

**NETWORKS, NETWORKING  
AND  
ADVANCED EDUCATION:**

**A PRELIMINARY REVIEW**

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NETWORKS, NETWORKING AND ADVANCED EDUCATION:

A PRELIMINARY REVIEW

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## INTRODUCTION

### Objective:

The main objective of this paper is to stimulate, clarify and focus thinking in relationship to the increasingly common phenomenon of networking, particularly as it bears on advanced education. The essential question is whether "networking" is significant in relationship to advanced education, and if so, how those who are responsible for advanced education in Alberta might pursue these issues further so that their actions are informed by an adequate understanding.

Accordingly, the main elements of this report are:

- ° the fact and nature of networking (Section I);
- ° why it is happening, the sources of networking:
  - ° economic (Section II);
  - ° scientific (Section III)
  - ° psychological and social (Section IV);
  - ° technological (Section V);
- ° the emerging shape and significance of networking (Section VI);
- ° avenues for further exploration and action (Section VII).

### A Word About This Paper:

This paper is a preliminary review and discussion document. Therefore, the style is pointed and suggestive, rather than exhaustive. The intent is to provide the reader with a preliminary overview and orientation.

### A Word About Perceptual Lag:

It is now commonly recognized (although often ignored in practice) that our recognition of emerging situations lags behind the actual emergence of those situations. What is more, our understanding of a new situation even lags behind our

recognition of it. These facts, which McLuhan caught in his image of going through life looking in a rear-view mirror, are a source of discomfort. They suggest, particularly to those who have formal responsibility for the future shape of our organizations and institutions, that unless we learn to be far more perceptive and discerning than up to now has been common, we will mistakenly assume that our understanding of the future is adequate, when in fact it is not.

The present difficulties of the Chrysler Corporation are a classic example of inattention to a subtly but profoundly changing situation. The heart of Chrysler's problem is inappropriate product and not the quality of that product. Appropriateness is, of course, a contextual term. Things are appropriate or inappropriate in given contexts. In short, Chrysler ignored its context. It mistakenly assumed that its context would not change and was not changing. Simply put, they were wrong.

The importance of understanding one's context is underlined by William Ascher in his study Forecasting: An Appraisal for Policy Makers and Planners (1978). He undertook the study because he recognized that forecasts were easy to make and that accurate forecasts were extremely rare. He therefore set out to see if he could isolate and identify those factors which were common to accurate forecasts. His major conclusion is that the major determinants of accuracy are the "core assumptions underlying a forecast, which represent the forecaster's basic outlook on the context within which the specific forecasted trend develops. . . Assumptions are even more important to the accuracy of a forecast than the methodology used in making it."

There is a further difficulty in relationship to the adequate perception of new cultural forms: namely, until we have lived with a new thing for some time, we tend to see it and therefore to use it in old and known ways. This can be seen in the initial response to the automobile: it was called a "horseless carriage". In fact, it is only recently that we have understood the impact of the automobile on the shape and form of our culture.

The same perceptual habits can be seen in the introduction of television monitors in virtually every university in North America. They were introduced in classrooms which ranged in size from 100 to 1,000 as surrogates for a live professor. Gathering people in such rooms for lectures was the way universities knew how to teach. It was natural that this would be the way universities used television. It was also,

unfortunately, an inappropriate way. T.V. is a small group medium. Only now is this being understood. Only now is the old pattern beginning to change and only in some places.

The same pattern can be seen our early perception of and use of computers. It is only now dawning on us that the machines we commonly call computers are in some important respects not mere machinery;\* that they do not merely compute, but assist us to process information; and that these shifts in language represent substantial and not merely semantic differences.

These facts justify the attempt to explore and understand the newly-emerging fascination in North America with networks and networking, and to ask what they portend for the future. For if it is the case that networking is of no particular significance, then we can carry on as before. However, if the phenomenon of networking can be tied to, and is an indicator of, more fundamental changes within the culture, then we had best attend both to the phenomenon and to the underlying cultural changes. They may indicate a change in context that bodes ill for traditional forms of higher education.

In this light, this paper can be seen as an exercise in foresight. It attempts to discern the significance of networking while it still is at an early stage of development, when its outlines are difficult to determine.

If the networking phenomenon were clear and unambiguous, this paper would not be necessary. It is precisely because this is not yet the case, because the evidence is not etched so sharply that all easily agree as to its presence and significance, that this exercise is both important and difficult. I do not claim that my judgement in all that follows is infallible. However, I am convinced that the networking phenomenon is far more significant than is commonly understood, and that it deserves far more critical attention than it is now given.

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\* If by 'machinery' one means those perceptions and mechanisms which underlay and powered the industrial age, then in important respects information processors are not machinery. The differences are both in internal structure and in external relationships. In fact it is these differences and their significance that are one of the driving forces behind the present transition from an industrial to an information era. This is the reason that the "post-industrial" age should not be confused with a "hyper-industrial" age.

SECTION I  
NETWORKING — WHAT IS IT?

"A system, etc. of interconnected or cooperating individuals."

Webster's New World Dictionary

The Fact and Variety of It

Before attempting to analyse and grasp the nature of the networking phenomenon that is emerging publicly in North American society, it may be helpful to consider a somewhat random set of examples of networking itself.

- In October 1980 the National Library of Canada announced the creation of a new series, The Canadian Network Papers, in these words: "The National Library of Canada will begin publishing a new bilingual series of occasional papers in the fall of 1980. Canadian Network Papers will encompass papers dealing with a wide variety of issues to be considered in the development of a decentralized Canadian library network. Topics which are of nationwide concern to Canadian libraries and which will contribute to the strengthening or creation of existing or future links among libraries will be examined in this series. . ."
- The Canadian Association for Future Studies is offering a networking service to its members. The CAFS network will enable CAFS members to get in touch with others in Canada who have similar interests to their own. The image of CAFS is changing from a national voluntary organization in which members are passive recipients of information from head office, to an organization which provides an opportunity for people to connect with others who share their concerns and interests. These connections will be developed in ways that those who do the connecting deem to be appropriate. No longer will the head office be the main focus of action.
- The main concern of participants in a recent conference on the future of the Central Alberta region was a concern to stay in touch with one another in order to provide support and encouragement to one another. The question asked was,

"how can we create a network among us to facilitate our connecting?" Regret was expressed that a computer-based network to serve such a purpose was not already at hand at an affordable price.

