase "information infrastructure." Raymond Williams describes the modern age as living through a "long revolution," which includes a political, an economic, and a cultural component, none of which can be understood apart from the other two processes. The importance Williams assigns to communications in these intertwined processes is explicit:

> My own view is that we have been wrong in taking communication as secondary [to political and economic terms of analysis]. Many people seem to assume as a matter of course that there is, first reality, and then, second, communication about it. We degrade art and learning by supposing that they are always second-hand activities: that there is life, and then afterwards there are these accounts of it. Our commonest political error is the assumption that power - the capacity to govern other men - is the reality of the whole social process, and so the only context of politics. Our commonest economic error is the assumption that production and trade are our only practical activities, and that they require no other human justification or scrutiny. We need to say what many of us know in experience: that the life of man, and the business of society, cannot be confined to these ends; that the struggle to learn, do describe, to understand, to educate, is a central and necessary part of our humanity....What we call society is not only a network of political and economic arrangements, but also a process of learning and communication (Williams, 1976, p. 11).

If Williams is right then a myth appropriate to a society undergoing this long revolution would have to in some way give expression to the emergence of communications to such prominence. I believe this explains, in part the powerful resonance of the concept of a national information infrastructure.

In addition, Williams's description of society as "a process of learning and communication" suggests the close links between communication networks such as the information infrastructures,

on the one hand, and education, including adult education, on the other. I would further argue that Williams's description of society suggests a radical redefinition of adult education that moves it at once from the margin to the center. Such a redefinition and revaluation is overdue. This study of information infrastructure policy is intended to contribute to such a redefinition.

Such a reading of Williams is appropriate in that Williams himself was an adult educator for fifteen years. The work from which the citation is taken is based, according to his own testimony, on methods of teaching which he used over several years in adult education classes (ibid p. 13).

PART TWO

THE FUNCTION OF THE INFORMATION MYTH

The HPCA legislates expanded Federal support for high-performance computing (Sec. 3 (1)). H.R. 1757 would increase that support. Should the government provide such support? If so, in what form? How should the government role be defined? In the second part of this paper I want to turn attention to the function of the information myth. What function does the information story have in the discourse concerning the government's role? Does it have a legitimating role? A defining role? A mystifying role? All three? None of the above?

THE FREE MARKET POSITION

We may start with the unsurprising position of those who, in the name of the market, hold that the government has no role to play in the computer or data network business. T.J. Rodgers, President and CEO of a semiconductor business, put it bluntly, "What we need is a Washington with the courage to get out of the way and let us fight it out" (U.S. Congress, 1993a, 210). The "invisible hand" of the market should be trusted to take the nation down the road to high-performance computing.[2] More

---

[2]See the title of his prepared statement for the House committee: "The Road to High-Performance Computing: Free Markets or Government Subsidies? An Entrepreneur Endorses the Invisible Hand" (U.S. Congress, 211).

specifically, government involvement means taxes and taxes "punish" those who have built America's high technology industries. "[T]he top 5 percent of all wage earners pay 44 percent of all income tax" (U.S. Congress, 1993a, 208).

Rodgers has no dispute concerning the importance of competition, economic growth, and even the administration's high-technology vision. "I certainly share [the administration's] enthusiasm for an America in which computers and communications carry data and video into companies and schools, and eventually into the home" (Ibid., 230). In his opinion, however, this is something the free market will pay for without one cent of expense to the taxpayer.

It is not necessary to spell out this point of view in detail. Behind the metaphor of the invisible hand looms the fundamental political question of the relationship between self and society. Belief in the invisible hand is belief that the market, left to itself, will automatically balance relationships between self and society. Does government have no role? Citing John Kennedy's aphorism, "A rising tide lifts all boats," Rodgers appeals to the legislature to "create an infrastructure of the economy that rises [sic!] all boats, all companies, so that we can all compete fairly with our foreign competitors" (Ibid., 210). More specifically, "Washington can take ... steps to restore our financial infrastructure" (234). In other words, the public interest and the interests of the individual will best be served if Washington confines its role to nourishing the economy,

i.e. "companies," by, for example, deregulation of telecommunications.

