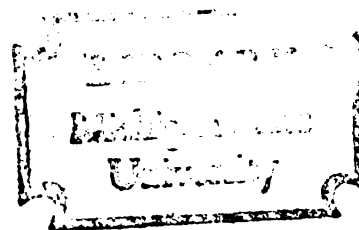


SOCIAL CONTROL AND TELECOMMUNICATION
TECHNOLOGY: IMPERATIVES FOR INSTITUTIONAL
CHANGE

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ABSTRACT

SOCIAL CONTROL AND TELECOMMUNICATION TECHNOLOGY; IMPERATIVES FOR INSTITUTIONAL CHANGE

By

Douglas E. Schrems

Social Control is the attempt to manage the rate and direction of change within a societal framework. It is a process to which the key institutions in the highly developed, technological societies increasingly devote energy and resources. Economic, military, industrial, and social planning is designed and applied to ascertain the possible outcomes of alternate courses of action under conditions of risk, certainty, and uncertainty, and thereby to increase the effectiveness with which these institutions operate. Control is a process of utilizing the latest and best information to either anticipate problems and design strategies to counteract them or to readjust operation based on the contingencies encountered. Information is the basic resource that makes this process possible. The communication systems that gather and circulate information and the institutions that develop and operate those systems take on an increased importance. This is especially true when the diametric nature of control is considered. It is potentially beneficial as well as potentially harmful. A society which seeks to determine, or control, what effects control will have

must concentrate its efforts on the development and operation of its communication facilities. In this context this report examines the nature of control, the characteristics of telecommunication/computer systems, and the institutional structure within which they develop.

Chapter I examines the change and control processes in the context of a systemic conception of society. The diffusion of innovations and cybernetic systems, and the information essential to each, are discussed from the vantage of the source-message-channel-receiver-effects model of the communication process.

Advances in telecommunication/computer technologies provide substantial increases in information capacity and promise to deliver dramatic new capabilities. The broadband network of cable, microwave relay, and satellite technology, the digital computer, and their effects on the information environment are discussed in Chapter II. Two specific interfaces between the computer and broadband links are remote-access computing systems and the message-switching capability of the computer. Their discussion reveals some of the information services made possible. The chapter concludes with a brief account of the potential applications and effects of an integrated broadband/computer network.

There are numerous forecasts of societal development that emphasize the centrality of the control function. Two such forecasts, The Post-Industrial Society and The Technological Society, are examined in Chapter III. The purpose is to reveal both potential benefits and dangers inherent in process of social control and to thus create

an awareness of societal needs and suggest ways in which communication technology can contribute to satisfying those needs. In addition, the manipulative nature of control through communication is treated.

The issue in Chapter IV is how to control the technology through which control is exercised. The present institutional structure surrounding the development of cable is examined. In this case it is evident that the Federal Communications Commission acts, at best, as a broker between competing economic interests. This is not a satisfactory arrangement in developing a communication system responsive to broader social interests. An institutional structure that promotes assessments of the technology and creates alternate plans for development and application is suggested. Some necessary steps in the establishment of such a structure are discussed.

In a construct as broad in scope as the present one, what is perhaps most noteworthy is the range of issues not confronted. There are indeed many. It is hoped that this attempt to create a broad perception of the environment in which the new media will be developed will serve as a framework in which to confront specific issues.

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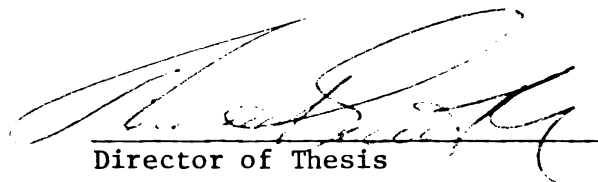
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Douglas E. Schrems^{more}

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CHAPTER I

CHANGE AND CONTROL IN THE SOCIAL SYSTEM

Social change has been defined as "the process by which alteration occurs in the structure and function of a social system."¹ The key elements of this definition, the notions of process, structure, and function, imply a systems approach to the analysis of society. Through the development of this concept of a social system, we can begin to understand the importance of the communication process within the ongoing phenomenon of social change.

In systems analysis, "a system...is any set of reciprocal relationships in which a variation in the character...of one of the elements will have determinate...consequences for all the others in the system."² A social system is "a collectivity of units which are functionally differentiated and engaged in joint problem solving with respect to a common goal."³ It is the "elements" or "units" which, through their status or position within the system, provide it with structure. They may be, depending on the nature and level of analysis, individuals

¹Everett M. Rogers with F. Floyd Shoemaker, Communication of Innovations: A Cross-Cultural Approach, 2d ed. (New York: The Free Press, London: Collier-MacMillan, 1971), p. 7.

²Daniel Bell, The Coming of Post-Industrial Society: A Venture in Social Forecasting (New York: Basic Books, Inc., 1973) p. 31.

³Rogers with Shoemaker, Communication of Innovations, p. 28.

families; formal or informal groups; key social, cultural, or political institutions; etc.. This report will be concerned primarily with what Daniel Bell has defined as "social frameworks." These are "the structures of the major institutions that order the lives of individuals in society...."⁴ These institutions are the sources from which many changes in this society are originated and, perhaps more importantly, controlled. The hierarchical statuses of the various units or subsystems have particular roles and expectations associated with them. The actual behavior of a unit vis-a-vis its status and role, exhibited in interaction with other units within the system or with the environment at large, determines its functioning. The collective behavior of all units determines the overall functioning of the system. In terms of the previous definition, then, social change is an alteration in the status and/or behavior of the components of the social system. Our immediate concern is with the process through which such alterations occur.

The Diffusion of Innovations

In a cross-cultural approach to social change, Rogers and Shoemaker propose a three-step social-change process involving the diffusion of innovations. The first step ^{is} in invention, or the development of new ideas, of innovations. Step two, diffusion, is the dissemination of new ideas to the units of the social system. The final step, consequences, consists of the changes that occur based on the acceptance or rejection of the innovation.

⁴Bell, Post-Industrial Society, p. 8.

The second step, the diffusion of the innovation, highlights the role of communications in social change. Diffusion research, in fact, is considered a subcategory of communications research in general. The classic S-M-C-R model of the communication process specifies source (S), message (M), channel (C), and receiver (R) as the elements in the process. In addition, some analysts have included effects (E) as an essential component. Given the status of diffusion as a subcategory of communications, it is possible to impose the S-M-C-R-E model on the diffusion process and thus assign its particular characteristics to the model's components.

In diffusion, the ultimate source is described as a change agent or agency. It is the source who identifies a need for change and introduces the innovation to meet this need. The agency may be either internal or external to the social system it is attempting to alter. If it is internal, it is of course designated as one of the units within the structure of the system. Changes that occur as a result of internal-agency activity are termed immanent changes, those that arise from an external agency are contact changes.

The message component of the model is the innovation itself, or more correctly, information about the innovation. As Walter Rosenblith states: "The 'commodity' that circulates in a communication system, no matter what its physical form, is information."⁵ An innovation, defined as an idea that is perceived as new by the potential adopters,

⁵Walter A. Rosenblith, afterword to The Human Use of Human Beings: Cybernetics and Society, by Norbert Weiner (New York: Avon Books, 1967, Boston: Houghton Mifflin, 1950) p. 277.

may be manifested as a material object, such as a new machine, or as a practice, for instance a busing program aimed at achieving the desegregation of schools. Diffusion messages contain information about the attributes of the innovation, including its relative advantages, its compatibility with existing status and behavior patterns, and the complexities involved in utilizing it. The nature of the information transmitted, as perceived by the receivers as potential adopters, will effect the success of the innovation.

The channel is the means through which a message gets from source to receiver. Channels are broadly divided between interpersonal, which are direct, two-way communication links between source and receiver, and mass media, through which the source utilizes a mass medium to reach a larger audience of receivers. Mass media are generally one-way, that is, there is no direct link from the receiver back to the source. In addition, mass-media channels generally do not allow the source to specify who will be the receivers. However, as will be discussed in more depth below, some of the newer communication technologies offer the potential to alter some of what have traditionally been considered one-way, mass-media channels.

Receivers are of course the units within the social system whose behavior or status the change agency is seeking to alter. Upon reception of the message, information about the innovation, a decision is reached to adopt or reject it. The decision may be reached individually by a particular unit, it may require the collective agreement of a number of units, or it may be imposed authoritatively upon the unit(s) from some other subsystem located at a power status. The type of decision is

dependent on both the nature of the innovation and the structural characteristics of the social system.

The alterations that occur within the system as a result of the decision to adopt or reject an innovation make up effects⁷ the component of the communication model. These effects, or changes, are categorized as functional or dysfunctional, depending on whether they satisfy the need for which the innovation was introduced; direct or indirect, based on whether they occur as an immediate response to the innovation; and manifest or latent, determined by whether they are intended⁷ by the receiver units of the social system.

It is necessary for the change agency, in maximizing the success of an innovation, to consider the steps in the diffusion process and to plan diffusion strategies accordingly. Regardless of the particular characteristics of such a strategy, however, the implications of the diffusion process within the context of the broader communication model⁹ is clear; as Rogers and Shoemaker point out, "social change is therefore an effect of communication."⁶

To this point we have established that change, within a systems approach that identifies society as a composite of functionally differentiated subsystems or units, is the process of alteration, in the character of those components,¹⁰ Further, that this process is based on innovation and communication. This generalized description could be expanded upon and, with varying emphasis on particular elements, imposed on a variety of types of social systems and usefully describe the change

⁶Rogers with Shoemaker, Communication of Innovations, p. 7.

process in a given environment. It is possible, however, and even necessary to expand our approach to include an additional concept that is increasingly evident in the more highly integrated, technologically developed societies such as the United States. This additional element is the notion of control.

Cybernetics and Social Control

Control will be considered here as the ability to influence outcome within preconceived boundaries and toward preconceived ends. Although not formally introduced to this point, control as an aspect of change has already been suggested. In speaking of systems analysis earlier, it was stated that subsystem variation had "determinate consequences" throughout the system. This idea has important ramifications when addressing the integration of society, which will be discussed presently. Even more apparent, however, is the suggestion that consequences are knowable, for knowledge of a possibility supplies a basis for the management or control of that possibility.

