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by

Paul C. McFadzen

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ABSTRACT

The purpose of this thesis is to investigate the impact of computer-telecommunication technology, in its future form, on the functioning of the community.

Information and the reasons why it is the prime force of social change are discussed. Emphasis is placed on the use of symbols, metaphor, language and myth in contemporary society focusing on how thought and consciousness is formed in community members.

An historical account of communication is provided with discussions centred around the role of communication in the shaping of societal ideas.

An investigation of the capabilities of computers and the functioning of other mediums, such as print, radio, and television is introduced.

In addition, the writer reviews the progress of videotex systems to date by reporting on the Qube experiment in Columbus, Ohio, the Teletext and Prestel systems in Great Britain, the Antiope system in France, and the Telidon system in Canada.

Following out of these discussions the thesis explores the probable impact of information processing born in a computer era, on community and cultural development. The ideals of community development as utilized in a sociopolitical mode are commented on, with a view to demonstrating the difficulties of these approaches as a means of

social change in North American societies. In comparison, cultural development as a community development instrument of social change is explained through the idea of 'conscientization'. A three stage process of 'conscientization'; awareness, understanding, and critical consciousness is presented.

The main premise of the thesis is that the development of information technologies stimulates changes in the societal value system. Computer-telecommunication technology can provide for a renewed sense of community based on the gemeinschaft of the mind.

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The advance of computer technology, especially in hardware[1] is presently blending with the communication networks of telephone and cable television companies to provide information services to the home. Videotex systems are being developed in Britain, France, Canada and several other countries.[2] In Canada alone, field trials of the Telidon system developed by the federal government's Department of Communications are scheduled for Winnipeg, Calgary and Toronto.[3] According to Susan O'Connor, reporter for *Computer Data* magazine, "Videotex systems will provide access to educational services, teleshopping, news information, banking, travel and leisure activity programs, occupational guidance and handicraft instruction."[4]

The introduction of these services may have a profound impact on the home and community. All aspects of information delivery and retrieval could be incorporated into the computer-telecommunications medium. In particular, the mass media approaches of television, radio, film, magazines, newspapers, and mass mailings may undergo radical changes.[5] Two fundamental shifts in the way information is treated by the mass media may occur with the advent of videotext systems.

Presently, mass media information is often filtered or refined in order to be of interest to the largest possible audience. This process of filtering is readily evident in the production of television news. Gaye Tuchman provides an insight into the effects of

a television news filter.

> Recognition that the frame of television news--including its rendition of time and its arrangement of space on film and video is qualitatively different from that of everyday life and the realization that news cannot be a veridical account frees us to look at the production of news as the generation of myth . . .
>
> Seeing news as myth, we can begin to view it as the product of the consciousness industry. And we can then seriously discuss the consciousness industry as the industrialization of the mind.[6]

The idea behind Tuchman's viewpoint can be extended to other forms of mass media. The controllers of the consciousness industry are the corporations or senders that tend to dominate and operate those communication channels over which the majority of a community's information is transmitted.

With the introduction of videotex systems and other types of computer-telecommunication networks the intensity of the present filtering systems may be alleviated. In their early stages of development videotex systems are under the control of the past information provider networks. Infomart, a Canadian videotex information provider, is owned by newspaper conglomerates.[7] But this does not have to be the case. As the two-way interactive capabilities of computer-telecommunication networks are developed more sources of information can become available to the individual.

The possibility of the control over information moving into the domain of the receiver is directly dependent on the orientation of the computer-telecommunications network. Having a personal teletype terminal at his disposal would allow the receiver to place his own filters on the information and select information that he feels is

pertinent to his particular situation. This subtle change in the placing of the filter will bring about a change in consciousness in the way a man perceives himself and the world.

The speed and range of information available to an individual will have increased allowing Man to become the initiator in seeking out information that will be more pertinent to his individual needs. This development will lead to a renewed search for meaning through conscientization, a process of cultural development. The term, conscientization, is adapted from the adult educator Paul Friere and involves the ability of an individual to effect his world through a combination of reflection and action.[8]

Difficulties in Western man's value system are rooted in the present delivery system of information. Information provided by the mass media can be considered to be uni-directional. Information flows one way, with little or no opportunity for the individual to interact. This form of information delivery leads to feelings of passivity and inefficaciousness amongst community members. Individuals lose a sense of control over events and hence are unable to act. Early forms of videotex and other computer-telecommunication networks can be considered reactive systems which only allows the individual to access information banks.

With the advent of more advanced videotex systems, this all or nothing approach to information provision will be eliminated as individuals will have the opportunity to interact and respond to the information. Whether it is by direct contact with the author or by depositing messages into the computer system, the user will be able

to open a dialogue and create a two way flow of information via this feedback component of the system.

In addition to becoming information receivers, the users of the computer-telecommunication networks could become information providers and generate their own inputs into the system. The capacity of the Videotex system to provide this service would allow for the establishment of communities in which individuals could seek out those with similar interests and assist each other in expanding their understanding.

The use of feedback in computer-telecommunications systems will allow for this gemeinschaft of mind.[9] Community can be viewed as the amalgam of common ties and social interaction amongst its members. In the information age communication will develop amongst individuals who share mutual interests and goals, similar to the notion of a community of scholars. Computer-telecommunication networks will allow the individual to pursue his needs and desires with others who share his sense of community without necessarily requiring close geographical ties.

These outlined capabilities of a two-way interactive computer-telecommunications network are not the only possible outcomes from the implementation of these kinds of information services. Increasing centralization of databanks may be viewed as a threat to individual privacy due to indiscriminate access and misrepresentation. Information overload, the possibility of too much information and information pollution, the repetition of similar messages, are both factors that have to be considered in the two-way computer-telecommunication systems. These negative aspects must also be dealt with in the future information age.

The distinguishing difference between the writer's more positive approach over these later remarks can be summed up in the following manner.

Control over content, that is, the ways and means of providing information should be the overriding consideration in the development of computer-telecommunication systems. The certainty is not the systems' impact on the work place and the job market nor its altering of transportation patterns nor even increased leisure time activities. The certainty is the potential for a renewed sense of community. It is to this potential for a renewed sense of community that the writer addresses in this thesis. The framework for this endeavor is to review the use of information in the past and relate these discussions to a community development model based on cultural development. This model incorporates the notion of value and attitudinal change rather than structural change as the key ingredient in the community development process.

It is the writer's contention that any alteration in the processing and dissemination of information is initiated by a changing value system in the society. The emerging information system then acts as a stimulus to hasten the value changes.

To support this argument the writer relies in two bodies of knowledge. First, the writer assesses the technological development of computer-telecommunication networks in terms of their history, the ability to provide information services, and the type of possible networks. From this appraisal, the feasibility of an information society emerging from contemporary Western society is illustrated. Second, a review of the uses of information in terms of its components,

the way Man makes meaning, the historical development of information channels (medium), and the current impact of information on society, is presented. The aim of this presentation is to demonstrate Man's past uses of information in order to show the interaction between value changes and the development of various information media. The current impact of information on society is designed to reveal the underlying value changes that can be stimulated by computer-telecommunication systems.

From these two bodies of knowledge the argument for a cultural development process for community development is solidified. Support for this assessment of computer-telecommunication systems as a community development vehicle is at the theoretical stage. Due to the recent developments in computer-telecommunication technology, the writer has relied on reports of field trials and other experimental works as a basis for these normative assertions. Despite the lack of adequate empirical evidence, the writer believes that conclusions can be drawn from the present activities in the computer-telecommunication area. The historical account of the development and consequences of past information technologies has been utilized to reveal possible outcomes for computer-telecommunication networks. In addition, a number of authors have speculated on the possible effects of computer-telecommunication technology and this writer has integrated these thoughts into a cohesive overview of the impact of computer-telecommunication systems on culture and community. It is from these sources that the writer explores the role of community development in the emerging information society.

FOOTNOTES

[1]Particularly in the areas of fibre optics and microchip technologies. For Fibre optics see "Miracles of Fibre Optics" article appearing in *National Geographic*, Vol. 156, No. 4, October 1979, pp. 516-535. For microchips see "The Computer Society," a special section appearing in *Time*, February 20, 1978.

[2]See *IEEE Transactions on Consumer Electronics*, Vol. CE-25, No. 3, July 1979, a special issue on consumer text display systems.

[3]See "Teledon can still win race but competitors are close" article appearing in *Financial Post*, November 17, 1979.

[4]O'Connor, Susan, "Home information systems given nod for Western trial installations," article appearing in *Computer Data*, October 1979, p. 28.

[5]Godfrey, D. and Parkhill, B. (eds.), *Gutenberg Two, Press Porcepic*, Toronto, 1979.

[6]Tuchman, Gaye, "Television News and the Metaphor of Myth," article appearing in *Studies in the Anthropology of Visual Communication*, Vol. 5, No. 1, Fall 1978, p. 61.

[7]See "Big Three Plug in to Infomart," *The Financial Post*, September 21, 1979.

[8]Friere Paulo, "Cultural Action and Conscientization," *Harvard Educational Review*, 1970, 40 (2).

[9]A term used by Ferdinand Tonnies to signify common understanding and feeling towards other individuals.

PART I

COMPUTER AND ITS EMERGING ROLE

CHAPTER 1

HISTORY AND DEVELOPMENT

Early Influences

In many ways the demands of a society to be able to count, calculate, and compute have had a direct bearing on the development of a computer.[1] A computer is a tool which can store, analyze, manipulate, and present data in a variety of ways.[2]

The origin of man's need to keep track of various items is buried in the origin of time. Ralph Parkman, in his book, *The Cybernetic Society*, states:

> Man had grasped the concept of numbers in prehistoric days. By the time he began to keep track of livestock, he required simple aids. This need could be met by tallying knots tied in a cord, or with piles of pebbles.
>
> The earliest mechanical counting device of any sophistication, the abacus, evolved from such methods.[3]

From the abacus, improvements in computation were assisted by the development of number systems and the introduction of record-keeping.

In its development, two basic components of a computer have to be considered. Initially, there was a requirement to perform arithmetical operations mechanically, and later the device had to function with an automatic control. During the fifteenth century man's need for arithmetic calculations began to increase.[4] With the renewal of trade and commerce, the formation of a new social class and the navigation

of the seas to service new found empires, the need for computations began to grow. These trends of expanding trade and growing government continue to exert an influence on computations in contemporary society.

One of the first calculating machines was designed by Gottfried Wilhelm von Leibniz in 1694. The Leibniz calculator added, subtracted, multiplied, and divided. The machine, itself, was mainly a series of gears but had two features, a pinwheel and a stepped reckoner which were also used in later machines. Unfortunately the Leibniz calculator was plagued with technical problems which affected operational reliability.

In the area of government record-keeping, the notion of calculating machines found fertile ground. As the power of the state began to increase, the complexity and functions of government multiplied and this resulted in vigorous record-keeping activity. In addition to the expansion of government agencies, governments began to centralize their power and applied scientific methods to public administration. One of the felt needs of the nation state during this period of time was the collecting of information in the form of a census. The gathering of census data did not become an efficient process until 1890 when Herman Hollereith designed the punched card, by which a combination of holes represented numbers and letters. The following is a description of how the Hollereith card worked:

> The reader consists of eighty wire brushes, one positioned over each column of the card. The card passes between the brushes and a roller, and an electrical circuit is completed when a hole allows the brush to touch the roller.
> Otherwise the card serves as an insulator. Since the card

> is passing through the reading station at a constant rate, the machine can identify which digit is punched in the column by the time the electrical circuit is completed.
>
> These early machines were on the level of the music box. They performed a fixed sequence of actions for each card. They read the number from each card and added it to the counter. When the last card was read, the operator could get the sum by reading the visible counter.[5]

Even though the machine developed by Hollereith was automatic, the automation of control had its beginnings in the sixteenth century with the use of figured clocks. It was not until the eighteenth century that increased demand for industrial production brought about the development of the Jacquard loom. The notable advance in the Jacquard loom was the automatic sequence control which was separate from the process it controlled.

The design of the Jacquard loom's automatic control unit inspired Charles Babbage, an English mathematician, to design the Difference Engine, an instrument to be used for calculating a table of logarithms by means of differences. Despite government support, a Difference Engine was never completed by Babbage. Parkman gives inadequate metalworking technologies of the period and Babbage himself as reasons for the failure:

> The difficulty was in the translating of his ideas to mechanical forms. Babbage himself had, at the start, no experience with machinery or manufacturing methods and although he proved astonishingly capable of inventing new tools and techniques, he had to rely on others for the actual making of the parts . . . . Not only was the metalworking technology of the time insufficiently advanced to produce all of the nonstandard parts he designed, but also Babbage's dream was inconstant; he was continually seeing possibilities for improvement, and changing the designs after the workmen had begun.[6]

Babbage went on to design the Analytical Engine, which is considered to contain all the functioning components of an automatic computer

including memory and arithmetic units.

Mowshowitz sums up the early developments of calculating machines as a product of their time:

> The reductionist spirit which laid the foundations of modern science and divorced the craftsman from his work conspired with the genius of the nineteenth century to give us the conception of the general purpose digital computer.[7]

Post World War Two Developments

The first significant breakthrough in computer technology was the construction of the Harvard Mark I computer in 1944. The Mark I computer was designed to calculate the solution of differential equations and was operated by a preprogrammed paper tape sequence. The Harvard Mark I was limited in that it was unable to undertake conditional branching sequences and its electro-mechanical nature hindered the speed of computation.

In 1946, the first electronic computer dubbed ENIAC (Electronic Numeric Integrator and Calculator) was built. The difficulties with the ENIAC computer was the amount of heat generated by the machine which required the continuous replacement of tubes. Parkman provides a description of ENIAC and its problems:

> The ENIAC when finally completed in 1946 was a massive thirty ton machine covering over 1500 square feet of floor space. It used 18,000 vacuum tubes in place of relays and other partially mechanical components. This caused wastage of 150 kilowatts of power as heat and posed a continuous maintenance problem, since the tubes were relatively short-lived.[8]

The technological development of the transistor in 1948 by Bell Telephone revolutionized the electronics industry and provided the next step for the computer. *TIME* magazine, in its special section

"The Computer Society" stated the significance of the transistor this way:

> Small, extremely reliable, and capable of operating with only a fraction of the electricity needed by the vacuum tube, the "solid state" device proved ideal for making not only inexpensive portable radios and tape recorders but computers as well. Indeed, without the transistor, the computer might never have advanced much beyond the bulky and fickle ENIAC, . . .[9]

Stemming from the research into transistors, the process of miniaturization continued with the development of integrated circuits by 1960. Integrated Circuits (IC) allowed for the placing of many transistors onto a tiny silicon square which enabled more logic and memory circuits to be placed in computers.

By the late 1960s, Large Scale Integrated (LSI) circuits were developed which allowed for a number of circuits with separate functions to be placed on a silicon chip. The original difficulty with Large Scale Integrated circuits was the fixing of rigid patterns in the circuitry which stifled flexibility. But this problem was overcome by the production of microchips with switchable memory chips making the circuitry usable for any number of purposes.

In 1969, John Diebold attempted to place in perspective the speed at which computers have enhanced man's power of calculation.

> Up to 1945, when the first electronic computer was built, man's calculating speed for several thousand years had been the speed of the abacus. Overnight, it increased five times. From 1945 to 1951, it increased one hundred times again, and, from then until now, it has increased one thousand times again. Our measure of calculations today is nanoseconds--one billionth of a second. A nanosecond has the same relationship to a second that a second has to thirty years.[10]

Future Developments

It appears the trend of computers towards miniaturization, expanding memory capabilities, and speed of computation will continue. Evidence of this trend to miniaturization is reflected in the share of the market being captured by small business computers. Deliveries of mainframe units to U.S. based computers slipped to 6,800 in 1978 versus 20,000 in 1973.[11] Dr. Charles Lecht, speaking at the DATA 79 conference held in Toronto in April 1979 compared mainframe computers "to decaying radioactive isotopes."[12]

William Hutchison in an article for *Computer Data* magazine estimated the following continuing trends:

> By 1990 chips will be available with the equivalent of one half million transistors in one chip. Already the micro is a mini. Tomorrow it will be a mainframe.
>
> Computer memories have also been manufactured in chip form for some time. . . . In 1990 the cost of computer memory will be 1/400th of today's cost. That means that a block of memory which sells for $1,000 today will cost $2.50 in 1990. . . .
>
> In 1990 the cost of computer logic will be 1/40th of today's cost, and the upper speed levels for logic performance will increase 10,000 times. . . .
>
> The continuing developments in memory and circuitry technology will produce a 1990 pocket calculator with more power than today's most powerful computer, the seven million dollar Cray-1 computer.[13]

The difficulty in predicting the growth and direction of computer technology lies in the vast number of applications.

> For the mighty army of consumers, the ultimate applications of the computer revolution are still around the bend of a silicon circuit. It is estimated that there are at least 25,000 applications of the computer awaiting discovery. Notes *The Economist*: "To ask what the applications are is like asking what are the applications of electricity."[14]

Memories continue to be improved as magnetic bubble memory devices are presently being developed to the tune of $25 million in

research investment.[15] Bubble memory devices offer two advantages over microchips, they are easier to manufacture and are nonvolatile.

Another area that researchers are currently working on is in the area of superconductivity. Using the Josephson principle, metal alloys are cooled to the temperature of liquid helium, where many metals become superconducting; allowing a switching time faster than 20 trillionths of a second.[16]

These are three of the continuing trends in computer technology: miniaturization, increasing memory capacity and speed. The profound effects of these developments on culture and community occurs when the computer is connected to telecommunication networks.

Link to Telecommunications

When the *Financial Post* reviewed the possibilities for technological innovations the following list was presented:

* Flat screened black and white TV sets, so thin they hang on walls.
* Scratch-proof audio disks scanned by laser to produce cleaner, crisper stereo sounds.
* Portable telephones and computer terminals.
* Computer terminals that respond to verbal instructions and that may utter a few well-known words or phrases of instruction.
* Small experimental space labs producing new metal alloys and other substances impossible to fabricate on earth due to the force of gravity.
* Small robot arms with sufficient 'intelligence' to perform assembly operations in most industries.
* Computers dozens of times more powerful than models now commercially available.
* The beginnings of a national electronic library whose contents you will be able to probe with an inexpensive computer terminal in home or office.
* Volume production of human hormones, such as insulin, through genetic-engineering techniques that can also be used to create new micro-organisms (to gobble up oil spills, for example).
* New plastics and fibres to replace steel in automobile bodies, making cars considerably lighter and more fuel efficient.[17]

A cursory examination of the *Financial Post* list reveals that seven of the ten-item list are involved with computers or telecommunications.

The Honourable Richard P. Wiley, Chairman of the United States Federal Communications Commission, in his 1976 address to the Third International Conference on Computer Communications held in Toronto noted the emerging roles of computers and telecommunications.

> In post-industrial society, computer data networks provide the same crucial integrating function that canals, railroads, and highways did in the earlier phases of our development. Computer communications are at the very heart of mankind's great advance in economic and social development.[18]

The implication in this statement is that telecommunication networks will be able to provide enough channels or have the capacity to allow for this flow of information. Two current developments in the telecommunication field are expected to expand the electronic highways in order to absorb this demand for channels; fibre optics and satellite communication.

Optical fibres have many applications in medical, industrial and military settings. In telecommunications, electromagnetic energy is utilized to carry messages. The most effective electromagnetic wave is light. *National Geographic* magazine explains:

> Light, of course, is a form of electromagnetic energy like radio and microwaves. Like them, too, light travels in a vibrating wave. By modulating, or varying, the height of this wave, a light beam can be made to carry messages just as does a radio wave.
>
> A beam of infrared light at its highest frequency oscillates nearly a hundred trillion times a second; incredibly, visible light vibrates faster still. Thus modulated light has immense potential to transmit information. Theoretically, one light beam could accommodate every telephone message, radio broadcast, and television program in North America simultaneously.[19]

The remaining difficulty lies in carrying the beam, as it was discovered weather conditions (i.e., fog, snow) absorbed the light. To overcome this problem flawless hairthin glass fibres were manufactured through which the laser could pass unmolested.

David Vaskevitch of Plandesign Corporation in Toronto discusses the impact of fibre optics on telecommunication systems:

> The capacity of communication links to handle information is a fundamental limitation in virtually all information related systems. Telephone conversations are limited by the inability to communicate visual information. Interactive computer systems are limited in design because the user can not access information as fast as he wants it resulting in unnecessarily clumsy dialogue.
>
> The use of optical links will eventually allow large transmission capacities in information systems; the communications channel will no longer be the weakest link. In fact, an optical link can transmit information faster than a person can handle it.[20]

The advantages of optical fibres over other carriers, such as copper cable, are awesome. Up to 10,000 times more information can be put into a light signal than into an electrical signal. Optical fibres are virtually immune to interference and in terms of security the optical fibre cannot be tapped without physically breaking the wire which interrupts the transmission.[21]

With the advent of the Space Shuttle in the 1980s communication satellites will be able to be constructed, assembled, tested and serviced while in orbit. This ability will enable a reverse in the present practice of small satellites and large earth stations.

Ivan Bekey, in an article published in *Astronautics and Aeronautics* explains the significance of complexity inversion.

> In the next decade, this trend could produce satellites so large and powerful that the two way user terminals shrink to desk top or even wrist watch size. This shrinking of terminals on the ground will make them very inexpensive, widely available,

> and extensively used--thus reducing communications via satellite to a routine matter for millions of people.[22]

Bekey points out three valuable uses for satellite communications in the areas of personal communications using wrist radio telephones, electronic transmission of mail and in the wide dissemination of educational television. Bekey goes on to predict that a personal communication satellite will be used by 10 percent of the U.S. population or 25 million people by 1990. For the electronic mail system Bekey calculates that 15 percent of the first class mail, approximately 15 billion pieces per year, will be distributed to 544,000 small terminals located in government and business office buildings (but not homes) by the year 1990. With regards to an educational television satellite Bekey foresees the interconnection of 65,000 U.S. schools and their 16,000 district headquarters or 4,000 universities with 250,000 remote learning sites with color television and interactive audio.[23]

Another implication of satellite communication is mentioned by James Martin in his book, *The Computerized Society*.

> This has interesting implications for international communications. If we transmit from New York to Chicago by satellite, the cost is about the same as from New York to Australia by satellite. . . . The links between nations will indeed have shrunk.[24]

The coupling of computer and telecommunication technologies has led to the possible development of a wide range of information services to the home. Hardware capabilities of instantaneous computation via large scale integrated circuits, massive information storage via memory chips and immediate transmission via fibre optics leaves Western society open for the diffusion of information on a massive scale.

It is this potential for social change brought about by these technological developments that requires investigation.

The role of technology in changing social values is well documented by such writers as Jacques Ellul, Theodore Roszak and Lewis Mumford.[25] All of these writers have portrayed technology as having a negative effect on the culture and community of man. This viewpoint is taken as a result of the perceived requirement for man to adapt to the technology rather than vice versa. It is in the light of this opposite condition, the technology adapting to man, that the computer-telecommunications revolution should be viewed.

The possibility of computer-telecommunication networks to provide a renewal of a sense of community through its interactive capabilities should not be discounted. The potential for a variety of information at the request of the receiver will provide for greater human fulfillment.

The purpose of this chapter is to review the past and present trends in computer-telecommunication developments. It appears evident that further improvements to computer-telecommunication technology will provide a potential for man to become an active participant in the processing and dissemination of information.

It is this perspective on computer-telecommunication technology that is presented in this thesis. It is not possible to deter this trend in techological development, therefore one must learn to use the technology to his purposes.