The free market, then, is not completely "free" of government intervention, even on this view. More to the point, it is not a market of individuals, competing on an equal basis with one another, as the phrase suggests. It is a market dominated by multinational corporations which have the status of individual persons before the law.

This creates a situation in which our language conceals basic ways in which individual and collective life are structured. What the market has produced is an economy, indeed, a world, in which the corporation has become the dominant form of collective life. This remarkable fact is obscured by the equally remarkable fact that corporations in the U.S. are by law considered persons, and are accorded the constitutional rights we associated with individuals, such as freedom of speech (Santa Clara County v. Southern Pacific Railroad, 1886, See Schiller, 1989, p. 47). In other words, terms like 'person' and 'privacy,' which we associate with human selfhood, have become ambiguous code words that embrace global collectivities. Furthermore, it is typical from this perspective for the term 'government' to become a code word associated with unwarranted intrusion into the "private" sector, "private" carrying the double reference to the corporate economy and the individual.

THE POSITION OF THE INFORMATION INDUSTRY ASSOCIATION (IIA)

Rodgers' opposition to any government support for high-performance computing represents a minority voice within the hearings. More typical is the call for a public and private sector partnership. This is the position articulated, for example, by Cynthia Braddon representing McGraw-Hill and the Information Industry Association. The IIA is the trade association of 500 leading companies that create, distribute, and use information products and services and technologies.

The IIA is the official voice of the commercial version of the information myth. "Our common theme is information," Braddon says (U.S. Congress, 1993b, 211), information viewed primarily as property, intellectual property. Competition is the "paradigm," as in this remarkable statement: "Increased competition - already evident in many markets integral to telecommunications infrastructure development - is arguably the most dramatic new paradigm for policymakers to consider" (232).

In her testimony, the commercialization of the NII under a "competitive regime" is the vision (Ibid, 231). The goal of the government, which should be explicitly stated in the legislation, should be "to foster a competitive marketplace in the information services arena" (Ibid). The "lodestar," or decisive criterion for evaluating all activities under the NII legislation should be "to assess whether activities under the Program and the Plan are advancing the goal of promoting competitive private sector provision of all products and services with which the Program and Plan are concerned" (Ibid, 228). The goal is "maximum information

provider participation in the network." Government should not "distort" the competitive marketplace (Ibid, 217).

Specifically, this translates, first, into an appeal for strong copyright protection in the legislation. Second, it means that the principle enunciated in Section 102(d) to the effect that government-supported test bed networks should be regulated in such a way that they do not replace or compete with privately operated commercial networks, should be extended to information services generally. "Our information industry," she says, "is diverse and dynamic, the strongest in the world. Corporations, non-profit institutions, and other players compete to keep Americans well-informed. This is an information marketplace that government should acknowledge, foster and promote" (Ibid, 217). Third, it means that the private sector role in the dissemination of government information needs to be recognized and supported.

Braddon's testimony expresses the same faith in the market as Rodgers and the same suspicion of government, despite the larger role she accords government. In this articulation of the information myth, scare words like control, power, restrictions, monopoly, distortion are one-sidedly applied to government. For example, "In our system, citizens are entitled to access to public information, from a diversity of sources, in a variety of formats, free from unwarranted government restrictions and control. The information industry has thrived under these principles, but more importantly, so has the American economy and our democracy" (Ibid, 225).

In her defense of copyright, the same bias comes through. "If copyright cannot be protected in this environment, then the supply of useful information will be drastically curtailed -- or, just as troubling, it will be limited to the information that government or some other powerful institution chooses to create (219). Here again, 'powerful' is a word uttered in connection with government, the power to choose, to select, to limit - this is a specter that is raised in connection with government. What is missing from this picture is the power of private corporations to use copyright provisions to limit, to control, to distort, to restrict the market.