Control is also implicit in the diffusion process. The source or change agency, in planning the introduction of an innovation, has a preconceived idea of existing structural or behavioral patterns, and a vision of the changed pattern that will result from the adoption of the innovation. The objective of the diffusion process, then, is nothing less than the influencing of social patterns within the relevant boundaries of the particular innovation's effects.

It follows that just as change has been designated as an effect of communication, so too can control be regarded. In fact, Norbert

Weiner, in developing the theories of cybernetic systems, classes communication and control together in analyzing the nature and effect of messages. In cybernetics, change is the product of the system's control of and adjustment to the environment. It is a self-regulative phenomenon based on the transmission and reception of information, the "commodity" in our communication model.

A simple mechanical illustration will illuminate the general operational features of the cybernetic system. The type of heating system common to many homes and buildings is a structure of units that might include thermometer, thermostat, furnace, furnace activating device, and electrical wire. Each element has its own subfunction within the overall goal of the system, which is to maintain a desired specific temperature. For instance, the role of the furnace is of course to provide heat. Thus the furnace is alternately turned on as the temperature drops below the desired point and off as it rises above that point. In this manner the system operates to exercise control over the temperature and in this process alters its action or behavior by "adjusting to the contingencies of the outer environment."⁷

The S-M-C-R-E model can also be imposed on this process to emphasize the centrability of communication. If we designate the thermostat unit as the source, the message it sends is an "on" or "off" signal. The physical form of the information is the presence or absence of electric current. The channel, of course, is a wire/conductor and the receiver is the activating device on the furnace. The proximate effect of the

⁷ Norbert Wiener, The Human Use of Human Beings: Cybernetics and Society (New York: Avon Books, 1967 Boston: Houghton Mifflin, 1950) p. 27.

message is the starting or stopping of the furnace, and thus the control of the temperature. The success of the system depends on one more important element, which leads us to the concept of feedback.

By definition, feedback "consists of modifying the behavior of a system by reinserting the results of actual (and not just expected) past performance."⁸ To return to our example for clarification, in order for the thermostat to determine which message, either "on" or "off" is required, it must be cognizant of conditions in the environment. Specifically, at any given moment it requires information on the current temperature, which is of course the product of the system's previous behavior. This information is taken from the environment by means of the system's receptor unit, the thermometers, and is the basis for its continued operation. Cybernetic activity then is based on the transmission, reception, and utilization of information.

It was evident to Wiener that the implications of cybernetic theory went beyond the simple mechanical response described and even more complex mechanical and physical activity. He states:

This complex of behavior is ignored by the average man, and in particular does not play the role that it should in our habitual analysis of society; for just as individual physical responses may be seen from this point of view, so may the organic responses of society itself.⁹

This approach is useful in analyzing the activities of Bell's social frameworks which result in the "ordering" of individuals in society.

⁸Rosenblith, afterward to The Human Use of Human Beings, by Wiener, p. 276.

⁹Weiner, The Human Use of Human Beings, p. 39.

The key institutions that collectively compose the economic, political, educational, et. al. frameworks are the functionally differentiated units of the social system. If feedback "may occur at a higher level when information of a whole policy of conduct...is fed back,"¹⁰ then these institutions will exhibit a utilization of feedback mechanisms in seeking to achieve their goals as defined by their status and role within the system. On the basis of information fed back, a particular institution may elect to continue policies it determines are effective, it may adjust to the environment by redefining its goals, or it may introduce new measures aimed at increasing its effectiveness. We can regard such a new measure as an innovation and its diffusion through the system, we have seen, is based on the communication of information.

This process in action, though evident to some degree in all social frameworks, is perhaps most observable operating within the institutions that compose the economic framework, where the "policies of this and indeed many other technologically advanced nations have increasingly become feedback-controlled."¹¹ The foundations of economic control are credited to the New Deal policies of the Franklin Roosevelt administration, but anyone with even slight interest in the recent recession is familiar with the use of unemployment figures, inflation indices, cost of living percentages and countless other economic "barometers" on which the executive and legislative branches base their policy formulations.

¹⁰ Rosenblith, afterword to The Human Use of Human Beings, by Weiner, p. 276.

¹¹ Ibid.

Each of these devices is an example of a feedback mechanism and evidences the degree to which feedback and control have been incorporated into the functioning of the economic sector.

The implications of the concepts of innovation and control are broad. Bell states: "Every modern society now lives by innovation and the social control of change, and tries to anticipate the future in order to plan ahead."¹² Such a society is in a position to control its own evolution. Speaking to this, Rosenblith states:

As long as we are able to formulate the parameters or variables with respect to which information we want fed back, there is no limit to the extent to which our society can improve its functioning by learning from the consequences of its previous year.¹³

It should be apparent that the success with which the social system meets in seeking to "improve its functioning" will depend greatly on the characters and competence of the communication systems through which its vital information passes. In a situation in which "the needs and complexities of modern life make greater demands on this process of information than ever before and our [institutions] are obliged to meet the needs of this process or fail in their purpose,"¹⁴ it is evident that "we need complete access to all information and to a communication system

¹²Bell, Post-Industrial Society, p. 20.

¹³Rosenblith, afterword to The Human Use of Human Beings, by Weiner, p. 277.

¹⁴Weiner, The Human Use of Human Beings, p. 27.

that is able to transmit both knowledge of events and our reaction to them."¹⁵ This awareness was the basis for Wiener's attempts to describe cybernetic behavior in a sociological context. It was his thesis:

...that society can only be understood through a study of the messages and the communication facilities which belong to it; and that in the future, development of these messages and communication facilities...are destined to play an ever-increasing part.¹⁶

The Thesis Plan

The apex from which we shall proceed is the convergence of theories of social development that emphasize the centrality of the control function and the development of communication facilities that supply a potential for vast improvements in the information environment.

It is commonly thought that we are in the midst of a communications revolution, a revolution created by advances in the development and diffusion of the various technologies that collectively compose the telecommunication/computer complex. These technologies serve at all points in the information transmission, reception, collection, storage, analysis, and manipulation process. In these capacities, the complex can accurately be described as "the central nervous system of humanity."¹⁷ But as in the case of most technological development, there are potentially both positive and negative consequences. Eli Ginzberg states:

¹⁵Barry N. Schwartz, "Humanism and the New Media," in Human Connection and the New Media, ed. Schwartz, (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1973) p. 3.

¹⁶Weiner, The Human Use of Human Beings, p. 25.

¹⁷Schwartz, "Humanism and the New Media," p. 3.

"The modern scientific-technology promises to be both the hope of man's future and the instrument of his enslavement and destruction."¹⁸ Communication technology is no exception, for, "in every case, communication techniques are tools that can be used for good ends or for bad ends."¹⁹ The following chapter will analyze the telecommunication/computer complex, its technical characteristics, its effect on the information environment, and the promises and perils it presents for society.

There is indeed a vast amount of literature which seeks to extrapolate current societal trends and project them into the future to arrive at some forecast of the character of a "new" society. In these analyses, "there is a whole spectrum, ranging from enthusiastic belief in to despairing pessimism about the future of our technological society."²⁰ In Chapter 3, two such forecasts, The Post-Industrial Society of Daniel Bell and The Technological Society of Jacques Ellul will be examined. These forecasts confront the issue of control in society from two widely varying perspectives. Though neither author specifically affirms such a posture, Bell's approach is essentially positive while Ellul seems generally pessimistic about technological control. Through this

¹⁸ Carl Stover, Technology and Culture, quoted in Technology and Social Change, Eli Ginzberg ed., (New York: Columbia University Press, 1964) p.1.

¹⁹ Dennis Cabor, "Social Control Through Communications," in Communication Technology and Social Policy: Understanding the New "Cultural Revolution," eds. George Gerbner, Larry P. Gross, and William H. Melody, A. Wiley-Interscience Publication (New York: John Wiley & Sons, 1973) p. 84.

²⁰ Charles R. DeCarlo, "Perspectives on Technology" in Technology and Social Change, ed., Ginzberg, p. 21.

dicotomy, it is possible to discern both the inherent promises and problems that future society may hold for mankind.

On the basis of the potential of the new communication technologies and the needs and dangers generated by a control oriented society, the final chapter will examine the institutional structure of the communications industry, its historical development, its strengths and weaknesses, and hopefully provide a basis from which to propose alternative directions for institutional arrangements.

CHAPTER II

TELECOMMUNICATIONS AND COMPUTERS

Electronic communication system components are of three classes, input/output devices, transmission media, and a sort of hybrid of the two, the digital computer.¹ In assessing the newer communication technologies, Dieter Kimbel states: "The promise of computer-telecommunications systems lies not in any particular function or service, but instead in the possibility of making information services in whatever forms they may evolve available to every human being."² It is the computer and the broadband transmission media that supply the potential for this "human connection." This is not to say that developments in input/output technologies will not be of major importance. Ultramicrofiche, cathode-ray tube display systems, electronic video recording (including cassettes), videophone, and many other devices will significantly improve information accessability and utilization. Yet it is the capacity of the broadband network and the store and forward message switching capability of the computer that will serve to link the receiver with the source, the information seeker with the supplier,

¹The computer can combine information manipulation and transduction functions of input/output devices with the circuit and message switching functions of transmission media.

²Dieter Kimbel, "An Assessment of the Computer/Telecommunications Complex in Europe, Japan, and North America," in Communications Technology and Social Policy, eds. Gerbner, Gross, and Melody, p. 149.

and the controlled with the controller in an ever changing, dynamic society.