- In Toronto, one of the new entrants in the field of adult education is the Way Meet Learners Market. Rather than organize and offer courses in the normal way, the Way Meet Learners Market is a tabloid listing of hundreds of people in the Toronto area who have particular skills and knowledge, and who are willing to share them with others. Way Meet does not offer courses; it offers the opportunity to make connections. The actual arrangement and style of the "learning situation" is left to those who wish to pursue specific issues with specific people. The Skills Exchange network operates on a similar model.
- In Vancouver, Ottawa, Toronto, and an increasing number of Canadian cities, women's networks are emerging and being greeted enthusiastically by hundreds of women in each city. Women's networks are explicitly organized to assist women to connect with others who can assist them in particular areas of their career development, or who they in turn can assist. Two books have been published recently devoted to helping women understand the importance and functioning of such networks: Networking, 1980, and Women's Networks, 1980.
- A Toronto consultant who wished to learn and work at his Spanish did not enroll in a language school. Rather, he placed an ad in the local Spanish newspaper, seeking someone who would speak with him on the telephone for two hours a day. Not only is he meeting his need, but he speaks with someone who knows the business community in Latin America and therefore has the vocabulary he needs to develop. His learning costs roughly 20% of a normal language school, and occurs without his having to leave home.
- There are hundreds of small newsletters such as "Turning Point" which do not "demand adherence to doctrines, manifestos and resolutions" but rather "enable us as volunteers to help and to seek help from one another". The range of subjects of such newsletters is virtually endless. However, the style is essentially similar. Without reference to rank or formal background, those who share a common concern are enabled to discover one another and then pursue their interests as it seems appropriate to them.
- Over the last nine months of the Constitutional debate, "The Canadian Connection" arose in Ottawa to facilitate linkages and connections among the various citizens groups in Canada who wished to be involved in the constitutional

discussion. The main thrust of The Canadian Connection was not the content of the government resolution, but rather the process by which it was debated in Ottawa and in the country. The Canadian Connection was in touch with dozens of volunteer and citizens groups across the country, so that each had a better sense of what others were doing, and so that groups with similar views could come to know of and support each other.

- Each office in the Canadian headquarters of Amoco in Calgary is now linked to a computer. Each secretary and officer has a computer terminal at his or her desk. The computer is programmed not only to handle a message service, but to assist in scheduling meetings, to allow two or more persons to create documents together, and to provide a common base of knowledge for the company's operations. In the first year of service, electronic messaging replaced 60%-75% of the phone calls that would have been made without the electronic system.
- The Xerox Corporation has the first effective local network in place -- its Ethernet Network. This allows all Xerox and other compatible electronic office equipment to be linked and operated as a single system. At the moment, the limits of the system are a one-mile radius from a central point. Other such systems are under development.
- The Electronic Information and Exchange System (EIES) in Newark, New Jersey, now operates as a commercially-viable worldwide computer conferencing service. The system is designed for electronic messaging, computer conferencing, text editing and electronic newsletters. As the designers of the system, Murray Turoff and Starr Roxanne Hiltz, say in their book The Network Nation (1978), "the main point for the reader to keep in mind is that designers and users of these systems have just begun to discover the power, efficiency and ease of group communication made possible by the computer."
- The Saskatchewan government has undertaken to install a fibre optic transmission network which will link all major and middle-sized centres in Saskatchewan by 1984. By that time over half the population of Saskatchewan will be on this network. It will require 3,200 kilometres of fibre optic cable.
- One of Canada's major churches is trying to understand the conceptual and the practical implications of transforming the church over the next ten to twenty years from a "bureaucratic hierarchy" to a "holographic network".

- It is just beginning to dawn on some who are involved in political parties in Canada that a "party" is an invention of the 18th and 19th centuries which presupposes both the worldview and the technological structure of that time. The 21st century analog is not a party, but a network. Some speculate that the first political party which understands the difference between parties and networks and is able to transform itself into a political network will be able to dominate the next several generations of Canadian federal and provincial life.
- A researcher based in a university wishing to become familiar with the cutting edge of an area related to his own, first accesses an electronic data base which includes current citations and text in the area, and then makes selected phone calls to those persons who are deemed to be on the cutting edge of the discipline.
- The Alberta Minister of Education is now linked electronically with his Deputy Minister by Xerox 850 word processors. Their offices are about a mile apart. The Minister also uses his word processor as a terminal to tap into various data bases at the University of Alberta.

All of the above are examples of networking. The questions that immediately come to mind include the following:

- What is networking? Can we develop a sharper sense of it?
- Is it significant and substantial, or just a new name for old and well-known human behaviour?
- Why is the language of networking more common now than it was?
- What does this portend about the future?
- How, if at all, should we respond now?

### What is Networking?

The first thing to note is that our consciousness of networks and networking has been increasing, particularly during the last decade. The language of networks and networking is common today in a wide variety of organizations, whereas twenty years ago networks meant telephones, television and radio systems, not something that ordinary people do both in and outside of their formal jobs.

The increasing awareness of networks and networking can be seen from the fact that the number of citations in journal articles which include the words "networks" or "networking" has been increasing steadily.

On March 26th, 1981, the ABI/INFORM data base was searched to determine the number of citations for any combination of the following words: network; networks; or networking; together with any or all of: teleconferencing; computer conferencing; or community. The results were as follows:

<u>Year of Citation</u>	<u>No. of Citations</u>
1980	205
1979	198
1978	150
1977	132
1976	80
1971-1975	110
Total:	902

The ABI/INFORM data base has been designed to meet the information needs of executives and covers citations to printed material regarding all phases of business management and administration. Approximately 400 publications are scanned, abstracted and included in the data base.

A similar search in the ERIC (Educational Resources Information Centre) data base reveals the following pattern:

<u>Year of Citation</u>	<u>No. of Citations</u>
1976-1980	1,288
1970-1975	1,188
1966-1969	296

A search of the LISA (Library and Information Science Abstracts) data base reveals the following pattern:

<u>Year of Citation</u>	<u>No. of Citations</u>
1976-1980	214
1970-1975	75

A search of the ABI/INFORM data base for any form of the word network with any form of the word education revealed the following pattern:

<u>Year of Citation</u>	<u>No. of Citations</u>
1980	33
1979	23
1978	20
1977	8
1976	9
1970-1975	15

Finally, a search of the ABI/IFORM data base for 'network' in any of its forms with 'government' in any of its forms provided the following results:

<u>Year of Citation</u>	<u>No. of Citations</u>
1980	78
1979	59
1978	59
1977	37
1976	29
1970-1975	45

The second thing to notice is that the focus of human attention is not merely on networks, but on networking. While the concept of networks as a pattern of linkages among animate or inanimate objects is well-established, the development of the verbal form 'networking' is a recent phenomenon.

In my judgement, the concept of networking is the more important of the two. Grammatical niceties to the contrary, it suggests that there is emerging within the society a recognition that one is not merely in a network--a part of a network--but that the creation of networks is something that human beings do. Networking is a verb. Therefore it is a human activity, rather than a state of affairs. As an activity, networking is not only something we do but something we do well or badly. It is a learned skill. The two books on women's networking presuppose this understanding. They are not merely seeking to describe an activity in which some women are engaging. Rather, they are seeking to encourage and instruct women in what is seen as a new social skill. Networking suggests both human activity and human agency. Networking thus understood is restricted to human beings, to persons.