FOOTNOTES

[1]See Mowshowitz Abbe, *The Conquest of Will* and Parkman Ralph, *The Cybernetic Society*.

[2]Definition from Tavis *The Computer Impact*, p. 3.

[3]See Parkman Ralph, *The Cybernetic Society*, p. 40.

[4]See Mowshowitz Abbe, *The Conquest of Will*, p. 25.

[5]See Rothman S. and Mosmann C., *Computer and Society* (2nd ed.).

[6]Op. cit. p. 47 (Parkman).

[7]Op. cit. p. 37 (Mowshowitz).

[8]Op. cit. p. 53-54 (Parkman).

[9]See "The Computer Society", a special section in *TIME* magazine, February 20, 1978, p. 43.

[10]See Diebold John, *Man and the Computer*, Frederick A. Praeger, New York, 1969, p. 9.

[11]"Small computers fit small businesses", article appearing in *Financial Post*, October 20, 1979.

[12]Reported in *Computer Data*, Vol. 4, No. 6, June 1979.

[13]Hutchison William, "Computer technology to 1990", article appearing in *Computer Data*, Vol. 4, No. 5, May 1979, p. 24-25.

[14]Op. cit. (*TIME* Footnote 11) p. 33.

[15]"New technology scrambles the memory market", article appearing in *FORTUNE* magazine, June 5, 1978, p. 137.

[16]Reported in Branscomb Lewis, "Future Computer" article appearing in *ACROSS THE BOARD*, Vol. XVI, No. 3, March 1979.

[17]See "Brave new world of technology", *Financial Post*, January 5, 1980, p. 5.

[18]See "Towards the information society", *Data Privacy*, Vol. 6, No. 3, 1976, p. 10.

[19]See "Harnessing light by a thread" article appearing in *National Geographic*, Vol. 156, No. 4, October 1979, p. 523.

[20]See "Fibre optics vanguard of future communications", *Computer Data*, Vol. 4, No. 5, May 1979, p. 33.

[21]Ibid., p. 32.

[22]See Bekey Ivan, "Big comsats for big jobs at low user cost", article appearing in *Astronautics and Aeronautics*, Vol. 17, #2, February 1979, p. 42.

[23]Ibid., pp. 42-43.

[24]Martin James & Norman, Adrian, *The Computerized Society*, Prentice-Hall, Englewood Cliffs, New Jersey, 1970, p. 42.

[25]See Ellul Jacques, *The Technological Society*, Roszak Theodore, *Where the Wasteland Ends*, Mumford Lewis, *Technics and Human Development* Vol. 1.

CHAPTER 2

COMPUTER-TELECOMMUNICATION SERVICES

Services to the Home

Paul Baran in his report "Potential Market Demand for Two Way Information Services to the Home 1970 - 1990"[1] estimated that there were thirty possible home information services that could be provided (see Fig. 1). Baran aggregated these services into six categories: general information access, entertainment, shopping facilitation, person-to-person communications, education, and business conducted from the home. Other possible services (that were not considered by Baran) were home security systems, automatic utility meter reading and game playing.

Baran undertook a Delphi inquiry into the demand for these services among company executives who were not necessarily experts on new communication services. His findings were that of all the services offered, educational and business from-the-home uses would account for 57.5 percent of the demand market. Other significant findings were that one of the first services to be introduced would be bus, air and train schedules and that plays and movies from a video library would account for the longest single transaction and transmission times. Electronic funds transfers would have the greatest penetration into households while computer-aided instruction would generate the most revenue five years after the introduction of the service. Lastly,

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Material included was Figure #1: Distribution of Market Size. A chart illustrating potential demand for home services.

Source: Baran Paul.
"Potential Market Demand for Two Way Information Services to the Home 1970-1990."
Institute for the Future, R-26.
Menlo Park, California, December 1971.

paid work at home would use the greatest number of transactions per home per month.

General Information Access

Included in this category are the ideas of electronic newspapers, travel schedules, library access and ticket reservations. These services are presently being incorporated into the videotex systems.[3] Arthur G. Clarke speculates on the impact of electronic newspapers:

> At any moment one should be able to call up all the news headlines on the screen, and expand any of particular interest into a complete story at several levels of thoroughness--all the way, let us say, from the *Daily News* to the *New York Times*. . . . I hate to think of the hours I have wasted, listening to radio news bulletins--for some item that never turned up. . . . For the first time, it will be possible to have a news service with immediacy, selectivity, and thoroughness.[4]

Cabletext, a system of electronic news distribution, was recently field tested in Las Vegas by Micro TV Inc.[5] The cabletext system utilized a satellite hookup in Douglasville, Georgia, and had broadcast the UPI and Reuter's News Service over the cable television network. A remote control unit and an external television adapter were placed in the home and the news service was broadcast in between the television signals known as the teletext format;[6] the news coverage broadcast was limited to sixty pages but the home user did have the option of requesting individual pages with no more than a ten second delay for a high priority material. The Cabletext venture can be considered the forerunner of an electronic newspaper requiring a greater selection of topics and the addition of a hard copy printer to become more versatile. In fact Gross points out that this is the

beginning:

> While the format of these three wire news services[7] (or should I say wireless news services) are not what you would describe as an electronic newspaper, with individually accessible pages of news, they do none the less point the way towards a method whereby the average home owner will eventually receive his news.[8]

Entertainment

Under this heading services such as plays and movies from a video library, information on past and forthcoming events and restaurant information are covered by Baran. Another entertainment service would be the availability of electronic games which was not foreseen by Baran.

The closest approximation to a video entertainment library presently in operation would be the concept of pay television. Qube, an experiment in interactive television in Columbus, Ohio, offers its cable viewers a choice of programming channels. One series of programming channels are for special features, sports events and first-run movies for which the user is charged an extra fee on a per program basis.[9]

The implication for entertainment services from pay-TV development is that the hardware will be in place for other forms of information services. The same basic logic and communication elements for the sending of messages to the cable television studio will be contained in the pay television terminal.

Before a call-up programming service could be provided the requirement of a switched video network is needed. This requirement is expected to be met by fibre optics technology. This demand service is expected to replace commercial video broadcasting.

Shopping Facilitation

In this area, services such as electronic fund transfers, consumer advisory services, and catalogue and grocery shopping are expected to become available.

These services presently exist in other mediums and only electronic fund transfers are experiencing development. Presently there are interbank transfers of money for clearing operations. As well there are transfers between organizations and banks for payroll functions. Another sign of the move to electronic funds transfers is the establishment of cash dispensing machines and on-line teller terminals in bank branches.

The next step for electronic funds transfer is the movement of the process to the retail outlet where magnetized credit cards would be used to complete the transactions. From here the move to the individual's home will still require the person's involvement. Edward Posner provides an example.

> For example, paying one's monthly bills will not be automatically done by paid authorization, with one bank's computers getting paid from another bank's computers with no intervention by the person paying the bills. . . . Readers of this article and their children will review the month's bills on the terminal and themselves authorize payment from the terminal. A message management network will transfer the correct messages to each bank (payer's and payee's) involved, and initiate the computing which affects the funds transfer. The individual's own record of transactions will be stored in his local data base for comparison, with bank statements transmitted at periodic intervals.[10]

This last stage in the development of electronic funds transfer parallels Baran's banking services (#22) which is included in the category of business conducted from the home.

Person to Person Communication

The main services to be offered in this category are electronic mail and message answering services. An electronic mail service would allow for transmission directly to the home of written text corresponding to first class mail. The mail would be received in the home by means of a facsimile machine.

The first step toward electronic mail will be in the business area. Already in existence are digital transmission networks such as CNCP Infoswitch or TCTS Datapac in Canada. In addition CNCP has announced plans for a commercial network of communicating word processors starting in 1981.[11]

Delays in establishing public electronic mail service revolve around jurisdictional issues with government postal services.[12] Until this outstanding issue is resolved electronic mail will lag behind in its development.

Education

Four services under this heading were identified by Baran. These are: computer aided school instruction, a computer tutor, correspondence school and adult evening courses on television.

The idea of using a computer to assist in education has been given a great deal of attention and subject to considerable experimentation in the school systems. The first field trial of computer assisted instruction (CAI) was conducted in 1966 at the Brentwood elementary school in East Palo Alto, California, and the results were encouraging.[13] James Martin describes the features of computer assisted terminals.

> The pupil, when being taught by a computer, carries on a two-way exchange at one of its terminals. . . . He can receive instruction from two screens, one of which (left) shows colored pictures selected from a reel of film inside the device. The other screen is a standard computer screen which can display writing, numbers, and simple drawings. The pupil also has a pair of headphones by means of which the computer can "speak" to him, if so programmed. The pupil must be able to answer back: two way communication is the key to success in computer-assisted instruction. To do this he can use either the typewriter-like keyboard, or a light pen with which he points to boxes or items on the screen.

One of the most advanced computer assisted instruction systems is the Control Data Corporation's PLATO network comprising twenty-six "campuses".[15] PLATO was first developed in 1960 at the University of Illinois by Dr. Donald L. Bitzer.[16] Most CAI systems are based on three types of interaction: between student and computer; student, computer and author of the lesson; and in a classroom setting. A versatile range of modes of interaction can be applied to the teaching situation. Firstly, a drill and practice mode by which the student is assisted in memory and skill exercises suited to the individual's need and combined with the infinite repetition of the computer. The tutorial mode allows the student to be presented with new materials and be immediately tested for comprehension by giving feedback responses to the computer. By the inquiry mode a student can ask questions of a computer which is programmed to respond with prescribed answers. The student can interact with the computer in the dialogue mode by asking and answering questions during which time the computer keeps track of the student response and supplies the necessary information. In the simulation mode the student is offered a model as a basis for composing against other models of real life situations. Another mode for problem solving

enables the student to produce solutions to problems in any context. Lastly, through the use of computer games the student can improve any particular aspect exemplified by the game.

The transference of the CAI system, such as PLATO, to a home use computer network would enable all of these types of learning to be used. It is important to note that the majority of these modes or applications are not machine dependent but are based on the software developed for the educational program. In other words, the skill of the programmer is the determining factor in CAI.

In the field of adult evening courses on television, the Columbia Ohio Qube interactive network began offering course material from four local educational institutions on its Qube campus channel.[17] Home students register in a course by paying the tuition fee and then attend class via Qube on weekday evenings with the lesson repeated later in the week. The Qube campus channel is narrowcasted to only those individuals who have enrolled with the final exam written on the campus of the offering educational institution. The feedback mechanism of the Qube allows students to respond to questions flashed on the screen as well as allowing the instructor to query about the pace of his/her lecture. The feedback mechanism operates in the following fashion.

> The home console has a "message light" which glows if its user has chosen correctly, providing instant learning reinforcement as well as gratification to the home student. The computer can also indicate which students gave which responses, and the professor can ask any individual student for a response to a question, which provides the individualized attention so important in learning situations. Also, a professor may hold "office hours" by telephone on the day following a lesson so that the students can ask for any additional help they may need.[18]

Business Conducted from the Home

In this category the main activities are paid work at home and computer assisted meetings. There are very few examples of paid work-at-home interactive systems. James Martin in his book, *The Computerized Society*, mentions a handful of applications.

> These users are mostly university staff engaged in research, programmers employed by a large corporation or sometimes a "software house", a handful of executives enthralled by the new technology and some traveling salesmen who use their terminals when they arrive home to transmit their orders to a computer.[19]

The other major service to be provided to business is in the area of computer assisted meetings or teleconferencing. Teleconferencing as a small group interaction vehicle is not necessarily limited to business applications. In a study conducted by the Institute for the Future, it was found that there were over fifty organizations experimenting with teleconferencing.[20] These organizations ranged from corporations and government agencies to post secondary institutions and community services groups.

Robert Johansen and Robert DeGrasse explained the operation of computer conferencing in an article prepared for the *Journal of Communication*:

> Computer conferencing refers to small group communication through computers. Participants enter a "conference" by logging into a computer network and joining the "discussion", an electronically stored transcript. A participant may then review previous entries on all his or her own messages. Participants need not be present simultaneously since the computer saves all messages entered.[21]

Computer conferencing provides a number of group dynamic advantages over the currently available telephone conference call. At present conference calls are hindered by the lack of visual contact.

People are unable to detect when one wishes to speak or whether an individual has been accidentally cut off (as no signal is sent to the group). With computerized conferencing the group can be informed as to who is present as well as keep track ofthe status of each group member. The term teleconferencing includes either the use of telephone, television or computers to reduce or eliminate physical distances as an impediment to group meetings. Groups are no longer restricted by time and space but can interact without constraint. Individuals in the group no longer have to wait until one member is finished talking before responding. Group creativity may be enhanced by multiple streams of thought as the computer-telecommunication system can automatically queue all responses.

From general access to information to work at home the potential of computer-telecommunication networks to alter a community's method of receiving information is considerable. This review of information services illustrates that the development of electronic information services is progressing at a steady pace. Interest in general information access and entertainment appears to have a higher priority than the other services. This may be due to the existing cable television systems' orientation towards the packaging of entertainment programs. Despite the higher demand for education and work-at-home services expressed in Baran's Delphi survey these services continue to remain experimental. Reasons for this may be higher capital investments and the labour intensive nature of computer programming. As more people become familiar with computer-telecommunication networks through general information access or

electronic games the demand for other types of services such as education or work at home will increase. It is the introduction of these latter services that will modify the community structure. Individuals will be able to seek out others with similar interests by utilizing telconferencing to interact. It is this interaction with others and not just the computer databanks that provides for the exciting possibilities of information age communities.

FOOTNOTES

[1]Baran Paul, *Potential Market Demand for Two Way Information Services to the Home 1970 - 1990*, Institute for the Future, R-26, Menlo Park, California, Dec. 1971.

[2]Ibid., p. 8.

[3]"Big three plug in to Infomart", news item in *Financial Post*, September 21, 1979.

[4]See Clarke Arthur C., "Communications in the second century of the telephone", article appearing in *Creative Computing*, Vol. 3, No. 3, May/June 1977, pp. 99-100.

[5]See Gross William S., "Info Text newspaper of the future", article appearing in *IEEE Transactions on Consumer Electronics*, Vol. CE-25, No. 3, July 1979, pp. 295-297.

[6]See Chapter 3, Operating Interactive Systems.

[7]Associated Press later signed up on the Cabletext satellite network.

[8]Op. cit., p. 295 (Gross).

[9]See "Qube--interaction on cable", article appearing in *Educational and Industrial Television*, April 1979, p. 51.

[10]Posner Edward, "Information and communication in the third millenium", article appearing in *IEEE Communications*, Vol. 17, No. 1, January 1979, p. 11.

[11]Seratini S. and Andrieu M., *The Information Revolution and its Implications for Canada*, Department of Communications, Ottawa, 1980.

[12]Miller H. and Scotman S., "Electronic alternatives to postal service", in Robinson, Glen (ed.), *Communications for Tomorrow*, p. 308.

[13]Reported in Martin James, *The Computerized Society*, Prentice Hall, Englewood Cliffs, New Jersey, 1970, p. 123.

[14]Ibid., p. 123.

[15]"Yes . . . Computers can revolutionize education", article appearing in *Consumers Digest*, Sept/Oct 1977.

[16]Paulson Roger, *Control Data PLATO System Overview*, Control Data Corporation, St. Paul, Minnesota, 1976.

[17]Op. cit. (footnote 10, Educational and Industrial Television).

[18]Ibid., p. 45.

[19]Op. cit. (Martin), p. 149.

[20]"Beyond DP: the social implications" interview appearing in *DATAMATON*, Vol. 25, No. 5, July 1979, p. 100.

[21]"The electronic briefcase", article appearing in *Financial Post*, October 20, 1979, p. 513.

CHAPTER 3

OPERATING INTERACTIVE SYSTEMS

Personal Computers

With the introduction of large scale integrated (LSI) microprocessors on the consumer market the personal computer became a possibility. Traditionally computers have been identified with big organizations and government.

A personal computer is a general purpose stand-alone computer system which does not have to be operated by a computer professional. The personal computer, like other computers, allows for a conversational level of interaction and can be used for recreational, educational or business purposes. Some of the specific uses for a personal computer are: billing customers, keeping tax and invoice information, playing chess or other games, planning menus, monitoring security alarms, and displaying graphics and animation.[1]

In addition, limited networks of personal computer owners can use a central location for large capacity disk storage and high quality printing with little additional cost. Another possibility is to connect the personal computers to large computers, forming networks for information storage and communicating with friends on the network. Already in existence in the United States is MicroNet, a national computer service for personal computer owners. For a subscription fee, personal computers use the telephone to connect into a commercial

computer to memory storage or to leave electronic messages for other subscribers. In addition, for a modest fee, a variety of software programs are available to MicroNet users.

Personal computing, as an interactive system, is in its infancy and mainly confined to hobbyists and other innovators. National networks such as MicroNet are the first step towards a full range of interactive services.

Interactive Cable Television— the Qube Experience

By 1973 the United States Federal Communications Commission (FCC) required all new cable television systems to have the capacity for two way interaction.[3] One of the first field experiments of upstream capability was launched on December 1, 1977 by Warner Communications in Columbus, Ohio. Upwards of 20,000 Columbus cable subscribers were involved in the interactive cable television system known as Qube.

The home terminal consists of a command console the size of a large paperback which has three columns and ten rows of buttons; a blue column for regular television channels, a green column for community programs and a yellow column for pay television selections. A button on the bottom of each colored column allows the user to select the type of programming desired and the ten rows of buttons are for the various channels. In addition, five response buttons are located in a column on the right hand side of the console which enables the viewer to respond to the program upon the request of the sender. Attached to the back of the television set is the in-house computerized terminal

monitor to operate with the cable item's computer. William Kowinski explains how the computers function.

> The key concept of the Qube system is the marriage of cable and computer. It had never been done quite like this before. And it is awesome: one computer sweeps the system every six seconds to note which sets are on, what they're tuned to, and which response button was last touched. When responses are asked for, another computer figures out which sets vote for what and does the computations. A third computer knows to whom each set belongs; it's used for billing for the pay-per-view premium channels and occasionally for identifying viewers for other purposes, such as awards to some winners. (Qube claims always to alert viewers that this will be done before they participate in such instances that I saw, they did.) The computers are what makes the response button system work; they also enable Qube to have instant ratings on all programs at all times. The billing computer makes possible the pay-per-view as well as the extra services, such as ordering merchandise and having it added to the Qube bill. These are the computers' basic cable services, but they can do much more.[5]

In rudimentary forms, Qube has been used for narrowcasting an electronic town meeting, assisted in providing adult evening courses and consumer information, allows individuals to make reservations at local restaurants, has been utilized for at-home shopping and offered pay television selections charged on a per viewing basis. A combined fire, burglar and medical security system was also being promoted.

By far the most frequent use of the viewers response buttons was for electronic polls on a variety of topics. Response buttons allow for up to five possible replies to the question asked. The Qube computer sweeps these buttons every six seconds and tabulates the results. This facility has been used from voting on a city snow removal proposal to bidding in an auction.[6]

Warner Communication does not intend to restrict the Qube system to Columbus, Ohio and is currently searching for other cable franchises.[7] With this expansion other services will be offered as

economies of scale could be achieved for such items as electronic newspapers and information databanks.

Teletext, the Broadcasting of Information

Teletext can be defined as:

> . . . a digital data broadcasting service associated with the normal television signal and intended to display pages of text or elementary pictorial material on the screens of suitably-equipped television receivers . . . this sytem employs cyclic repetition of pages.[8]

Both the British Broadcasting Corporation and the British Independent Broadcasting Authority (IBA) have conducted extensive field trials in 1974 through 1978 of their respective teletext systems, CEEFAX and ORACLE. In addition teletext experiments are being conducted in Sweden,[9] France,[10] the United States[11] and several other countries based on the British systems with minor modifications.

Information services are transmitted during the unused lines of the field-blanking interval of the television signal. This interval is the time that the electron gun in the television receiver needs to travel from the bottom of the screen to the top after completing its scan. In the French Antiope system the entire television channel is dedicated for teletext information. Joe Roizer explains the advantage.

> One of the reasons is that ANTIOPE is an asynchronous system--it is not tied to any line rate. All you do is flip a switch and it will cover the whole screen. If you wonder why anybody would want to do that, one reason is that when a TV station (or common carrier channel) is off the air, you can dedicate the complete channel to the sending of thousands of pages of information--information which is quickly received.[12]

The constraint in broadcast channel capacity leads to a tradeoff in the teletext systems between access time and number of

pages. Walter Cicina, Gary Sgrignoli and William Thomas describe the British teletext operation,

> In teletext the digital signal is embedded in video waveforms as an ancillary signal. The system is usually non-interactive. That is, the user does not control what is transmitted down the channel. Rather the pages of information are cyclically repeated and the receiver grabs a page as it comes by and stores it in a local page memory. The size of the data base is moderate, numbering several hundred pages. The number of pages present affects the access time since all the pages must be cyclically repeated.[13]

As the teletext information is broadcast over airwaves the signal is subject to error as a result of atmospheric disturbances. To control for these occurrences, special codes are required. Despite these problems L. A. Sherry estimates that approximately 95 percent of the existing television market can receive a teletext service.[14]

In order to accept the teletext signal, a control unit and a television set decoder are required. The control unit is about the size of a hand held calculator and is comprised of a series of buttons. Bill Loveless explains the operation:

> On the right side there are three buttons; text, mix and picture. They give the viewer some options. With the TEXT button, he selects the teletext system alone. If he pushes the PICTURE button on the bottom, he has the conventional TV signal received by a TV set. If he pushes MIX, he has both.
>
> There is also a button on the top called "concealed display". We can transmit a quiz page, for example, with the answers transmitted in the concealed mode. Pushing the CONCEALED DISPLAY button will reveal the answers.[15]

The decoder can be compared to a home computer as it consists of all the main components.

> . . . the standard teletext decoder already contained many of the components required for a home computer: it has a character-generator for visual-display; a page-store, and a very convenient numeric key pad for data entry. With the addition of a few other components, the result is a powerful stand-alone computer right inside the TV set.[16]

The user of the British teletext systems is able to retrieve the information that is provided in three ways. First, the user can wait for the desired page such as an index page or high priority page. If the user knows the number of the page he can request that numbered page and wait for it to be transmitted in the cycle. Third, the user can select a time when he knows a page is to be transmitted and receive the page at the specified time. In an article appearing in *Educational and Industrial Television* published in June 1979 the information capability of teletext is listed.

> Teletext can bring into the living room a host of services that are as varied as the needs of the audience. Instant access to news, sports, weather, shopping information, transportation schedules, movie listings, restaurants, or the horoscope of the day can be programmed and broadcast by the TV studio transmitting teletext. In the home, games, educational material, software for your home computer, or even emergency phone numbers are all currently viable potentials for teletext, and they are inevitable.[17]

Comparing teletext services to Baran's Delphi study list one can see the emergence of a listing of past and forthcoming events; an electronic and dedicated newspaper, an aid to adult evening courses on TV, special sales information, weather bureau, bus, train and air scheduling and restaurant selection.

Videotex, the Interactive Medium

The distinguishing difference between teletext and videotex from a technical standpoint is that videotex systems are usually operated through public switched networks (i.e., telephone systems).

Videotex is defined as:

> . . . an interactive data-retrieval service operating through public networks and capable of displaying text or elementary

pictorial material on the screens of suitably-equipped television receivers. . . . This system provides pages only on demand.[18]

A number of countries are presently involved with videotex systems. Finland,[19] Sweden,[20] France,[21] Japan,[22] Great Britain,[23] United States,[24] Canada[25] and several other countries are conducting field trials or preparing to publicly market their versions of the videotex system.