The Broadband Network

In electronic communications, the message at the point it leaves the output transducer, is termed the signal. Signals are of two types, analog and digital. An analog signal is one in which the input information is represented by differences in directly measurable units, such as voltages, resistances, etc.. The amplitude or frequency modulated signals used in television or radio broadcasting are analog signals. In the case of digital signals, input information is expressed in numeric code, most commonly in the binary mode. Information "bits" are binary digits. The electrical waveform on which analog or digital information is imposed is known as the baseband signal. Bandwidth, measured in Hertz (Hz) is the portion of the electromagnetic spectrum needed to accomodate transmission of a given signal. Television broadcasting for instance requires a baseband channel with a bandwidth of six megahertz (mHz), while the paired wire voice transmission of the telephone utilizes a bandwidth of up to six kilohertz (kHz). The capacity of a channel for either analog or digital information is determined in part by its bandwidth.³ The "narrowband" telephone channel may accomodate a relatively poor "analog" of the human voice, but not high fidelity music. Similarly, in terms of information bits, it can fulfill the transmission requirements for relatively low speed data processing devices, but not the upwards of 16,000,000 bits per second (BPS) at

³Signal to noise ratio, as a limiting factor, also effects channel capacity.

which some processing equipment operates.⁴ Thus it is the broadband media, those with capacities in excess of the voice grade telephone channel, that will most significantly effect modern communication systems.

The effects and capabilities of the broadband network are embodied in the concept of the "wired nation," which forecasts a communication system utilizing coaxial cable for urban transmission distances and microwave relays and satellites for regional, national and international interconnection. It is the cable that at present seems most likely to serve as the heart of the broadband network.

Cable. There are several inherent characteristics of coaxial cable, hereafter referred to simply as cable, which lend it such significance. Foremost among these is a virtually unlimited information capacity. Cable has a usable bandwidth of up to 300 MHz. To put this capacity in perspective, it has the potential to accomodate up to fifty, 6 MHz television channels or 50,000, 6 kHz telephone channels. Comparing cable to telephone is like, former FCC Commissioner Nicholas Johnson is quoted, "comparing Niagra Falls to a garden hose."⁵ Whereas the theoretical digital limit of the telephone is 60,000 BPS, that of cable is 1.5 million BPS. Certain state of the art technical problems, primarily in the integral amplifier system, actually limit this potential somewhat. Present cable television systems are required to provide 20

⁴Theoretically, a channel may handle up to 10 times its bandwidth in data transmission, in this case 60,000 bits (binary digits) per second (BPS).

⁵Ralph Lee Smith, "The Wired Nation..Cable TV: The Electronic Communication Highway" (New York: Harper & Row, 1972), p. 7.

channels.⁶ Nevertheless, refinements in amplifier technology and channel expansion and reuse methods will make for more channels possible. In admittedly conservative speculation, The Sloan Commission on Cable Communications predicts forty channel systems will be "commonplace" by 1980,⁷ while the Rand Corporation's Nathaniel Feldman forecasts multiple cable systems of 400 channels by 1990.⁸ Such abundance would clearly negate any concept of channel scarcity as a limiting factor in information transmission and utilization.

Cable, as the link in CATV systems, is best known as a distributor of broadcast television signals and the various auxiliary services provided by most CATV operators. However, cable's ability to carry both analog and digital signals means that it is "capable of carrying virtually any kind of communication."⁹ In addition to television and radio, telephone, teletype, facsimile, computer data, and more are all feasible on cable. Indeed, some have speculated an end to separate facilities for different kinds of communications and the advent of "a single, unified system of electronic communications."¹⁰ This

⁶ Cable Television Report and Order, 37 Fed. Reg., No. 30, (February 12, 1972), p. 3269.

⁷ The Sloan Commission on Cable Communications, On The Cable: The Television of Abundance (New York: McGraw-Hill, 1971), p. 37.

⁸ Smith, The Wired Nation, p. 7.

⁹ Cabinet Committee on Cable Communications, "Cable Report to the President," January 16, 1974, in Television Digest 14:3 (January 21, 1974): p. 4.

¹⁰ Smith, The Wired Nation, p. 9.

second characteristic of cable, its ability to carry many different forms of information, make it "the potential complete telecommunications system"¹¹

As an effect of increasing the number of channels available, cable should contribute to the lessening of per channel costs to the point that "the cost of communications capacity is likely to be a small component of the overall cost of producing and distributing...information services that might be offered over cable."¹² Similarly, "as the number of services carried by one communications system increases, the cost factor decreases."¹³ Thus the lessening of per channel and per service costs has the potential to limit price as a barrier to the accessibility of information.

The circuit switching, two way capability of the telephone system allows connection between any two (or more) points for voice and data communication. A two way, switched cable system, with its broadband capacity, would extend the capability to the wide range of information services likely to develop via cable. Among the potential effects of such a system, already is experimental usage in isolated localities, would be to alter the strictly mass media nature of broadcasting. Television has been characterized as a "vast wasteland," offering little

¹¹Roscoe L. Barrow and Daniel J. Manelli, "Communications Technology-A Forecast of Change (Part I)," Law and Contemporary Problems 34 (Spring, 1969), p. 238.

¹²Cabinet Committee, Cable Report to the President, p. 4.

¹³Roscoe L. Barrow and Daniel J. Manelli, "Communications Technology-A Forecast of Change (Part II)," Law and Contemporary Problems 34 (Summer, 1969), p. 433.

beyond mass appeal entertainment programming. Cable can serve to link program origination centers to specific, special interest audiences allowing programming tailored to more homogeneous audiences to be physically and economically viable. This "television of abundance" could provide channels dedicated to educational, political, cultural, and professional service thus making television more responsive to the overall needs of a heterogeneous population. Cable's ability to carry "upstream" signals can allow subscribers to select, from among the various offerings, those of interest to him. In addition, a variety of other services, as will be discussed, are likely to grow out of this subscriber response capability. The net effect of two way cable could be to end the era of man as "a passive recipient of information chosen and transmitted by others."¹⁴ Rather, the individual is presented options in the selection and introduction of information.

This short list of cable's characteristics is not meant to be all inclusive. Rather it should supply a basis for comparing cable to the more traditional transmission media through which the electronic information processes of society have operated. The development of cable, however, has been largely an urban phenomenon with individual systems serving specific municipalities. In order for cable to achieve its full potential, it will be necessary for these individual systems to be linked, providing an informational network beyond narrow urban boundaries. The most promising technologies for accomplishing system interconnection are microwave relay and communication satellites. As

¹⁴Ibid., p. 432.

potential components of a broadband network, these technologies share many of the characteristics attributed to cable, as well as technical and developmental features distinctive to each.

Microwave Relay. Microwave transmission is a medium that operates on the same general principals as radio transmission. In this case, high frequency radio signals with the desired information imposed, are transmitted from source to receiver via a series of relay stations spaced from twenty to thirty miles apart. These high frequency signals, extending into the gigahertz (GHz) range, give microwave the broadband capacity and flexibility discussed in regard to cable. It can be used as one link in a larger communication system, as it is utilized in the telephone system for high capacity, long haul transmission needs. In addition, it can be used independently of other links, for instance in high volume, intercity data systems.

These latter systems, operating as "special service common carriers," have developed by offering services either not available from existing carriers or in competition with them. Special service categories include importation of distant broadcast signals to CATV systems, mobile radiotelephone services to geographically fixed mobile units, marine radiotelephone services, and radio paging services.

The special service systems can contribute to a lessening of per channel costs. By operating independently of other systems, microwave can more feasibly tailor bandwidth to the specific requirements of particular customers and signals. Secondly, independent systems do not incorporate older, less efficient technologies into the overall

system. The telephone system for example utilizes a physical plant incorporating a variety of switching devices and transmission media that have developed over long periods of time, leading to relatively high per channel average unit costs. Conversely, the systemic integrity of special service carriers lowers these costs.

The flexibility, low cost potential, and good signal quality features of microwave are benefits that are likely to lead to a proliferation in the range of services offered via it, either independently or in conjunction with other media. Based in part on this contingency, the FCC, in the Above 890 Decision,¹⁵ set aside frequencies above 890 MHz for licensing to state and municipal governments and public utilities for microwave use. In 1969, based on the MCI Decision,¹⁶ this privilege was extended to private entrepreneurs. Spectrum availability for microwave then, should prove no handicap to the development of the broadband network.

Communication Satellites. Satellites are becoming an increasingly important link in the nations's and the world's telecommunication system. Communication satellites transmit, as do microwave relays, in the higher frequencies. Specifically, satellites utilize the four and six GHz channels to and from satellites respectively. The capacity and

¹⁵In the Matter of Allocation of Frequencies in the Bands Above 890 MC, 27 FCC 359 (1959), 29 FCC 825 (1960).

¹⁶In Re Application of Microwave Communications, Inc., FCC Docket Nos. 16509-19519, Decision of the Commission, Issued August 13, 1969.

flexibility features already discussed are again applicable to satellite channels. Additional characteristics provide satellites with distinctive transmission potential.

Both cable and microwave are strictly point to point media, that is they physically connect isolated terminals. Satellites, however, are capable of transmitting information to a number of geographically separate ground stations simultaneously. Direct satellite to home transmission is even feasible as the cost of appropriate ground equipment is lowered. This ability to skip over terrestrial links can make channel costs independent of distance. Microwave and cable costs are directly effected by distance. Satellites will be useful for long haul (especially transoceanic), high capacity, high volume users. Inter-continental live television transmission, already common, is indicative of the impact and immediacy of satellite transmission.

The era of commercial satellite communication began with the enactment of The Satellite Communications Act of 1962.¹⁷ The act provided for the formation of a company, to be owned jointly by the common carriers and the public, to develop such a satellite system. The Communication Satellite Corporation (COMSAT) was formed in 1963 "to design, launch, and operate communications satellites and sell circuit capacity to the carriers."¹⁸ The International Telecommunications

¹⁷Public Law 87-624, H.R. 11040, 87th Congress, August 31, 1962.

¹⁸Stuart L. Mathison and Philip M. Walker, Computers and Telecommunications: Issues in Public Policy (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1970), p. 8.

Satellite Consortium (INTELSAT) was later formed to carry out these purposes on an international level. COMSAT represents the United States in INTELSAT and is the manager of the INTELSAT systems.