She appropriately argues against subsidies on the basis that they "create artificial demand" (Ibid. 236). She has in view government subsidies, overlooking the fact that multi-million dollar corporate subsidies of particular health care policies, or product advertising, or a consumption culture, also create artificial demand.

Finally, in Braddon's view, the public interest "is best served when open competition flourishes" (Ibid, 235). To be fair, this quotation occurs in a sentence which clearly implies a government role in protecting the public interest. But the point of the sentence is that governments' carry out this protective role best when they promote open competition and work their way out of a job in a specific market.

Braddon's views fit the policy of "reindustrialization" which has been advocated since the beginning of the '80s, in

contrast to the free market position of Rodgers. William Connolly conveniently summarizes the differences in his 1987 essays on political theory entitled Politics and Ambiguity. The new industrialists, he points out, "openly support a positive role for the state in the economy, not in aiding the poor or protecting the natural environment, but in subsidizing the private expansionary process" (Connolly, 1987, 20). They are "not concerned about monopolistic or oligopolistic corporations. Even if one unit dominates a product field, the possibility of entry by a new competitor will goad the giant to maintain efficiency and cost effectiveness." In contrast to the marketeers (like Rodgers; see his remarks on balancing the budget) "the new industrialists do not view inflation as the most fundamental social evil to be avoided; inflation becomes a virtue when it supports a new burst of industrial expansion and the redistribution of income toward the upper levels of the economy."

More important than the differences between marketeers and reindustrialists is the common "devotion to economic growth." Both "insist that it be given the highest priority." Both support "the hegemony of growth." But reindustrialists go beyond both marketeers and welfare state advocates in believing that to support growth, "[t]he state must exercise new initiatives (including those opposed by market monetarists) and eliminate unproductive subsidies (primarily those traditionally supported by welfarists) in pursuing this objective" (Ibid, 21).

THE ADMINISTRATION POSITION

A third position is that of the Clinton administration. This view is spelled out in the 1993 position paper entitled, Technology for America's Economic Growth, A New Direction to Build Economic Strength" (Clinton and Gore, 1993). It is an unabashedly technocratic vision. The statement spells out the role of technology in achieving three goals - long term economic growth; responsive government; and world leadership in basic science, mathematics, and engineering. The NII represents one of six new initiatives to achieve these goals.

The statement also makes it clear that "civilian technology" represents a major form of the "peace benefit" under the Clinton administration. "We cannot rely on the serendipitous application of defense technology to the private sector" (1)..."the U.S. government has relied on its investments in defense and space to trickle down to civilian industry" (7). "New programs will accelerate transfer of this experience [defense capabilities] to civilian institutions" (14). The application of technology to military purposes is the model. Military training provides a model for "how to use the new technologies in practical teaching situations" (14).

The military example in the case of information management is explicitly cited by Gore in testimony on March 7, 1991, the morning after the Gulf War victory was celebrated. Gore makes mention of the celebration and then goes on to reflect that

"I don't think it's stretching things too much to say that one of the principal reasons our military coalition was able to win such a decisive victory was that we had a superior command of information in all its forms" (U.S. Congress, 1991, 20). The military demonstration of the power of information is immediately applied to "the economic battles of the future with Japan and a unified Europe," which will "depend on whether or not we develop a superior command of information of the kind directly relevant to success in the world economy" (Ibid).

The liberal technocratic vision believes that technology can save the American dream; that is, can reconcile corporate capitalism with democracy. Representative Owens (NY), for example: "We will renew and rebuild the American dream once again, this time as part of the revolution in electronic communication" (U.S. Congress, 1993b, 108).