Operating through public switched networks, the videotex system provides instananeous access to large data banks. Videotex signals are audio signals and adapt readily to telephone lines and can be preserved on audio recording devices. Data bases for videotex can be extensive with instantaneous transmission of data at a rate faster than the human reading speed.

Besides telephone networks, videotex signals can be transmitted over other media.

> The information, in written or graphic form, can be delivered over various media, such as fibre optics, telephone or cable lines. Teledon was successfully tested two weeks ago using Hermes, the high-powered communications satellite, and a portable earth station with a 1.2 m disk antenna. This was the first time Teledon was tested over satellite and opens the possibility of Teledon service to remote areas of the country.[26]

In addition to these media channels and to compensate for the small data base of the Teletext system, a service "Touch Tone Teletext" has been field tested in Salt Lake City, Utah.[27] "Touch Tone Teletext" operates as a teletext system by broadcasting the information but with the additional feature of the individual user being able to telephone the data bank for extra pages in a particular subject area.

Upon reviewing Baran's list of services presented in the last chapter, all of them appear to be feasible in a videotex system. In addition to Baran's services, videotex systems are able to provide home security devices, such as fire, medical and police alarms.

Of all the videotex systems being tested, the Canadian Telidon systems appear to have technical advantages over the European models. European systems are based on an alpha-mosaic character-orientation which results in rudimentary graphic images. In addition, terminals employing these image-description techniques are dependent upon the characteristics of the equipment used. These difficulties have been overcome by the Canadian videotex system Telidon by the development of Picture Description Instructions (PDI's) which are alpha-geometric. The PDI's are software dependent and can be generated on any hardware device which has the appropriate encoder and decoder attached. In addition, any equipment that is designed for PDI's can also accept alpha-mosaic characters.

John Madden, the coordinator of new home and services for the Department of Communications in Canada notes the advantages of the Canadian Telidon system:

> — With its superior resolution, it can reproduce maps, charts, cartoons and engineering drawings clearly and accurately and with flowing lines.
> — Because the data base coding is independent of the display terminal and communications media, changes in the standards of display terminals or communication media will not affect the data bases.
> — A terminal based on the Canadian system can easily be modified to also display the Prestel or Antiope signals. The converse is not possible.
> — The videotex terminal with its built in computing power can act as a mini-computer for home or office use.

— The design permits one terminal to communicate directly with another without need of a central computer.
— The system has electronic mail capability for sending or receiving messages, including sending of personal signatures.[28]

The ability to have different types of home terminals allows for a variety of user-machine interfaces.

> Viewdata is both an information retrieval system and offers simultaneously an interactive capability. Thus the mere act of making page selections is of itself utilising a return path from the users keypad device back to the central computer. This immediately makes possible a technically unlimited database—restricted only by the user's diligence in sifting through an enormous mass of material—and provides the communication features, etc. to be exploited in various permutations:
> i) user to information provider, e.g. orders, enquiries, transactions.
> ii) user to user, i.e. store and forward message service.
> iii) user/machine dialogues, e.g. decision trees, calculation programs.
> iv) user to machine-remote e.g. access to other databases or services.
> v) user:micro to machine, i.e. the ability to retrieve stored programs and process locally.[29]

By utilizing the home television receiver with the appropriate modulation as a monitor and linking this via telephone or cable lines to the computer data banks, the Telidon system becomes operational. At the moment a keypad similar to a calculator is provided which allows the user to call up information in a menu format, known as a tree structured search technique. Starting from an index page of major categories the user selects the information by calling upon further refinements of the category of interest. This is done through selecting the appropriate page numbers as displayed on the index page. In addition, the user can access a specific page by imputing that page number directly and thus avoid the tree search procedure.

Eventually other devices will allow the user to enter his information in either written or graphic form as well as communicate with other terminals directly. Each of these systems noted in this chapter are in their development phase and may eventually come to serve a particular market. Various levels of skill and involvement can be incorporated into the different computer-telecommunication systems. Three groups of users can be identified; computer literates, semi-literates, and illiterates. Computer literates will have the sophisticated programming skills. Their needs may be met by a personal computer with time sharing capabilities which would encompass teletext and videotext networks. Computer semi-literates will view their personal computer terminal as a convenience, a device to access other software packages and services while retaining a programmable mode. Computer illiterates will use their personal terminals as an appliance to access user friendly services such as teleshopping, electronic messaging, and information retrieval. It is towards this last group that much of the present development of computer-telecommunication networks is focused. This is a short sighted view for as the younger age cohorts of the population become more exposed to computer programming and data base management in education curriculums, the more demands could be placed on computer-telecommunication networks to provide better services. The emerging computer literate and semi-literate population may demand more than pretty pictures and pages of text. Computer-telecommunication network users may become dissatisfied with the imitative and uncreative media presently found on videotex systems and demand more input and variety.

Systems represented by Qube, are in reality inexpensive polling terminals that may be adequate for meter reading and security but unable to provide for two way time sharing and data base services that will be required in the future. Computer-telecommunication networks which allow for transaction services, monitoring, messaging, information retrieval, calculations, shared graphic space, opinion polling, quizes and games, and assisted instruction will become more prevalent. None of the videotex systems to date incorporate all of these services. The development of videotex systems such as Prestel has led to an 'infomarket' which is characterized by some information being absent (no buyers) and some being redundant (more buyers, more versions). This market flavor has directed the British Post Office into a common carrier status which leaves Prestel open to a business orientation with higher priority given to travel agents, investment commodities and stocks, and commercial real estate. From this approach it is obvious that the information needs of other community members are not being met. The information needs of community members are related to their everyday life situation and their needs are met from various sources; personal, social, institutional, or media. The information needs are related to the situation and not the source of the information. It is this premise that leads to the orientation towards transactional services (shopping, banking, messaging, reservations), interactive games and puzzles, and fast moving information (news, weather, sports, etc.).

It is the fast moving information needs that can be accompanied by teletext systems with their limited data bases. Teletext systems are not user sensitive in that the addition of more users does not

diminish the access time as in the case with time sharing interactive networks. Despite their user sensitivity, computer-telecommunication networks are able to meet the other information needs of community members for interactive and transactional services. With the development in computer-telecommunication technology much of the user sensitivity problem can be alleviated.

The overall conclusion to be reached regarding existing operating systems is that no one system is able to provide all the necessary services for an information community. The present orientation of videotex systems towards business applications ignores the needs of many community members. It is the movement of the population in terms of computer literacy that can provide for the transformation from the presently existing reactive videotex systems to a more interactive system that can incorporate more of the potential services available in a computer-telecommunication system. It is the development in computer literacy that can accommodate a change in community structure based on a post industrial society. The demographic characteristic of a better educated population in Western society will lead to more involvement in an information community. The existing operating interactive systems can be altered to meet these demands for variety and participation.

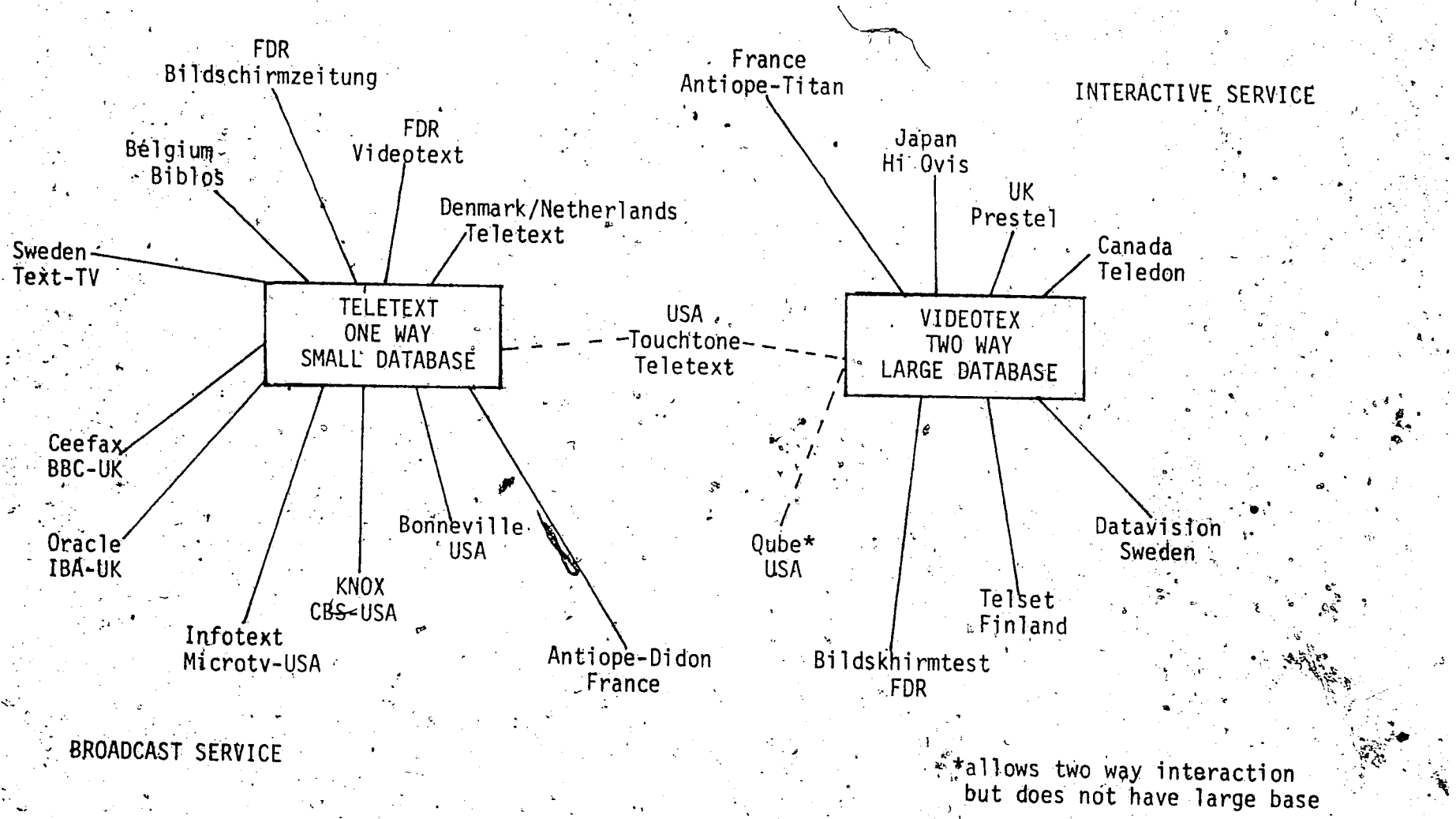

FIG. 2 HOME INFORMATION SERVICES

FOOTNOTES

[1]See Oughton, John, "Home Computers, a Toy or Tool for Mankind," article appearing in *CIPS Review*, Vol. 3, No. 2, April 1979.

[2]See "Computer CB," article appearing in *Hobby Computer Handbook*, 1981.

[3]Reported in Herrero, Michael C, *New Communities and Telecommunications*, Center for Urban and Regional Studies, University of North Caroline, Spring 1973.

[4]Black, Jonathan, "Brave New World of Television" article appearing in *New Times*, Vol. 11, No. 2, July 24, 1978.

[5]Kowinski, William, "Talk Back to Television" article appearing in *Penthouse*, March 1979.

[6]Op. cit. (Black), p. 43.

[7]Ibid. (Black), p. 52.

[8]Tanton, N.E., "UK Teletext--Evolution and Potential," article appearing in *IEEE Transaction Consumer Electronics*, Vol. CE-25, No. 3, July 1979.

[9]Kvaraefalk, Gunnar, "Datavision and Text TV in Sweden," article appearing in *Computer Communications*, Vol. 2, No. 2, April 1979.

[10]Roizer, Joe, "The French ANTIOPE System," article appearing in *Educational and Industrial Television*, Vol. 11, No. 5, June 1979.

[11]O'Connor, Robert, "Teletext Field Tests," article appearing in *IEEE Transactions on Consumer Electronics*, Vol. CE-25, No. 3, July 1979.

[12]Op. cit. (Roizer), p. 36.

[13]Ciciora, Walter; Sgrignoli, Gary; and Thomas, William, "An Introduction to Teletext and Viewdata with Comments on Compatibility," *IEEE Transactions on Consumer Electronics*, Vol. CE-25, No. 3, July 1979.

[14]Sherry, L.A., "Teletext Field Trials in the United Kingdom," article appearing in *IEEE Transactions on Consumer Electronics*, Vol. CE-25, No. 3, July 1979, p. 235.

[15]Loveless, Bill, "The Broadcasting of Teletext," article appearing in *Educational and Industrial Television*, Vol. 11, No. 6, June 1979, p. 34.

[16]Hedger, J., "Telesoftware: Home Computing via Broadcasting Teletext," article appearing in *IEEE Transactions on Consumer Electronics*, Vol. CE-25, No. 3, July 1979, p. 279.

[17]"An Introduction to Teletext Systems," *Educational and Industrial Television*, Vol. 11, No. 5, June 1979, p. 31.

[18]Tanton, N.E., "UK Teletext--Evolution and Potential," article appearing in *IEEE Transactions on Consumer Electronics*, Vol. CE-25, No. 3, July 1979, p. 246.

[19]Pekka, Joakola; Maarit, Hiromen; and Baerlund, Ole, "Telset, the Finnish Viewdata," article appearing in *Computer Communications*, Vol. 2, No. 2, April 1979.

[20]Op. cit. (Kvaraefalk).

[21]Marti, B., et al., "The Antiope Videotex System," article appearing in *IEEE Transactions on Consumer Electronics*, Vol. CE-25, No. 3, July 1979.

[22]Namekawa, T., "Video Information System Development in Japan," article appearing in Kaiser, W., et al. (eds), *Two-Way Cable Television*, Springer-Verlag, New York, 1977.

[23]Bright, Roy, "Prestel, the World's First Public Viewdata Service," article appearing in *IEEE Transactions on Consumer Electronics*, Vol. CE-25, No. 3, July 1979.

[24]Robinson, Gary, and Loveless, William, "'Touch-tone' Telextext A Combined Teletext-Viewdata System," article appearing in *IEEE Transactions on Consumer Electronics*, Vol. CE-25, No. 3, July 1979.

[25]Brown, H.G., et al., "Teledon: A New Approach to Videotex System Design," article appearing in *IEEE Transactions on Consumer Electronics*, Vol. CE-25, No. 3, July 1979.

[26]"DOC to Deliver Teledon Terminals to Manitoba Telephone System for Major Field Trial," Department of Communications, Government of Canada, *news release*, July 21, 1979.

[27]Op. cit. (Robinson & Loveless).

[28]Brown, H.G., et al., "Canadian Videotex System," article appearing in *Computer Communications*, Vol. 2, No. 2, April 1979.

[29]Op. cit. (Bright), p. 251.

CHAPTER 4

ECONOMIC CONSIDERATIONS

Having previously outlined the technological developments, the progress of information services and the types of delivery systems, the question still outstanding is the willingness of the public to accept the computer-telecommunication network. A response to this question is dependent upon a number of considerations, such as individual and social needs and costs involved. One of the main considerations is costs. A variety of factors impinge upon the costs to the user. Manufacturing and production costs will affect the price of terminals. Government regulations to ensure system compatibility and to determine who has accessibility will also impose costs on the distribution system. Another factor is the types and kinds of information that will be available for the public to purchase. It is these economic considerations that will eventually shape the public response and it is the public response that will dictate the rate of development and structure of the computer-telecommunication network.

Public Acceptance

The integration of a host of information into a single communications medium does not necessarily imply that the services have been altered. All the services listed by Baran earlier exist in one form or another. It is the mode of delivery of these information services that will be altered. The second point is that Telidon-type

technology is also not a new technology but based on digital electronics. Digital electronics, the use of a discrete binary code to represent data, has become the foundation for computer-telecommunication networks. The application of this technology to data has not been directly felt by the public. The automation of record-keeping such as credit card transactions, school and health records, has led to the creation of large central data banks. This tendency towards automated functions and large data banks has been a cause of concern with regards to the privacy of individuals. In recent years, freedom of information legislation has been introduced in Canada and the United States to counteract this fear.[1] This strategy of accessibility to public records will partially redress the imbalance that may have resulted from unequal access to information. Those members in the weaker position will not have to resort to privacy legislation to avoid exploitation. Instead all records will be available for public scrutiny and will not hold significant economic value for resale purposes.

In addition to legislative guidelines, the technology itself may act as an effective counterweight to the concentration of information.

> Some view the computer as a tool fueling the development of strong, centralized government, but the computer may end up giving individuals greater freedom by providing a capability previously available only to large organizations.[2]

This decentralization of information storage will allow for a more aware and concerned citizenry. The potential for decentralizing computer usage into the home is dependent on consumer acceptance. The social need for decentralized information may be met by the consumer's willingness to pay for the services to meet his individual needs.

Computer applications are being introduced into many facets of everyday life. David Ahl states:

> We all know that computers are around us. They're invading our lives along dozens of dimensions. We see them in supermarkets--the little product code you find on the side of virtually every food and grocery product you buy can be read by an optical scanner connected to a computer. Computers in department stores--a little "magic" wand, actually a tiny laser device, reads a product code from the tag. Medical facilities--hospitals frequently keep all their patient records on computers. . . . Every time you pick up the telephone and dial it you're actually using the largest general-purpose computer in the world--the switched telephone network. Magnetic-ink character recognition in the bank; sport stadium score boards; and so on.[3]

Ahl continues by stating that people's perceptions of computers are shaped by the media which has led to false impressions.

> The everyday perceptions of a computer are formed by people in the media and elsewhere who really don't know what computers are all about either. For example, newspapers, comic strips, TV and so on. What does a newspaper cover? They're going to report the computer error, the problem with the computer.[4]

The computer has become the scapegoat for human failings. From overbilling and overpayment to accepting life insurance on guppies, the computer has been blamed. Ahl reports that only one segment of the media produces accurate descriptions . . . science fiction writers.[5] From these impressions Ahl concludes that people have incomplete notions of what they would do with a computer in their home. Despite this misinformation, Ahl does feel that as people become more familiar with computers they will quickly be incorporated into the home. As personal computing becomes more prominent and computer-telecommunications networks become established, the familiarity with the computer's capabilities will increase. The segment of the population that has become the most familiar with the uses of computers are the young.

Children are increasingly being exposed to computer technology through video gaming and computer camps. Coin-operated personal computers have been experimented with in public libraries with game playing being the most popular use.[5] Stuart Lipoff has estimated that the growth in personal computers increased tenfold from 1977 to 1978 and more than doubled for video games in the same period.[6]

In addition, the type of clientele that is purchasing personal computers is beginning to change. Lewis Bercovitch notes that it is the family man who is interested in a personal computer for his children who is becoming the main purchaser.[7] Seymor Papert of the Massachusetts Institute of Technology has estimated five million private computers in people's homes and available to students within two years with 80 percent of upper middle class families owning a personal computer.[8]

The acceptance of electronic gadgetry, including personal computers, appears to be becoming a well established pattern. The *Financial Post* reports:

> There are 7.3 million households in Canada and their occupants obviously are gadget oriented since they own 10 million TV sets, have 9.6 million telephones, and more than half the homes are wired for cable TV.[9]

With the introduction of computer network services the link to extensive information holdings will provide increased impetus to consumer demand and public acceptance.

Bill Loveless, in response to a question regarding the marketing of teletext services, stated:

> Two years ago, we took a market survey and we asked whether people would subscribe to it at four different costs. For the price of $50 additional 67% of the people in a group of 300 said they would buy teletext. At $100 additional, it was 42%; at $350, it was 15% and at $500 it was 4%.[10]

It is clear from these figures that the cost of the various services will play a key role in the public acceptance of these services. But these costs are beginning to fall. Stuart Lipoff reports that current costs for accessing information in data banks is between $35 to $100 per hour but some companies are beginning to offer services for a $25 subscription fee and a moderate connect charge per minute.[11] In addition, New Jersey Telephone recently broadened their time and weather recordings with an interesting result.

> New Jersey Bell Telephone has expanded upon this familiar service by adding TV & Soap Opera Update, Sports Phone, and Lottery. When they did so they saw their usage increase by 30% to over 50,000 calls per day. This indicates that there is an unsatisfied public need for timely information not now being met by radio, TV, or the newspapers, and people are willing to pay 10¢ per call to get it. This suggests that the services which could be provided with a home terminal could be even more attractive.[12]

Services such as these, even on a limited basis, appear to show a demand for access to data bases and data banks from a home location.

> Although there are as yet no definitive statistics on consumer acceptance of this new product, European governments are pouring millions of dollars into the technology. One recent independent study for the Department of Communications estimated that the number of Teledon subscribers in Canada alone could exceed 600,000 by 1986.[13]

Another indicator of computer acceptance and use is in the area of electronic games. Game playing has been utilized to assist in computerized instructions.[14] David Godfrey provides an estimate

and an insight into the role of computer games in an interactive computer-telecommunications network.

> But if one looks at the current actual utilization of home-computers, or at the common tales from many large systems of how game playing finally had to be banned since vast amounts of user time were obviously being devoted to such non-productive activities, it is relatively easy to forecast a similar response from larger public participation in these toys; up to 30% of use of the Electronic Highways may be involved with games. Indeed the art/game may become the most natural form of the medium as the miniaturization is brought into public acceptance by means of games which utilize the techniques of the new systems in powerful but human ways, allowing artists of a new kind within society to bring together many diverse elements (myth, simulation, historical databanks, psychology) in order to create new works which will eventually gain a genre/title, just as the novel finally gained a terminology of its own many decades after the printing press made that art form a possibility.[15]

From these limited findings it appears that a trend towards consumer demand for information services from entertainment to up to date news and weather, is becoming established. As individuals gain more access and exposure to computer-telecommuniation services the resistance to and myth of computers will be discarded.

In order to benefit from the interactive potential of computer-telecommunication, a basic knowledge of computer functions must be extended to other ages through adult education and direct experience. The marketing strategy in Canada for Telidon is to first provide terminals in public places such as government offices and shopping centres and libraries in order to provide this exposure.[16]

It is this action that is required to stimulate public awareness and foster public acceptance.

Terminal Design Cost Estimates

The primary consideration in the hardware design of a home terminal should be the potential for adaptation in order to provide for an adequate product life cycle, as it is estimated that these installations will be in existence for ten to twenty years.[17]

Three possible choices for the receiving of the various services can be offered to the consumer. For those who presently own a television receiver a set top adapter could be marketed to convert the television set into a monitor. Another option would be to build into new television sets the microprocessor that would decipher the teletext of videotex signals. This option would have considerable application to the European markets as most televisions are rented whereas the first alternative of a set top adapter would have greater impact in North America where television sets are individually purchased.

The third choice would be the development of special terminals which may or may not have television reception capabilities. These special terminals would be suitable for business uses and may become essential when conflicts between viewing television programs and optional services begin competing for the same time period.

Stuart Lipoff in an article appearing in *IEEE Transactions on Consumer Electronics* outlines the standards for a home computer terminal that can undertake numerical analysis, provide information and electronic news, operate as a word processing device, and become a home entertainment centre.