In 1965, Early Bird (INTELSAT I) became the world's first commercial communications satellite. Early Bird was a synchronous orbit¹⁹ satellite with a capacity of 240 voice circuits. The present INTELSAT system includes five INTELSAT IV satellites, with capacities in excess of 4000 voice circuits, and two smaller INTELSAT III satellites.

In 1973, COMSAT General Corporation was formed as a subsidiary of COMSAT to develop domestic satellite services. The MARISAT system, with two synchronous orbit satellites, one over the Atlantic Ocean and one over the Pacific Ocean, provides voice and data links to ocean going vessels. It is owned by COMSAT General, RCA Global Communications, ITT World Communications, and Western Union International. Another program involving COMSAT General, American Telephone and Telegraph, and General Telephone and Electronics Corporation has also begun offering domestic satellite services. It is evident that the era of communication satellites is the present as well as the future.

Based on these developments in cable, microwave relay, and satellite communication, an integrated broadband network offering virtually unlimited information capacity for a wide variety of information forms to users at home, work, and play is certainly technically feasible. An integral component of the telecommunication system will be the computer.

¹⁹ A synchronous orbit is one in which the satellite, at the plane of the equator and a height of 22,300 miles, appears to be stationary in the sky.

The Digital Computer

The convergence of telecommunication and computer technologies as part of a larger communication system is a natural evolution. The potential uses and benefits of each depend greatly on the capabilities and services of the other. It is their convergence that has "given birth to a promising set of capabilities which are significantly altering the operation and organization of industry, business, and government, and which will ultimately effect the daily life of each of us."²⁰

The digital computer, as previously described, deals with information in the form of a numeric code, the most widely utilized being the binary code. All binary information is reduced to the two digits in the code, 1 and 0, represented in the computer by on and off circuits. Through this rather simple ability to recognize on and off circuits, the computer gains an amazing range of proficiencies. As Roscoe Barrow and Daniel Manelli describe the computer:

It is capable of dealing with any information, quantity, or concept which can be reduced to a symbolic representation or code. It can remember instructions of a great complexity, recall a desired item of information from an immense hoard of stored items in its memory, and exercise a form of logic by automatically taking specific alternate courses of action depending on the outcome of a particular operation. All this it does at incredibly high speed.²¹

²⁰ Mathison and Walker, Computers and Telecommunications, p. x.

²¹ Barrow and Manelli, "Communications Technology" (Part I), p. 277.

The computer utilizes and operates a variety of input and output devices that transduce digital information from or to a form readily usable by humans. Such devices include electronic interrogating typewriters, card and paper tape readers and punches, magnetic tape devices, chart or print readers, plotters, and cathode-ray-tube displays. The applications of the computer and associated equipment are endless, encompassing functions from chess playing to medical diagnosis, from merchandise inventories to airline reservations.

Remote Access Computing Systems. The proximity of the user to the computer itself provides the basis for the first interface between the computer and the telecommunication media. Computers can be utilized on an "in-house" basis in which the entire input and output process takes place within the confines of the location of the computer. Many institutions utilize this type of arrangement, which is adequate for a variety of useful computer functions. Probably of greater significance for the ultimate development of information services, however, are "remote access" computing systems. Remote access means simply that the user is linked to the computer via a telecommunication channel and sends and receives information by means of that channel. A brief examination of the computer industry will clarify the significance of this type of arrangement.

Stuart Mathison and Phillip Walker, in describing the computer industry, segment it into three broad divisions based on function. The first segment consists of the suppliers of computers and peripheral equipment. The largest of these "hardware" suppliers is IBM. The

second division consists of service bureaus, which maintain computer facilities, and software houses, which provide programming services. These two types of firms are grouped as one because their services often overlap or are provided in total by a single firm. These services include rental of computer capacity, development and rental of general programs, system analysis service, special program contracting, and educational services that familiarize clients with the equipment and services. The final segment of the industry consists of firms offering computer based information services. These firms are "engaged in the collection, processing, and sale of information itself."²² They use their own information whereas the service bureaus and software houses service the information of their clients. Together, the latter two segments of the industry, known as computer utilities, are developing the services which necessitate a remote access capability and thus forge the convergence of computer and telecommunication facilities.

Mathison and Walker provide a list of the present applications of remote access systems that distinguishes their importance. Their list includes:

1. Conversational time sharing systems. A Central computer, connected to remote terminal equipment, is shared by numerous users. Each user is allocated a specific time period in which a portion of his program is processed and transmitted back. At the end of the time period, the program is interrupted and the computer continues sequentially with other programs, eventually returning to the original. Because of the high speed of operation, each user has the illusion that he alone is utilizing the computer.

²² Mathison and Walker, Computers and Telecommunications, p. 10.

2. Inquiry systems. A large number of terminals connected to a single processing center query a central store of information. Stock market quotation services are an example.
3. Data collection systems. A central computer receives, stores and processes information gathered at remote terminals. Weather services are an example.
4. Remote document production systems. A central computer transmits reproductions of printed documents to remote users.
5. Remote batch processing systems. Operate as time-shared systems, but because of low volume or the absence of high speed requirements, data is stored and processed at a latter time.
6. Information distribution systems. Operate much like inquiry systems, but without the need for inquiry. Data is gathered, processed, and transmitted automatically and selectively to subscribers.²³

Collectively, these types of systems allow the sharing of both hardware and software costs among many users, leading to lower per unit computation costs. This in turn makes computer services available to those who would otherwise be unable to afford them. The wide range of services being developed in this highly innovative field and the increased number of subscribers to them, accentuates the requirement for the flexible, high capacity services provided by the broadband media.

Message Switching. The data processing services of the computer industry and the other information services associated with broadband communications tremendously increase the sheer volume of information available to the individual. "However," as Barrow and Manelli state,

²³Ibid., p. 12.

"the volume of information can inundate us and prevent orderly use of the information unless a commensurate system of selecting and channeling information is utilized. The computer satisfies this need for selection and organizing of information on the part of the individual."²⁴

The second major interface between telecommunications and computers then, lies in the store and forward message switching capability of the computer. Described simply, the computer serves as a traffic director, routing information to, from, and among specific sources and receivers. By way of analogy, the telephone system accomplishes interconnection between terminals for point to point voice communication by means of circuit switching. When an individual dials a desired number, his telephone circuit is physically connected to the desired circuit and a complete, two way circuit results.

Similarly, utilizing the two way response capability of cable, a subscriber may specify the type of program or service he desires. In response, the computer can appraise him of the suitable offerings available and transmit them to him, either from the information stored in its memory or by rerouting the request to some other specific terminal point. This capability will enable the individual to "become an active seeker of information and entertainment and a participant in the process of self-government."²⁵

²⁴Barrow and Manelli, "Communications Technology (Part I)", p. 225.

²⁵Ibid., p. 232.

Applications and Effects

In conjunction with the descriptions of broadband and computer technologies, the concept of information services has been referred to quite extensively. Yet, with the exception of the section dealing with computer utilities, the nature of these services has remained essentially undisclosed. The most appropriate explanation for this exclusion centers on sheer numbers. Any list of potential services that are feasible in connection with these technologies is virtually endless, limited perhaps only by entrepreneurial imagination and the consumer's willingness to pay for them.

It is apparent that they can and probably will effect nearly all facets of an individual's activities. In regard to remote access computer services, James Martin of the IBM Systems Research Institute states:

Data transmission may become as indispensable to city dwelling man as his electric supply. He will employ it in his home, in his office, in shops, and in his car. He will use it to pay for goods, to teach his children, and to obtain information, transportation, and items from the shops; he will use it from his home to obtain stock prices and football scores; he will use it to seek protection in crime infested streets."²⁶

Similarly, at the level of social frameworks, the effects of communication technologies will alter structural and functional relationships. In the economic sector, the forecasts of change range from an "automated economy" to a "cashless society." In education,

²⁶James T. Martin, "Communication and Computers," in Communications Technology and Social Policy, eds. Gerbner, Gross and Melody, p. 9.

analysts speak of individualized in home instruction and computerized fascimile libraries. Politically, the effects of instantaneous polling leading to "true democracy and mass indoctrination are argued. Terms like "telemedicine," "electronic mail," and "cybervalance" are used in relationship to "wired cities," the "wired nation," and "global village" concepts. Certainly the applications and effects of the revolution in communications will have profound societal and individual consequences of both positive and negative natures. That, it seems, is the course of technological development.

If we return to the conceptualization of change, control, and communication developed in Chapter I, it should be apparent that the new information services and their effects should be evaluated in the context of forecasts of societal development based on the concept of social control. Rather than proceed with a lengthy list of applications and effects that is sure to be incomplete, I shall proceed with descriptions of The Post-Industrial Society and The Technological Society. In the course of these descriptions, relevant applications of the telecommunication/computer complex will be discussed. This approach should facilitate a clearer understanding of the issues related to the evolution of this complex in the context of the broader issues relating to social control.

CHAPTER III

TOWARD A NEW SOCIETY: TWO FORECASTS

At the outset it should be made clear that the following descriptions were neither developed as nor are they presented here as predictions. Predictions are attempts at the determining, in advance, the outcome of events. They seek to assess interest, forces, and pressures in order to specify the results of decisions, a process which is inherently difficult. The proceeding analyses may be termed forecasts. Forecasts seek to identify trends or regularities in a complex "reality" and to project their evolution into the future. Forecasts are also difficult, for at any point in the evolutionary process, unforeseen forces may intervene in the "natural" progression of events. Thus forecasts are not so much attempts at the specification of outcomes as they are tools for the identification of potential constraints on the actions of men or societies. As such, they serve to pose questions about the future and contribute to the social self-consciousness. The concepts of a "post-industrial society" and a "technological society" should not be judged either true or not true. Rather, their significance is determined by whether they are useful or not useful. Their usefulness here is in providing an environment in which to place the telecommunication/computer technologies in order to examine their potential uses and misuses. The purpose of this

examination is to pose questions about the institutional structure under which they are developing, which is the subject of Chapter IV.

