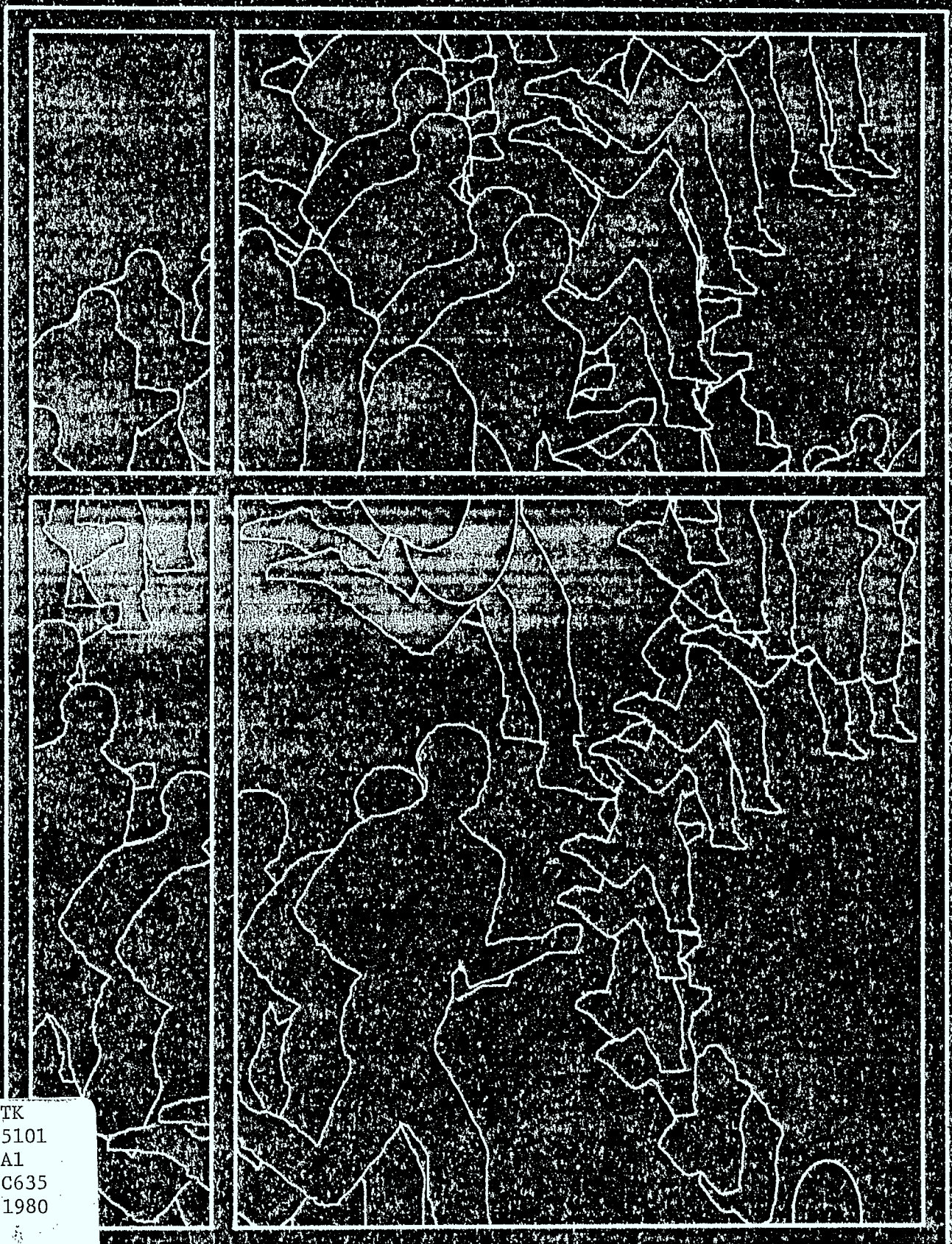
COMMUNICATIONS, COMPUTERS AND HUMAN SETTLEMENTS



1. Communications, computers and human settlements

Acknowledgements

We are deeply grateful for the support for the Symposium provided by:

The Faculty of Arts, York University,

The Federal Department of Communication,

The Communications Branch of the Ontario Department of Transportation and Communication.