Lipoff estimates the cost of the terminal in the following manner:

> If the terminal described was built as a stand-alone unit the retail cost would likely be in the $200 to $300 range with typical markups. However, if the unit was contained within a TV, possible cost sharing of the microprocessor and other support circuits would reduce the cost considerably.[18]

Lipoff goes on to estimate the cost of integrating the necessary circuits into an existing television receiver at $46.88.[19]

In order to deliver the services mentioned by Lipoff, the terminal would be required to display information in several modes. A. M. Chitnis and J. M. Costa[20] propose a hierarchy of five types of videotex terminals based on their capability to display information. These are: general text, positional text, mosaic graphics, geometric graphics, and photographic imagery. In order to accommodate these modes of information display Chitnis and Costs recommend a Layered Capability Structure for videotex terminal design. Chitnis and Costa explain their recommendation:

> The preferred terminal design strategy is a flexible one, so as not to place undue constraints on the service features which may be offered in the future. Ideally there should be a maximum of forward and reverse compatibility between terminals and databases. Forward compatibility means that present day terminals can reserve and decode expected future information within the limits of their capability. Backward compatibility means that the system must be designed so that future terminals can access old data. In addition there should be a maximum of upward and downward capability between terminals and databases. Upward compatibility means that low-feature terminals should be able to display as well as possible any information from a sophisticated database. Downward capability means that sophisticated terminals should be able to access simple data.[21]

The advantages of a layered capability structure are threefold. Primarily, individuals will be able to trade up to higher feature

terminals without loss of previously stored material. Secondly, the costs of downward capability will be minimal due to the higher sophistication of the advanced terminal. A third advantage accrues to the information providers who will have an idea of the size of population that can access their information. When creating the data base the less features utilized gives a greater terminal population.

At the moment questions of standards and terminal design are being debated in the computer-telecommunications industry.

G. O. Crowther provides an estimate of the cost-effective price which will allow for significant market penetration.

> To establish the cost target of Teletext and Viewdata systems, it was considered that an increase of less than 10% on the purchase price of a TV viewer for Teletext only and 20% for a combined Teletext/Viewdata receiver (including modem) would lead to a significant market penetration. Any increase in cost above these figures would lead to a rapid reduction in the market penetration and the loss of economy in quantities.[22]

It appears that terminal designs are reaching Crowther's market penetration barrier quickly. Add-on or set top adapters and built-in units are being rapidly developed in Canada by Norpak, a major Canadian manufacturer of computer display equipment. Spurred on by the federal Department of Communications' Telidon videotex system, Norpak is looking forward toward a fourth generation built-in microprocessor.

> The attache case-size terminal, of which Norpak will be manufacturing 170 units by the end of March 1979, represents second generation technology. Norpak president Mark Norton says the third generation, to be used in field trials, will be about the size of a small portable tape recorder, will probably retail for around $800 and is expected to be available by the third quarter of 1979. The fourth generation, he says, could be reduced to about "10 integrated circuits mounted on a board

> which would be an option retailing for perhaps $200 or $250 which you would buy from your local TV retail outlet.[23]

The predictions of falling costs are based on the continuing advances in microelectronics and the introduction of mass production techniques as pointed out by the periodical *Educational and Industrial Television*.

> The decoders made from discrete components are very expensive, especially when made in small quantities. The answer is an LSI circuit that does the whole job for just a few dollars. Current estimates are that a decoder made from dedicated microcircuitry would add less than $100 to the cost of any color TV set that is [*sic*] was built into. But it will take a demand for a million plus teletext receivers to make this low price viable. It's the old chicken-and-egg routine, and it will take some major capital investments to solve.[24]

With regards to capital investments commitments are beginning to be made. The British estimate that by 1983, 35 percent of color televisions sold or rented in the United Kingdom will have videotex capability.[25] In addition, Britain has committed $40 million in 1979 to establish twenty-four Prestel centres with a service capacity of 100,000 users.[26] In France a plan to flood the market with 100,000 mass-produced terminals is expected to stimulate market appeal.[27]

It is these developments with government support that is pushing the manufacture and production of terminals within the reach of consumers.

The Computer-Telecommunications Utility

The difference between a personal computer and a videotex system can be compared to a citizen band radio and the telephone. The full potential of the computer as a communications utility is achieved when it is harnessed to a telecommunication network.

Even though development is progressing on both the teletext and videotex networks, each system can be considered complementary to the other. B. Marti et al. explain:

> Depending on their own peculiarities, the two different kind of network will be used in different circumstances, and may be complementary:
> hot information, with frequent updating which may be accessed to by a large number of users simultaneously will better be broadcast while archives, "cold information", which may represent a volume by far larger than the hotter one but is not of so common interest will be accessed to through a telecommunication network.[28]

From the perspective of a computer-telecommunication utility, the videotex system can be viewed as having the greatest potential for selection of information and interaction with others.

In North America at the moment two communication organizations are developing the potential of interactive services to the home; community antenna television companies or cable companies and the telephone companies.

In the United States, cable companies were slow to develop interactive services as the result of being restricted to outlying rural areas. Despite the handicap of being sent to the rural areas cable television did grow in the United States from approximately 70 communities in 1950 to nearly 4,000 communities with 13 million subscribers in 1978.[29]

In 1977, the United States regulation was changed and the one hundred largest American cities were allowed to award cable contracts.[30] This is leading to fierce competition among Canadian and American cable company conglomerates for the franchises. New services and interactive capability are being promoted in a bid for the contracts.

The opening of the U.S. market, from an economic growth perspective, could not have come at a better time for Canadian cable companies. Maggy Laws, a communications writer for the *Financial Post*, states:

> In the growth years since the later 1950's, cable companies were adding new subscribers as fast as they could lay the cable until Canada was able to bill itself as the most "wired" nation of television viewers in the world. More than 50 per cent of all households with television now subscribe to cable--a level considered by many to be near the saturation point. Although there are still unlicensed areas, the introduction of cable in many such areas is considered uneconomic at this time because of low population density.[31]

The impressive growth of cable companies in Canada still does not compare with the penetration of telephone companies. Maggy Laws notes:

> In fact, telephone companies could be judged to be really in a better position when one considers that they alone have a nation-wide two-way communications network to just about everyone.[32]

Another difficulty with cable companies has been their utilization of the coaxial cable. Arthur Hall explains:

> . . . all present CATV systems are nonswitched; essentially they are one-way mass party lines. There are experimental systems featuring two-way transmission, but in nearly all of these the 'upstream' direction is narrowband while the 'downstream' direction is wide band to allow for many TV channels.[33]

As well, Canadian telephone companies have stated their intention is to move into the nonbroadcasting areas of home services.[34] James Martin in his book *The Computerized Society* cites the motivation behind the telephone companies' interest.

> This use of communication links [referring to transmission of data, pictures and nonvoice messages] is expanding much faster than that for conventional telephone conversations.

> Although AT & T [American Telephone and Telegraph] has become the world's largest commercial organization mainly because of people talking to people, they recognize that greater revenue is likely to come in the future from machines talking to machines, and from men communicating with distant computers.[35]

Gary Robinson and William Loveless, in their article for *IEEE Transactions on Consumer Electronics* are even more blunt as to videotex systems and the telephone company.

> Viewdata, a related information system, was designed especially to increase the utilization and revenue of the telephone company. The average telephone is used 20 minutes per day, and therefore, telephone equipment is not used to its maximum efficiency. Viewdata is a two way system using telephone lines at a low data rate.[36]

In further considering the efficacy of the telephone companies, H. G. Brown points out:

> On telephone networks a "private" link exists between the data base and the user so that neither the page address nor users address need be included in the downstream message. Signals on cable television networks are broadcast and can be picked up and decoded in all the homes on the network. Thus some means of providing privacy on cable networks is required.[37]

Essentially the telephone company in Canada can be considered a regulated monopoly and it appears, with the advent of fibre optics, that telephone companies will continue to be the common carriers providing an integrated network for Canadian communities and homes. David Vaskevitch states:

> In the long run public networks will evolve based on the same concept: a single uniform link between every home or workplace and the network. For example a home could have a single, hair thin fibre for its telephone, television, computer terminal and alarm system.
>
> The technology to implement this type of uniform, high capacity network is available and cost effective today.[38]

With respect to cost of a fibre optics network the following estimate is provided by O. W. McAleer:

> Based on technological projections of optic fibre and associated electronic costs in the year 1985 for typical urban applications, the new capital cost of providing combined CATV, telephone and other information services on equivalent integrated loop facilities would be $525 per household. This is the same as today's cost of providing separate copper pairs and coaxial cable and less expensive than the introduction of separate fibre technology for each on a non-integrated basis which would cost $625.[39]

Perhaps the provision of facilities is a *fait accompli* for the telephone companies, leaving the competition for services to be divided between the cable and telephone businesses. Cable television can be considered an offspring of broadcasting and as much a packager of information in terms of entertainment, education or news. This viewpoint is argued by the Canadian Cable Television Association (CCTA) in order to affirm its interest in the content of its distribution system.[40]

Software is the Key

In the shadows of the development of the network infrastructure and the provision of services by various agencies lies a key question when it comes to information services. Who is to provide the content? It is necessary to reiterate one of the findings of the Baran Delphi study: 57.5 percent of the demand market will be comprised of educational and business-from-the-home services.[41]

The software that will have to be generated to fuel these information systems are beginning to emerge.

According to James Martin,[42] in his discussion of computer-assisted instruction, more than 100 hours of programming time is required for each hour of student time at the terminal. This ratio

can go as high as 500 to 1 for different subject areas. This ratio is two to three times higher than the ratio for equivalent textbook writing. This growth required in information producing, processing and handling will lead to tremendous job opportunities.

As an incentive to information providers the British Post Office (BPO) allows the British Videotex system, Prestel, to operate on a market system. The Prestel system acts as a common carrier collecting a standard tariff. The underlying philosophy for Prestel is to be an inexpensive and readily available facility for use by even unsophisticated users.

For the information providers, the cost of Prestel is comprised of a fixed annual charge of $4,800 per annum for a five year contract and $8,000 for a one year contract. In addition, the number of frames utilized comprised the variable cost at $4.80 per frame per year for the five year contract and $8.00 per frame per year for the one year contract. As well the information provider is required to supply his own terminal equipment and communication link but there is no charge for accessing these files for editing purposes.

For low use material a data warehouse service is offered at $2,000 per annum and a $2 per frame charge. This option may attract more non-professional information providers even though there is a one cent access charge to each frame when updating is required.

The cost to the information user for this information has a maximum ceiling of one dollar which does not include local telephone charges and the connect time fees.

When compared to traditional data bases the user charges are modest. The critical element for information providers is to appeal to the largest audience for their material. As overheads are fixed, the information provider's revenue is determined by the number of users of his information. Thus information competes in a market by which the demand for information must meet the cost of supply. Using this market concept for Prestel, the British Post Office is preparing for full scale market introduction with 250,000 pages of information available.[44]

In Canada a similar philosophy for the Telidon system is espoused by the Bell Canada Telephone company as that for the Prestel system offered by the British Post Office.[45]

In the beginning the Telidon system is not expected to allow the user to become immediate information providers. David Wright states:

> As well, a host of information providers are expected, ranging from small entrepreneurs to data processing companies, airlines, theatres, wire services and news gatherers such as The Globe and Mail and Torstar Corp., both of Toronto.[46]

To assist in the Telidon field trials in Canada a company called Infomart was established to provide information packages and services. Infomart is composed of F.P. Publications Ltd., Southam Inc., and Torstar Inc.; all three companies have been involved in the newspaper publishing business as well as the establishment of professional data bases.

This early interest displayed by existing information providers of the society appears to be the forerunner of an electronics

publishing firm. The *Financial Post* reports:

> Infomart says it will develop a wide variety of services to other organizations that wish to mount and distribute their information on videotext systems.
>
> Eventually, says Infomart President David Carlisle, it will be possible even for individuals to sell information through such a system: "The technology for that already exists. The key will be to develop the appropriate indexing system so small packages of information will not be lost in the huge volume of material such systems will provide."[47]

In addition to Infomart other companies are quickly being formed to act as information providers. For the Manitoba field trial of Telidon two other companies, Canadian Home Information Services and Cybephone, have been formed to provide information services along with the Infomart company.[48]

The development of information packages for the users continues to be in its infancy and the focusing on existing information providers should be considered the first step in the economic requirement of capitalization of the system. Besides pooling experience Infomart is investing $9 million in the electronic publishing industry.[49]

The philosophies behind the videotex systems will in the future lead to a wider number of information providers and bring about the required proliferation of software design and information packages.

From an economic point of view videotex systems are a recombination of information services into a single medium. The public has been exposed to the centralizing tendencies of computer use and is only beginning to view the possibilities of home computer applications, particularly among the younger segment of the population.

The cost of terminal design is dependent on its product life cycle (ten to twenty years) and the terminal's ability to handle

innovations in data display characteristics (alphanumeric, geometric and photographic). From present trends the economic feasibility of mass produced home terminals will allow for appropriate market penetration.

System development is dominated by cable television companies and telephone companies with the latter being better prepared to act as a common carrier, particularly with the use of fibre optics. Cable television companies will continue to act in a programming capacity.

In terms of economic considerations the availability and infrastructure for computer-telecommunication terminals are within a feasible range. The largest stumbling block to public acceptance is therefore not technical but in terms of services offered. Demand for entertainment services such as electronic games will likely become a mainstay of computer-telecommunication networks. General access information, reservation systems for restaurants and travel are also being developed. In the past these types of information services have been advertising-based with little cost to the consumer.

Gordon Thompson has proposed that information be treated as a private good.

> Content in VIDEOTEX type system behaves totally like a classical private good. Since all users enter the system via an interface with a computer, it is an easy matter to deny service to noneligible users. Furthermore, adding additional users entails enlarging the user interface facilities of the computer used in the system, and so marginal users rival bona-fide users for service. Since the properties of exclusivity and rivalry are present, the system ofers its content as a private good, not as a public one. Theoretically, this opens the way for the establishment of a proper market.[50]

The concept of an electronic publishing company such as Infomart may assist the small information provider but also could lead to restrictive trading in the information marketplace. Electronic publishing companies could practice price discrimination by charging and collecting differential fees from both information providers and information users respectively. This type of activity on the part of electronic publishing could lead to censorship and propaganda.

This early trend in information provision for videotex systems may be directly attributable to our past information structures. One would suspect that these corporations would have a vested interest in converting to the electronic media. The difficulty lies in allowing the old institutions to control the content of the videotex networks. As videotex and other computer-telecommunication systems develop individual and small groups of information providers must be allowed access to storage in the information marketplace.

In order for governments to subsidize information the computer-telecommunication network should be divided into public and private sectors. The private sector will operate on the market principles with information treated as a private good. In the public sector, information will be accessible to everyone and will have no assigned property rights. In this manner the general pool of knowledge will be shared throughout the populace.

This division between public and private spheres will allow for the maximum benefits to be obtained from the computer-telecommunication network.

The verdict on consumer acceptance of computer-telecommunication networks has not been conclusively proven. The evidence to date suggests that the technology driven computer-telecommunication systems are becoming available at costs that are acceptable for individual or home use. Government involvement as well as private investment coupled with the increasing familiarity of the young with computer uses may yet create an interactive two way computer-telecommunication network.

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PART II

COMMUNICATION AND SOCIAL CHANGE

CHAPTER 5

INFORMATION AND MEANING

Information has come to be considered the basic building block of the universe we live in. From the physical sciences, the theories of quantum mechanics, relativity and thermodynamics are pointing to the interconnections of data with levels of energy.[1] Negative entropy, the reversal of energy flowing to its lowest level, is considered to be a method of pattern recognition or information generation that is found in human thought.[2] Increasingly the collection, refinement and uses of information are playing a greater role in Western society.[3] Philosophers such as Ernst Cassirer,[4] view human thought as impossible without the development of human languages. Human languages are sophisticated information systems and a great deal of time and effort has been expended in studying their underlying structures.

With the advent of computer-telecommunication networks as described in Part I, the manner in which the individual and the community deal with their information sources may be facing radical changes. The capabilities of information technologies to provide vast quantities of information must be weighed with the need for quality information or meaning. This chapter and the next review these two aspects of information quantity and quality in order to better understand the impact of computer-telecommunication systems on culture and community.

Shannon's Information Theory

Data, when viewed as a contributor to meaning can only be significant to Man when it is decipherable into information. The notion of decipherability or translatability implies a common code or alphabet between the source of data and the receiver of that data. Central to this model is the idea of a medium or channel between the two parties that allows them to transmit or send the data. The mathematical formulation of this communication model was developed by Claude E. Shannon.[5] Shannon's theory is based on the statistical probabilities of randomness. The simplest system of randomness is the flipping of a coin where either heads or tails has an equal chance of being selected. From this either/or or yes/no system of probability, the coding of data can be attained.

From this dichotomy, any language that is logically communicable can be expressed as a series of yeses and noes. When developing a code for an alphabet one also expands the degrees of freedom or choice from which to select messages. For the English language, conditional probabilities can be computed based on the frequency of use of each letter and bundling of these letters into recognizable words.

Colin Cherry notes the function of a coding system.

> They may be the letters of a written language, numbers, printed words, the ordinates of wave forms; any set of distinct sign-types constructed for communication. But the alphabet must be specified; before the information content of messages can be discussed numerically; further it must be assumed that the same alphabet exists at both the transmitting and receiving ends of the communication channel. It is then the function of the source of information to select the signs successively from this alphabet, thus constituting messages, and to transmit them in physical form as signals, through a channel, to the receiver. At the receiver, the signals operate upon an identical alphabet and select corresponding signs. Messages are then sent and received.[6]

Cherry's explanation of a coding system makes no mention of error or uncertainty in messages but in reality this phenomenon occurs. Two terms in communication theory have been incorporated into the communication system to handle these difficulties. These terms are noise and entropy.

Noise is the term used to denote disturbances that occur in the physical universe. Noise can be due to atmospheric condition which is heard as crackling and hissing on radios or seen as interference on television screens. Crosstalk is another form of noise which occurs mainly on telephones when individuals can hear a third voice during their conversation.

Another class of noise is known as Gaussian noise which is based on the concept of Brownian motion. Brownian motion is the random movement of small particles as a result of their haphazard collisions with other particles. Prediction and control of any one particle is not possible but on a macroscopic level, in aggregates, motions can be described statistically.

In communication theory noise has been considered to have originated from a separate source. Cherry states:

> The theory of communication has so far been applied, almost entirely, to cases in which the information source and the noise source are completely independent, and the source signals and noise are simply added; any knowledge of the information source, or signals received from it, can give no information about the moment-by-moment noise values. However, communication theory demonstrates the surprising fact that, solely from knowledge of the statistical parameters of the noise source, the average rate loss of information may be determined.[7]

It should be noted that the word "average" is used as an adjective for information rate loss. As a result of noise the

information rate is limited.

Shannon's contribution was to find the average frequency of error for all possible coding systems when these codes were selected at random. Cherry states:

> Shannon's most important contribution to statistical communication theory is undoubtedly his Capacity Theorem; this gives a result which would certainly not be suspected intuitively. It is this: It is possible to encode a source of messages, having an information rate H, so that information can be transmitted through a noisy channel with an arbitrarily small frequency of errors, up to a certain limiting rate C, called the limiting capacity, which depends upon the channel constraints (e.g. bandwidth, power restrictions, noise statistics, etc.) provide that $H \leq C$.[8]

The main thrust of Shannon's Capacity Theorem is that the error in the transmission of information can be set by manipulating the rate of transmission. As long as the information rate is less than the channel capacity then the frequency of errors can be contained.

In terms of communication systems Shannon's theory sets the physical limitations of any given system to transmit information. The point to be made is that there is an upper bound to the speed with which information can be transmitted through any particular communication medium. The overall implication of Shannon's theory for computer-telecommunication networks points to a maximum size at which a system can operate. With improvements in computer technology noted in previous chapters, this limitation is not readily apparent. The optimum size of computer-telecommunication networks will be constrained by the speed of transmission. If accurate responses are not readily available then the computer-telecommunication network may deteriorate in its effectiveness as a community development vehicle.

Coding, Redundancy and Feedback

To maintain accuracy other corrective measures have to be introduced into the communication channel. Man must trade off the speed of information with the required degree of accuracy. Three methods are available for the control of error in the information channel. These are coding, redundancy, and feedback.

Both coding and redundancy are a means of control that attempt to inhibit the amount of variety or error that is contained in an information system. When one considers coding of information one is necessarily limiting the variety of information to be communicated. For example, Shannon's Information Theory is applicable only to logically communicable languages that are expressed by the binary code. Redundancy is mobilized to reduce errors in the transmission of information by repeating the message or portions thereof. Cherry states:

> Briefly, redundancy is a property of languages, codes and sign systems which arise from a superfluity of rules, and which facilitates communication in spite of all the factors of uncertainty acting against it.[9]

Despite the necessity for coding and redundancy in information systems Stafford Beer[10] has argued that the application of these methods as measures of social control are not feasible. Beer views coding (i.e., the use of rules or law) and redundancy (i.e., systems of checking) as being unable to deal with the increasing complexity of the world. Beer believes that the increasing complexity of the world is due to increasing diversity and variety. Beer points to Ashby's Law of Requisite Variety that only variety can absorb variety as the

required solution. For this purpose the use of feedback as a means of controlling variety should be enhanced. It is the ability of machines and in particular the computer to display feedback properties that sets the computer apart from the use of machines in the past. Feedback goes beyond self-correction but entails self-correcting behavior or altering of the information source. It is through feedback that Ashby's Law of Requisite Variety can be followed in which variety can be matched with variety.

The expansion of the channel capacity of information systems through the development of computer-telecommunication technologies leads to the possibility of greater use of feedback mechanisms and the concomitant dispersion of variety throughout the society.

Feedback forces participation and involvement among the actors of the communication system. Feedback requires interaction. It is through interaction that pattern recognition is enhanced. A prevalent electronic example of the demand for interaction can be found in the use of video games. These electronic games require the individual to take control and respond to the changing environment of the video monitor. Individuals are no longer the passive receivers of information but initiators and controllers of their environment. It is true that video gaming is only one restricted example but other computer-telecommunication services could also force interaction. Computer assisted instruction, computer conferencing and electronic shopping will all require the individual to become a more active user of information. It is this potential of computer-telecommunication networks to enhance feedback that will assist the community development

process and aid in cultural development.

Meaning

It should be noted that Shannon's Information Theory is interested in 'how much information?' rather than 'what sort of information?'. Shannon's preoccupation with the difficulties of transmitting messages leaves open the question of the 'meaning' or value of that information to the recipient. The meaning of a word is not dependent on its frequency of occurrence in a message but is reliant upon the relationship between a sign or symbol and its referent.

As Shannon's Information Theory tackles the syntax (signs and the relations between signs), there are two other areas of information that remain; semantics and pragmatics. Semantics, the relation between signs and their referents has been considered to be 'the science of meaning'.[11] But semantics plays only a portion in the role of meaning and it is the area of pragmatics, the involvement of sign users that has been investigated as a field of meaning, especially in the discipline of psychology.

From this discussion the word 'meaning' can have many meanings. Ogden and Richards in their book *The Meaning of Meaning*[12] came up with sixteen different meanings. Charles Morris has contended that there are four different classes of meanings: to designate, to signify, to indicate and to express.[13] It can be seen that semantics would deal with the areas of designation, whereas pragmatics would cover those involving interpretation on the part of the user (the remaining three). Colin Cherry states:

> To the pragmatic level we must relegate all questions of value or usefulness of messages, all questions of sign recognition and interpretation, and all other aspects which we would regard as psychological in character. Again, the concepts of meaning to specific people reaches this level; associations of signs and designata in the mind of someone, in some specific situation, are semantic-pragmatic questions.[14]

To derive meaning, information has to be transmitted and to Norbert Weiner this process is a necessity for life.

> Information is a name for the content of what is exchanged with the outer world as we adjust to it, and make our adjustment felt upon it. The process of receiving and of using information is the process of our adjusting to the contingencies of the outer environment, and of our living effectively within that environment. The needs and the complexity of modern life make greater demands on this process of information than ever before. . . . To live effectively is to live with adequate information. Thus, communication and control belong to the essence of man's inner life, even as they belong to his life in society.[15]

Meaning is found in the context of situations and thus can change as information is transmitted. The expression of information through communication, as pointed out by Weiner, plays a significant role in Man's activities. According to Victor Frankl it is a search for meaning that is the driving force of Man.