The Post-Industrial Society

For purposes of analysis, Daniel Bell divides society into three parts which he designates the social structure, the polity, and the culture. The economic, technological, and occupational subsystems comprise the social structure.¹ The polity is concerned with the adjudication of conflict and the regulation of power, and the culture is the area of symbolism and the meaning of life. The concept of post-industrial society, as a sequential development out of the roots of industrial society, is based on alterations in the social structure, "the way in which the economy is being transformed and the occupational system reworked, and with the new relations between theory and empiricism, particularly science and technology."²

In order to cope with the broad scope of this analysis, it will be helpful to specify the five dimensions of change which constitute the basis for the evolution of the post-industrial society. As Bell delineates them, these are:

1. Economic sector: the change from a goods-producing to a service economy;
2. Occupational distribution: the pre-eminence of the professional and technical class;
3. Axial principle: the centrality of theoretical knowledge as the source of innovation and of policy formulation for the society;

¹This concept of social structure should not be confused with the broader definition of the total societal structure of roles and behavior outlined in Chapter I.

²Bell, Post-Industrial Society, p. 13.

4. Future orientation: the control of technology and technological assessment;
5. Decision-making: the creation of a new "intellectual technology."³

It is the latter three dimensions that clearly distinguish the centrality of the control function in the concept of the post-industrial society and thus it is necessary to discuss them in some depth.

Intellectual Technology. If we return to the concept of society as a social system, as described in Chapter I, it can be viewed as a complex web of interacting subsystems, each seeking to control relevant aspects of the social milieu as well as its own functioning. This naturally leads to constraints and conflicts with the collision of spheres of interest and influence. The problems generated in such an environment "are those of 'organized complexity' -- the management of large scale systems, with large numbers of variables, which have to be coordinated to achieve specific goals."⁴

Intellectual technologies are tools and techniques that allow the "management" or control of such systems. Bell includes:

...information theory, cybernetics, decision theory, game theory, utility theory, stochastic processes. From these have come specific techniques, such as linear programming, statistical decision theory, Markov chain applications, Monte Carlo randomizing, and minimax solutions....⁵

³ Ibid., p. 14.

⁴ Ibid., p. 29.

⁵ Ibid.

These developments allow, in the decision-making process, "the substitution of algorithms (problem solving rules) for intuitive judgments."⁶ This is important when dealing with complex systems, which are by nature "counterintuitive," there are too many variables for the human mind to deal with simultaneously. Intuitive judgements, which are generally based on simple cause and effect relations, may overlook the more meaningful relations that are fundamental for the solutions to problems in complex situations.

The utility of the intellectual technologies is their ability to define the conditions of certainty, risk, and uncertainty in given situations and determine rational strategies that maximize outcome or minimize losses. Bell cites the example of a computer simulation model that reflects the growth, stagnation, and decay of a central city. The model contains three sectors, business, housing, and population, each with three elements linked by 22 modes of interaction covering a 250 year period. Through the model, negative effects of certain policy alternatives were made evident. For instance, the effect of building low income housing was to bring in more low income residents, a lowered tax base, and the consequent discouragement of new industry. The intuitive judgements that called for increased low income housing were not as good as more difficult approaches to altering job patterns and population balances.

As Bell defines it, "the goal of the new intellectual technology is, neither more nor less, to realize a social alchemist dream: the

⁶Ibid.

dream of 'ordering' the mass society."⁷ Significantly, if decision theory is the master in this approach, it is the computer that makes it possible.

The chain of multiple calculations that can be readily made, the multivariate analyses that keep track of the detailed interactions of many variables, the simultaneous solution of several hundred equations -- these feats which are the foundation of comprehensive numeracy -- are possible only with a tool of intellectual technology, the computer.⁸

The Control of Technology. It was suggested in Chapter II that the development and diffusion of new technologies have both positive and negative consequences. The past decade has seen an increased awareness and concern about potentially undesirable effects of technological development, particularly with respect to environmental and health hazards. The gasoline engine and air pollution, chemical fertilizers and water pollution, DDT and the destruction of wild life, food preservation and carcinogens, are all examples of consequences that were unknown, unintended, or overlooked when these innovations were introduced.

The control of technology, simply stated, is the application of intellectual technology to the development of other technologies in order to determine "second-order and third-order consequences." The effect is to allow the assessment of a particular innovation and if the perceived risks so warrant, "the selection or encouragement of different technologies or at least modified ones -- functional

⁷Ibid., p. 33.

⁸Ibid., p. 30.

alternatives with lower 'social costs' (though not necessarily lower total costs)."⁹

Intellectual technology provides the tools to make technological assessment feasible. What is lacking is a political environment that encourages the necessary studies to provide criteria for the regulation of technological development. Chapter IV, in essence outlines the need for such an assessment of the developing telecommunication technologies.

Axial Principle: The Primacy of Theoretical Knowledge. Based in part on technological assessment and the application of intellectual technology to wider spheres of activity, there is a change in the central features of society. An axial principle, as utilized by Bell, is "the energizing principle that is a primary logic..."¹⁰ for the operation and organization of the key institutions in society. In an industrial society, the axial principle is the efficient and economical coordination of men and machines for the production of goods. "Post-industrial society is organized around knowledge, for the purpose of social control and the directing of innovation and change."¹¹

Knowledge, of course, is a primary resource in any society. What is new is an alteration in the character of knowledge itself. Decisive for a society which attempts to control its destiny is "theoretical knowledge - the primacy of theory over empiricism and the codification

⁹Report of the National Academy of Sciences, U.S. House of Representatives, Committee on Science and Astronautics, Technology: Processes of Assessment and Choice, quoted in Bell, Post-Industrial Society, p. 27.

¹⁰Bell, Post-Industrial Society, p. 10.

¹¹Ibid., p. 20.

of knowledge into abstract systems of symbols...."¹² It is theoretical knowledge that provides the basis for empirical confirmation in studies such as those required for technological assessment.

The crucial nature of theoretical knowledge is evident first in industry. Many important twentieth century industries are "science based," that is they required a sound theoretical basis in science prior to development. The chemical and electronic (including electronic communication) industries are examples.

Equally important is the application of theoretical knowledge to policy formulation. Just as the use of feedback mechanisms is evident first in the economic sector, so is the use of theoretical knowledge and theoretical models, such as econometric models, that allow policy experimentation for "fine tuning" the economy. In fact, the use of such devices might be considered as a sort of simulated feedback mechanism.

The significance of theoretical knowledge is not limited, however, to industry and economics, but encompasses most fields. Bell states:

...the advances in a field become increasingly dependent on the primacy of theoretical work, which codifies what is known and points the way to empirical confirmation. In effect, theoretical knowledge increasingly becomes the strategic resource, the axial principle of society."¹³

Social control, we have seen in Chapter I, is based on the communication of information. In Chapter II, the revolution in communication technology and the effects on the information environment were discussed. The preceding analyses of the three dimensions of change

¹²Ibid.

¹³Ibid., p. 26.

that form the basis for the control function in post-industrial society highlight the importance of information, knowledge, and the computer in that society. To further this investigation, however, it is necessary to examine more closely what kind of society a post-industrial society is and the communication needs it generates. We can continue first with the remaining two dimensions of change.

The Service Economy. The economic sector may be divided into three segments, the "primary" being principally agriculture, the "secondary" consisting of manufacturing, and the "tertiary" being made up of services. Services include business (banking and finance, trade, retail, insurance, ect.), communication and utilities, transportation, health, education, recreation, research, and government. The first distinguishing feature of a post-industrial society is that the highest proportion of the labor force is engaged in and the greatest proportion of the GNP is derived from, the service sector. Bell states: "The United States today is the only nation in the world in which the service sector accounts for more than half the total employment and more than half the Gross National Product."¹⁴

The services that develop out of the new potentials in telecommuni-
cation and computer technologies then, are part of a more general
acceleration in the whole service sector. What is most significant
however, is that it is through these technologies that more and more of
the other classes of services will be offered. In business, banking

¹⁴Ibid., p. 14.

and shopping via cable are envisioned. Remote medical diagnosis and two way, in-home educational and instructional services are possible. Each class of service in fact will be effected by increases in communication capacity and expansion of capabilities. This is especially true in the governmental category. "which is decisive for post-industrial society."¹⁵

In the evolution of industrial society and the transition to post-industrial society, the growth of services occurred in stages. The transportation, utility, and distribution services necessary for industrial development were followed by the auxilliary finance, insurance, real estate, etc. services. Then, as industrial society increased the standard of living, there was an expansion in personal services (laundries, garages, etc.). At that point, the demands generated by societal expectations lead to governmental provision of services, in education, community and environmental maintenance, basic health programs, and, significantly, in social services for both the disadvantaged and advantaged citizenry.

Social service functions include job training and placement, individual and family counseling, rehabilitation, home management assistance, etc. For our immediate purposes, their most important defining feature is that "the vast majority of social service transactions are basically information exchanges, "and thus communication is the essence -- not just peripheral to -- of the function."¹⁶

¹⁵Ibid.

¹⁶The Sloan Commission on Cable Communications, Cable Communications and Social Services, (New York: Alfred P. Sloan Foundation, 1971), p. 2.

The Sloan Commission specifies four ways in which cable and associated technology can effect the delivery of social services:

The first is communicating with those who could use social services--providing information about what is available, and how to obtain it, as well as motivating the person receiving information to use it. The second, and perhaps most extensive use of communications is in providing information directly relevant to the solution of a person's interest, need, or problem. The third possible use of cable communications is in direct action to solve a problem--the issuing of a medicaid card, for example or arranging a job placement.

The final class of uses of communication is in the management (including operations and training) of the service function, whether it be public or private.¹⁷

Social services are normally executed from a centralized location and often "consists not in directly solving problems or delivering services, but rather in serving as a broker and advocate to arrange that people who have needs are matched with the appropriate resources."¹⁸ A message switched, broadband communication system linking the social service agency with the service consumer would benefit the quantity, quality, and cost of these services. In government services in general, such a system would lead to "tremendous savings and productivity increases....In governmental planning and operations, it is 'questimated' that such systems could cut the annual budget by about 10% without reducing the quality or quantity of services now provided."¹⁹

¹⁷ Ibid., p. 3.

¹⁸ Ibid., p. 5.