The NII is perceived by the administration as a perfect tool for this kind of democratization through commercialization and government nourished privatization. According to Gore, the technology developed under the proposed legislation "will pave the way for high-speed networks to our homes. It will give each and everyone of us access to oceans of electronic information, let us use tele-conferenceing to talk face-to-face to anyone anywhere, and deliver advanced, digital TV programming even more sophisticated and stunning than the HDTV available today" (U.S. congress, 1991, 26,27).

SUMMARY OF PART TWO

To summarize the three positions outlined. The free marketeer takes the position that government should take hands off, except to protect the financial infrastructure. The other two positions advocate a government/private sector partnership, but one emphasizes the dangers of government whereas the other emphasizes the benefits of government. All agree that the Internet should be commercialized. None make mention of dangers from the private side of the partnership. All three support the priority of economic growth. All three appear to agree that everyone wants and needs the kind of information access that the NII represents. In Gore's words, there is a "hunger for information," information which is stacking up unused, "silos of data rotting," like the huge silos of grain rotting while people starve to death by the millions (U.S. Congress, 1991, 21). All recite the danger of the growing gap between the information rich and the information poor.

PART THREE

BEYOND THE INFORMATION MYTH

MAKING ROOM FOR AMBIGUITY

In part one I argued for the presence of an information myth in the discourse over national information policy. In part two I argued that the function of the information myth is to legitimate the growth imperative. In this third part I want to argue the necessity of going beyond the thinness of the information myth.

Outside of the official discourse represented by the hearings there are, of course, other opinions expressed. The move to privatize information, including government information, has been vigorously criticized, for example, by Herbert Schiller in Culture, Inc. His thesis is that corporate reality is "enveloping" public expression (Schiller, 1989, 29). "The corporate 'voice' now constitutes the national symbolic environment" (Ibid, 44). The creation and global extension of a near-total "corporate informational-cultural environment" is seriously eroding the democratic order. The Clinton administration's NII policy is speeding up this corporate takeover of public expression (Schiller, 1994).

Others, such as William Connolly, challenge the "hegemony of growth," the assumption common to all of those represented in the hearings that everything must be subordinated to economic growth. Connolly calls for the "taming" of the growth imperative. For

example, his distinction between inclusive and exclusive goods is directly relevant to the question of a national data superhighway.

An exclusive good is defined as one which "cannot be extended to the populace as a whole without (1) decreasing the private value of the good to those who have already received it, (2) increasing the private costs of its use, (3) accentuating the adverse social effects of its use, and (4) increasing the costs borne by the state in trying to rectify these adverse effects."

Inclusive goods, by contrast, "promote an infrastructure of consumption that eases the public pressures for constant economic growth and incorporates more members into the good life it makes possible" (Connolly, 30).

Is the data infrastructure as conceived by policy makers more properly described as an exclusive, or an inclusive good? Is it more like the automobile highway or the railroad infrastructure As Connolly points out in an particularly apt example, the universalization of the automobile receives low grades compared to the universalization of rail, transit, and bus systems. In my judgment, it depends on how it is implemented. If the roaring engine of the computer industry which values only that which is faster, more powerful, and has no time to consider inclusivity as a criterion, is left to drive forward unchecked, then the gap between rich and poor will continue to grow.

Connolly's critique is particularly useful because it is concrete enough in its analysis of party politics, on the one

hand, to account for the differences among the marketeers, welfarists, and liberals in their approach to growth, while at the same time situating this analysis within a broader theoretical critique of the fundamental understandings about the relations between self and society.

The information myth as spelled out in the first part of this paper is used to legitimate the growth imperative assumed by all of the supporters of the administration's NII policy. However, the legitimacy it offers is "thin," to use Connolly's term; that is, it papers over contradictions and recasts complex and serious policy issues in trivial terms (Connolly, 1987, 74ff).[3]

Connolly's detailed analysis of the dilemma of legitimacy is highly relevant to NII policy (Connolly, 1987, ch. 6). Legitimacy in U.S. society today depends upon allegiance to both productivity and democracy and the ability of each to exist in harmony with the other. But allegiance to the "civilization of productivity" is losing its credibility.