> Man's search for meaning is a primary force in his life and not a "secondary rationalization" of instinctual drives. This meaning is unique and specific in that it must and can be fulfilled by him alone; only then does it achieve a significance that will satisfy his own will to meaning. There are some authors who contend that meanings and values are "nothing but defense mechanisms, reaction formations and sublimations." But as for myself, I would not be willing to live merely for the sake of my "defense mechanisms," nor would I be ready to die merely for the sake of my "reaction formations". Man, however, is able to live and even to die for the sake of his ideals and values![16]

According to Frankl Man's search for meaning is a personal journey in which each individual's own meaning is incorporated into his ideals and values. The implications of this viewpoint to

computer-telecommunications and community is twofold. First, the ability of computer-telecommunication systems to enhance greater variety will allow the individual to search more thoroughly for different meanings. Secondly, individual meaning is an interpretation or re-interpretation of a community's ideals and values as the beginning point in the individual's search.

Thus computer-telecommunications networks will test the cultural foundations of the society in terms of its tolerance for diversity and variety. It is these opposing forces of the individual search for meaning and the pull of the ideals of society that will be elaborated on throughout this thesis.

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CHAPTER 6

SYMBOL, METAPHOR, LANGUAGE AND MYTH

From the previous chapter, the quantitative constraints of information were noted along with the possibilities of computer-telecommunication networks to overcome some of these constraints. To assist in our understanding of the qualitative aspects of information, the use of symbols, metaphor, language, and myth require investigation. In addition, the basis for community ideals is to be found in its use of symbols, metaphor, language, and myth. From these components Man's past cultural heritage imposes itself upon a community. It is from these building blocks that Man is able to make sense of his world. It is the reshaping of Man's cultural tools that occurs when communication media alter. Computer-telecommunication networks can provide the means by which an adjustment in the current Western cultural milieu can be achieved. In order to understand this process a more extensive review of these building blocks is in order.

Symbol and Metaphor

Semantics can be defined as how signs come to denote other objects or referents. This relationship oftentimes cannot be directly stated, as the sign may take on symbolic significance. Carl Jung distinguishes between sign and symbol in the following manner:

> The sign is always less than the concept it represents while a symbol always stands for something more than its obvious and immediate meaning. Symbols, moreover are natural and spontaneous products. No genius has ever sat down with a pen or a brush in his hand and said: "Now I am going to invent a symbol." No one can take a more or less rational thought, reached as a logical conclusion or by deliberate intent, and then give it 'symbolic' form. No matter what fantastic trappings one may put upon an idea of this kind, it will still remain a sign, linked to the conscious thought behind it, not a symbol that hints at something not yet known. In dreams, symbols occur spontaneously, for dreams happen and are not invented: they are therefore, the main source of all our knowledge about symbolism.[1]

Thus the symbol according to Jung is a powerful force that dwells in the unconscious of Man and can be analysed through discovery in the dream medium and in the arts.

In addition to the symbol's ability to tap the unknown, a symbol can provide the stimulus for an affective or emotional response. Whether an image, a word, a melody or a sound, it is the symbolic significance of these occurrences that evoke an emotional response in the observer. This symbolic significance is determined in the consciousness of the observer based on his past cultural heritage. It is this interconnection with the past that provides for man's ability to comprehend the world.

Ernest Cassirer views symbol as the interface between man and the universe. Cassirer states:

> No longer in a merely physical universe, man lives in a symbolic universe. Language, myth, art, and religion are parts of this universe. They are the varied threads which weave the symbolic net, the tangled web of human experience. All human progress in thought and experience refines upon and strengthens this net. No longer can man confront reality immediately; he cannot see it, as it were face to face. Physical reality seems to recede in proportion as man's symbolic activity advances. Instead of dealing with the things themselves man is in a sense constantly conversing with himself. He has so enveloped himself

> in linguistic forms, in artistic images, in mythical symbols or religious rites that he cannot see or know anything except by the interposition of this artificial medium. His situation is the same in the theoretical as in the practical sphere. Even here man does not live in a world of hard facts, or according to his immediate needs and desires. He lives rather in the midst of imaginary emotions, in hopes and fears, in illusions and disillusions, in his fantasies and dreams.[2]

Cassirer's viewpoint implies that man is unable to confront physical reality but must use his cultural intermediaries to impose meaning on the world. This imposition is not a straightforward proposition but involves the melding of interpretations in terms of language, myth, art and religion. Thus it is through symbol manipulation that man comes to live in the world. It is this naming of objects and endowing them with symbolic import that separates Man from the other animals. Susanne Langer considers symbolic transformations as a basic need for Man.

> This basic need, which certainly is obvious only in man, is the need of symbolization. The symbol-making function is one of men's primary activities, like eating, looking, or moving about. It is the fundamental process of his mind, and goes on all the time. Sometimes we are aware of it, sometimes we merely find its results, and realize that certain experiences have passed through our brains and have been digested there.[3]

This need for symbol making harks back to Frankl's idea of search for meaning expressed in the previous chapter. Man's search does not commence with an emptiness or nothingness but instead relies on revitalizing, reinterpreting, or resurrecting previous symbol-uses to meet the meanings required in Man's present search. Joseph Henderson explains:

> Some of the symbols in such dreams derive from what Dr. Jung has called 'the collective unconscious'—that is, that part of the psyche which retains and transmits the common psychological inheritance of mankind. These symbols are so

> ancient and unfamiliar to modern man that he cannot directly understand or assimilate them.
>
> It is here that the analyst can help. Possibly the patient must be freed from the encumbrance of symbols that have grown stale and inappropriate. Or possibly he must be assisted to discover the abiding value of an old symbol that, far from being dead, is seeking to be reborn in modern form.[4]

It is this ability to regenerate symbol-meaning that provides not only the basis for the individual to seek out his role in life but also for the society as a whole to function. Joseph Campbell notes:

> For not only has it always been the way of multitudes to interpret their own symbols, literally, but such literally read symbolic forms have always been—and still are, in fact—the supports of their moral orders, their cohesion, vitality, and creative powers. With the loss of them there follows uncertainty, and with uncertainty, disequilibrium, since life, as both Nietzsche and Ibsen knew, requires life-supporting illusions; and where these have been dispelled, there is nothing to hold on to, no moral law, nothing firm.[5]

According to Theodore Roszak, the purpose of culture is to allow for a renewal of symbols.

> Clearly the great symbols have been with us for a very long while. Within recorded history, the major cultural activity has not been that of adding to the basic symbolic repertory, but of re-enacting the disciplines of visionary power and elaborating their contents. Exploring the richness of the symbols or lending them a new ethnic relevance: these are the foremost tasks of cultural life. For a great symbol is an inexhaustible potentiality. It is superabundant and all but cries out for endless restatement. It is there to be reworked; it needs incessant renewal.

It is this continual renewal that provides for the dynamic aspect of community. Symbol is not artifact but the rebirth of the cultural vitality of the community. 'Great symbols', as pointed out by Roszak, have this replenishing power. As computer-telecommunication systems develop the need for a reinterpretation of symbols increases. The distinguishing feature of feedback mechanisms calls forth diversity

which implies a reconfiguration of symbols to meet the individual's needs. Just as information needs to be communicated in order to have meaning, symbols must also be related in a recognizable pattern. Symbols have been incorporated in the main into metaphor, language and myth, in order to provide meaning to the individual and the community. It is through this structuring of symbols that Man becomes a culture bearing species. It is through culture that Man is able to form community. Common ties and social interaction can not be established in a vacuum. The structuring of symbols fosters community and the introduction of computer-telecommunication systems increases this potential through feedback and interaction.

Metaphor is the 'verb' by which symbols transfer from the denotation of signs to having connotations beyond the referents. Metaphor in a linguistic sense is a category of tropes. Included in the trope categories are the ideas of simile, analogy and hyperbole. Metaphor will be considered to encompass all these categories and hence is a powerful force in shaping Man's thoughts.

Robert Samples in his book *The Metaphoric Mind* discusses several modes of metaphoric thought.[6] On the simplest level, metaphor can be considered as denoting a sign for several meanings. On another level, metaphor can be used to compare two objects and through this process a synergistic growth occurs rather than reductionist rational comparison. Metaphor can be used to integrate the thought and feelings of an individual with an object and can be considered the emotive aspect of metaphor. Lastly metaphor can have an inventive mode through which the finding of the unknown via the known occurs. This inventive mode

is often equated with creativity.

Metaphor in its synergistic sense can result in the sense of community. Ted Cohen notes in a discussion on literal and figurative use of language:

> The sense of close community results not only from the shared awareness that a special invitation has been given and accepted, but also from the awareness that not everyone could make that offer or take it up. In general, and with some obvious qualifications, it must be true that all literal use of language is accessible to all whose language it is. But a figurative use can be inaccessible to all but those who share information about one another's knowledge, beliefs, intentions, and attitudes.[7]

It is this division between literal and figurative use of language that allows for the proliferation of subculture or subgroups while still maintaining a central core of symbols. It is the ability of the individual to know the difference between the sign and its symbolic meaning for his particular group that gives rise to the sense of community, of belonging, of togetherness. This sense of community based on common ties and goals can be the foundation for a myriad of computer-telecommunication communities. Individuals with similar interests may form groups more easily with the aid of computer-telecommunication networks and may broaden an individual's options in his search for meaning. It is here that computer-telecommunication networks will apply metaphor with feedback to bring about new insights for the individual. An example of this type of activity can be found in the application of computer technology to the creative arts. Both the sound and graphic capabilities of the computer are being explored by artists in a host of metaphoric dimensions.

Metaphor is comprised of the ability to make cognitive sense for Man of the universe as well as the ability to conjure up feelings or emotions. The two main instruments for metaphoric thinking are known as language and myth.

Ernst Cassirer sums up this point:

> That language and myth are subject to the same, or at least closely analogous, laws of evolution can really be seen and understood only insofar as we can uncover the common root from which both of them spring. The resemblances in their results, in their forms which they produce, point to a final community of function, of the principles whereby they operate. . . . And this common center really seems to be demonstrable; for, no matter how widely the contents of myth and language may differ, yet the same form of mental conception is operative in both. It is the form which one may denote as metaphorical thinking; . . .[8]

Metaphor as the central focus for myth and language amalgamates the discursive thought processes of language with the presentational thought processes of myth. The use of metaphor as the key ingredient for the feedback processes of computer-telecommunication networks will provide the bridge between society's values and individual growth. Communications technology has been accused of limiting man's insights and actions by allowing the imposition of centralizing structures through which the creation of societal values has been fostered.[9] Computer-telecommunication networks may reverse this centralizing trend by allowing indivjduals to reassert themselves by finding similarities amongst their differences by the use of metaphor.

Language and Myth

It is from language that Man is able to participate in discursive thought. Discursive thought allows Man to conceptualize the

world by limiting the meanings of various symbols into a single focus or word. This microscoping of symbols does not occur in a vacuum but is directed by the needs of the individual.

Man must distinguish between entities in order to consolidate his impressions of the world. Thus entities that reflect man's needs and desires will be imparted a verbal meaning. This selection provides for the sorting and categorizing of essential entities in order to better relate to man's world. If one follows this idea further then it is possible to have different languages and different ways of viewing reality. Edmund Carpenter provides an example:

> Language does more than label: it defines; it tells not only what a thing is, but also its relation to other things. I may say that his pencil is lying on the table, making both pencil and table nouns, separate objects without indicating their relationship. But a Wintu would say "The table lumps," or if there were several things on the table, "The table lumps severally." The Wintu and I experience different realities, not simply the same reality in different ways.
>
> What I've said of language applies to all media. . . . And a thought or event that is excluded from all media, or that doesn't lend itself kindly to any available medium, is difficult to experience, even more difficult to convey.[10]

This limiting of language is a result of an enforced closure upon the system in which every component is defined by the other components in the system. The difficulty, as mentioned by Carpenter, is that certain thoughts remain outside the language but the need for closure is explained by Jacob Bronowski:

> So it is useless to deal with inconsistent systems. Yet we have the fact that every closed formal system, if it is consistent, is not able to prove statements that I can prove standing outside the system. And we have the additional fact that if the system is inconsistent, it can prove anything, but it is useless. Now what does this say? It says that the reach of all formal systems is limited. When you axiomatize an arithmetical or mathematical system, you automatically impose a limit on it. In the phrase that I have used earlier, you cut the universe in half.[11]

This limiting of the world is even greater when one considers the everyday use of the English language. Don Fabun points out that even though the English language comprises 600,000 words and is continuing to grow, the average adult utilizes 2,000 words of which 500 are most frequently used.[12] One can see that language, as a coding system, is having an impact on the culture of Western society. This diminished use of language is a reflection of the dominance of the society in community values in the sense that ideas have been over-refined in order to be widely available. Instead of accepting these diluted ideals, the individual has searched for meaning and a sense of community in other symbol-generating processes such as art, religion and theatre. This is not to say that language has lost its value. The point is that Man has turned to presentational forms of culture in order to fulfill his needs for belonging.

Inherent in presentation forms of culture is the role of myth. Myth is not a correct or right conceptualization of the world but should be thought of as an attempt to explain the mysteries of the world.

D. H. Turner, in discussing Levi-Strauss' ideas on myth, states the following:

> Mythical thought is neither entirely concrete, nor entirely symbolic. Rather, it operates at a level somewhere between "precepts and concepts". It takes to pieces and reconstructs events which are significant within the culture—images which are already imbued with meaning. The task of an anthropologist is to examine these 'sets of meaningful events and concepts (or 'mythemes', as Levi-Strauss calls them) which constitute a particular myth in order to discover the opportunities they embody and the contradictions in the society to which these in turn relate.[13]

In the past myths were not studied or investigated but were the life pattern of society. It is only recently, according to Jung, that man has reflected upon myths and their underlying symbols.[14] It is through rational thought or discursive language that man was able to release himself from the mythic view of the world but not from the mythic pattern.

One should not have the impression that myth is a static picture of the world that does not change. Myth is transformed by history into explaining the events of the present period. Myths originally attempted to explain the beginnings of the universe and objects that were found in Man's world. Later myths began to narrate how Man possessed various virtues and how he was allowed to control and command objects in the world.

With the use of language Man has been able to reflect upon the world and upon himself. Self-reflection has allowed Man to overcome myth and to look for explanations of the world within himself. This inner reflection is challenging myth and leaving ambiguity in its wake. Joseph Campbell states:

> The problem of mankind today, therefore, is precisely the opposite to that of men in the comparatively stable periods of those great coordinating mythologies which now are known as lies. Then all meaning was in the group, in the great anonymous forms, none in the self-expressive individual; today no meaning is in the group—none in the world: all is in the individual. But there the meaning is absolutely unconscious. One does not know by what one is propelled. The lines of communication between the conscious and unconscious zones of the human psyche have all been cut, and we have been split in two.[15]

It is precisely this split that has left man with a paucity of everyday language use and a return to presentational forms of

knowledge. For Roszak, the virtue of myth is not in the narration but in the insight that myth brings forth. Roszak states:

> The narrative surfaces of myth are unimportant: the truth of mythical thought is not a matter of fact, but of perennial insight, which may be cast in a thousand forms. So the tendency is for myths to blend and identify, rather than to exclude one another. Myth makers, unlike historians, are able to say to one another, "You tell the story this way, I tell it that way. But both are true." The meaning of myths lies in the vision of life and nature they hold at their core. Either one re-experiences that vision, or one has missed the message—in which case the myth is bound to become an empty literal shell, a fiction or lie; it loses its magic and becomes an idol.[16]

Myth must then continually adapt to the channels or mediums that are provided by the society. But myth can no longer be the be-all and the end-all. It must make room for discursive thought and language. Myth has to be placed in a perspective. Campbell, in a later book, notes:

> However, there is a danger here as well; namely, of being drawn by one's dreams and inherited myths away from the world of modern consciousness, fixed in patterns of archaic feeling and thought, inappropriate to the contemporary life. What is required, states Jung, therefore is a dialogue, not a fixture at either pole; a dialogue by way of symbolic forms put forth from the unconscious mind and recognized by the conscious in continuous interaction.[17]

The interplay between language and myth can beprovided by computer-telecommunication networks but it is the interaction of human beings through this medium that will yield a sense of community. Those communities that require more emphasis on discursive thought can be just as easily accommodated as a community based on presentational forms of knowing within the computer-telecommunication network. The potential of computer-telecommunications to assist in this endeavour (i.e., community formation) lies in the diversity of information that individuals

are able to self-generate and discover through interactions with others. Fresh symbols will be formulated to reinterpret myths for the contemporary society. An example of this process can be seen in the ease by which video games have replaced television shows as topics of conversations amongst the youth of society. Another example is the increasing sophistication of electronic visual effects utilized by the movie industry. New flights of imagination are being disseminated with unlimited bounds.

It is this visual, presentational, symbolic regeneration that is allowing Man to be revitalized as an actor and initiator in his own personal fulfillment. By providing new horizons and challenges for man to explore, and be part of, is one of the main roles for computer-telecommunication technology.

It is this technology that integrates both ways of knowing, discursive and presentational, in a manner that can allow for community to provide a framework of ideas and values in which the individual may grow and develop.

FOOTNOTES

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[14]Op. cit. (Jung et al), p. 69.

[15]Campbell, Joseph, *The Hero with a Thousand Faces* (2nd ed.), Princeton University Press, 1968, p. 388.

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CHAPTER 7

HISTORICAL DEVELOPMENT OF INFORMATION

From the previous chapters, it can be noted that, quantitatively, computer-telecommunication systems can have a significant impact on retrieval and dissemination of information. But, qualitatively, man must harness the computer-telecommunication technologies to meet his own needs through the interaction with others, in addition to the man machine interface. It was also pointed out that individuals acquire their patterns of classification, their sense of time and their perception through the structure of their language.[1] Before reviewing the impact of computer-telecommunication systems in this regard a further elaboration of the effect of communication medium is in order.

This argument of the ability of language to shape an individual's view of reality has been used and extended by Marshall McLuhan in his analysis of media and their effects on culture and community. McLuhan proposes that the way or method of communication affects the community more than what is actually stated or communicated. McLuhan and Fiore note:

> Societies have always been shaped more by the nature of the media by which men communicate than by the content of the communication. . . . Words and the meaning of words predispose the child to think and act automatically in certain ways. The alphabet and print technology fostered and encouraged a fragmenting process, a process of specialism and of detachment. Electric technology fosters and encourages unification and involvement. It is impossible to understand social and cultural changes without knowledge of the workings of media.[2]

In addition, McLuhan argues that technological media, acting as products of the society, are similar in consequences to any other staple or natural resource. McLuhan states:

> Technological media are staples or natural resources, exactly as coal and cotton and oil. Anybody will concede that a society whose economy is dependent upon one or two major staples like cotton, or grain, or lumber, or fish, or cattle is going to have some obvious social patterns of organization as a result. . . . Cotton and oil, like radio and TV, become "fixed charges" on the entire psychic life of the community. And this pervasive fact creates the unique cultural flavor of any society.[3]

Harold Innis views the predisposition of the communication medium as a bias in favor of time or space.

> The concepts of time and space reflect the significance of media to civilization. Media which emphasize time are those which are durable in character such as parchment, clay and stone. The heavy materials are suited to the development of architecture and sculpture. Media which emphasize space are apt to be less durable and light in character such as papyrus and paper. The latter are suited to wide areas in administration and trade. . . . Materials which emphasize time favour decentralization and hierarchical types of institutions, while those which emphasize space favour centralization and systems of government less hierarchical in character. Large-scale political organizations such as empires must be considered from the standpoint of two dimensions, those of space and time, and persist by overcoming the bias of media which over-emphasize either dimension.[4]

According to Innis, the process of change in communication patterns or structure occurs as a result of a bias in space or time. This change is accompanied by a shift in the holders of knowledge in the society. George Gerbner explains the process:

> A culture cultivates the images of a society. The dominant communication agencies produce the message systems that cultivate the dominant image patterns. They structure the public agenda of existence, priorities, values, relationships. People use this agenda—some more selectively than others—to support their ideas, actions, or both, in ways that, on the whole tend to match the general composition and structure of message systems (provided, of course, that there is also other environmental support for these choices and interpretations). There is

> significant change in the nature and functions of that process when there is change in technology, ownership, clientele, and other institutional characteristics of dominant communication agencies.
>
> Decisive cultural change does not occur in the symbolic sphere alone. When it occurs, it stems from a change in social relations that makes the old cultural patterns dysfunctional to the new order.[5]

The extension of cultural effects of language to communications technology leads to the idea that innovations in communication technology inevitably requires a reordering of social relations and institutions. Past events such as the widespread use of the alphabet, the introduction of the printing press, and the electrical transmission of information appear to lend support to the argument that communication technology has altered Man's relationship to his environment, to each other, and to himself.

The Oral Culture of the Word

Oral cultures do not lend themselves to investigation as there are no written records of the activities. An oral culture manifests itself in presentational form such as the dance or tribal ritual. Other manifestations are the epic poem, drama, and recitation or chants. All of these forms can be considered the beginnings of mythology and emphasis was placed on memory and training. The oral tradition found its base in religion with its use of chants and repetition to aid memorization. Language was used to establish traditions and to maintain group life. Epic stories were invested with mythic properties to reinforce the authority of the ruling class of nobles and priests. Often these individuals had superior memories and hence came to control the laws and edicts of the society. It was from the traditions and

mythic stories that social control was exercised. According to Julian Jayes,[6] discursive thought as represented by the self was not present in oral cultures and Lewis Mumford[7] likens ancient civilizations as magamachines responding to the commands of the king.

With the advent of writing, the oral culture as a dominant communication system was replaced by the visual culture or the print culture. The importance of nonverbal behavior has not completely disappeared as gestures and movements continue to carry importance in the human communication system. Nonverbal behavior has received particular attention in cross cultural studies. Edward Hall in his book *The Silent Language* attempts to explain the failure of American workers in other cultural settings.

Hall states:

> Most Americans are only dimly aware of this silent language even though they use it every day. They are not conscious of the elaborate patterning of behavior which prescribes our handling of time, our spatial relationships, our attitudes toward work, play and learning. In addition to what we say with our verbal language we are constantly communicating our feelings in our silent language—the language of behavior. Sometimes this is correctly interpreted by other nationalities, but more often it is not.[8]

The Visual Culture of Print

With the development of the phonetic alphabet from cuneiform and hieroglyphs Man's view of himself and the world was altered. In its early stages the alphabet remained the exclusive preserve of the ruling and priestly classes. Manuscripts had to be handwritten and training to become a scribe was centered in the church and monastery. The final blow to oral culture was delivered by the development of the

printing press. The monopoly of knowledge was ended and a new age of heightened individualism commenced. McLuhan notes:

> Print is the extreme phase of alphabet culture that detribalizes or decollectivizes man in the first instance. Print raises the visual features of alphabet to highest intensity of definition. Thus print carries the individuating power of the phonetic alphabet much further than manuscript culture could ever do. Print is the technology of individualism. If men decided to modify this visual technology by an electric technology, individualism will also be modified.[9]

This transformation of the individual that began with Plato[10] into the dichotomies of Man and nature, mind and body, rational and irrational were given a wide audience by the printing press with the emphasis falling on the former rather than the latter terms of the dualisms.

Even as Man's perspectives were changing so too was his concept of community. The major shift in emphasis was to weaken geographical ties in favor of more wide ranging social interaction and social issues. Previous to the formation of a reading public, the community was required to gather together to hear pronouncements or messages. Reading reduced this requirement but at the same time allowed individuals to become involved in new forms of group identity centred around a social issue that went beyond the local level.[11] Pamphlets, leaflets, magazines, and newspapers formed the larger communication network of community.