¹⁹ Kimbel, Assessment of the Computer - Telecommunications Complex, p. 148.

In a post-industrial society, the greater demand for services, particularly those that become a governmental responsibility at the federal, state, or local level, will necessitate a communication system capable of servicing the service function.

The Pre-eminence of the Professional Technical Class. Roughly committant with the shift in emphasis to the service sector is an alteration in occupational distribution, that is where people work and the kind of work they do. Naturally, there will be more people employed in services, but this in itself does not fully describe the nature of the phenomenon. In industrial society, the class of semi-skilled factory workers replaced the farmers of agricultural society as the largest employment class and the group whose needs and demands shaped the class structure and to some degree the value system of society. A similar shift takes place with the evolution of post-industrial society, the service sector, and the government as a chief employer. This shift is a distinct change from a "blue collar" to a "white collar" working force, and more importantly, within the white collar working force, the emergence of trained professional and technical personnel, including but not limited to, the scientists and engineers.

This group forms the basis for the new class consciousness in post-industrial society, with wide ranging ramifications. In particular it poses a new set of political problems, which we shall take up presently. Our immediate concern is with the implications within the educational framework, for education is the key for access to and continued participation in this dominant occupational class. As such, and with an

expanded definition of social rights, "the most important claim of all is full access to education, within the limits of one's talents and potentials."²⁰ The nature of education itself, however, is altered in that there is particular emphasis on the distinction between schooling and education and on what has become known as "continuing education."

The distinction between schooling and education is relevant in discussing all media. Bell states: "Education take place outside the school, in the multifarious influence of media and peer group, while schools,..., have become more vocational and specialized."²¹ The improved selection of program alternatives presented with the development of cable and/or satellite networks, the diverse special interest program possibilities, and the potential for increased interaction within peer groups (professional and other), will allow vast improvements in the ranges of vicarious and real experiences as key components of knowledge. Computerized access to libraries, lectures, and instructional materials, on a two way basis, will allow a more individualized educational process. Schools, of course, will continue to serve an important function, but they may no longer be the central component in the educational structure.

An important circumstance that becomes increasingly important to the professional-technical class is an exponential growth in knowledge itself, evidenced in the proliferation of scientific literature and the branching of scientific disciplines. The result that the store of

²⁰ Bell, Post-Industrial Society, p. 363.

²¹ Ibid., p. 421.

knowledge accumulated during a specific time frame, such as through a college degree program, may have a limited span of usefulness. As futurology popularizer Alvin Toffler states: "Today's 'fact' becomes tomorrow's 'misinformation'."²² The implication for the professional-technical workers is clear. They can expect to continue the learning process long after the completion of the formal educational process. There is, in fact, already strong evidence of an acceleration in continuing or lifelong educational programs in this country, for the professional as well as other segments of the population.

A report prepared for the Aspen Program on Communications and Society²³ suggests that the knowledge requirements of a rapidly changing technology coupled with a highly educated increasingly leisure population demands an educational structure that accomodates expanded learning needs. In particular, there is a need for a wider variety of educational programs capable of utilization when and where the learner needs them. Again, the cable and satellite networks are projected as important forces in meeting these needs.

The Polity. The five dimensions of change specified by Bell do not necessarily reflect corresponding alterations in the other two segments of society, the polity and the culture. Returning once again to the system concept of society, however, it is inevitable that these

²² Alvin Toffler, Future Shock (New York: Bantam Books, Inc., 1970), p. 414.

²³ Richard Adler and Walter S. Baer, Aspen Notebook: Cable and Continuing Education, Praeger Special Studies in U.S. Economic, Social, and Political Issues, (New York: Praeger Publishers, 1973).

changes will have consequences for the other subsystems. In the volume we are discussing, Bell is particularly concerned with the problems generated in the political sphere. He states:

In a society which becomes increasingly conscious of its fate, and seeks to control its own fortunes, the political order necessarily becomes paramount. Since the post-industrial society increases the importance of the technical component of knowledge, it forces the hierophants of the new society - the scientists, engineers, and technocrats [i.e. the professional-technical class] -- either to compete with the politicians or become their allies. The relationship between the social structure and the political order thus becomes one of the chief problems of power in a post industrial society.²⁴

The impact of the telecommunication facilities in the political process, though largely speculative at this time, is nonetheless likely to be significant. Broader and cheaper candidate exposure, increased news, public affairs, and documentary coverage, and instantaneous public opinion polling are some of the political uses that the new technologies can make possible. Polling could even allow a referendum form of popular democracy to replace representative democracy. In terms of the professional-technical class, their access to the political system, in part, relies on these technologies. Edwin B. Parker states: "Changes in the capability and costs of information access, storage, and transmission will influence the distribution of who has what information at what time. These changes can alter the distribution of political power."²⁵

²⁴ Bell, Post-Industrial Society, p. 13.

²⁵ Edwin B. Parker, "Technology Assessment or Institutional Change?" in Communication Technology and Social Policy, eds. Gerbner, Gross, and Melody, p. 533.

The political problems of the post-industrial society are as varied as they are complex. The allocation of scarce research and development funds, the multiplicity of demands for social and economic justice, and obtaining consensus in "social" decisions which require adherence by large numbers of citizens, groups, or the entire society are among the major questions in which answers come from the political sphere. The major question, however, is who is to provide leadership in the application of new techniques, including the techniques of social control. DeCarlo states:

At the base is the problem of communication between technicians and scientists responsible for technological development and that leadership in our country responsible for the many institutions and organizations which constitute our ongoing expression of aims and purposes.²⁶

Exactly how communication technology will bridge this "communication gap" is also a question for the future, and one which will likely be made in a political context. Perhaps the ultimate link between government and technician will be indirect, that is through the general populace. Speaking to this, DeCarlo goes on:

Those who manipulate the frontiers of knowledge have become very powerful. But such people comprise a relatively small and esoteric group who cannot easily communicate with other people. In a modern democracy, although groups of scientists control specialized information, each citizen has a responsibility to share in the shaping of that society. The scientific community therefore must attempt to communicate esoteric information to the citizen in a form which will permit him to make reasonable judgements.²⁷

²⁶De Carlo, "Perspectives on Technology" in Technology and Social Change, ed., Ginzberg, p. 19.

²⁷Ibid., p. 41.

Access to information by all segments of society then, may be the key to the success of our democratic institutions. There must, however, be safeguards for what may be termed private information. This danger is a central feature of the negative side of social control which results in the loss of personal freedom, the topic we take up with an examination of the technological society.

The Technological Society.²⁸

The concept of The Technological Society is based not on the predominance of technology, or at least machine technology, as the title might imply, but rather on the notion of "technique," which grew from the requisites of machine technology but eventually transcended it. "Technique," as defined by Ellul, "is the totality of methods rationally arrived at and having absolute efficiency...in every field of human activity."²⁹ To put technique into the context of control, we can refer to a further definition supplied by Robert K. Merton. He defines it as "any complex of standardized means for attaining a predetermined result."³⁰ I refer the reader to the original definition of control presented in Chapter I. Technique then is the "means and ensemble of means" by which control is achieved. Means operate, of course, through communication. A technological society is, in essence, one in which the means or techniques have become so

²⁸Jacques Ellul, The Technological Society, trans. John Wilkinson, with a Foreword by Robert K. Merton (New York: Random House, Vintage Books, 1964).

²⁹Ibid., p. xxv.

³⁰Robert K. Merton, Foreword to The Technological Society, Ellul, p. vi.

integrated and powerful that they achieve autonomy in relation to society and "the ever-expanding and irreversible rule of technique is extended to all domains of life."³¹ The manner in which this rule is developed and maintained is evident in an examination of the characteristics of technique.

Ellul presents a total list of seven characteristics of technique in modern society. The first two are the most obvious and widely discussed. Technique is rational, that is it proceeds according to logic, and it is artificial, obeying different rules than nature and thus having different imperatives, which subordinate the natural. The remaining characteristics are less apparent and deserve broader evaluations.

Automatism. The technical movement is self-directing. Based on criteria of rationality and efficiency, it "selects among the means to be employed,"³² and this choice is made automatically. The one best means is always selected, and though there is some room for the choice to consider other criteria and is dependent on the stage of development, the direction is always toward efficiency.

Self-augmentation. All human effort is directed toward technical progress, but since technique is automatic, human effort only corresponds to, and does not dictate, technical progress. Progress proceeds then, "almost without decisive intervention by man."³³ In addition, it is an irreversible process.

Monism. "The technical phenomenon, embracing all separate techniques, form a whole."³⁴ Any differences between various classes of techniques are secondary. Mechanical, economic, organizational, and human techniques all share common features and form a united process.

³¹Ibid.

³²Ellul, The Technological Society, p. 80.

³³Ibid., p. 85.

³⁴Ibid., p. 94.

Universalism. There are two distinct aspects of universalism, geographic and qualitative. Geographically, the area of activity of the monolithic technique is the whole world. This corresponds to the "global village" and "cultural invasion" descriptions of McLuhan and others. This is not to say that technique is at the same stage of development in all geographic areas, but its imperatives are already a feature of even underdeveloped third and fourth world nations. The telecommunication facilities of the world are of course an important factor in this occurrence. Qualitative universalism means that technique pervades all aspects of civilization's activities, or as Ellul states, "technique has taken over all of civilization."³⁵

Autonomy. The autonomy of technique means simply that it obeys only its own imperatives. It is indifferent to economic, political, moral, or human considerations. In fact, technique seeks to eliminate any and all variability or irrationality in these areas, for these cause friction in its operation. The only area in which technique cannot assert complete autonomy is in respect to certain physical laws. These, technique puts to work for its own purpose.

Technique is the all powerful force that dominates civilization, subordinating all that opposes its progress. In addition to the mechanical, Ellul distinguishes three subdivisions of the modern technique, economic, organizational, and human. In economics, the descriptions of feedback mechanisms and decision theory techniques are representative of the nature of Ellul's perceptions of economic techniques. Similarly, the techniques of organization apply to the management of complex environments. Thus, though these subdivisions are indeed important and Ellul presents thought provoking analyses, I will not elaborate them further.