Third, the motivation to network arises internally and is not imposed externally. It is a function of one's person and not merely one's position. That is, people network in response to some desire, some felt need. It may be a need to share themselves, to get information or extend their own budgets, by sharing costs, but the underlying motivation is always because the person engaged in the networking wants to link up with another in order to meet some felt need.

Fourth, networking is engaged in voluntarily. It is not merely a function of one's formal role or position. Put another way, one cannot be forced or coerced to become a networker, nor can one who is reached out to be forced to share in a network with those who for whatever reasons are disliked or distrusted. Put negatively, in any situation in which a relationship is created and/or maintained solely because the power relationships of those involved coerce the relationship, then it is not a networking relationship.

The voluntary nature of the networking relationship is very important. While it does not exclude all work-related relationships—for the majority of these are still entered into voluntarily--it does exclude the possibility that human networks can be created, maintained or extended by those who are unwillingly forced to engage in such activity by others.

Fifth, networking creates a connection or relationship where one did not exist before. In these terms, a network of networkers is a pattern of relationships among living human beings, and not a pattern of hardware. This point is essential. Networking is a human response which, in principle, is independent of technology. It is not created by technology or technology-driven. In the sense used here, networking is not to be equated with computer-conferencing or computer-messaging. It may be the case--in fact, it will almost certainly be the case in the future--that some form of electronic hardware is involved in supporting human networks. But the desire and capability to network is logically and historically prior to the development of any particular technology.

In this light, the question of why there is a growing fascination in North American society with networking is even more interesting than it might otherwise appear to be. For only part of the answer rests with the types of technology now or

soon-to-be available, which can facilitate networking. Much of the answer, as will be seen below, rests with other factors--economic, scientific and social/psychological.

Sixth, networking relationships provide information or support in a form that is mutually beneficial at a time and in a place that is mutually agreeable. In other words, there is a particularity to the networking relationship which is unique to those involved in it. The relationships have the particular character that those involved with it want them to have. Standardization has no place in a networking relationship, nor does the concept of a mass appeal. In marketing terms, networking is a form of demand distribution.

The above features can be seen in the definition of networking offered by Mary-Scott Welch in her book Networking:

"It's the process of developing and using your contacts for information, advice, and moral support as you pursue your career. It's linking the women you know to the women they know in an ever-expanding communications network. It's building a community of working women, across professional and occupational lines, outside the old boys' network. It's helping each other to become more effective in the work world--with more clout, more money, more know-how, more self-confidence. It's beating the system that isolates women as they move up in male-dominated environments. It's asking for help when you need it--knowing when you need it, knowing whom and how to ask for it. It's giving help, too, serving as a resource for other women. In sum, it's getting together to get ahead."

This definition, however, is both too cumbersome and too specific to the concerns of women's networks to serve as a general definition.

The definition from Webster which began this section is helpful, but it leaves too much out.

My own definition, therefore, follows:

By networking I mean an activity in which persons engage voluntarily because they desire to connect with and possibly relate to others who can meet a particular need at a time, in a place and in a way that is mutually compatible and beneficial, without particular reference to other considerations, which are essentially external to their relationship, e.g. formal role, position, title, or organization.

This broad understanding of networking, then, encompasses within it any of the particular forms of networking now known in North America: informal networks within a community of women who meet for coffee; the network of those who are on the cutting edge of any particular subject or field, be it microbiology, future studies or digital mapping; a network of women within a particular organization or city who are seeking to support one another; or a network of those who have temporarily come together to learn a new skill.

It is now time to ask the questions: why has the interest in networking arisen at this time? What are the forces behind it? What are the sources of networking? The next four sections are devoted to answering these questions.

## SECTION II

### THE ECONOMIC AND ORGANIZATIONAL SOURCES OF NETWORKING

#### Pressures to Share Information and Experience

There is no question that in virtually every organization, whether business, government or voluntary, there are increasing pressures for those with particular responsibilities to seek out and connect with others who have similar responsibilities and experience, so that they may learn from one another. The form of the sharing of information and experience differs widely from setting to setting. It ranges from new acquaintances who discover at a dinner party that they have similar interests, meeting later for lunch, to the organized women's networks, to the national network of libraries which is now emerging within Canada, to the creation of the Inter-governmental Committee on Urban and Regional Research, to the forthcoming exploration among those who have an interest in developments in land-related information systems to determine if their interests are sufficiently similar to create a network for systematically sharing information. Each reader, I am sure, can provide other examples out of his or her own experience.

Three of the factors which contribute to this increasingly widespread and powerful desire to share both information and experience are the following:

1. The recognition that funds, and indeed all resources, are scarce rather than plentiful, and that this will be the case for the foreseeable future. In other words, it is slowly sinking into both public and private consciousness that the period between 1950 and 1973 was an economic and a social aberration. There is no likelihood we will return to conditions which saw low inflation, steady growth of 4% to 7% in the GNP, and an increasing share of the GNP being spent by governments. It is simply no longer the case that there are many organizations which have enough resources to meet all of their own needs by themselves on their own time frame, without reference to others.
2. A second factor comes from the recognition that the world of the future will at the least be increasingly complex and interdependent. Decisions taken in one area turn out to have second, third, or fourth order consequences of substantial

magnitude for others who were not initially taken into account or consulted. Hence, an increasing number of organizations engage in some form of environmental scanning. There is a need to know what others are doing now that will affect one's own future. There is a need, in short, to learn to talk with others who previously were ignored and share information about present and planned projects.

3. The third factor is the recognition that information is itself a valuable commodity, even if it does not have all the characteristics of other economic goods. It is increasingly recognized that gathering, patterning and clarifying raw data into useful information is a very expensive and time-consuming operation. This being the case, there is an increasing tendency: (a) to look for secondary uses of the information one have created--that is, to share it with others; and (b) to determine if others already possess the information or experience that one needs.

#### The Pressure to Utilize Information

One of the changes that is slowly occurring in our society is a shift from rewarding persons or institutions for the mere possession of information, to rewarding those who can assist us to utilize what is known. This shift can be seen in the increasing concern and literature about the utilization of knowledge. It can be seen in the shift in language from "management information systems" to "decision support systems". It can be seen in a study on the future of non-theatrical film in Canada which suggested to the National Film Board that its mandate in the future should be the production and utilization of film, rather than the production and distribution of film. It can be seen in the Technical Information Service of the National Research Council, the sole raison d'être of which is to assist small and medium manufacturers in Canada to put into use knowledge that emerges from Canadian laboratories.

The interesting thing in this shift from mere possession to utilization of knowledge and information is that utilization is inherently a social concept. One can possess information by oneself in isolation, but utilization is in the context of living and doing, which is inherently social.