Disillusionment with the promise of productivity involves, first, a growing awareness that the pursuit of universal private affluence keeps notching up the standard of affluence so that the result is an infinitely receding target. The "social infrastructure of consumption" defines a set of "paradigmatic

---

[3]There is no specific reference to the information myth as a version of the "thin theory of legitimacy" in Connolly's essay, but he does cite Bell (1976) as one example of such theories.

goods," which decline in paradigmatic value as they are extended to more people. So universalization of affluence is self-contradictory.

This leads to less willingness to submit to "disciplines" for the sake of affluence, and to awareness of other stresses, and contradictions in the system including awareness that labor mobility damages social ties; that the stratification system needed to motivate people to fill the lowest positions also closes off some segments of the society from its rewards; that the economy of growth increases dependency on foreign resources, threatens the natural environment, generates obsolescence, and increased managerial controls.

Marketeers like Rodgers employ a variety of strategies to minimize these evidences of cracks in the system and the consequence disillusionment.

Connolly's next point, that disillusionment with the economic system is deflected on to the state, is directly pertinent to the one-sided concern with the threat of state control reflected in the IIA testimony by Braddon (Ibid, 79). The reason for this deflection, according to Connolly, is that belief that the state, as the one institution of public accountability, has sufficient resources to promote common ends and purposes, preserves our view of ourselves as free agents, citizens who can do something about our future. Connolly's point, however, is that this misses the real problem, which is with the <u>economic</u> system. Furthermore, this creates a catch-22 situation for the state,

responsible for those whom the privately incorporated economy finds it unprofitable to care for, and responsible to promote growth through efficiency and cost cutting.

Finally, Connolly's analysis of the liberal response to the dilemma posed by having to choose between productivity and equity sheds light on the technocratic policies of the Clinton administration. In Connolly's terms, liberalism has split into two wings, technocrats, who have opted for productivity at the cost of increasing coercion, and "beautiful souls," who have opted for democratic virtue at the cost of disengagement from practical issues.

To return to information myth as a legitimating device, there are three points in Connolly's analysis which apply directly to the legitimating function of the information myth and bear out the contention of thinness. The first is the assumption of rationality. The second has to do with ends. The third has to do with the relationship between identity and institutions, what he calls the "internal structure" of legitimacy.

First, he points out that the technocratic liberal accepts the increased controls and coercion, because "these controls are thought only to do more consciously and coherently what traditional guides to conduct did unconsciously and unevenly" (Ibid, 84). In other words, they are rational, and "it is not an unjust infringement of freedom to do what is necessary to promote rational ends." The information myth is taken to be inherently rational by the believers in technology.

Second, the assumption of rationality contributes to a failure to even raise the question of ends. Even though "the ends fostered by the civilization of productivity no longer can command reflective allegiance of many who are implicated in those institutions," the ends are not questioned. Another reason for this failure to re-examine the direction we are going is the dense "structure of interdependencies" of modern institutions, which makes it extremely difficult to alter course (Ibid, 81).

The information myth defines direction in terms of growth, the infinite frontier to which the economic engine will take us, fuelled by information, the infinitely renewable resource.

Connolly poses the following question, "what constellation of ends, limits, imperatives, and priorities could a modern populace endorse today as worthy of its allegiance? If a reconstitution of the defining institutions were possible, what direction should the evolutionary changes take? What could replace or temper the ends of the civilization of productivity" (Ibid, 82). The failure to answer this question, even in theory, he points out, increases the gap between covert disaffection and overt allegiance.