Human techniques are varied, including among other activities, medicine, genetics, psychology, education, publicity, and propaganda. Their distinguishing feature is that the object of their application

³⁵Ibid., p. 128.

is man. It is through them that man becomes "mass man" and ultimately loses personal freedom. Techniques "are mobilized to persuade the human being to be satisfied with his condition of mechanical, mindless 'mass man,' and ruthlessly to exterminate the deviant and the ideosyncratic."³⁶ This "process of massification" is described quite astutely by Theodore Raszak, who engenders the "Technocracy" in his analysis of society. He states:

Drawing upon such unquestionable imperatives as the demand for efficiency, for social security, for large-scale co-ordination of men and resources, for ever higher levels of affluence and ever more impressive manifestations of collective human power, the technocracy works to knit together the anachronistic gaps and fissures of the industrial society.³⁷

He concludes further:

...-that it may well lie within the capability of the technocracy to utilize its industrial prowess, its social engineering, its sheer affluence, and its well developed diversionary tactics, to reduce, in ways most people will find perfectly acceptable, all the tensions born of disorganization, privation, and injustice which currently unsettle our lives (Note that I do not say it will solve the problems; but rather,..., it will cunningly sooth the neurotic hurt.³⁸

The purpose of technique in the human realm, it is apparent, is to adapt man to the conditions of a society created by technique itself, and created without regard to man's freedom of will. Communications,

³⁶ John Wilkinson, Translator's Introduction to The Technological Society, Ellul, p. xvii.

³⁷ Theodore Roszak, The Making of a Counter Culture: Reflections on The Technocratic Society and Its Youthful Opposition (New York: Doubleday and Company, 1969, Garden City, New Jersey: Anchor Books, 1969) p. 5.

³⁸ Ibid., p. xiv.

and the new capabilities evolving now, plays several distinct roles in accomplishing this adaption, and herein lie the dangers in telecommunication development. First, the adaptive process, according to Ellul, begins with the tensions created with the erosion of a sense of community and the interpersonal relationships it fosters. Correspondingly, new communication systems, by providing "more universal use of more modes of communication,"³⁹ can contribute to the breakdown in the quantity and quality of interpersonal relationships. This, I expect, would be an example of a "second order" consequence not considered in the diffusion of communications technology. There are, however, even more overt dangers.

The increased capacity potential will provide more channels to the individual, fostering new interactions between people and groups of people. But who will use these channels? It may be that, as Bertram M. Gross cautions, "New opportunities for interaction may become new chances for political, consumer, and social behavioral control through computer based pinpoint advertising and politics as broadcasting is replaced by 'narrow' casting to specific, well-defined audiences."⁴⁰ Propaganda, consumer and political, may comprise a significant amount of the information total that circulates in the new channels. This presents the dangers of information control and restricted access to channels. Merton suggests:

³⁹ Arthur D. Hall, III, "What Can the New Technology Do? The Dimensions of Change," in Communication Technology and Social Policy, Gerbner, Gross, and Melody, eds., p. 5.

⁴⁰ Bertram M. Gross, "The New Field of Urban Communications," in Communication Technology and Social Policy, Gerbner, Gross, and Melody, eds., p. 290.

The conflict of propaganda takes the place of the debate of ideas. Technique smothers the ideas that put its rule in question and filters out for public discussion only those ideas that are in substantial accord with the values created by a technical civilization. Social criticism is negated because there is only slight access to the technical means required to reach large numbers of people.⁴¹

In Ellul's appraisal, it is the state that is the most efficient mechanism through which technique operates. It is evident that "the proper use of the instruments of communication and computation in the legitimate function of government constitute a genuine concern."⁴²

The increased number of entertainment program alternatives possible via cable and satellite networks may only serve to provide more distractions for the individual. Merton states "The technological society requires men to be content with what they are required to like; for those who are not content, it provides distractions - escape into absorption with technically dominated media of pop culture and communication."⁴³ In Roszak's *Technocracy*, the "furnishing of parodies of freedom, joy, and fulfillment becomes an indispensable form of social control....In all walks of life, image makers and public relations specialists assume greater and greater prominence."⁴⁴ We can be sure they will have more channels of communication with which to work. If television is a "vast wasteland," the new capabilities may make it more vast.

⁴¹Merton, Forward to The Technological Society, Ellul, p. vii.

⁴²DeCarlo, "Perspectives on Technology," in Technology and Social Change, ed., Ginzberg, p. 23.

⁴³Merton, Forward to The Technological Society, Ellul, p. viii.

⁴⁴Roszak, The Making of a Counter Culture, p. 15.

Schwartz cautions, "If the new media are harnessed by the existing value system, they will only help us to continue to do what we already do, only now more effectively."⁴⁵

The potential uses of communication technology could allow the compiling of vast stores of information concerning personal behavior. Where one travels, with whom one talks, what one reads, buys, plays, and potentially, how one feels. The protection of this information from those institutions which would seek to use it for manipulative purposes is another important concern. Technique, to be effective in human as well as all other spheres, relies on the best information. Personal integrity depends on safeguards to the privacy of personal information and freedom from "cybervalance."

The Shape of the Future?

Given two distinct appraisals of the social control process, one in which control is exercised in the pursuit of solutions to real human and social problems and one in which this pursuit ultimately results in the enslavement of mankind, the temptation is to ask which form of control will prevail in future society. Will there be an Orwellian version of 1984 or will the forces of human spirit transcend the obstacles of "technique" and a materially satisfying and humanly fulfilling society emerge? The question, of course, is an open one. In a metaphysical sense there is no future other than in the memories and imagination of the human mind.

⁴⁵ Schwartz, ed., Human Connection and the New Media, p. 4.

What can emerge from the concepts of control and society discussed is a realization that society is a process. It is likely to continue functioning and undoubtedly the effort to control the pace and direction of change will intensify. Both positive and negative effects of control will probably be evident in future society, as they are evident in the present. New communication capacities and capabilities will develop and be put to both constructive and manipulative uses. What should be most evident is that it is no longer necessary to pursue an uncharted course of technological development. The tools to assess the potential results of decisions are available. What is needed is an institutional structure which insures that the assessments are made and selects from among alternate courses of action those that best serve social needs without infringing on the freedom of the individual. Such an institutional structure is especially imperative in the area of communication technology, for it is through communication facilities that the responses to others technologies will be made.

CHAPTER IV

THE INSTITUTIONAL STRUCTURE OF THE TELECOMMUNICATION INDUSTRY

Based on the ramifications of the control function in society, the changes it generates in the social structure, and the positive and negative potentials associated with developments in telecommunication and computer technologies and applications, numerous issues regarding that development are evident. Among those I have attempted to briefly outline are:

1. How to insure a telecommunication system responsive to the educational and social service needs of society.
2. How to prevent political, economic, and social manipulation through the electronic media.
3. How to establish safeguards to the privacy of information.
4. How to insure access to the channels of communication.

These are but a few of the issues surrounding the developing communication facilities, each presenting such complexities that its analysis would require a much lengthier discussion than is possible here. Consequently, specific issues will not be examined in this report. Rather, the purpose of this chapter is to evaluate the institutional structure under which specific policy issues are decided.

The growth pattern of the telecommunication industry will transcend

the determinisms of its technological characteristics. Hubert J. Schlafly describes four categories of factors that will control the rate and direction of the applications of the new technologies.

These are:

1. The desire and true public need for and productive use of broadband information service and entertainment access for the home.
2. The incentive foresight and wisdom of industry and other leaders who must risk the capitol, realistically appraise the political and competitive fights, and supply the energy to make this happen.
3. The effectiveness and magnitude of opposition of established services whose immense plant investments or carefully developed profit patterns caution them to let new services happen "all in good time."
4. The vision, energy, and competence of regulatory bodies.¹

These categories, the public or consumers, the entrepreneurs, the established companies, and the regulators broadly define the institutional structure around which development will take place. All of them, with the possible exception of the consumer, can be expected to carry out planning or assessment techniques in promoting the applications of the technology. However, both the promoters and the established services, often in conflict with each other and relying on the profit motive of the firm, will be concerned primarily with economic consequences of development. If an assessment is to include the broader and, I think, more

¹Hubert J. Schlafly, The Real World of Technological Evolution in Broadband Communication, New York: Alfred P. Sloan Foundation, 1970), p. 1.

important social and political consequences, that assessment must come from either the regulators, primarily the Federal Communications Commission,² and the Office of Telecommunication Policy, (OTP), or from outside the structure, from university research sources for instance, or from the public. The FCC, by virtue of its mandate to guide development in the "public interest"³ is, it would seem, in the most suitable position to generate such an assessment. Historically, however, this has not been the case, as is suggested by FCC activity in cable or CATV, development.

The FCC and CATV⁴

Cable first appeared in the late 1940's as a means of providing rural communities with broadcast television service. During this early period, there was apparently little need or demand to regulate these systems. Within a few years, however, broadcasters began to fully realize the potential of cable to fragment their audiences by importing the signals of stations not otherwise available in their area. This fragmentation could negatively effect the local station's revenues and the demand by broadcasters for regulation began.

²In regard to cable in particular, state and municipal government may also assume some regulatory control.

³The legal precedent for public interest was established by the Supreme Court in the case of Munn v. Illinois, 94 U.S. 113, 126. In that case, the court stated: "When, therefore, one devotes his property to a use in which the public has an interest, he, in effect, grants to the public an interest in that use, and must submit to be controlled by the public for the common good, to the extent of the interest he has thus created."

⁴Within the context of this chapter CATV (Community Antenna Television) and cable are used interchangeably.

Based on the Frontier Case,⁵ the FCC ruled in the 1959 Report and Order⁶ that it had no jurisdiction over CATV. The reasoning was that since the cable operator had control over the messages he carried, he was not a common carrier within the meaning of The Communications Act of 1934⁷ and since he did not originate programming, he was not a broadcaster.