The reader will also recognize that the above factors are an ecological and not a linear set. They must be held together and seen in relationship to each other because they in fact influence and reinforce one another. This of course is true not only of these economic and organizational factors, but of all the factors which create pressures towards networking. For example, the pressure to value information in use, fits with and reinforces the pressures of individual persons to demand that information suit their particular situations and needs. (See Section IV below.)

### SECTION III

## THE SCIENTIFIC SOURCES OF NETWORKING

I have suggested earlier that our consciousness of networks and of networking is a fairly recent phenomenon, even among reasonably literate people in North America.

We now understand enough about the dynamics of social and cultural change to know that while new concepts and interests may appear to emerge almost overnight, in fact there are long historical antecedents which create the conditions for the public emergence of new interests. Developments in science, particularly in this century, are the most powerful forces that have prepared the now-emerging public interest in networks and networking.

There is no question that both our general understanding of the nature of scientific activity and the understanding of particular scientific disciplines have undergone fundamental conceptual reorientations since 1900. This is not to say that all that was known before is of no value. No revolution is that complete. It is to say, however, that the fundamental frameworks within which scientific activity now takes place is a framework that earlier scientists would have rejected as not only wrong-headed but inconceivable.

At the heart of the new understanding of science is the recognition that bits of scientific data are neither ontologically or epistemologically discrete, but relational. This being the case, what is of fundamental interest to scientists is not the facts in themselves but the patterns, relationship and rhythms of data. What is more, it is now commonly recognized that the scientific enterprise is inherently a communal enterprise, rather than an enterprise of isolated and self-contained individuals. Historic relationships, in short, are not only essential to understanding the particular subject matter of any given science, but essential to understanding the nature of scientific enterprise itself.

What is interesting for our purposes is that the shift in the understanding of particular sciences and of science in general is a shift away from understanding things in themselves, as if they were a-historical unchanging entities, to understanding particular things as having particular shapes at particular times, because of the relationships by which they are constituted. The new focus of science is both historic and relational. It is, in short, oriented to seeing things in context, as a pattern of relationships, as part of a network.

A year ago, Gunther Stent wrote about these things (Encounter, March 1980) while reflecting on the emergence of molecular biology. It may be useful to consider some of the things he said.

He pointed out that in the early part of this century:

"Scientific enterprise (was) an autonomous exercise of pure reason by disembodied, selfless spirits, free of moral and affective influences, inexorably moving towards knowledge of the true fact of nature.

"Nearly all of them (philosophers of science in the 30s) regarded epistemology as something that is discussable in terms of a lone, rational Robinson Crusoe setting out to discover the world all by himself, independently of his particular historical or social setting. Thus, to that philosophical thought collective, Fleck's notion of contextually dependent facthood had to seem just as wierd a notion, and as irrelevant to its deliberations, as the resurrection."

He goes on to say that:

"The recognition that the very 'explananda' of science (i.e. its 'facts') are not objective givens, but rather products of social interactions is a more recent phenomenon . . . The discovery of a fact is not to be regarded as a process that goes on in the mind of a single individual. Rather, it is a result of a social activity, since the current state of knowledge invariably transcends what one person can know.

"To say, therefore, 'A has discovered fact X' is to make a logically incomplete proposition, just as to say 'A is bigger'. What is needed to complete the latter proposition is adding 'than B', and to complete the former, the phrase 'within the context of such and such a state of knowledge' or, better yet, 'as a member of such and such a thought collective' must be added."

Later he elaborates on the social nature of the scientific enterprise by commenting on the work of Fleck:

"As Fleck sees it, of all human activities scientific discovery is that which is most socially conditioned, and in that process, language as a means of communication plays a crucial role, in that the meanings of words (e.g. 'syphillis') do not merely represent arbitrary designations for this or that element of reality, but already embody within them the theories, knowledge and thought-styles of the thought collective (as the word 'steed' already embodies the thought-style of knighthood romance). Hence the words delimit what kind of discoveries can be made in the first place."

This sensitivity to the fundamental conceptual frameworks within which thought is created, and to the language by which it is formed, is important in the context of networking. It suggests, at the very least, that an orientation to networking and the development of the language of networking may reflect the emergence of a fundamentally different understanding than that which has been common in our culture. This possibility is the central issue of this paper.

At the very least, it can be seen that the emergence of a sensitivity to the relatedness of the various aspects of reality--in biology, in physics, in environmental studies and ecology--has prepared the ground for and provided a push to the emergence of an orientation to networking in our own time.

## SECTION IV

### SOCIAL AND PSYCHOLOGICAL SOURCES OF NETWORKING

If it is the case that we are now discovering, that both ourselves and the world of which we are a part are influenced and indeed shaped by the vast array of relationships of which we are a part—genetic, biological, psychological, economic, organizational, nutritional, etc.—then it should not be surprising that there are a variety of social and psychological developments which contribute to the emergence of the networking orientation, and therefore of networking activity. Several of these are explored briefly below.

#### The Desire to be In Touch

As we saw in Section II, there are economic and organizational pressures which increase the desire of people in particular places and positions to be in touch with others who can meet their needs. Further, the fact of loneliness as a common and debilitating experience in modern industrial society has been noted by many commentators. Accordingly, it is not surprising, particularly at a time when people are more direct in recognizing and meeting their psychological needs, that the desire to be in touch with others who can help them appears to be increasing in North American society. This is recognized by Carol Kleiman, the author of Women's Networks, when she says, "Women's networks are an outgrowth of the women's movement and the increasing awareness among women that they do, indeed, need one another." She also quotes Dr. Rosabeth Cantor of Yale University as saying, "The past ten years have aroused the hunger among women to work with each other. We hunger for contacts with one another. Women have left the isolation of their kitchens and are seeking the sisterhood they once had."

The point is that for social as well as economic reasons, our is a time in which increasing numbers of people are deliberately and consciously seeking to identify and make contact with others who share their interests. This is true organizationally and personally. This represents a substantial pressure towards networking.

### Awareness of Roots and Specificity

Many observers have commented that the popularity of the television series "Roots" was not an accident, but that it responds to the increasing awareness in North America of the specificity of life. Particular people have particular characteristics because of their particular histories—of language, geography, genetics, nutrition, etc. This recognition reinforces the sense that one is a particular person with a particular shape and with particular desires, and not just an abstract "individual" who is part of a mass.

This reinforces the sense that one seeks out and turns to others who are in some sense like oneself, rather than just accepting anybody in a relationship. Carol Kleiman, in Women's Network, suggests that "the need to know other women with similar concerns is one of the strongest factors in networking."

### I Like, I Want . . .

Concurrent with this awareness of the specificity of self is a strong underlying sense in our culture that we are moving to a time in which people want the things they want, in the form that they want them, when they want them, and not according to pre-set and standardized times and places that are determined by others.