Their funding, and the patient work of the recorders who transcribed the discussions, made possible this publication of the papers and summary.

Our thanks are also extended to Bryan Massam for his encouragement and skill at finding a babysitter on short notice; Peter Sindell, Lyndsay Green, Nicole Leduc and Annie Mear who sharpened our thoughts; David McKendry, Norman Spector and D. Parkhill who kept the ball rolling; Dal Brodhead who was there in spirit; Denise Pieau and Liliana Guadagnoli who made the burden manageable; Harold Kaplan for his encouragement and seed money; Rodger Schwass who acted as animateur after a long flight from Kenya; Peter Danielson for providing a tape of an "unscheduled" discussion of networks and futures; David Ward who made the computer Zing, Will Anielewicz who designed the computer graphic for the cover, and Lori and Alexander who made the world sing.

Preface

The Ninth Annual Urban Studies Symposium took place on March 19-21, 1980 and was entitled COMMUNICATIONS, COMPUTERS AND HUMAN SETTLEMENTS. The symposium was an effort to explore in an extensive way the social, cultural, political and regulatory impacts of converging interactive telecommunication and computer technologies on human settlements including cities, rural communities and native settlements, particularly in the Canadian context.

The participants represented a wide range of interests: urban planning, computer science, telecommunications, broadcasting, newspapers, film, federal and provincial government agencies, public service organizations, libraries, universities and potential users of communications hardware and software.

Initially, the plan was to have about 50 participants, but by the outset of the symposium the number had risen to 90 - an indication of the interest and curiosity aroused by the topic. The participants received the background papers in advance of the symposium, and the plenary address by Bernard Ostry was the only formal paper presentation.

On the first day the participants were divided into two teams, and the working sessions took place in two separate but adjacent rooms which were merged when appropriate. The setting was informal and "off the record" to encourage as much individual participation as possible. The first day's sessions began with discussions of the communication and information needs of particular groups and then took up the topic of the Canadian videotex technology, Telidon, and its field trials. This focus on Telidon was rather by design — we hoped that by inviting as participants a number of people actively engaged in Telidon-based projects, and bringing them together with people who in varying senses represented user groups and user perspectives, the symposium would treat Telidon as a concrete paradigm of the perils and promises of the "information revolution".

The second set of sessions continued and broadened the concerns and criticisms revealed in the first day's discussion. With such a diversity of interests, a consensus was not to be expected; nonetheless, a persistent theme emerged — the anxiety of individuals who have no immediate economic stake in the outcome of the technological "game" and no direct leverage on social policy — that their needs and aspirations will only count, if at all, as the ingredients of market surveys and consumption patterns. At a final session, several participants urged that the results of the discussions be converted into specific policy recommendations to government. While that suggestion was not one which a symposium such as this could implement, we hope that the summary of the discussions, which follows the invited papers, and in which a large number of participants (though unidentified) speak "for themselves", will contribute to the general process of criticism and assessment on which any responsive policy for new information services must be based.

The invited papers are divided into two sections. The first examines the information and communications needs of several user groups: artists and their potential audiences, urban planners, the Inuit and northern residents, community organizations, and cooperatives. The second set of papers focus on Telidon and the upcoming field trials. Two papers which were not received in time to be distributed initially have been included.

The symposium brought together a group of intelligent and articulate people and ideas and opinions were expressed fast and furiously. The dynamics of the symposium were difficult to capture in a literal form, to people who were not at the sessions. What we have tried to do is capture issues and insights which reflect what was on people's minds at the time. The comments and interchanges have been paraphrased, plagerized and synthesized into a set of statements which are not organized into a strict linear or sequential pattern, but are grouped impressionistically under a set of rubrics, corresponding to the re-emergence and repetition of similar issues throughout the sessions.