Under continued pressure from the broadcast industry, the Commission soon reacted to the economic threat posed to broadcasting, and in 1962, on the basis of the Carter Mountain Case,⁸ assumed limited, indirect jurisdiction. This jurisdiction was based on CATV's use of microwave facilities to import signals. Microwave operations are clearly within the scope of the FCC's common carrier regulations. The rationale was that the economic threat to existing stations in turn constituted a threat to public interest.

In 1965, the Commission promulgated rules for microwave served systems. These rules were contained in The First Report and Order.⁹

⁵Frontier Broadcasting v. Collier, 16 R.R. 1005 (April, 1958).

⁶"Inquiry into the Impact of Community Antenna Systems Television Translators, Television 'Satellite' Stations, and Television 'Repeaters' on the Orderly Development of Television Broadcasting," Docket No. 12443, Report and Order No. FCC 56-292, 26 FCC 403 (1959).

⁷The Communications Act of 1934, Public Law 416, 73d Congress, June 19, 1934 (Amended to December, 1964). Under Title II of the act, a "common carrier" is defined as "any person engaged as a common carrier for hire, in interstate or foreign communications by wire...".

⁸Carter Mountain Transmission Corp. v. FCC, 321 F 2d 359 (D.C. Cir. 1963).

⁹Amendment of Subpart L, Part 91, to Adopt Rules and Regulations to Govern the Grant of Authorizations in the Business Radio Service for Microwave Station to Relay Television Signals to Community Antenna Systems (First Report and Order), 38 FCC 683, paras. 83-127 (1965).

Basically, systems were required to carry the signal of local broadcast stations and were prevented from duplicating local station programming by the importation of distant signals.

The Second Report and Order,¹⁰ one year later, extended these rules to all CATV systems. The FCC held that its powers under the Communications Act gave it the authority to regulate CATV to prevent disruption of the general scheme of broadcast regulation. This jurisdiction was upheld by the Supreme Court in the Southwestern Case¹¹ in 1968. The Court ruled that the FCC had jurisdiction to regulate CATV as a service "reasonably ancillary" to broadcasting. The result was that cable, because of the strict importation rules,¹² was effectively "frozen out" of the major television market.

Also in 1968, the Commission issued a Notice of Inquiry and Proposed Rulemaking¹³ and invited the submission of opinions concerning proposed rules. This came to "represent a genuine effort by the Commission to rethink its role in cable TV."¹⁴ The proposed rules, which became effective pending the outcome of the proceeding, applied even stricter standards for the importation of distant signals. Also required was the

¹⁰Second Report and Order on Microwave Served CATV, 2 FCC 2d 725 (1960).

¹¹Unites States v. Southwestern Cable Co., 392 U.S. 157 (1968).

¹²The Second Report and Order states that if any TV station or proposed UHF station objects, a CATV system may not import signals into the market.

¹³Commission Rules and Regulations Relative to Community Antenna Television Systems (Notice of Proposed Rulemaking, No. 18397, 33 Fed. Reg. 19028 (FCC, released December 13, 1968).

¹⁴Smith, The Wired Nation, p. 53.

origination of programming by systems serving more than 3500 subscribers. The Notice further stated that systems "should be encouraged and perhaps ultimately required, to lease cable space to others."¹⁵

A Second Further Notice of Proposed Rulemaking¹⁶ in 1970 expanded upon the first. It set up a formula for allowing the importation of some distant signals and proposed to require public, government, and educational access channels. In addition it provided that, at the operators discretion, excess channels be made available on a lease basis.

The new rules finally became effective when the Commission issued The Cable Television Report and Order¹⁷ in 1972. This document contained many of the provisions of the 2nd Notice. It required that extra channels be offered on a lease basis at standard rates with first come, non-discriminatory access.

It was obvious that the FCC had come a long way since declining jurisdiction thirteen years earlier. The movement from a strict protectionist viewpoint to a realization that CATV might promote the local outlet, program diversity, public interest criteria that the Commission had ostensibly sought to encourage through its UHF policies is a remarkable shift. It is still apparent, however, that FCC policies have seriously impeded the growth of the cable industry, particularly in the larger markets. The new Subscription Cablecasting Rules,¹⁸ issued

¹⁵ Notice of Proposed Rulemaking.

¹⁶ Second Further Notice of Proposed Rulemaking and the New Dockets, Docket No. 18397-A, 24 FCC 2d 580, 587 (1970).

¹⁷ Cable Television Report and Order, 37 Fed. Reg., No. 30, February 12, 1972.

¹⁸ Subscription Cablecasting Rules, 40 Fed. Reg., No. 67, April 7, 1965. These rules designate by formula what programming cable may use on a subscription or pay basis, clearly with the interest to protect the broadcaster's ability to exhibit the most attractive programs.

last year, show that a policy of protecting broadcasters, or at the very least a policy of tempering the disputes of competing economic interests, is still prevalent. The question is why?

"The problem stems principally from the fact that the Commission has defined the public interest as the perpetuation of the over-the-air television industry as it now exists."¹⁹ This philosophy results in the continuing definition of cable as a supplementary service, which, given its vast potential, is clearly inappropriate. By adhering to this view, the FCC has relegated its activity to the arbitration of competing economic interests. These arrangements result in a situation in which "the full economic and political power of the communications industries is clearly used to insulate, preserve, and extend their markets, as well as to control the development and application of new technologies."²⁰ This leads to the consideration of alternate institutional arrangements, as proposed by Ralph Lee Smith who states:

If our present institutions are in fact incapable of implementing any concept of the public interest other than the accomodation of economic interests, then the question of devising new and better institutional arrangements that are capable of giving better expression to a larger concept of public interest is a matter of national priority that should not be delayed. The new communications technologies are coming fast and time is short.²¹

¹⁹Smith, The Wired Nation, p. 45.

²⁰William H. Melody, "The Role of Advocacy In Public Policy Planning," in Communications Technology and Social Policy, eds. Grebner, Gross, and Melody, p. 177.

²¹Ralph Lee Smith, "CATV: FCC Rules and the Public Interest," in Communications Technology and Social Policy, eds., Grebner, Gross, and Melody, p. 131.

Toward New Institutional Arrangements

The problem is succinctly stated by Clark C. Havighurst:

Regulation that confines itself to concern about the economic condition of the regulated industry or that perpetuates simplistic notions of the public interest, as if there were only one public to be served, will clearly not have measured up to its responsibilities.²²

The challenge is "to bring about the changes needed to control technology in the interests of the society as a whole instead of one particular institution or group of institutions."²³

Given what has been discussed in regard to the capabilities of assessment, the first step in changing existing structures is to institutionalize the policy planning and advocacy functions. But to whom is this responsibility delegated? Melody cautions against reliance on a single institutional planner, stating, "There really is no such thing as an optimum plan for the public."²⁴ He suggests that alternate plans be prepared by different institutions, which would allow both the range of different perspectives and the inherent biases of each to be measured one against another. Thus, we should look to the industry, the FCC, OTP in the executive branch, and to various research and development organizations. It is essential to our democratic principle, however, that the people have input into the creation of their telecommunication system. It is individuals who ultimately are the information consumers of telecommunication messages and who are the

²²Clark C. Havighurst, Forward to "Communications: Part I," Law and Contemporary Problems 34 (Spring, 1969), p. 203.

²³Parker, "Technology Assessment," p. 541.

²⁴Melody, "The Role of Advocacy," p. 179.

"controlled" in the visions of a managed, cybernetic, technocratic or post-industrial society.

Strategies that allow for citizen input to the decision-making process rely, of course, on information. Parker concludes that effective action must "involve sound intelligence, widespread publicity, and mobilized manpower."²⁵ Similarly, Schwartz calls for the "media information to be democratized and made assessible," for "the informed individual to become involved with the new media,"²⁶ and for this involvement to lead to a commitment to political action. The conclusion is evident as stated eloquently by Gross, "It is essential that our media be used to raise the issue of how media should be used."²⁷

The capacity and flexibility of the new telecommunication facilities are ideally suited to these processes. They can allow citizen access to the specialized information needed to make intelligent decisions, they can allow groups of interested individuals to mobilize their resources, and they provide the channels necessary to publicize the natures of the decisions to be made. It is access to the media that may be the "bootstrap" needed to make effective assessments of communication and other technologies.

²⁵ Parker, "Technology Assessment," p. 544.

²⁶ Schwartz, Human Connection, p. 5.

²⁷ Bertram M. Gross, Introduction to "The New Field of Urban Communications," in Communication Technology and Social Policy, eds., Grebner, Gross, and Melody, p. 292.

I conclude this chapter with a quote from the Justice William

O. Douglas:

The safety of the Republic lies in unlimited discourse. Only when the mind is free to explore problems to the horizon is man free to challenge and criticize intelligently those in power and summon opposition to depose them.²⁸

²⁸William O. Douglas, Freedom of the Mind, quoted in DeCarlo, "Perspectives on Technology," p. 15.

SUMMARY

The powerful forces of social planning and control are a reality and their manifestations already evident in the functioning of society. The forecasts of post-industrial and technological societies give a false sense of a distant future in assessing their ramifications. This is a dangerous illusion. Though it is somewhat arbitrary, Bell fixes 1945 as the key transition year in the evolution to post-industrial society and concludes that the United States now is the world's first such society. Similarly, Ellul believes the forces of technique are most advanced in this country.

The implication for telecommunication/ computer development is clear. The issues that will determine the character and effects of these technologies are today's issues. If the necessary institutional arrangements required for a socially responsive communication system are not brought about quickly and effectively, the chance to do so may be lost or forfeited. Action at all levels of government, industry, and citizen decision-making is necessary. Their action requires the effective use of information and communication to inform, persuade, and mobilize manpower to bring pressure to bear on those who would seek to further private, economic interests at the expense of the public interest. Importantly, this activity will not conclude with the achievement of threshold goals but must continue to access and promote

continued favorable performance. As Ellul states:

Freedom is not static but dynamic; not a vested interest, but a prize continually to be won. The moment man stops and resigns himself, he becomes subject to determinism. He is most enslaved when he thinks he is comfortably settled in freedom.¹

¹Ellul, in author's Forward to The Technological Society, p. xxxiii.

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