One can see here the beginning of what is now called a "demand orientation". Those who are to receive goods and services are increasingly in a position to differentiate specifically what it is they want, and the terms according to which they want it.

This demand orientation can be seen more sharply if it is contrasted to the age of broadcasting standardized products. At that time, one could talk of a few general markets, whether for magazines, records, automobiles or houses. Increasingly, mass markets are breaking up into segments, and these into sub-segments, according to highly specific definitions of what is wanted.

All these factors push towards the creation of networks because of the specificity that is allowed within them.

### The Need to Choose

The Heretical Imperative is the latest book by Peter L. Berger, an American sociologist. In it he notes that the essential feature of modernity, in contrast to traditional societies, is that one must choose and therefore be responsible for virtually every fact of one's life in a way that would not only have been impossible but unthinkable in traditional society. The modern imperative, he argues, is heresy, the root sense of which is choice.

Berger is highlighting the fact that in North American society pre-set roles, definitions, relationships are increasingly under attack, and ignored. Increasingly, roles and relationships are defined by those who have them, rather than set by others. Doing one's job in the way it has always been done is no longer satisfying or a guarantee of success. But few of us are willing to define ourselves by ourselves. We seek to be in touch with others, who are in similar situations, whose judgements we trust. Again, a pressure towards networking.

### From Bureaucratic Hierarchies to Holographic Networks

It is commonplace today to hear people say that the work ethic is eroding, that respect for authority is diminishing, that good leaders are hard to find. These are common complaints.

What is less common is the recognition that these complaints are symptoms of a much more profound and gradual shift in our understanding of the ways that are appropriate to shape organizations to accomplish human tasks.

Throughout the whole of Western society, our basic organizational structures have been hierarchical. Since the Industrial Revolution, they have been increasingly bureaucratic. Let me say a word about each. By hierarchical, I mean the sense that it is right and proper for someone to be "in charge", to be "at the top". After all, when push comes to shove, somebody in authority must determine what is right and good. This is the essential job of the leader. Accordingly, others find their place in the hierarchy in relation to the leader. The significance of one's place is in direct proportion to one's access to the leader. But whether significant or not, only the leader or those designated by him have the final authority to fundamentally alter the

roles that are played. One's place and role, whether deputy minister, welfare mother or shop steward, is not self-determined, but is determined by those with authority in particular organizations. (It is this fact, of course, that makes the pressures towards self-definition scary to those who find themselves in such situations, and ultimately threatening to the organizations of which they are a part.)

This structure can be seen in the Egypt of the Pharaohs, the Holy Roman Empire, the absolute monarchs of Europe, and in present-day democracies. Most leaders still agree that, after all, "a leader must be a leader".

I use 'bureaucratic' without prejudice, and in the sense that Weber intended it: namely, the that it is reasonable to organize a hierarchy by dividing it into self-contained sections which are assigned specific tasks, i.e. into bureaus. Therefore, some can do marketing, and some finance, and some manufacturing, and others research, as long as their roles are not mixed or confused.

That this sense is still common can be seen in a recent article in the Montreal Gazette on Kenneth Barclay, the President of Dominion Bridge. It includes this paragraph:

"Barclay likes to see neat organizational charts, with the same five slots at each level—finance, engineering, marketing, manufacturing and a general manager to tie it all together. That means that people at each level know exactly who they should talk to above and below. It also means no one in his operating companies is neglecting finance because its president happens to be a marketing whiz or vice-versa. 'It's like the army or the Catholic Church,' Barclay explains: 'No detail is left to chance.' All this is tied together at the top by Barclay himself."

It can be seen from this that, in principle, in a well-formed bureaucratic hierarchy, networking is neither essential nor desirable. In fact, the reverse: networking threatens bureaucratic hierarchies which depend upon the close control of the relationships into which others enter, whereas networking presupposes that relationships are essentially self-defined.

It is important to note, therefore, that Kenneth Barclay to the contrary, bureaucratic hierarchies in Western society are under increasing pressure and increasing attack. Neither the Catholic Church nor the army remain as hierarchical and bureaucratic as they once were, nor work as effectively as Barclay seems to assume they do.

Every reader will have his or her own experience to reinforce the sense that bureaucratic hierarchies work less and less well in today's world of complexity and pressure. Paul von Ward, in his recent book Dismantling the Pyramid (1981), talks about the inappropriateness of the bureaucratic hierarchy:

"It does not even hint at the interrelated complexities of social institutions. It cuts down the ways we conceive of the dimensions of human personality by portraying individuals and units in relationship only to those formally on either side of them. It implies that those with such proximity are the most important. Too, it excludes or minimizes the influence of factors other than explicit formal reporting or control relationships on work behaviour. An example of the unreal expectations engendered by this concept is the assurance given to me by one department deputy secretary that the chief-to-chief relationship was the sole key to better integration between the work of the two agencies; he apparently really believed the top point of the triangle directly controlled all below . . . In this view of bureaucracy, the influence of personal factors, environment, history, anticipated futures and cross-cutting processes are not generally taken into account, except by reference to them as exceptions."

At the least, von Ward is pointing out that our organizations have never worked according to the description in the textbooks. Informal communications processes and procedures are essential to the effective functioning of all modern bureaucratic organizations. But the pressures to create informal networks are increasing. This is due in part to the increasing disenchantment with large-scale organizations, and in part to the other factors mentioned in this paper.

Warren Bennis and Chris Argyris are two of the management theorists who are most helpful at this point. Bennis has written about the rigidities of bureaucracies and the need for more flexible ad hoc organizations. It can be argued that the essential error of his little book, The Temporary Society, is not its essential thrust but his sense of timing. The pressures to dismantle our hierarchies into temporary organizations will be manifest in the 80s and the 90s, rather than in the 70s, as Bennis suggested.

Likewise, Chris Argyris has documented the fact that rigid bureaucracies are unable to learn, and that an organization which is not able to learn in today's increasingly volatile environment is at risk.

All in all, one can understand the pressure to abandon hierarchies and to explore organizational forms that are more flexible, that allow all of the knowledge within an organization to be identified and used, and that allow the organization as a whole, and not merely individuals within it, to learn.

Further, it is being recognized that if the above-mentioned features are to be achieved, the persons within the organization need themselves to be a different sort of person than those that are encouraged (and often promoted) in bureaucratic hierarchies. They must themselves be more open, cooperative, willing to share, less fearful, and have a greater capacity for the integration of all forms of knowledge and human experience. Those who engage in networks argue both that these are the characteristics which are required in order to network successfully, and that networking reinforces these characteristics.