Jerry Durlak
Urban Studies Program

Peter Roosen-Runge
Department of Computer Science

Table of Contents

Keynote Address

Bernard Ostry,
Deputy Minister of Communications

It is a privilege as well as a pleasure to have the opportunity of speaking in this great university and to address this symposium on computers, communications and human settlements. Greater still is the privilege of listening and conversing. The appetite of public servants for Great Thoughts, ironically noted by Northrop Frye, is still insatiable. And although ministers and their deputies and staffs have been known to attempt these Great Thoughts on their own, it is surely from the universities that the profounder reflections on human life and destiny should emerge. A perspective of scholarly detachment is needed for the long view. Public policy which is not founded on this long view is apt to go astray.

May I say then that I offer my thoughts here with diffidence -- or as much diffidence as my temperament allows -- in the hope that they may offer openings for discussion and reasoning together. The mix of disciplines and interests represented here will, I feel sure, produce novel insights into the human implications of what has been called The Information Revolution. I say 'what has been called The Information Revolution' because I want to back away a little from such terms, which I think we tend to throw around with too much abandon. Even the expression Industrial Revolution has been called into question. The discovery of a technology does not mean it will immediately change the world. Sir Christopher Wren invented a machine that would knit several pairs of stocking at once, but in the reign of Charles II, London tradesmen were not ready for it. In Gulliver's Travels Jonathan Swift writes sarcastically about a scheme of some projectors for reconstituting boards from sawdust; it took more than 200 years for chipboard to become a reality.

Now it is true that, in electronics, technology has evolved with frightening speed. And still that word "Revolution" seems to connote whirlwind change in every sphere of human activity; there is an apocalyptic or millenarian feel to it: it excites visions of the New Jerusalem or a Brave New World.

Visions of the future always take one or other of these two forms: Utopia or the Police State, Paradise or Hell, the Land of Cockaigne or the City of the End of Things. This is because the future does not yet exist to talk about, it can only be imagined. It can only be imagined! And imagination is usually governed either by what we wish or by what we fear.

Some things can be foretold with reasonable certainty, but they tend to be remote from human influence, for example, the transit of Venus, which even so early a civilization as the Mayan of Meso-America could predict with astonishing precision. Such achievements by early star-gazers have given us the illusion of foresight. In large modern organizations like governments and business corporations the illusion is strengthened by the practice of budgeting, so that we say that death and taxes are certain. Death, a fact of nature; taxes, an invention of governments; we make them equal.

Illusion or not, some degree of foresight seems necessary to large organizations and governments. The governments of the ancient world had recourse to the Delphic Oracle or the Augurs from whom they received warnings or promises. The future, I repeat, can only be imagined, and imagination shows us only what we wish or what we fear. That is why investors, who bet on the future, suffer from chronic manic-depression. When fear rules their imagination there is a Bear market; when desire and hope are in control there is a Bull market.

Does this mean that we should not think about the future at all? Take no thought for the things of the morrow? I do not think so. Even the common law supposes that a man must intend the consequences of his acts. I believe it is reasonable to try to imagine the consequences of our wishes and fears as well as of our acts.

To do this, we should attempt the discipline of imagination, we should learn what we can from its adepts. It is no accident that the distinguished scientist Freeman Dyson in his beautiful and brilliant book Disturbing The Universe begins with a children's story The Magic City by Edith Nesbit. The Magic City, like our own Brian Moore's Great Victorian Collection, is an imaginary place which has become real. In the Magic City, if you wish for anything, you can have it. In addition, to quote from the book, "there's a dreadful law here -- it was made by mistake, but there it is -- that if anyone asks for machinery they have to have it and keep on using it."

When I read this — with a shock of recognition — I thought of those other children's stories, the fairy tales in which the hero is given three wishes. In these tales the consequences of the first two wishes are so horrible that the third wish has to be used to cancel them. Now here is the catch: in the real world there is no third wish.