The rise of individualism, the industrial revolution, and the printing press transformed man's communities and left the individual exposed to the larger social concerns of that period. The former community of the oral culture was disintegrating and being replaced by a wider perspective as societal values swept down upon the individual.

Fragmentation, specialization and reductionism was the order of the day.

From the alphabet to the printing press and newspapers, Man's thinking has been shaped into linear (sequential), rational and positivistic processes. McLuhan and Fiore note the impact.

> Western history was shaped for some three thousand years by the introduction of the phonetic alephbet [*sic*], a medium that depends solely on the eye for comprehension. The alphabet is a construct of fragmented bits and parts which have no semantic meaning in themselves, and which must be strung together in a line, bead-like, and in a prescribed order. Its use fostered and encouraged the habit of perceiving all environment in visual and spatial terms— . . .
>
> Visual space is uniform, continuous, and connected. The rational man in our Western culture is a visual man. The fact that most conscious experience has little "visuality" in it is lost on him.
>
> Rationality and visuality have long been interchangeable terms, but we do not live in a primarily visual world any more.
>
> The fragmenting of activities, our habit of thinking in bits and parts—"specialism"—reflected the step-by-step linear departmentalizing process inherent in the technology of the alphabet.[12]

The Electric Culture of the Image

With the advent of electricity Man's visual world based on the alphabet underwent a major revision. McLuhan and Fiore state:

> Electric circuitry profoundly involves men with one another. Information pours upon us, instantaneously and continuously. As soon as information is acquired, it is very rapidly replaced by still newer information. Our electrically-configured world has forced us to move from the habit of data classification to the mode of pattern recognition. We can no longer build serially, block-by-block, step-by-step, because instant communication insures that all factors of the environment and of experience co-exist in a state of active interplay.[13]

The first application of electrical energy to a mechanical communication device was the development of the telegraph.

The telegraph and later the telephone destroyed the obstacle of distance and allowed information to be synchronous with events.

Both of these media continue to be used for personal communication and it was the radio that became the first electric public communication medium. Karl Nordenstreng and Tapio Varis state:

> The decisive breakthrough in the field of communication took place only with the beginning of wireless communication, which made it possible to receive the same message simultaneously in an unlimited number of locations. Public and synchronous communication were now technically possible; in fact, radio communications could not be anything but public, since it was impossible to prevent others from hearing what was broadcast. The only requirement for the reception of electromagnetic messages was the possession of a receiver.[14]

Following in the footsteps of radio was television. After receiving its allocation of the airwaves television began to proliferate after the Second World War and usurped the positions of radios and movies.

Television replaced radio in its centralizing role as information provider and maintainer of societal norms. Television became the national medium which was directed at every individual and tended to homogenize differences by reducing sources of divergence. Radio and film became increasingly segmented as they found a purpose in serving to the diversity in national tastes. Eric Leed notes that this process of new medium development is directed at satisfying commonly felt cultural and social needs and finds a niche in the cultural fabric of society.[15]

Following the argument made by Leed that the new medium, television, is fulfilling cultural and social needs, then an investigation of these needs is in order. McLuhan has noted that the electric media have fostered a tribalness among the world's population as a result of the awareness of others due to the world's interconnectedness.

From this awareness McLuhan believes that an explosion in Man's thinking has occurred. McLuhan states:

> The stepping-up of speed from mechanical to the instant electric form reverses explosion into implosion. In our present electric age the imploding or contracting energies of our world now clash with the old expansionist and traditional patterns of organization. Until recently our institutions and arrangements, social, political, and economic, had shared a one-way pattern. We still think of it as "explosive", or expansive; and though it no longer obtains, we still talk about the population explosion and the explosion in learning. In fact, it is not the increase of numbers in the world that creates our concern with population. Rather, it is the fact that everybody in the world has to live in the utmost proximity created by our electric involvement in one another's lives. In education, likewise, it is not the increase in numbers of those seeking to learn that creates the crisis. Our new concern with education followed upon the change-over to an interrelation in knowledge, where before the separate subjects of the curriculum had stood apart from each other.[16]

But the electric media appear to exert a tribal centralizing in its socialization of the young. Raymond Williams argues that the electric media has replaced members of the community in their roles as socializers.[17] Children, who may have once been limited to local role models, such as teachers, priests, or relatives, may find their role models through the watching of television.

But it is not only children that are shaped by the electric media but man's sharing of symbols and symbol-making capacity has become dominated by the electric media of television. Rose Goldsen has come to call television "the show and tell machine" which attempts to 'monopolize the socially shared lines of sight for surveying social reality and making things familiar'.[18] Television has come the respository for all songs, stories and images of Western society.

As the visual culture of print stripped away the protective layer of the oral culture, the electric image culture has attempted to superimpose gross social values on to the individual. The community

as the interface between individual and society has become further distended. The print culture based on language has heightened individualism at the expense of myth and tradition. The electric image culture has attempted to regenerate these myths but in turn has diluted their significance. Instead Western man has imploded in the face of the electric media.

From human potential movements, Eastern religions and religion in general to natural or health foods and sexual explorations and permissiveness; from distrust of professionals and anti-intellectual feelings to appropriate or intermediate technologies, experiential knowledge, and travel; all these occurrences, brought about by electric media, are leading Man to an inner directed search for meaning and an organic or organismic view of the world. The ideas of gestalt, general systems theory and spaceship earth lead to a synergistic totality of Man's place in the world rather than Man set apart from the world. Increasingly the organismic paradigm is replacing the mechanistic approach to the world of the last three centuries. Variety, decentralization, and feedback are the key concepts of the forthcoming post-industrial societies based on information as a form of energy. All three concepts are readily incorporated by the computer-telecommunication network. The changes in social relations which accompany the post-industrial society will evolve along similar lines as the introduction of the alphabet in oral culture. The electric image culture as a result of implosion has provided the incentive for the individual to search for his needs in a new communications medium.

The next two chapters review the arguments in support of these sentiments.

FOOTNOTES

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[2]McLuhan Marshall and Fiore Quentin, *The Medium is the Message*, Bantam Books, New York, 1967, p. 8.

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[9]McLuhan Marshall, *The Gutenberg Galaxy*, Mentor Books, New York, 1962/1969, p. 192.

[10]Eisenstein Elizabeth, *The Printing Press as an Agent of Change* Vol. I, Cambridge University Press, London, 1979, p. 84.

[11]Ibid., p. 132.

[12]Op. cit. (McLuhan and Fiore), pp. 44-45.

[13]Ibid. (McLuhan and Fiore), p. 63.

[14]Nordenstreng Karrle and Varis Tapio, "The nonhomgeneity of the national state and the international flow of communication," article in Gerbner George et al. (eds.), *Communications Technology and Social Policy*, John Wiley and Sons, New York, 1963, p. 398.

[15]Leed Eric, "Communications revolutions and the enactment of culture," article in *Communications Research*, Vol. 5, No. 3, July 1978, p. 311.

[16]Ibid. (McLuhan—*Understanding Media*), p. 35.

[17]Williams Raymond, *Television*, Fontana/Collins, London, 1974, p. 132.

[18]Goldsen Rose, *The Show and Tell Machine*, Dell Publishing, New York, 1978, pp. 63-64.

CHAPTER 8

THE ARRIVAL OF THE INFORMATION AGE

Growth of Information

The computer-telecommunication network has evolved from the growth of information in contemporary society. Just as the alphabet fostered the demise of oral culture, the computer has proliferated in its number of applications. Mowshowitz contends:

> Since the end of World War II, the computer has emerged as a major force in contemporary society. An industry of mammoth proportions has come into existence, and virtually every major social activity from warfare to agriculture has felt its impact. One of the principal underlying causes of the rapid diffusion of computer applications is the diversity of contemporary society. The crowded urban centers in which most of us live embrace a staggering variety of activity. The force of numbers is of course an important component of this diversity, but equally important is the high degree of differentiation and interaction which characterizes the social structure. The self-sufficient individual and community are things of the past. The necessities of our daily existence are furnished by an exceedingly complex network of interdependent elements.[1]

According to Peter Drucker, it is the computer that has transformed information into energy and has allowed information to become a prominent factor in Western society. Drucker states:

> Yet without the computer we would not have understood that information, like electricity, is a form of energy. Electricity is the cheapest, most plentiful, and most versatile energy for mechanical work. But information is energy for mind work. This is indeed the first era when energy for mind work has been available. Information through the ages has been all but completely lacking. At best it has through the ages been all but completely lacking. At best it has been expensive, late, and quite unreliable.[2]

The linking of computers with telecommunication devices has allowed for a greater sharing of information. Mowshowitz explains the difference:

> As an isolated tool employed in unrelated activities, the computer has already exerted a considerable influence on contemporary affairs. The possibility of consolidating computing power in the form of utilities signals a new stage in the evolution of computer technology, pregnant with consequences for the future of society. . . .
>
> The concept of sharing is crucial for the effective utilization of social resources. If each user of electric power required a separate generating station, many people would still be using candles. The integration of transportation, communication, and power facilities into large networks has made service more economical, reliable, and universally available.[3]

A further measure of the impact of computers and information technologies is the numbers and rate of growth of employment in information related occupations. Generally, society has been divided into three phases, the pre-industrial, the industrial and the post-industrial. Each phase is characterized by a different proportion of workers employed in various tasks. The pre-industrial phase involved agricultural and resource extraction as its main employment generator. The industrial phase is comprised of a preponderance for manufacturing occupations. The post-industrial society is information oriented with the majority of employment involved in administration and knowledge industries. Marc Porat[4] in his investigation of this sector of the American economy in 1967 found that 25.1 percent of the U.S. Gross National Product was involved with the production, processing, and distribution of information goods and services. Porat also noted that the long run trend of employment was towards information occupations. When compared to the turn of the century where information

occupations comprised 10 percent of the labour force, they now account for 46 percent of the U.S. labour force.

The reason why the U.S. figures are of interest is that the United States accounts for 57 percent of the computer installations in the world.[5] This correlation between the information labour force and computers signifies that the increasing utilization of computers in communication networks will lead to further employment opportunities in the information field.

As can be seen by the discussion computer-telecommunication systems are becoming increasingly prominent. To ensure that benefits flow from any computer-telecommunications network requires that individuals become familiar with theinformation technology. Barry de Ville considers this to be essential.

> The best way to ensure that the effects of computers will be universally beneficial is to enable more people to use them for their own purposes. For only if ordinary people are familiar with a technology can they hope to influence its evolution for the public benefit.[6]

With increasing employment opportunities familiarity with the functioning of computer-telecommunication networks will be greatly assisted.

Effect on Community

In addition to expanding service sector jobs in the information field, the place of work will also be altered. In the past employment opportunities have usually been located near the natural resources required for the extraction or manufacture of the product in question. With information products the need for concentration of employment is no

longer necessary. Information workers will be free to establish their work place wherever a computer terminal is found. Communities will be able to follow a process of decentralization and diversification. Communities will be formed around the members' similarity of interests. David Godfrey states:

> What this does to the nature of boundaries is not hard to see. The individual group will have a far greater range of choice as to the degree of definition it wishes to impose upon itself. Just as new social groups, some of which are still with us today, formed out of the knowledge they gained from the bibles which Gutenberg and those who followed provided, so will we have new groups form out of the far larger body of fact, wisdom and revelation they are able to store within their own databanks.[7]

The fragmentation of people's time into individual pursuits goes directly against the current methods of media use—broadcasting. But Thompson points out the need for a countervailing force to television.

> There is a profound need to limit the impact of this overly powerful and totally seductive ephemeral medium, if it does restrict the "I—me" interaction that began with the phonetic alphabet adoption, and grew into the complex society of recent years. The return to the non-critical behaviour patterns of pre-literate man in any significant statistical quantity could spell disaster for society. Such a potential exists, if it hasn't already happened.
>
> If its extensions are chosen with appropriate care, television can play a significant role in the Information Marketplace. Because these particular extensions would involve the addition of storage means to the television medium, they would tend to ameliorate the social toxicity now associated with television.[8]

The computer-telecommunication network can renew Man's use of discursive thought but television may be able to play a more pluralistic role. Benno Schmidt sees no danger in pluralistic programming. Schmidt states:

> Fears are occasionally voiced that pluralistic programming will erode social and political cohesion, confuse consumers by an embarrassment of choices, and fractionalize audiences beyond

> the point necessary to support expensive program production. These fears seem exaggerated as a matter of prediction. They can be tested by looking at the effects of communications media where pluralism has been accepted without much question. Records and books are media that offer consumers a bewildering abundance of choice. Yet each medium generates very substantial social cohesion. To some extent, this may be attributable to the influences of other, less pluralistic media—radio, for example, in the case of records. But if radio as viewed as a force for cultural cohesion, we are dealing with as pluralistic a medium as emerging telecommunications systems are likely to offer in the foreseeable future. Moreover, even if some loss of social cohesion results from pluralistic telecommunications, this will be compensated for by the stimulus of diversity, by the opportunity for consumers to move from a passive to an active role, and by reducing the fears of manipulation of opinion that inhere in the present system of scarcity and concentration.[9]

McHale points to the expansion of Man's symbol making capabilities.

> There is obviously great potential for enlarging the range of aural and visual images and symbol manipulation. Various artists, musicians and computer scientists are exploring ways in which audio-visual media and computers can be combined together to provide new kinds of devices for communication. Such instruments might be unique means for creating images of ideas which have hitherto not been expressed in pictorial form, to translate visual symbols into sound patterns or to create verbal equivalents for audio and visual patterns.[10]

It has already been noted earlier, that Man's everyday use of language has shrunk to approximately 500 frequently used words[11] and that television has come to monopolize the symbol generating capacity of Western society.[12]

Interactive computer-telecommunication systems have the capability to reverse this shrinkage of symbols and provide Man with a creative and an active outlet for his potential. This kind of activity will require a different emphasis on institutional structure similar to the concept of feedback discussed by Stafford Beer in the use of Ashby's Law of Requisite Variety.[13]

McHale notes the difference in emphasis:

> Where we have referred also to the increasing diversity of life-styles, social movements, and social groupings, these may present similar problems of social and political cohesion. The challenge to the 'governance' institutions may, in many cases, be the reverse of their role in the past, which was to optimise conformity and stability. Their emerging task may be the optimisation of diversity in a social climate for continuing change.[14]

With information increasingly being recognized as a resource in its own right, and having noted the growth of information workers in Western society, it is apparent that a new economic base is forming. Parker provides a description of the information society:

> In the immediate future there will be small blurrings of the distinction between work and leisure, home and office. In the more distant future, it may be possible to decouple the physical-reward system from the workplace and provide all citizens with the minimum of food, clothing and shelter required to satisfy their physical needs, whether or not they 'work' in the usual sense of the term. The rewards that drive a fully developed information economy may be intrinsic satisfaction and a kind of cooperative barter economy in information. We may pay a flat or metered note for the use of the communication network itself. Information travelling over that network may be exchanged freely, just as in most telephone conversations today. Meanwhile, policies will still be required to facilitate the sale of information without incurring unduly high transaction costs.[15]

As patterns of employment change, social relations will be altered. The role of community will be rediscovered. The individual will be able to seek out people with common interests or pursuits without regard to geographic distance.

The possibility of the individual becoming further isolated as his information needs are met by the computer-telecommunication networks is remote. Other communication channels are not replaced but are rearranged. Individuals will continue to attend theatres, read books, and go to recreation centres.

Computer-telecommunication systems should not be viewed as replacing all other forms of communication but more as a powerful option that individuals will come to use in their daily lives. The advantages of the computer-telecommunication option is to place under the control of the individual an interactive device that will allow for a feasible method of searching for these events and persons that will meet his needs. It is this alteration in social relations along common interests that can provide for a change in community structure.

FOOTNOTES

[1]Mowshowitz Abbe, *The Conquest of Will*, Addison-Wesley, Reading, Massachusetts, 1976, p. 48.

[2]Drucker Peter, *The Age of Discontinuity*, Harper and Row, New York, 1968/1969, p. 27.

[3]Op. cit. (Mowshowitz), p. 146.

[4]Porat Marc, "Communication policy in an information society", Robinson Glen (ed.), *Communications for Tomorrow*, Praeger Publishers, New York, 1978, p. 4.

[5]Op. cit. (Mowshowitz), p. 146.

[6]deVille, Barry, "Unmasking a modern-day myth", article in *In Search*, Department of Communications, Ottawa, Spring 1975, p. 17.

[7]Godfrey David, "Epilogue" appearing in Godfrey David and Parkhill Douglas (eds.), *Gutenberg Two*, Press Porcepic, Toronto, 1979, p. 199.

[8]Thompson Gordon, *Memo from Mercury*, Occasional Paper No. 10, Institute for Research into Public Policy, Montreal, June 1979.

[9]Schmidt Benno Jr., "Pluralistic programming and regulation of mass communication media", article in Robinson Glen (ed.) *Communications for Tomorrow*, Praeger Publishers, New York, 1978, p. 225.

[10]McHale John, *The Changing Information Environment*, Paul Elek, London, 1976, p. 52.

[11]Fabun Don, *Communications*, Glencoe Press, Beverley Hills, California, 1960.

[12]Goldsen Rose, *The Show and Tell Machine*, Dell Publishing, New York, 1978.

[13]Beer Stafford, *Platform for Change*, John Wiley and Sons, London, 1975.

[14]Op. cit. (McHale), p. 79.

[15]Parker, dwin, "Social implications of computer/telecoms systems", article in *Telecommunications Policy*, December 1976, p. 17.

CHAPTER 9

SOCIAL EFFECTS

> Although no single communications innovation now appears strong enough to have a significant impact on our society, it seems as if a combination of already-known techniques can be assembled to produce a medium with a considerably higher level of conviviality than that present in televison-based media.
>
> In the design of a new communications medium, the particular technologies of display, delivery and editing should be chosen as a result of other considerations, such as conviviality.[1]

The point Gordon Thompson is making is that computer-telecommunications systems are not new services but rather an integration of existing communication services and hardware to the computer. This marriage of computer to telecommunication does not imply that already existing forms of media will disappear. The centralizing function of television will continue but its dominance of an individual user's time may be diminished as a result of the introduction of computer-telecommunication services.

These services, as listed in Chapter 2, will increase the diversity of information and have a decentralizing tendency on institutional structure.

The initial shape of the computer-telecommunication networks is beginning to take form. Information is playing a more prominent role in Western society and the implosive attitudes and values of the

population have manifested a need for computer-telecommunication interactive networks. This progression is irreversible and choices have to be made. If no decisions are forthcoming then the technological drive of computer-telecommunication devices may force Man to accommodate to the machine rather than use the machines for Man's purposes.

Information Overload

Man needs information. Arthur Clarke notes:

> Man is the communication animal; he demands news, information, entertainment, almost as much as food. In fact, as a functioning human being, he can survive much longer without food—even without water—than without information, as experiments in sensory deprivation have shown.[2]

Fortunately this is not Man's difficulty as information totally surrounds Man. The problem lies with the processing of information. Rose Goldsen states:

> We can never act by scanning all the facts, all the events, everything. That would add up to what sound engineers call white noise, sound and sury signifying nothing. Facts and events must be arranged selectively for us or we see only chaos. Human perception can pick out only patterns; it is the patterns that convey information, never "pure" factual data unarranged. Most of the time, when we see familiar patterns, we take it for granted that the information they convey is the same information they have always conveyed, and we act as we have always acted. As long as others around us seem to see the same familiar pattern, acting as if they, too, take it for granted, we feel no need to seek further verification. Most of the time we gauge social reality by seeing our own ideas of it verified in reflections that come back to us from the eyes of others.[3]

This role of comparing reality with others is one of the aspects of culture. Edward Hall explains how information overload occurs. Hall notes:

> One of the functions of culture is to provide a highly selective screen between man and the outside world. In its many forms, culture therefore designates what we pay attention to and

> what we ignore. This screening function provides structure for the world and protects the nervous system from 'information overload'. Information overload is a technical term applied to information-processing systems. It describes a situation in which the system breaks down when it can not properly handle the huge volume of information to which it is subjected. . . . People can handle the crunch through delegating and establishing priorities, while institutional solutions are less obvious, the high-context rule seems to apply. That is, the only way to increase information-handling capacity without increasing the mass and complexity of the system is to program the memory of the system so that less information is required to activate the system.[4]

The solution to information overload described by Hall appears be occurring in Western society. Through the self-awareness movement individuals are searching for high context situations; formerly represented in the past by myth and religion.

The computer-telecommunication networks by assisting the establishment of geographic communities based on a nascent consensus amongst its members could also lead to high-context groups while maintaining links to the low-context main culture through the common shared nongeographic space of the computer-telecommunication system.

Another aspect of information overload not resolved by Hall's response is the idea of "information pollution".

Individuals receive impersonal messages daily from newspaper, radio and television. It is not only the number of impersonal messages but the number of exposures that leads to information pollution. Ithiel de Sola Pool notes that advertising campaigns are geared to a certain rate of public exposure.[5] A cumulative rate of exposure through the use of different media is expected and sometimes desired in order to reach the majority of the public. In addition these cumulative impersonal messages are considered to be of a different type by Alvin Toffler. Toffler states:

> The industrial revolution, bringing with it the enormous elaboration of the mass media, thus alters radically the nature of the messages received by the ordinary individual. In addition to receiving uncoded messages from the environment, and coded by casual messages from the people around him, the individual now begins to receive a growing number of coded but pre-engineered messages as well.
>
> These engineered messages differ from the casual or do-it-yourself product in one crucial respect: Instead of being loose or carelessly framed, the engineered product tends to be tighter, more condensed, less redundant. It is highly purposive, pre-processed to eliminate unnecessary repetition, consciously designed to maximize informational content.[6]

Redundant information will continue to utilize the existing media channels but perhaps in a necessary way. In many respects, engineered messages, television shows, comics, contemporary music, and commercials are re-interpretations of myths which support a commonly shared information space.

Information overload also leads to limits in the production of knowledge. Abbe Mowshowitz comments:

> The development of large-scale information storage and retrieval systems as a response to the information explosion, will inevitably reinforce the tendency toward specialization. In particular, it makes it easier for a scientist to obtain references relevant to a very narrow problem area. . . . Specialization leads to yet greater pressures for selectivity in information dissemination, which in turn facilitates more specialization. The dangers of fragmentation of knowledge are often cited in efforts to establish interdisciplinary programs and institutes. But these efforts may be, strictly speaking, rearguard actions, having little effect on the general trend. . . . This follows naturally from our attitudes towards research. The value of scholarly production is inversely proportional to the dimension of the underlying intellectual interest.[7]

This description could be considered a result of overfiltering in which specialized information is the opposite of the previously mentioned information pollution. One could consider the limit of knowledge as a result of overspecialization to be the point where the

cost in time and effort, of reviewing the literature is equivalent to actually performing the experiment yourself. Simultaneity of scientific discovery will become more prevalent and resources will be wasted due to the lack of coordination. Computer-telecommunication systems will alleviate this situation to some extent but this tendency of the communication capacity of the channel being greater than the flow of information could allow the channel capacity to carry redundancy.

For the ordinary individual this problem may have no direct application to his use of filters but it is a long run limitation of the computer-telecommunication system.