This leads to the third point. According to Connolly, theories of legitimacy that cannot comprehend the "internal structure" of a social order will of necessity be thin, or inadequate. Internal structure has to do with the interrelationship between self and society, personal identity and the social order. Any healthy order imposes limits. But if limits

are viewed, on the basis of "an enormous load of prejudgments," as necessary to the common good, the social order will still command allegiance. Personal identity is bound up with the social order, so that attitudes to the social order and attitudes to the self are intertwined. It is personal identity that "provides one with the density needed to maintain social relations, to form practical judgments, and to criticize specific features of the common life" (Ibid, 74). A theory of legitimacy that takes into account this internal structure of the social order will pay attention to the symptomatic, the covert, the indirect, the unarticulated clues to disaffection, will have room for ambiguity in the relationship of self and society.

To summarize, there is nothing about the self, the interrelationship between self and society, in the information story, no "social ontology," no density. It is thin, both as a theory of legitimacy and as myth. It represents what Michael Collins calls "technicist" thinking, what Donald Levine calls "computerized thoughtways," what Mechthild Hart calls "encircled" thinking, which "sees the solution to the problems caused by the introduction of new technology within the very same technology." (Collins, 1991, Levine, 1985, ix, Hart, 1992, 134).

Encircled thinking tends to blind to the increased controls, disciplines, and coercion needed to maintain growth. It tends to an uncritical acceptance of growth for growth's sake, an inability to think critically of direction, ends, purpose, to nourish a kind of fatalism, or technological determinism, or what

Connolly calls a "studied innocence" about our historical course. Finally, it is unable to do justice to the "density" of the self. Information policy discussion needs to break out of the circle of technicist thinking. It needs to go beyond the information myth.

EPISTEMOLOGY OF THE INFORMATION MYTH

I want to start from Connolly's critique of contemporary theories of legitimacy, summarized above, but where Connolly focuses primary attention on ontology, I want to focus on epistemology.[4]

Connolly's critique is grounded in social ontology, which he defines as "a set of fundamental understandings about the relations of humans to themselves, to others, and to the world" (Connolly, 1987, 9). He argues for a social ontology of "discord" over against the prevailing social ontology of "concord," which has no place for otherness - "dirt, things out of place, unreason, mystery, eccentricity, instability"(Ibid, 10, 11). An ontology of discordance, by contrast, "identifies some forms of otherness as the unavoidable effect of socially engendered harmonies" (Ibid. 11).

Applied to legitimacy theories, this leads Connolly to the

---

[4]There is an intimate relationship between technology and epistemology, hinted at in the fact pointed out by Heidegger that in Greek thought the word techne is linked with the word episteme, and that both "are names for knowing in the widest sense" (Heidegger, 1977, 13).

conclusion that only theories which make room for ambiguity offer a basis for practicality and democracy. "The intuition guiding this exploration," he states, "is a simple one: until the contemporary self is prepared to affirm ambiguities in ideals it prizes most, it will oscillate between cultivating innocence about the historical course we are on and expressing covert disaffection from it. Both response, when transmuted into politics, license extension of disciplinary controls into new areas of life" (Ibid, 97,98).

Such an ontology requires an epistemology which has room for ambiguity. The importance of epistemology is recognized by Connolly, who devotes the last chapter of his book to clarifying the relationship of the themes developed in the rest of the book "to the knowledge enterprise" (Ibid, xi). The main point of this last chapter is to warn against the "ways in which the will to knowledge can suppress ambiguity in life" (Ibid, xii). "[C]ognitive articulations" do not exhaust life, he says (Ibid, 154). And again, "while knowing is definitely essential to political thought, it does not exhaust it" (Ibid, xi,xii).

This warning, in the last chapter, concerning the limits of epistemology is based upon an earlier essay (Chap. 8) in which Connolly follows Richard Rorty in repudiating the primacy of epistemology, by which he means the quest for valid and certain grounds for knowledge, or epistemological foundationalism. Connolly parts company with Rorty's "social foundationalism," that is his "refusal to call the reigning values of [his] own

society into question" (Ibid, 123). But this does not, in Connolly's view, take away from the value of Rorty's case for demoting epistemology.