It is here that the image of a holographic network (in contradistinction to that of the bureaucratic hierarchy) begins to emerge as the fundamental organizing principle of the future. In a hologram, each part contains all of the information contained in the whole. (The extent to which this sounds funny is the extent to which our thinking has been conditioned by hierarchical thinking in which a part is necessarily less than the whole.) In a hologram each part of the hologram has all of the features of the whole, rather than just some of them. Further, the image of the network suggests that the various persons or organizations that are involved are involved in relationships that are essentially voluntary and mutually beneficial, rather than relationships that are formally defined by others and then imposed.

Northrop Fry, Marshal McLuhan, and John W. Dixon Jr. are some of the people who have written on the disintegration of the hierarchical imagination in Western man—that is, on the loosening of the grip of the hierarchical vision on our imagination. This dynamic in the breakdown of hierarchies and the stumbling towards networks can be seen organizationally as well as in art, music and dance. It suggests that there is a far more profound dynamic to the emergence of the language and phenomenon of networking in our own time than a superficial exploration might suggest.

### From Eternal Truths to Community Judgements

In the past, truth was understood as eternal, as unchanging. Whether the truths of religion or of science, the common image was, and for most still is, that if something is true, it is true for all people in all places for all times. It cannot change. Truth therefore is essentially a-historical. It is neither affected or touched by history.

The advantage of such a concept of truth is that it maintains the authority of those who proclaim it. It allows them to keep their place in the pyramid, whether they are Pope, Prime Minister or Chief Scientist. Eternal truth and hierarchical authority go together.

However, as we saw in Section III, it is increasingly recognized by those who worry about the basis of judgement and knowledge in science, art, religion and philosophy that there is no place in our future for eternal truths. Rather, we must come to terms with the fact that when something is judged to be true, a particular community of human beings in a particular time and particular place with a particular authority structure is making a judgement that, according to its best light, the structure of reality is adequately described in its judgement. Truth, in short, is the judgement of an historic community.

If this is the case, then there is no basis for forms of authority which are in principle fixed and infallible, be they in science, art, religion or politics. What is important is not the single judgement of those deemed to be "leaders", but that the community as a whole come to sound judgements. In the future, the role of leader will not be to define that which is true, than to facilitate the community in coming to a common and adequate judgement.

If one examines the nature of the networks that are developing in our own society, one sees that they are precisely the kinds of institutions and relationships which reflect such an understanding of authority and truth. One can be more pointed. Those with formal authority who insist on asserting their formal authority, without respect for others around them, are consistently left out of and ignored by the networks which are now emerging.

#### A Process Orientation

It is common in our society to make a distinction between content and process. What is more, if push comes to shove, content is seen to be more important and precious than process. (This, for example, is explicit in the defence by the Prime Minister and his Cabinet colleagues of their unilateral Constitutional initiative.) Such an orientation assumes that the most important aspect of a society or community is the content of its belief structure--its ideology. As long as the ideology is maintained and upheld, the community is protected, regardless of the means undertaken to do so.

However, not only the isolation of content from process but the distinction between them is being eroded on many fronts. It ranges from the cutting edge of molecular biology and nuclear physics, to the feeling experienced by many that they are not respected by present-day constitutional processes and that this is far more important than the Prime Minister admits, even though they are not themselves able to put their finger on the reason for this sense.

If it is the case that process and content are intimately related, then it is no longer sufficient to seek that which is timelessly true as an adequate basis for decisions, let alone for a way of life. The trouble with the timelessly true as a basis for a common life together is that, if those who lead feel they can discover what is true without reference to others, then by definition most in the community are excluded from playing significant roles in the evolving shape of their society or situation.

#### Object/Victim or Co-Creator

It is still common in North American society for persons to see themselves as over against the society or its institutions, rather than as an inherent and creative part of them. It is commonplace that "the system" or "city hall" or "them" are both other than and impervious to oneself.

The advantage of this understanding is that it allows one to see oneself as a victim, as a pawn in somebody else's game. It removes any responsibility one might have for the present state of affairs, whether on the earth or in one's own community.

However, this essentially abstract and a-historic understanding of the human condition is slowly but irrevocably giving way to an understanding that is both more particular and more historical. It is slowly being recognized that what we are is a function of the relationships of which we are a part, and that these are myriad. Conversely, the way the world is is a function of particular decisions made by particular people in particular times. Our society, in short, is a social creation and not an abstract eternal given.

We are discovering that the range of our responsibility both for our own condition and that of our organizations and the society around us is much greater than

is commonly understood. It is not only, as the butter ads say, that "we are what we eat", but that our organizations are what we make of them and so is our society. We are discovering that we are co-creators, both of our own lives and of our society. This phrase is increasingly common. It is not an accident that there are societies for co-evolution. We are discovering, as Paul von Ward points out, that "the co-creating relationship has been there all along, but only now are we becoming conscious enough of it to begin intervening in a planned and advanced manner in our own creation."

The bearing of this on networks is direct. One of the features of a network is the fact that whether consciously or not, people are reaching out to others of their own choosing for their own purposes, and are therefore taking responsibility for those relationships in a way that is not the case in formal bureaucratic relationships. Networks are an expression of the historic co-creative role of human beings in relationship to themselves, their organizations and society. Up to now this co-creative aspect has always been recessive. It has been suppressed by and held in check by the overwhelming and common sense that our society is given and unchallengeable; that one is dependent on those in authority. What is beginning to emerge and is now dimly recognized is that fact that human beings can be openly and deliberately responsible for their relationships and the situation they are in.

As this consciousness sinks in, the implications will be revolutionary.

### From Mega-Projects to Distributed Systems

Up until recently, the common use of the word "scale" was in the phrase "economies of scale", according to which "bigger is better". That we accepted this perception uncritically can be seen in our hospitals, universities, churches, office buildings and cities. However, a new phrase is beginning to be used with increasing frequency. It is "human scale". It reflects an emerging concern that will intensify in the 80s. Put bluntly, it is slowly dawning on us that economies of scale apply to impersonal, industrial processes, but they do not apply to living, human, social situations. Every professor knows that he is less rather than more productive when he addresses a class of a thousand rather than a group of twenty-five. We are also learning that it costs far more per capita to police a city of a million than it does to police a city of 50,000. Further, virtually every school board in Canada has learned that one of the costs of consolidated high schools, to which students are bussed but to which none can walk, is an increasing cost per capita for vandalism.

The underlying point is the same. Human scale matters.

If this is the case, we must learn to think in terms of appropriately scaled developments which are linked together, rather than simply building larger and larger entities. We are moving, in other words, from thinking in terms of mega-projects to thinking in terms of distributed networks of appropriately-scaled projects. Interestingly enough, this same shift of thinking is occurring in relationship to computers. It used to be common to think of a giant information utility based on a single mainframe computer, serving a whole area. Now this image is thoroughly discredited. The future lies with fully distributed systems, based on micro-computers.

It is this sense that underlies the Stay Option which is being developed in both Saskatchewan and Alberta in relationship to smaller options and rural living.