Privacy Access

The application of computers to the centralization of personal information in data banks leads inevitably to the question of privacy. There is a tendency to view computer technology as being capable of monitoring all personal actions and in some manner controlling the individual. This scenario is possible but as societies become more information conscious with the diminishing of personal privacy a public reaction may control this type of activity.[8]

The notion of privacy itself is not an absolute but a culture specific value. Mowshowitz explains:

> The concept of privacy has no fixed universal meaning, and cannot be understood apart from a particular socio-cultural context. An act may be interpreted as having social significance even if it is performed by a solitary individual and has no direct consequences for anyone else. In contemporary society, it is customary to invoke the general welfare to distinguish between public and private behavior. . . . In each case, the community may perceive indirect consequences bearing on its collective interests, and seek to regulate individual behavior.
>
> The increased scope of institutional functions and their associated record-keeping requirements places severe strains on

> traditional notions of privacy. Public safety, education, health-care, and other basic services have become formal social responsibilities, whose performance necessitates information surveillance. Since computers are instrumental in these tasks, the technology itself is a powerful agent of change. The major problem we face is a redefinition of the respective spheres of public and private behavior which takes into account the central role of computer-based information systems.[9]

A difficulty in meeting Mowshowitz's redefinition of private and public spheres with respect to computer data is that there is no solution to the maintenance of privacy of data in computer storage facilities.

Taking into account this situation Mowshowitz supports a legislative solution along the following lines:

> First, it is necessary to establish as a legal principle an individual's right to limit the circulation of personal information about himself. This principle must be accepted as part of a fundamental right to privacy which can only be waived for good cause. A second policy proposal deals with procedures for classifying information in order to facilitate implementation of the first guideline. Information must be distinguished according to the use for which it is intended. Such a scheme which might, for example, differentiate between matters of public record, confidential, or strictly secret information would provide a means for controlling the circulation of data about individuals.[10]

Having discussed the case of privacy as a problem of the centralization of computer data banks, the case of access is a problem of the decentralization of computer data banks to the general population.

In contemporary Western society, information production and dissemination is generally regarded as a public good. Fritz Machlup,[11] in his investigation of the knowledge industry found that government intervention, in both education, and research and development, allowed for the consumer to receive information virtually free of charge. But

Edwin Parker takes exception to Machlup's analysis viewing the production of information to be geared for the elite of the society. Parker sets out the difficulties with this approach to information distribution and the impact of the computer-telecommunication system.

> Information policies that cater to an information elite and serve to widen the gap between the information-rich and the information-poor may have short-term advantages to elites already in power. They would, however, have the effect of limiting economic growth and of risking political upheaval by exacerbating inequities of political power.
>
> Some proposals put forward in the name of distributing political power, especially electronic-referenda proposals, may have the opposite of the claimed effect and lead to increased opportunities for demagoguery and manipulation. The real opportunity for wider participation lies in the issues of access.
>
> Lowered technical costs associated with the manipulation, storage, transmission, and reception of information will make it economically possible for near-universal access to the information resources of the society.[12]

Electronic referenda as exemplified by the Qube experiment appear to bear out Parker's assertions. The response buttons on the home consoles allow "reactions" from the community and do not encourage in-depth participation.

To facilitate the ease of access, Parker has called for government intervention. Parker states:

> Two major dangers in the development of information utilities are inequitable distribution and shortage of educational content. In the absence of an aggressive national policy backed with public funds, the information utilities will be developed by private industry with profit motivation. Without federal regulation or federal subsidy, it is unlikely that the economically and geographically disadvantaged will have access to the information utilities.[13]

Parker goes on to envision the computer-telecommunications network if government assistance is not forthcoming. Parker states:

> Without such government action, it appears inevitable that the information utilities will serve primarily that segment of the population that already has both the financial resources

> and the information-seeking and information-processing skills needed for efficient utilization. Only two kinds of information are likely to be available. One is information for which there is already a large market of subscribers. The other is information that individuals and corporations are willing to pay to have others see (for example, advertising). Thus, the needs of large corporations and the middle classes generally are more likely to be served than the interests of less privileged segments of society. This could lead to increased disaffection and alienation of the less privileged.[14]

This trend is clearly evident. Upper and upper middle income families are buying personal computers for their children. Electronic publishing firms are being established to coordinate information packages. Initial design of home use terminals are a series of buttons that are reactive while information provider terminals are interactive.

It should be expected that start up costs would require this approach in order to assist capitalization costs and to market the experimental systems. This market approach to computer-telecommunication development emphasizes allocative efficiency over Parker's equitable distribution demand.

The in-between route of a regulatory commission can be established by legislation to ensure access of a set standard. This sometimes blunt instrument has been the main device in controlling the monopolies of public utilities. The idea behind public regulation is to separate the content or messages from the carrier or the medium. For example, the activities of the electronic transmission technologies could be viewed in the same manner as the Post Office, a neutral conduit for goods and services.

But regulatory commissions can not perform all functions. Robert Kling notes the limitation:

> The foci of regulatory agencies are largely economic. Traditional regulatory agencies, for example, do not deal with the ways in which the public becomes dependent upon certain industrial products. Thus, the FCC regulates the number of television stations in a geographical area and the content of programmes, but is mute in dealing with the extent to which parents use it as an 'electronic baby sitter'. This is not to propose that regulatory agencies should extend their administrative powers into people's daily lives. It is simply important to note the traditional scope of regulatory authority.[15]

Thus regulatory commissions may require access to and a certain level of interaction with computer-telecommunication networks but not how the content is used. Having a common carrier still leaves the question of software or content unanswered. Raymond Williams believes this question is crucial.

> All this will take time and prolonged effort. The struggle will reach into every corner of society. But that is precisely what is at stake: a new universal accessibility. Over a wide range from general television through commercial advertising to centralised information and data-processing systems, the technology that is now or is becoming available can be used to affect, to alter, and in some cases to control our whole social process. And it is ironic that the uses offer such extreme social choices. We could have inexpensive, locally based yet internationally extended television systems, making possible communication and information-sharing on a scale that not long ago would have seemed utopian. These are the contemporary tools of the long revolution towards an educated and participatory democracy, and of the recovery of effective communication in complex urban and industrial societies. But they are also tools of what would be, in context, a short and successful counter-revolution, in which, under the cover of talk about choice and competition, a few para-national corporations, with their attendant states and agencies, could reach farther into our lives, at every level from news to psycho-drama, until individual and collective response to many different kinds of experience and problem became almost limited to choice between their programmed possibilities.[16]

Computer-telecommunication systems have the potential to integrate both time and space. Through their capacities for centralization computer-telecommunication networks convert every point in space into equivalent points. Locations, from the user's point of view, are

indistinguishable as far as the computer-telecommunication network is concerned. Through their capacities for decentralization computer-telecommunication systems can control the time bias by making all events relevant to their context. For example, computer-telecommunication networks could allow shoppers to know instantly the least cost price of a basket of groceries at several shopping outlets. The context for information can be differentiated to a fine degree.

The analog or centralizing function is best represented by television broadcasting where space is filled by a similar signal and events become simultaneous. The digital or decentralizing capacities of computer-telecommunication systems allows for the breakdown of the sequential aspects of time that are imposed by other information forms, such as the print medium, and to provide for an instantaneous synthesis of information within its historical context. Thus, the question of content becomes all important as a result of the digital function of the computer-telecommunication system.

Of all the limitations, the availability and control of content is the one most determined by Man and his structures. If Man is to control the computer-telecommunication system he must be prepared to do so by way of a critical consciousness. Current developments will allow Man to establish his own filters but will not immediately allow him to become an actor in a fully two-way interactive system.

The second step, Man as actor, can be fulfilled through a cultural development process utilizing computer-telecommunication systems as its base.

Summary

Computer-telecommunication systems are not eliminating existing forms of media but will place services into a single medium which will compete for the user's time. As the initial shape of the computer-telecommunication networks takes form the underlying social structures and functions will become entrenched. Trends, such as electronic publishing firms, do not bode well for the two-way interactive capabilities of computer-telecommunication systems.

Man's inability to place filters on his information may lead to information overload as a result of the low-context Western culture. Information pollution, the repetition of messages, will be alleviated to some extent even though this function is necessary for the maintenance of a main culture. Information overload leads to increased specialization and becomes a limitation on the production of knowledge due to a duplication of productive efforts in the system.

The rights of the individual with regards to privacy can only be protected through judicial legislation as privacy, a normative judgement, must be established by convention. The second right of the individual is for access to the computer-telecommunication system. Regulatory agencies are suggested as necessary to allow for efficient market allocation in the light of the need for equitable distribution.

The most pressing limitation is the establishment of a structure to allow for the availability of and control of content to remain in the possession of individuals in a fully two-way interactive computer-telecommunication system. The need for this requirement is a result of the power of the computer-telecommunication system to control

space and time. Current developments will allow Man to establish his own filters but the second step, Man as actor, must also be fulfilled through a cultural development process.

FOOTNOTES

[1]Thompson Gordon, "Is your medium convivial?", article in *In Search*, Department of Communications, Ottawa, Fall 1974, p. 14.

[2]Clarke Arthur, "Communications in the second century of the telephone", article appearing in *Creative Computing*, Vol. 3, No. 3, May/June 1977, p. 97.

[3]Goldsen Rose, *The Show and Tell Machine*, Delta Books, New York, 1975/1977, p. 245.

[4]Hall Edward, *Beyond Culture*, Anchor Books, Garden City, New York, 1977, p. 85.

[5]De Sola Pool Ithiel, "Communication systems", article in Schramm Wilbur et al., *Handbook of Communication*, (eds.) Rand McNally, Chicago, 1973, p. 7.

[6]Toffler Alvin, *Future Shock*, Bantam Books, New York, 1970, pp. 164-165.

[7]Mowshowitz Abbe, *The Conquest of Will*, Addison-Wesley Publishing, Reading, Massachusetts, 1976, p. 120.

[8]McHale John, *The Changing Information Environment*, Elek Books, London, 1976, p. 35.

[9]Op. cit. (Mowshowitz), pp. 171-172.

[10]Op. cit. (Mowshowitz), p. 181.

[11]Machlup Fritz, *The Production and Distribution of Knowledge in the United States*, Princeton University Press, Princeton, New Jersey, 1962, p. 28.

[12]Parker Edwin, "Social implications of computer/telecoms systems", article appearing in *Telecommunications Policy*, Vol. 1, No. 1, IPC Science and Technology Press, London, December, 1976, p. 15.

[13]Parker Edwin, "Technological change and the mass media", article in Schramm Wilbur et al. (eds.), *Handbook of Communication*, Rand McNally, Chicago, 1973, p. 635.

[14]Ibid., p. 635.

[15]Kling Robert, "Six models for the social accountability of computing", article in *Information Privacy*, Vol. 1, No. 2, Nov. 1978.

[16]Machlup Fritz, *The Production and Distribution of Knowledge in the United States*, Princeton University Press, Princeton, New Jersey, 1962, p. 28.

PART III

COMMUNITY DEVELOPMENT AS CULTURAL DEVELOPMENT

CHAPTER TO

COMMUNITY

The role of Man in the application and uses of computer-telecommunication technology is the determining factor. To assist Man in this endeavour a cultural development process has been called for. In addition, the concept of community has been used throughout this discussion as the foundation on which an information society can be built. These assertions must be further tested by investigating how these factors, processes, and structures can be blended together with the computer-telecommunication technology.

Definitions

Among the multitude of definitions of community three aspects are usually mentioned. These are: geographic locale, common ties and social interaction. From these three characteristics two overriding perspectives are formulated. The first perspective emphasizes the locale characteristic and is concerned with the kinds of settlements. The second perspective emphasizes common ties and social interaction. It is this second perspective that has been focused on throughout this thesis for it is the 'common ties' of the social values and cultural milieu that act as a base for community. Thus a shift in this base from agriculture to industrial to post-industrial will reverberate throughout the communities of the society. Plant states:

> There is thus a necessary connexion between man and the social form of life which he inhabits; far from the nature of society being derived from some external specification of needs, what counts as a determinate need will depend upon the way of life of a particular society, and the particular ideological forms to be found within it.[1]

Technology has had a prominent impact on the structure and function of both types of communities. The influence of the physical sciences has led to the increased use of mechanical devices in the factories and in the homes. Industrial production, with its use of specialization and tendency to reductionism in tasks, was well supported by scientific modes of thought.[2] However, the outcome of this process was to also create a greater mutual interdependence for society as a whole. This interdependence has fostered a greater need for information and communication channels.

Of all the technological advances that have transformed community, it has been communication systems that have played the significant role. Bernard explains:

> In the past community depended on spatial propinquity. It was not easy for social relationships to have intimacy and emotional depths or for social cohesion and continuity to persist in the absence of nearness. And since the beginnings of agriculture, except in such anomalous cases as gypsies and other wanderers, spatial propinquity was related to a fixed settlement. Locale was thus fundamental. . . . Modern communication and transportation technology mark the end of the community just as agricultural technology marked its advent at the beginning of human history. Once individual mobility has reached a certain level, once speed and feasibility of communication have reached a certain level, and once economic and political integration have reached a certain level, we do not need the concept of the community at all to understand how a society operates.[3]

The diminishing importance of geographic locale in the concept of community has also been noted by Roland Warren.[4] Warren discusses the "great change" in community as being an orientation towards

external systems which has resulted in a decline in community cohesion and autonomy. This decline can be termed as a lack of close-ness in community leaving the individual more exposed to societal values. Electric communication media such as television and radio have been particularly noteworthy in centralizing a community's attitudes and values towards a societal norm.

Warren views these extra community connections as stretching community along a vertical dimension causing an integration to larger national institutions. For Warren it is the horizontal dimension, the relationship between community structures that is diminishing. Even though Warren's model has been closely associated with the geographic locale characteristic, the model can be applied to all three aspects of community.

The ratio between the three dimensions of community—locale, common ties and social interaction—can be altered with the introduction of interactive computer-telecommunication networks. Through the concept of feedback social interaction could become the paramount dimension for community. Individuals through social interaction may develop common ties with other users of computer-telecommunication networks.

Effective communications can be based on three components: ease of access to stored information, size of the shared common information space and the ability to discover and develop consensus.

Hayden Roberts notes the need for the synthesis of these elements.

> Communications technology has brought about such a resource of mass media, providing instantaneous information over such a wide area, as to make these spatial dimensions irrelevant. What matters in the formation of a community is the people, roles, and places

> with whom and with which we can communicate, and we can now do this beyond small localities. The important elements in creating a community are: a centre where intelligence or knowledge can be gathered and stored, a code in which this intelligence can be expressed and commonly understood, and a channel by which it can be transmitted both ways. This alone is not, of course, sufficient: it requires, as well, a commonly agreed purpose.[5]

This commonly agreed purpose has been distinguished by Ferdinand Tonnies into two ways of organizing communities--gesellschaft and gemeinschaft.[6] Tonnies defined gesellschaft to signify industrial and economic methods of interaction.

> Gesellschaft, an aggregate by convention and law of nature, is to be understood as a multitude of natural and artificial individuals, the wills, and spheres of whom are in many relations with and to one another, and remain nevertheless independent of one another and devoice of mutual familiar relationships.[7]

Tonnies' gemeinschaft is related to the idea of common understanding and feeling towards other individuals which is based on kinship, physical proximity and intellectual affinity.

> Gemeinschaft of locality may be conceived as a community of physical life, just as Gemeinschaft of mind expresses the community of mental life. In conjunction with the others, this last type of Gemeinschaft represents the truly human and supreme form of community.[8]

The Gemeinschaft of mind can be considered one of the purposes or goals of a communications community. Computer-telecommunication systems will allow the word community to become a viable concept based on the previously mentioned communication parameters.

Through the interactive use of teleconferencing learning webs can be established which will bring together not only those individuals with similar interests but also those individuals at a particular level of development. In addition, service communies or co-operatives could be based on the tertiary service sector of the economy and individuals

with similar interests could form into communication communities.

In other words, the ease with which stored human experience will become available will allow communities to be formed around common goals or objectives regardless of locational concerns and hence individuals will be able to select their geographic location based on the interests of others in their immediate physical space. No longer will communities have to be exclusively built near rivers or railroads or near mineral or other natural resources. This is not to suggest that these types of settlements are no longer required but that the option for communities based on common interest and activities will become a possibility. The geographic dimension of community will become further integrated with the dimension of common ties.

It is this potential of computer-telecommunication systems that will allow for a gemeinschaft of mind.

Common Ties

In the past, common ties in the community encompassed the totality of Man's actions, as exemplified by the oral culture discussed earlier in Part II of the thesis. With the rise of the ideas of individualism, the social control exerted by myths and rituals weakened but did not become completely divorced from community. The need for a shared conceptual framework still exists. For without such a framework rules or norms would have no import, and the community would disintegrate. This is not to say that the shared conceptual framework must be total and complete as in traditional societies. On the contrary, discrete and partial frameworks can be shared by many communities, thus permitting the individual to engage in a number of communities. This

ability to be a participant in many communities is dependent upon the prevailing social philosophy.

Roberts points to the impact of social philosophy on the structure of the social system in the following manner:

> This relationship—the place accorded to the individual in the scheme of things—will be reflected in the nature of, and the relationships between, the other elements. In community development terms, the opportunities available to the members of society to develop themselves and initiate or participate in changes in the society are influenced by the prevailing social philosophy and social structure. The main elements of the social structure, that is the political, economic, and other institutions, suggest the need for certain kinds of knowledge and skills, and provide the resources for learning them. The relationship between social philosophy and social structure influences the way people learn about their environment, the content of their learning, the resources available to them. The social structure in other words, reflects the ends which the social philosophy sets out for the society and its members, and it creates the structural context in which learning takes place.[9]

The dimension of common ties with the development of transportation and communication facilities expands community beyond discrete geographic localities to include different levels of thought. Bernard states:

> The distribution of people in dispersed social systems is not only spatial but 'mental'. Some people are in a planetary community; some are in a national community; still others are in a community bounded by their limited interests. The bodies of people might be in one spatial area, but not their social worlds. The concept of locale has little meaning in this context. The concept of 'communality' was once proposed to refer to these locale-independent relationships.[10]

It is this pluralization of community along a consciousness continuum that will revive the buffer-like characteristic of community in the post-industrial age. It is in this regard that computer-telecommunication networks will have a decentralizing tendency. The necessity of a massive homogeneous common ties pool will no longer be

valid. The size of the common ties dimension or a common information space must be large enough to allow for social interaction without stultifying the ambitions of the members of the community.

Social Interaction

Social interaction is the process whereby ideas are exchanged and information is communicated to other members of the community. From this perspective, structures or social institutions are 'means' by which Man is able to manifest and fulfill his needs and are not the ends in themselves. Roberts states:

> Externally, the systems model helps us to recover some of the sense of the common living of social beings which may be thought to have been lost in turning away from the traditional concept of community toward more discrete and explicit human groupings. For the quality of interrelatedness exists not only within these groupings when they are seen as systems in themselves; it exists between such groupings and other groupings, all of them now seen as sub-systems of larger systems.
>
> So, although in practical terms, i.e. in terms of management of social change, it is more realistic to see community development as working through explicit organizations than through some implicit sense of social identification, systems theory enables us to relate the functioning of such discrete and explicit organizations to a wider sense of community. Indeed, systems theory requires people in explicit organizations to bear such a relationship in mind.[11]

Plant describes these groupings as functional interest groups that have grown out of the industrialization of Western society.[12] But Nisbet[13] argues that the replacement of kinship groups with voluntary associations has not been able to extend their coverage to everyone. According to Nisbet, a large number of urban dwellers do not participate in voluntary organizations. This for Nisbet leads to apathy and disinterest

Plant argues from a democratic perspective that the apathy noted by Nisbet is a result of the prevailing social structure. Plant states:

> They argue that apathy and the privatisation of life are not, as it were, intrinsic features of human nature. On the contrary they argue that it is because social and political structures have become so unresponsive to the wishes of ordinary people and become so large and bureaucratic that they cannot become involved that this privatisation has gone ahead. Men have become conditioned to apathy by an over-organised society. The solution is seen not so much in being realistic and accepting the alleged facts about human nature and its under-developed social motivation but rather in developing this side of men's personalities by making participatory institutions. It is seen as an educational objective: people have to learn again to be active citizens and it is not too farfetched to see community workers, particularly community development workers as being in the vanguard of this movement.[14]

A convivial tool, interactive computer-telecommunication networks will allow Man to become a creative actor in the community. Just as the industrial revolution broke the boundaries of kinship and locality, the communications revolution may break the boundaries of status and power. Teleconferencing points the way to establishing consensus forming networks where each individual participates equally. The establishment of computer-assisted learning groups based on interest may allow for the proliferation of ideas through the interaction of its members. Community-wide referendums may occur in which an informed populace is given the task of deciding on relevant issues.

These types of nongeographic communities enhance the potential for cross-fertilization of ideas among locale specific community members instead of the isolation faced by the geographic communities of the past. The common ties dimension will be maintained in order to allow for a common information space. Social interaction will become a process of

interaction through which consensuses on issues can be formed.

Thompson provides a summary of the task at hand.

> Clearly, the 'city of wires' must be designed to make stored human experience more readily accessible to its inhabitants, must help them to share a larger information space, one with another, and must contribute significantly to the ease with which the citizens can discover, develop and overthrow out-dated consensus in a highly pluralistic way. If this is what we mean when we talk about a wired city, then this will be significant. Suffice it to say, that wires alone do not have the necessary and sufficient relation with the goals as outlined above. The danger is that the wires become ends in themselves and the important goals get overlooked.[15]

This potential for computer-telecommunication networks to restore a horizontal dimension to community without repressing the needs of the individual will not occur automatically like a side effect to the technology. As Thompson so aptly points out, Man as initiator and actor must contribute to this process. The critical element is Man's need for a return to community in this revised version offered by computer-telecommunication technology. The alienation and anomie spawned by the industrial revolution has fragmented Man to such an extent that a backlash has been building in society. The counter culture movement of the 1960's was an attempt to re-establish a sense of community based on an alternative value system. The adaptation of computer-telecommunication technology to this purpose is a distinct possibility if the individual comes to understand technology for what it is—a tool for the use of all men.

FOOTNOTES

[1]Plant Raymond, *Community and Ideology*, Routledge and Kegan Paul, London, 1974, p. 80.

[2]Park Robert, *Society*, The Free Press, Glencoe, Illinois, 1955, p. 308.

[3]Bernard Tessie, *The Sociology of Community*, Scott Foreman and Company, Glenview, Illinois, 1973, p. 181.

[4]Warren Roland, *The Community in America* (2nd ed.), Rand McNally, Chicago, 1963/1972.

[5]Roberts Hayden, *Community Development*, University of Toronto Press, Toronto, 1979, p. 60.

[6]Tonnies Ferdinand, *Community and Society*, Harper and Row, New York, 1887/1957.

[7]Ibid. (Tonnies), p. 76.

[8]Ibid. (Tonnies), p. 42.

[9]Op. cit. (Roberts), p. 81.

[10]Op. cit. (Bernard), p. 183.

[11]Op. cit. (Roberts), p. 47.

[12]Op. cit. (Plant), p. 40.

[13]Nisbet Robert, *The Quest for Community*, Oxford University Press, London, 1953/1969.

[14]Op. cit. (Plant), pp. 70-71.

[15]Thompson Gordon, "Moloch or Aquarius?", *the*, issue 4, Bell Northern Research, Ottawa, February 1970, p. 61.

CHAPTER 11

CULTURE/CONSCIENTIZATION

From the previous chapter it can be noted that the dimensions of community are readily amenable to computer-telecommunication technology. Horizontal aspects of community, such as common ties and feelings amongst members, can be enhanced by computer-telecommunication systems but this will require a shift in societal values. Cultural development is the term used to incorporate this required societal shift in values.

Culture

Cultural change has been a continuous process throughout man's history. By the use of metaphor man continually recognizes patterns in the world which require the re-interpretation of societal myths.