I do not want to argue for the primacy of epistemology; however, I do want to argue for a reconstituted epistemology, one that makes room for and respects ambiguity in life. To simply warn against the will to knowledge or to dismiss epistemology, as Rorty does, is to abandon a powerful weapon to the enemy. It is to accept the foundationalist definition of epistemology as the quest for certainty. I believe it is vital that epistemology be redefined or reconstituted rather than abandoned. Epistemology includes both a quest for reasons and a quest for richness. These two elements in knowing coexist in tension. Connolly's social ontology of discordance and ambiguity needs an epistemology of discordance and ambiguity, which is, perhaps, what he intends in his last chapter on theories of language, entitled, "Where the word breaks off."

IMPLICATIONS FOR ADULT EDUCATION: BEWARE THE BLINDING SUN

The point, it seems to me, is critical for education. Education, adult education, is about learning and knowing and therefore implies an epistemology. To abandon epistemology is, for educators, to remain at the mercy of unexamined assumptions about knowledge and knowing. National information policy, currently being spearheaded by national information

infrastructure proposals, is of vital concern to adult education.

The response of educators cannot remain at the level of uncritical attempts to "catch up." There must be a critical response which escapes the circle of technicist thinking. Looking at the sun can cause blindness. Just as there are iatrogenic diseases, that is, diseases caused by healers, so there are communication systems that can make one "deaf-and-dumb" (Dupuy, 1980, 8).

Adult education must in practice and in policy work from an epistemology that does justice to the density of persons.[5] To the extent that technicist thinking as expressed in the information myth represents a kind of scientism, that is, an uncritical acceptance of "science" as the only means of knowing, there must be a response which escapes from the circle of scientism.

Since science has official status as the way of knowledge in our society, the epistemological challenge is also, in this society, intrinsically political. It is significant that the Chairman of the House Committee on Science, Space, and Technology, Representative George E. Brown, Jr., felt it necessary to convene a symposium on the role of science in society, the results of which were printed as a report by the chair to the committee, entitled The Objectivity Crisis: Rethinking the Role of Science in Society (U.S. Congress, House,

---

[5]Cf., for example, Sherman Stanage on the concept of personhood as fundamental to adult education theory and research (Stanage, 1987).

1993c).

Knowledge and power are not apart. Therefore, the will to knowledge cannot turn its back on politics but must precisely finds its way through the tangled intertwining of the two. There is no objectivity in the foundationalist sense, but objectivity in the sense of putting myself into the shoes of others, especially those who are different, is essential. Hence the need for an epistemology that insists on ambiguity, mystery, that insists that there is always more beyond any articulation. And hence the need to recover tools of articulation, such as myth and symbol, which make room for multivalence. Persons cannot live by information alone.

REFERENCES

Bell, Daniel. The Cultural Contradictions of Capitalism. New York: Basic Books, 1976

Clinton, W.J. & Gore, A. "Technology for America's Economic Growth, A New Direction to Build Economic Strength." Reprinted in U.S. Congress. House. Subcommittee on Technology, Environment and Aviation of the Committee on Science, Space, and Technology. H.R. 820 - The National Competitiveness Act of 1993. U.S. House of Representatives. 103rd Cong, 1st sess, March 2, 1993. Appendix.

Collins, Michael. Adult Education as Vocation: A Critical Role for the Adult Educator. London: Routledge, 1991.

Connolly, William E. Politics and Ambiguity. Madison: The University of Wisconsin Press, 1987.

Dupuy, Jean-Pierre. "Myths of the Informational Society," in: The Myths of Information: Technology and Postindustrial Culture, ed. Kathleen Woodward. Madison, Wisconsin: Coda Press, Inc., 1980, 3-17.

Elmer-DeWitt, P. "Take a Trip Into the Future on the Electronic Superhighway," Time. April 12, 1993, 50ff.