For our purposes what is important is that this is another pressure towards the importance of distributed networks and away from massive undifferentiated developments.

Again, the reader will be able to supply examples of ways in which the above features interrelate with and reinforce one another, and with the economic, organizational and technological sources of networking which are identified in Sections II to IV. This of course adds to the weight of the argument—namely, that whether it is widely understood or not, the language and phenomenon of networking is an indicator of a far more important cultural transformation than is commonly recognized.

This last phrase is important, for as can be seen in this section, the change is fundamentally a social, psychological and therefore cultural transformation and only secondarily a technological transformation. The technology reflects and reinforces the cultural transformation, but does not drive it.

The technology, however, is important. To that we will now turn.

## SECTION V

### THE TECHNOLOGICAL SOURCES OF NETWORKING

Talk of the micro-electronic revolution and the coming of the communications era is by now old hat. (This is true even if relatively few grasp the shape and significance of the age into which we are moving and how it differs from the industrial era firmly enough to write even a five-page essay on this transition.) Therefore, I will make no attempt to repeat the information which is by now found in dozens of books and hundreds of articles regarding the awesome capabilities of present computers compared to those that were in common use even fifteen years ago, or of the likely state of affairs by the year 2000.

There is one point, however, I do wish to reinforce, because it is little understood. We are moving into the first time in human history in which it will be a practical possibility to organize large-scale human enterprises as holographic networks, rather than as bureaucratic hierarchies. This shift, so easily said in words, represents a fundamental reorientation of human understanding, human relationships and human values, the essential nature of which was sketched in the last section.

Until today, the types of human relations which are possible in holographic networks were possible but only on a small scale, face-to-face basis. Large scale endeavours, particularly those which required common action, required hierarchical forms of organization. Hence the pervasiveness of the hierarchical forms of organization in all cultures.

The point in relationship to technology is this: it has not been possible to organize large numbers of people as holographic networks because the technology to do so has not been available. This, of course, is not changing. The micro-electronic revolution will permit the organization of large scale human endeavours as holographic networks.

It is important to note that this new form of organization is only permitted and not required by technology. There is no technological determinism here. There is,

however, a new human and social opportunity which is dependent on the presence of the technology. As I argued in the last section, micro-electric technology is not the sole source of the networking phenomenon. However, it does make it possible on a large scale basis that is historically significant.

A number of interrelated developments have made this new situation possible. Included are:

- The emergence of local networks, which enable the creation of genuinely distributed information sharing systems. As noted earlier, Xerox has begun to market its Ethernet Local network system. Other companies with other forms of local networks will soon follow.
- The widespread use of word processors and their capability to communicate with one another and with computers. As noted earlier, the Alberta Minister of Education, who works primarily out of the Legislative Building, and his Deputy Minister, who works out of the Devonian Building, now communicate not only by telephone but by interconnected Xerox 850 wordprocessors.
- The ease and relative low cost of communicating digital information among major centres across the country, due to the development of such things as DATAPACK, satellites and fibre optics.
- The possibility of electronic filing on a massive scale, which does not require mainframe computers. Prototypes of such computers are already being built. They will be available commercially in three to four years, at an anticipated cost of \$100,000 to \$200,000.

The significance of this can be understood when it is remembered that computers were developed not as information processors in the ordinary sense of that term, but as computers--as very powerful calculators. Their basic architecture, even today, reflects this initial purpose. Accordingly, the use of computers to store, retrieve and process textual information is only in its infancy. This relates both to the fact that the prime focus was initially elsewhere, and to the fact that large scale information storage and retrieval, given current computer architecture, now requires a mainframe computer.

In spite of this, the use of computers for electronic messaging is increasingly common, both within organizations (e.g. Amoco, and Bell Canada COCOS) and among organizations (e.g. Canada Systems Groups COMET, I.P. Sharpe's Mailbox, InfoMedia's PLANET, and QL Mail). In other words, it is possible to create a computer-linked messaging service today which will reach into any community that is serviced by telephones. In short, the day is rapidly approaching in which all of the information which exists within a whole organization can be available to any part of that organization electronically at any given time. This, of course, is the essence of a holographic network.

### The Electronic Information and Exchange System (EIES)

The EIES at the New Jersey Institute of Technology in Newark, New Jersey, is a computerized conferencing system. It is unique in North America. It deserves special mention because it is the forerunner of computer conferencing systems in the future. It uses the abilities of a computer to facilitate a wide range of human communication. EIES supports electronic messaging, computer conferencing, personal notebooks, text editing and document preparation. It includes a multitude of specialized features, such as voting, automated questionnaires and data gathering to facilitate group communication processes.

EIES has five alternative human/machine interfaces, from simple menus for the beginning and casual user, to self-defined user commands and procedures for customized tailoring of the interface.

EIES allows the development of specialized sub-systems for specific tasks. This has been utilized in such areas as legislative information exchange, standards setting, project management and social experimentation and forecasting.

EIES is operational on a dedicated mini-computer. Approximately \$200,000 could turn up a turn-key copy of EIES to operate for a membership of about 1,000 individuals. Any organization with 300 or more potential active members could, in the view of the EIES designers, cost justify such a system, by comparing alternative costs from mails and/or telephone to accomplish the same ends.

Based on 900,000 hours of user experience, now running about 7,000 hours per month, the through-put cost of operating EIES is about \$3.00 per hour. Adding to this the current costs of TELENET (the nation-wide digital packet network used by EIES) at \$3.75 per hour, the effective cost of nationwide use (U.S.A.) of the EIES system is less than \$7.00 per hour. At this rate, EIES is cheaper than long distance phone charges or travelling to meetings. In fact, the startling thing about the economics of EIES is that the current technology is cost-competitive with the mail for user groups of nine or more who wish to exchange communications as a group on a regular basis.

EIES is a fixed-capacity resource which will accept a maximum of 450 Class One users.

The cost to Canadians to access the EIES network is an additional \$3.00 per hour via DATAPACK.

At the present time, there is no analog of the EIES network available to Canadians operated on a Canadian computer.

### Future Developments

I am led to believe design work is now being completed by at least one company, possibly by several, which will substantially increase the electronic networking capabilities in relationship to ordinary information over the next five years.

One advance is the development of new forms of computers which are based entirely on VLSI chips. Today's mainframe computer will be a thing of the past. Tomorrow's computer will be a series of interlocking micro-computers, which will allow each customer to design the specific computer they require for their own task.

This development is at the heart of a true electronic filing system--the possibility of filing literally millions of documents electronically, and being able to access them instantly. When such machines are part of a communications network, it will mean, for example, that all of the information which now exists in the headquarters in any organization can be made available to the whole of that organization. It will no longer be the case that only those who are close to the king will know what is going on.