Glen Eyford, in a discussion on cultural change cites the following use for culture.

> Obviously no individual can process all the messages, all the stimuli about him; therefore he must have some method of selecting those that are useful and meaningful. Traditionally this is done through a sort of cultural filter, a value and belief system which helps the individual determine what is worthwhile. If it is true that 'society has gone random!' then we must find ways of reducing the randomness, or the tendency towards entropy. Culturally oriented education then becomes an anti-entropic force assisting the individual and society to fight the tendency for things to fall apart. . . .
>
> Our culture is expressed in and through our symbolic code, that is through art, mathematics, science; language, religion and myth, and unless we are prepared to examine and revise that cultural core we face decay and anarchy.[1]

This emphasis on culture differs from psychological or sociological model of Man which is focused on various drives or social pressures for Man's motivation. The cultural model views Man's will as driven by his need to express himself and his experiences in the symbolic forms of the culture. Culture then is an ongoing group process by which reality is reaffirmed and renegotiated. It is in this cultural milieu that symbolic models and social actions come together. Culture is both a product of Man and a way of becoming human.

The implication of this viewpoint is that human nature is not a biologically fixed entity but is a sociocultural variable dependent on anthropological constants such as world openness or plasticity of instinctual structure. It is these constants that limit Man's sociocultural formations.

Berger and Luckmann go on to consider the process of socialization as central to culture. Berger and Luckmann provide the following analysis:

> Primary socialization ends when the concept of the generalized other (and all that goes with it) has been established in the consciousness of the individual. At this point he is an effective member of society and in subjective possession of a self and a world. But this internalization of society, identity and reality is not a matter of once and for all. Socialization is never total and never finished. . . . Secondary socialization is the internalization of institutional or institution-based 'subworlds'. Its extent and character are therefore determined by the complexity of the division of labor and the concomitant social distribution of knowledge.[2]

Even though the social structures or institutions may be complex does not necessarily imply that the cultural needs of the members of the society are being fulfilled. If this were the case then the complexity of Western society represented in its technology, political and economic

system, social organization and leisure system would signify a vital cultural base. Complexity by itself is not sufficient. In addition, the cultural core can remain poorly defined, particularly when the value or belief system has become irrelevant and no longer commands the loyalty of the society's members. In other words members no longer find purpose or meaning within the culture.

It follows from the discussion so far in this chapter that culture is conducive to change when members of the culture are prepared to do so.

It is into this cultural setting the computer-telecommunication technology is advancing. The question as argued throughout this thesis is not how the computer-telecommunication networks will affect culture but how the individual out of his own felt needs will generate new means of communication and integrate these symbolic forms into the prevailing habits of society with the use of computer-telecommunication systems. Computer-telecommunication networks provide a new set of alternatives and choices by which Man's task is to understand these transformations in communications and comprehend how to mesh these alternatives with new styles of symbolic representations.

According to Paul Freire, to change one's culture requires a change in consciousness. Freire states:

> To the extent, however, that interiorization of the dominator's value is not only an individual phenomenon, but a social and cultural one, ejection must be achieved by a type of cultural action in which culture negates culture. That is, culture as an interiorized product, which in turn conditions men's subsequent acts, must become the object of men's knowledge so that they can perceive its conditioning power. Cultural action occurs at the level of superstructure. . . . This analytic tool prevents us from falling into mechanistic explanations or, what is worse, mechanistic action. An understanding of it precludes surprise that

cultural myths remain after the infrastructure is transformed, even by revolution.

> When the creation of a new culture is appropriate but impeded by interiorized cultural 'residue', this residue, these myths, must be expelled by means of culture. Cultural action and cultural revolution, at different stages, constitute the modes of this expulsion.[3]

The ability of the "infrastructure" or institutions to be transformed without an accompanying cultural change has been argued by Charles Reich.[4] Reich states that in the past the slow pace of change kept the society's consciousness in accord with the underlying material realities. But with the rise of industrialism, consciousness began to lag behind reality leaving large segments of the population with inappropriate value systems. The difficulty of maintaining a consistent or adequate cultural base in contemporary society is compounded by the pluralistic nature of Western society. The shared conceptual framework for the society has contracted, leaving a multiplicity of partial universes in a state of mutual accommodation.

As a result of a diminishing common cultural base Man has become the centre for his values. Berger et al. present the situation in the following manner:

> The modern rationalization of consciousness has undermined the plausibility of religious definitions of reality. As a result, the secularizing effect of pluralization has gone hand in hand with other secularizing forces in modern society. The final consequence of all this can be put very simply (though the simplicity is deceptive): modern man has suffered from a deepening condition of 'homelessness'. The correlate of the migratory character of his experience of society and of self has been what might be called a metaphysical loss of 'home'. It goes without saying that this condition is psychologically hard to bear. It has therefore engendered its own nostalgias—nostalgias, that is, for a condition of 'being at home' in society, with oneself and, ultimately, in the universe.[5]

The psychological difficulties of this situation are immense leaving the individual to attempt to maintain a psychic equilibrium in which prevailing social forces can offer little assistance. A tendency for self-absorption instead of self-awareness leads to further social distortions.

J. R. Wilkes provides a prescription for the alleviation of self-absorption. Wilkes contends:

> The student who does not learn basic reference points drifts into relying on the self to provide the truth of life. To help prevent such a destructive drift, the school must nourish three basic reference points for life: history, present reality, and imagination. Each of these are essential to one's orientation, and it could be said that mental health itself is fostered when one is able to integrate one's past into one's present reality, and from this position to use one's imagination to see future possibilities. The same is true for a culture. The healthy culture is one which integrates past history into a present way of life which squarely faces the issues and events of the time while holding an imaginative and constructive vision of the future.[6]

Even though Wilkes' prescription is simplistic it does contain all the ingredients. A further step is noted by Christopher Lasch:

> But common sense is not enough. In order to break the existing pattern of dependence and put an end to the erosion of competence, citizens will have to take the solution of their problems into their own hands. They will have to create their own "communities of competence". Only then will the productive capacities of modern capitalism, together with the scientific knowledge that now serves it, come to serve the interests of humanity instead.
>
> In a dying culture, narcissism appears to embody—in the guise of personal 'growth' and 'awareness'—the highest attainment of spiritual enlightenment. The custodians of culture hope, at bottom, merely to survive its collapse. The will to build a better society, however, survives, along with traditions of localism, self-help, and community action that only need the vision of a new society, a decent society, to give them new vigor.[7]

All of these authors are attempting to express the idea that the open-ness of community must begin to close. The battering and shattering of the individual has left man with little sense of direction and the world out of control. To end this situation, the concept of community as buffer must be reasserted. Computer-telecommunication systems will allow the individual to return to community in order to find a sense of meaning and fulfillment.

Conscientization

Having explored the contemporary societal makeup as a trend towards a self-absorbing personality as a result of a fragmenting cultural milieu implies that individuals are becoming lost in their search for meaning. The point to be made regarding this tendency is that a change in societal values is being recognized by the individual. This does not necessarily assume that self-awareness or the human potential movement has become a degenerative process as much as it has become misdirected. Schur states:

> Self awareness may propel individuals into actions aimed at producing meaningful change. It can initiate and activate, but by itself—at least in the absence of a widely shared sense of collective interests and goals—it cannot accomplish much more. Potentially it is a significant generator of change. Whether it will fulfill this potential, however, depends on the extent to which individuals caught up in the awareness-enhancing process can move beyond its built-in limitations. . . .
>
> At present, the self-awareness movement is encouraging us to become a nation of 'direct experiencers'. This need not preclude active pursuit of social and political goals, but the danger is that the very process of experiencing will itself envelop us.[8]

If one considers self awareness as the first stage of cultural change, in that a problem with the existing cultural values has initiated a pattern of searching for meaning amongst its members, then

the second stage is the development of new metaphors or new understandings. It is this lack of development of collective interests and goals that Schur points to as the main stumbling block of the self-awareness movement.

Metaphor is at the base of conscious thought. Consciousness operates by analogy, a metaphysical space where information is manipulated and compared. In this regard conscious thought is purposively manifested by the individual in order to comprehend the world. Consciousness is intentional and is linked to an experience whether it be external or internal to the individual. One of the major means of expressing conscious thought is through the use of language. Language allows metaphor to move concretely out into the world to describe and perceive it more definitively as well as to allow metaphor to work on an abstract level linking experiences together through time.

The idea of language as a perceptual device in addition to its communication function is a central focus of Friere. Friere argues:

> Insofar as language is impossible without thought, and language and thought are impossible without the world to which they refer, the human word is more than mere vocabulary—it is word-and-action. . . .
>
> Learning to read and write ought to be an opportunity for men to know what speaking the word really means: a human act implying reflection and action. As such it is a primordial human right and not the privilege of a few. Speaking the word is not a true act if it is not at the same time associated with the right of self-expression and world expression, of creating and re-creating, of deciding and choosing and ultimately, participating in society's historical process.[9]

From Friere's argument conscious thought or understanding is not the end stage of the process of cultural change. The final or third stage is achieved by conscientization. Man becomes conscious

when he achieves a critical consciousness formed by praxis, a combination of reflection and action. Freire provides the following summary of the conscientization process:

> An explicit relationship has been established between cultural action for freedom, conscientization as its chief enterprise, and the transcendence of semi-transitive and naive-transitive states of consciousness by critical consciousness. Critical consciousness is brought about not through an intellectual effort alone, but through praxis—through the authentic union of action and reflection. Such reflective action cannot be denied to the people. If it were, the people would be no more than activist pawns in the hands of a leadership which reserved for itself the right of decision making. . . .
>
> After the revolutionary reality is inaugurated, conscientization continues to be indispensable. It is the instrument for ejecting the cultural myths which remain in the people despite the new reality. Further, it is a force countering the bureaucracy, which threatens to deaden the revolutionary vision and dominate the people in the very name of their freedom.[10]

If critical consciousness is the end stage of cultural change then why has the self awareness movement failed to achieve this goal? The answer is provided by Bauman. Bauman states:

> The idea of creativity, of active assimilation of the universe, of imposing on the chaotic world the ordering structure of the human intelligent action—the idea built irremovably into the notion of praxis—is indeed comprehensible only if viewed as an attribute of community, capable of transcending the natural or 'naturalized' order and creating new and different orders. Furthermore, the idea of freedom, associated in turn with the notion of creativity, acquires an utterly different meaning when considered as a quality of a community, from when it is discussed in terms of a solitary human individual. In the first case it is the freedom to change the human condition; in the second, freedom from communal coercion and limitation. The first is a real, genuine modality of the human existence; the second often happens to emanate from a misplaced nostalgia for a new, more suitable human-ordering-of-the-world, cast into the illusory realm of individualism by the obfuscating impact of an alienated, ossified, immobile society. The community rather than mankind, frequently identified with the human species, is therefore the medium and the bearer of praxis.[11]

Bauman's point is that the individual requires community in order to find meaning. Community can be viewed as the optimum unit by

which individuals are able to fulfull their human potential. The interactive capabilities of computer-telecommunication systems can allow this form of community to be more easily obtained by the individual. The computer-telecommunication capabilities of an expansion of metaphor through symbol regeneration, increased diversity of groups, and the use of a feedback mechanism on a large scale, can enable more and more individuals to develop a critical consciousness through praxis. The validity of Bauman's remark is found in the previous discussion of culture as being a manipulation of symbols and as the product and producer of symbols. It follows that community as a container for culture would bear the concept of praxis rather than the individual who could potentially make use of praxis.

This three stage process of cultural change, awareness, understanding and consciousness has been applied in terms of adult literacy based on the ideas of Friere and centering on language.

To transpose these ideas to contemporary Western society one can use as the vehicle the computer-telecommunication system discussed in this thesis. It has already been pointed out that the cultural values of Western society are under review and that a number of people are at the first stage of cultural change: awareness. This stage has been growing[12] and can be linked with Reich's idea of consciousness lag, in that there is a gradual shift in cultural values. The ascendancy of Consciousness III[13] appears to have become a self absorption process as a result of a lack of an efficient outlet for the growth of communities of meaning.

From this demand one can view the computer-telecommunication networks as filling this vacuum and meeting the felt needs of the individual. The computer-telecommunication networks will allow for the second stage of cultural change; understanding. Conscious thought or understanding is based on metaphor and to date language has been the major medium. With the computer-telecommunication system metaphor will be expanded through teleconferencing, computer games and general information access.

The final stage, critical consciousness, is not a product of the computer-telecommunication network but must beproduced by the users. What the computer-telecommunication system allows is a greater degree of diversity or plurality while a central cultural core is maintained. People will be able to form geographic communities of interest as previously discussed in the Community Chapter. It is from these communities that praxis can take root.

FOOTNOTES

[1]Eyford Glen, "Working paper on culture", in Stewart Lorne (ed.), *Teacher Education in an Emerging Social Context*, Faculty of Education, University of Alberta, Edmonton, 1979, pp. 30-31.

[2]Berger Peter and Luckman Thomas, *The Social Construction of Reality*, Doubleday and Company, Garden City, New York, 1966/67, pp. 137-138.

[3]Freire Paulo, "The adult literacy process as cultural action for freedom", article in *Harvard Educational Review*, Vol. 40, No. 2, 1970, pp. 216-217.

[4]Reich Charles, *The Greening of America*, Bantam Books, New York, 1970, p. 17.

[5]Berger Peter et al., *The Homeless Mind*, Vintage Books, New York, 1973, p. 182.

[6]Wilkes, J. R., "Narcissism or truth at the crossroads", article in *Canadian Mental Health*, Vol. 27, No. 3, September 1979, p. 16.

[7]Lasch Christopher, *The Culture of Narcissism*, W. W. Norton and Company, New York, 1979, p. 235.

[8]Schur Edwin, *The Awareness Trap*, McGraw Hill Book Company, New York, 1976, p. 16.

[9]Op. cit. (Freire), p. 212.

[10]Freire Paulo, "Cultural action and conscientization", article in *Harvard Educational Review*, Vol. 40, No. 3, August 1970, p. 473.

CHAPTER 12

ROLE OF COMMUNITY DEVELOPMENT

Process

The emphasis placed on culture in this thesis has its justification in a remark made by Saul Alinsky:

> Those who build People's Organization begin realistically with what they have. It does not matter whether they approve or disapprove of local circumstances, traditions and agencies: the fact remains that this is the material that must be worked with. Builders of People's Organizations cannot indulge in the sterile, wishful thinking of liberals who prefer to start where they would like to be rather than with actual conditions as they exist.[1]

Working from where the people are at implies a necessary feel for the cultural values and attitudes of the community. In Chapter 11 of the thesis it was noted that cultural values are shifting the population of contemporary Western society from a passive, inefficacious lifestyle to an active dynamic life. This process is in a volatile transition stage and the impact of computer-telecommunication systems has the possibility of further promoting this shift.

Community development practitioners have often overlooked the importance of culture or have taken culture as a given; an immobile stable force. This has led to changes in the structure of community without a subsequent change in the power distribution of the community. In most instances community development practices have been co-opted by the prevailing conventional wisdom. Hayden Roberts notes:

> Such an analysis suggests, within the present framework of things, severe limitations of community development as a process of changing the broad economic and political environment. It is, in fact, marginal to the main process of social and political change-- . . .
>
> Which is to suggest that the marginality of community development and its relative ineffectiveness as a process of wide change or as an influential element in the whole political system is related to the dominant political and social paradigm in which it operates. . . . But it is precisely in such a mass society, with its values based on economic returns, largeness of scale, multinational corporations and international decision making, and the remote rule of 'experts' that endeavor is unlikely.[2]

Roland Warren also provides a description of the failure of community development to initiate change in the sociopolitical system of Western society. Warren states:

> Whatever the ultimate resolution of this relationship may be, the conclusion seems to be warranted that community development programs which have not sought a redistribution of power have encountered fewer difficulties and less resistance than those which have. As a consequence, the temptation, once again, has been to work with the existing power structure in order to get the job done (or even in order to be able to work at the job at all), rather than to restructure the power configuration by a partial transfer of power to formerly powerless segments of the population. To the extent that this has occurred, to the extent that programs have worked with 'the same old power group', they have come to be seen as 'system-maintaining' rather than 'system changing', as ways of preserving the power status quo by giving the semblance of broad participation without its reality.[3]

Charles Reich goes even further in condemning liberal and radical approaches to social change. According to Reich, not only have these approaches failed but they have triggered a reactionary response. Reich contends that:

> We must no longer depend wholly upon political or legal activism, upon structural change, upon liberal or even radical assaults on existing power. Such methods, used exclusively, are certain to fail. The only plan that will succeed is one that will be greeted by most social activists with disbelief and disparagement, yet it is realistic--the only means that is realistic, given the nature of the contemporary State: revolution

by consciousness.

> Any discussion of the means of change must start with a recognition that our present course, including nearly a century of liberal and radical struggles by orthodox means, has brought us to the brink of an authoritarian or police state. Liberals and radicals both assume that this proves only that more of such efforts are needed. Is it not possible that they are wrong? Despite all efforts at reform by legal and political means, for the past twenty years we have helplessly watched the coming of a closed society.[4]

Reich calls for cultural revolution as a process by which contemporary society can bring about necessary change. As argued by the writer in Chapter II, cultural change consists of three states; awareness, understanding and consciousness. Computer-telecommunications systems can be the vehicle to move people from stage one to stage two; the use of metaphor and cognitive thought. From here, conscientization, the development of critical consciousness is required before cultural change is completed. In many ways conscientization is the internalization of the new values into the daily praxis of the individual.

This process is not structure-bound and does not require computer telecommunication systems. This fact is demonstrated by the literacy training of Paulo Freire, a South American adult educator.

The focus should be on 'process', a prevailing concept in community development but in most instances viewed as a sociotechnical process of structural change. Edward Hall explains:

> In American culture, depending on our philosophical orientation, we blame such failure on either the individual or the social system. Seldom do we look to our lack of understanding of the processes themselves or entertain the notion that there might be something wrong with the design of our institutions or the manner in which the personality and the culture mesh. Much of this frustration stems from people's failure to quite understand the more obvious, superficial manifestations of the institutions they have created.[5]

It is the logic-symbolic underpinnings of institutions that require change once the variety and diversity of the society has overflowed the structural bounds. The process is the means which have become ends in themselves. The process for this undertaking is praxis, reflection and action, where means and ends become one and the same. In order to secure praxis one must have community. Community is formed when a group not only shares an awareness of tensions but creates a conscious set of objectives that clarify the identity and membership of the group. Community development includes this process of community creation.

Even though the writer has argued for the inevitability of computer-telecommunication systems on socio-technical and logico-symbolic cultural grounds, the need for community development to ensure adequate policy formulations was aptly demonstrated in Chapter 9. Peter Berger comments on the required change in perspective in order to complete this analysis:

> The central mythic motif in these quests is the hope for a redemptive community in which each individual will once more be 'at home' with others and with himself. This motif of a redemptive community is present in the great religious and political movements of messianism since the sixteenth century. . . .
>
> The dream of bringing about a redemptive community necessarily carries revolutionary implications for the institutional order of the status quo. This was so in premodern times and societies. The peculiarly powerful thrust of this dream under modern conditions is due to the confrontation between the dream's vision of 'home' and the actually experienced state of 'homelessness'. In other words, the cry for community comes de profundis. But the quest for community, while always antagonistic to the order of modern industrial capitalism in at least potentially revolutionary way, may take either a 'reactionary' or a 'progressive' form. . . .
>
> The quest is 'reactionary' when it locates the longed-for community in the past, be it a real or a fictitious past. . . . By contrast, the quest is 'progressive' when the redemptive community is projected into the future. Here there is a vision

> of a 'homecoming' that is altogether new—indeed, that is eschatological in the proper sense of the word. Not only the present but the past is perceived as unredeemed; therefore there can be no return, only movement forward. Even true humanity still lies ahead.[6]

Berger's perspective further reinforces the idea of community development as cultural development. Only by searching out a revised culture in a future community can Man once again achieve a sense of 'home'.

This same sentiment is expressed by Daniel Bell. Bell comments:

> The principle of culture is thus that of a constant returning—not in its forms, but in its concerns—to the essential modalities that derive from the finitude of human existence. . . .
> What, then, are the guides to human conduct? They cannot be in nature, for nature is only a set of physical constraints at one extreme and existential questions at the other, between which man threads his way without any maps. It cannot be history, for history has no telos but is only instrumental, the expansion of man's power over nature. There is, then the unfashionable traditional answer: religion, not as a social 'projection' of man into an external emblem, but as a transcendental conception that is outside man, yet relates man to something beyond himself.[7]

This transcendental quality can be related to Frankl's idea of man's search for meaning. Thus the role of community development should be viewed as the process whereby Man searches for meaning. The possibility for computer-telecommunication systems to aid in this endeavor is immense.

Summary

From Part I, the development of computer-telecommunication technology is steadily advancing. Experimentation with delivery systems and types of service is still in its infancy but the potential for rapid development is being driven by the technology. Two technological factors are at work; increased storage capacity and ease of access reflected in

speed of transmission. Both of these factors are being combined to provide for a unified computer-telecommunication network which can absorb all present forms of information services.

The thesis showed that past alterations in communication media, such as the alphabet, the printing press, and broadcasting have impacted on the society and changed social relationships. The potential for computer-telecommunication systems to initiate similar wideranging social changes is based on the following two premises. Firstly, that the computer-telecommunication technology can allow the individual to filter his own information to suit his needs rather than the present unidirectional, all or nothing approach of existing mass media. Secondly, the interactive capability of computer-telecommunication systems can allow for the individual to become an active initiator and creator of information versus the present passive, inefficacious role required of unidirectional media.

In addition to these aspects, the creative potential for the use of metaphor and feedback to enhance symbol regeneration permits a search for a sense of community. The writer has argued that this search for community has already commenced with the fragmentation of existing social values. Into this environment, the computer-telecommunication system can act as a vehicle by which individuals can more readily form communities based on shared interests and social interaction through a cultural development process. The cultural development process is comprised of three stages; awareness, understanding and consciousness. As outlined, the computer-telecommunication system can aid in the development of understanding as a result of increased diversity. The

computer-telecommunication system can not automatically provide for this achievement. It is Man who must harness and use the computer-telecommunication technology for these purposes.

The potential for computer-telecommunication technology to be used as a unidirectional medium with only reactive capabilities is demonstrated by the Qube experience and the establishment of electronic publishing firms by existing newspaper conglomerates. These difficulties must be overcome in the legislative and regulatory arenas. The role of community development should not only be to focus on these public policy issues (even though they are important) but to also assist in the cultural development process through the practice of community development principles of self help, group process and adult learning.

The writer has argued that the development of the computer-telecommunication medium can lead to greater human potential and fulfillment. Rather than fearing the technology, community development practitioners must assist society in utilizing the technology to form a variety of communities. Only by searching out a revised culture in a future community can Man once again achieve a sense of 'home'.

FOOTNOTES

[1]Alinsky Saul, *Reveille for Radicals*, Vintage Books, New York, 1946/1969, p. 77.

[2]Roberts Hayden, *Community Development*, University of Toronto Press, Toronto, 1979, p. 42-43.

[3]Warren Roland, *The Community in America* (2nd ed.), Rand McNally, Chicago, 1963/1972, p. 386.

[4]Reich Charles, *The Greening of America*, Bantam Books, New York, 1970, p. 323.

[5]Hall Edward, *Beyond Culture*, Anchor Books, Garden City, New York, 1977, p. 105.

[6]Berger Peter, *Pyramids of Sacrifice*, Anchor Books, Garden City, New York, 1974/1976, p. 24.

[7]Bell Daniel, *The Cultural Contradictions of Capitalism*, Basic Books, 1976/1978, p. 166.

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