Fitzpatrick, Peter. The Mythology of Modern Law. Routledge: London: 1992.

Hamelink, Cees J. "Is There Life After the Information Revolution?" in: The Myth of the Information Revolution: Social and Ethical Implications of Communication Technology. ed. by Michael Traber. London: SAGE Publications, 1986.

Haraway, Donna J. Simians, Cyborgs, and Women: The Reinvention of Nature. New York: Routledge, 1991.

Hart, Mechthild U. Working and Educating for Life: Feminist and International Perspectives on Adult Education. London: Routledge, 1992.

Heidegger, M. The Question Concerning Technology & Other Essays. trans. William Lovitt. New York: Garland Publishing, Inc., 1977.

High-Performance Computing Act of 1991. U.S. Code. secs. 5501-5528 (1991).

Levine, Donald N. The Flight from Ambiguity. Essays in Social and Cultural Theory. Chicago: The University of Chicago Press, 1985.

Poster, Mark. The Mode of Information: Poststructuralism and Social Context. Chicago: The University of Chicago Press, 1990.

Rheingold, Howard. The Virtual Community: Homesteading on the Electronic Frontier. Reading, Massachusetts: Addison-Wesley Publishing Company, 1993.

Ricoeur, Paul. "Hermeneutic Method and Reflective Philosophy," In Phenomenology and Existentialism, ed. Richard M. Zaner and Don Ihde. New York: G. P. Putnam's Sons, 1973.

Santa Clara County v. Southern Pacific Railroad, 118 U.S. 394 (1886).

Schiller, H.I. Culture, Inc.: The Corporate Takeover of Public Expression. New York: Oxford University Press, 1989.

Schiller, H.I., "The Corporate Pipeline into Our Heads," Lies of Our Times, January-February 1994. Reprinted by LOOT, 145 W. 4th St., 5 W. 4th St., New York, NY 10012; 212-254-1061. Copyright 1994 by Sheridan Square Press, Inc., and the Institute for Media Analysis, Inc.

Schwartz, Evan I. "Like a Book On a Wire," Publisher's Weekly, 11/22/93, 33-38.

Stanage, Sherman M. Adult Education and Phenomenological Research: New Directions for Theory, Practice, and Research. Malabar, Florida: Robert E. Krieger Publishing Company, 1987.

Stayskal. Chicago Tribune, January 28, 1994, Section 1, p. 19. Reprinted from Tampa Tribune.

Stoll, Cliff. The Cuckoo's Egg: Tracking A Spy Through the Maze of Computer Espionage. New York: Pocket Books, 1989.

U.S. Congress. House. Subcommittee on Science, Research and Technology of the Committee on Science, Space, and Technology, High Performance Computing, 101st Cong., 1st sess., October 3, 1989.

U.S. Congress. House. Subcommittee on Science and Subcommittee on Technology and Competitiveness of the Committee on Science, Space, and Technology, H.R. 656--The High-Performance Computing Act of 1991, 102nd Cong., 1st sess., March 7, 1991.

U.S. Congress. House. Subcommittee on Technology, Environment and Aviation of the Committee on Science, Space, and Technology, Technology Policy: Information Infrastructure [Information Superhighways and High Performance Computing]. 103rd Cong., 1st sess., March 23, 25, 1993a.

U.S. Congress. House. Subcommittee on Science of the Committee on Science, Space, and Technology. H.R. 1757 - High Performance Computing and High Speed Networking Applications Act of 1993, 103rd Cong., 1st sess. April 27, May 6,11, 1993b.

U.S. Congress. House. Chairman's Report to the Committee on Science, Space, and Technology. The Objectivity Crisis: Rethinking the Role of Science in Society. 103rd Cong., 1st sess. June 1993.

Williams, Raymond. Communications, 3d ed., Harmondsworth, Middlesex: Penguin Books, 1976.