Another development called "Mediator" by one Canadian company is a device which acts as an interface between a variety of data bases and a user. It will allow a user to ask queries in ordinary language and to receive the information he or she wants, but without having to worry about which particular data base is being searched, or whether the information is coming from an information retrieval system or a data base management system.

Creation of special purpose electronic networks for health or educational purposes within particular jurisdictions—including Alberta—are now being discussed. Once one such system is in place and effectively operating, its attractiveness to other types of institutions will be almost impossible to resist.

Two other features in relationship to the development of electronic communication should be noted. One is the fact that it is increasingly costly to operate a paper-based society. Both the cost of paper and the cost of transporting it are rising sharply. There is, in short, an economic reason to move from paper to electronic systems.

The second factor is the fact that the Exxon Corporation in the United States has chosed the electronic office as one of the two areas in which it will invest its future. When it is recognized that Exxon has twice the assets and five times the cash flow of IBM, and that its products are being marketed in Canada by a subsidiary of Bell Telephone, one begins to realize that there is no question about whether in the future we will live in an electronically interconnected world.

One further reflection on technology is appropriate. The computer is able to make distinctions and to adjust particular responses accordingly without being exhausted by such flexibility in a way that even human beings cannot match. This feature supports and reinforces the shift in our society noted earlier from broadcasting of standard products to demand distribution of products specified by each user. We suggested earlier that the development of such an orientation is itself one of the factors contributing to the development of the networking phenomenon. Again, electronic technology supports and reinforces this trend.

The major question facing Canadians, and therefore their governments, in relationship to the use of micro-electronics to facilitate communication is not whether it will happen, but which forces will be allowed to drive the design of whatever arrangements emerge. There are three possibilities:

- The systems can be technology-driven. This can be seen in relationship to Telidon at the present time. An interesting and world-class piece of technology is being marketed in and of itself in order to sell the technology.
- They can be market driven. In this case systems will emerge on the basis of what it is that will sell to those who presently have the cash to buy.
- They could be policy driven. In this case, governments would seek an understanding of the possibilities of the new technologies which is powerful enough to enable them to determine the basic parameters of the situation as it emerges.

It is far from clear which of these options will be chosen in Canada as a whole, or within any particular province. It is safe to say that no province has an adequate grasp of these issues, or adequate policy in relationship to them.

## SECTION VI

### NETWORKS AND NETWORKING: THEIR EMERGING SHAPE AND SIGNIFICANCE

Given the above, it will not surprise the reader that I suggest that the creation of new networks and the phenomenon of networking: (a) is happening; (b) is culturally significant; and (c) will substantially increase over the next ten to twenty years. But I would go further. I am also suggesting that the networking phenomenon is an indicator of a profound cultural transformation which will alter the fundamental shape, rhythms and form of our society; a transformation that only now is beginning to be publicly visible. If this transformation were not already underway to some extent, the phenomenon of networking would not be possible, nor would it be publicly visible to the extent that it now is. In turn, the networking phenomenon reinforces and enhances the transformation.

As can be seen above, the transformation is many faceted. It includes new attitudes epistemologically to the nature of reality and the nature of truth, to our understanding of authority, and the appropriate forms by which human beings should be organized to accomplish common tasks. Most fundamentally, it presupposes a fundamentally different understanding of the role of relationships and the importance of the quality of relationships in relationship to life.

Put simply, we are moving from a time which has focussed on and been dominated by "things" and the logic of things, and therefore the logic of arithmetic and geometry. We are moving to a time in which we recognize that the world is not made up of separate and discrete things, but of focal points of energy, which are themselves a function of the relationships of which they are a part. Therefore, relationships and the dynamic of relationships become key not only to the physical world but to the human world as well. When this fact is understood and absorbed, the present arrangements of health, education, welfare and even government will be transformed.

The fundamental motivation for this transformation is both economic and personal/psychological. Economically, as argued by Gordon Thompson of Bell Northern

Research, it provides the only possibility of returning to and sustaining a new form of economic growth.

The social/psychological motivation is far more personal. It comes from the joy and excitement of discovering a new sense of self--a new sense of what it is to be a person--that comes from being part of a network. Theodore Rozak captures this sense in his Person/Plant, when he suggests that once any human being has experienced himself as a person and has been treated by others as a person, he or she will not easily give up this experience and return to the type of relationships that are normal in our society.

Gordon Thompson argued in 1972 that three factors determine the power of any new invention: first, that it increase and ease access to stored human experience; second, that it increase the size of common communication space and therefore of human interaction; and third, that it ease the development and spread of new ideas.

Electronically assisted networking meets these three criteria. The interesting question is: what will we think is worth doing, and who will we think is important, once enough of us are in touch with others with whom we share some common understandings, rather than with those who simply are near to hand?

## SECTION VII

### AVENUES FOR FURTHER EXPLORATION

This paper should be read as a hypothesis which needs to be tested. The hypothesis is that the networking phenomenon is important not only in and of itself, but as an indicator of a fundamental cultural transformation which is already well underway, but which only now is beginning to be visible within North American society.

If this be true, then it follows that:

- The emergence of new forms of electronic communication which allow genuine two-way dialogue should stimulate networking. The experience of those organizations, both commercial and non-commercial, which have experience in electronic networking should be explored.
- The social/psychological/cultural factors of networking are absolutely essential, particularly in relationship to the design of hardware to facilitate networking. The experience of those who are involved in networking should be explored.
- The broad cultural context within which networking is emerging and of which it is a part is essential to understanding the phenomenon itself. Therefore, special efforts should be made to understand those persons who are trying to alert us to profound cultural change and its implications, particularly of the shift from an industrial to a communications era. A comparative study of such persons should be undertaken.
- Special attempts should be made to identify those who have a deep commitment to the advanced education system of Alberta and who are making special efforts to understand its future, with a view to creating an electronic computer conferencing dialogue among them. This action would not only focus and enhance their dialogue. It would allow those who are involved to have a hands-on experience of present state-of-the-art electronic networking in relationship to their own needs and desires. The importance of such hands-on experience with new technology cannot be overestimated.

- Finally, a preliminary exploration should be undertaken which sets out and documents the origins and characteristics of bureaucratic hierarchies and how these compare and contrast with the origins and characteristics of holographic networks. This study should also attempt to explore at greater length the present organizational form and stresses of advanced education, and the potential for encouraging institutions of advanced education to deliberately undergo a transformation to take on more of the forms of a holographic network.

While this paper suggests that a fundamental transformation is occurring in North American society, and that the phenomenon of networking both indicates and reinforces this transformation, there is no need to take precipitous action. The transformation is sufficiently profound that its implications will not be felt overnight. There is time for those involved in the Government of Alberta and its institutions of advanced education to understand the transformation, its implications for advanced education, and to respond with what can be characterized as a gentle persistence over the next ten years.

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