In 1938 Otto Hahn wished to understand the atom and discovered nuclear fission. Robert Oppenheimer and his associates wished to defeat Germany and Japan and invented the atom bomb. There is no third wish. Someone asked for machinery and got it, so all of us are condemned to have it and to keep on using it or at least threatening its use.

•

I do not think we should be pessimistic. That could lead to the worst kind of self-fulfilling prophecies. What I think we should do is try to cheat the myth by having the third wish first. The first wish is a policy that could help govern the realization of other wishes. Perhaps I am not putting this very clearly, but I think the meaning will emerge as I go on. For the moment, I should just say that for us the third wish (now in first place) does not put the clock back but rather preserves the human values that might otherwise be lost.

So then, let us not dwell too much on our fears of the apocalypse or the holocaust. Let us not get carried away either by our desire and longing for Paradise on earth. With as little illusion as possible, with as much restraint as is proper, let us consider for a few moments where we are in communications and where we might be going.

I shall be brief on what the new technologies are, since I have seen many of you at other conferences on computer-communications and I know you understand the nature of the changes we are confronting.

They are based on a dramatic convergence of computer and telecommunications technology, a confluence of technological change which the Science Council of Canada has called "transformative". As everyone knows by now, computers have been falling in price and improving in performance ever since their invention and, with the emergence of integrated circuitry in the early 1970s, these changes have become even more rapid. Meanwhile, telecommunications technology has not stood still. The first communications satellites soared into geostationary orbit in the 1960s, and we have since come to depend on them for relaying television signals and telephone conversations over long distances. In addition, Canada now has in orbit a prototype of the direct broadcast satellite of the future which is capable of beaming signals down to earth to terminals small enough to be placed on residential rooftops. At the same time, not only are we already field-testing fibre optics transmission systems which can carry far more information than conventional copper cable of equivalent size, but Canada is beginning construction of the largest fibre optics system in the world. The recently announced project in Saskatchewan will employ more fibre than has been produced in the world to date — all of it, I might add, being provided by a Canadian company. These new transmission technologies may abolish distance as a constraint on communication. They will carry much more information than their predecessors. The new computer technology is already enhancing the efficiency of telecommunications systems and reducing the cost of a great many new services which may become available, not only to businesses, but to every householder. Not unimportant to "human settlements".

Such, then, is the technological aspect of the famous "Information Revolution". It is when we talk about the services made possible by this technology that we discover possibilities that might fairly be described as "revolutionary". The Canadian home, for example, may become an information nexus receiving up to 100 TV channels and employing retrieval systems to access information in data banks right across the country and perhaps throughout the world. It may become possible to shop and bank electronically without leaving one's home. For that matter, the office of the future may be the home as word processing networks and other computerized information-exchange systems appear to undermine the need for propinquity among clerical, managerial and administrative workers. The recent emergence of remotely controlled "intelligent" industrial robots may mean the automation of many Canadian manufacturing plants and a much more rapid transfer of the work force into information-related activities which, given the power of these new technologies, could be carried out at home.

All of these possibilities could drastically affect existing patterns of human settlement and particularly the cities and towns where most of us live and work. If our normal habitat in fact becomes "wired", urban planners will face a completely new set of questions. Will the tendency to urban sprawl associated with the automobile be increased or arrested by the new technologies? If people can do their work at home, they may choose to live as far from the city centre as possible. Or they could very well do the exact opposite and move downtown. Writers and artists have worked at home for generations and for every one who goes back to the land, there is another who prefers the bright lights and the theatres and taverns of the city. Vacant office buildings could, of course, be converted into apartments. But there are questions we cannot answer at the moment. Will workers really choose to stay home and meet bosses and fellow workers only on the cathode-ray screen? And if they do, what will this homebound existence do to their marriages and domestic arrangements, considering that one can have too much even of the best of things? Perhaps there are research scholars here well-advanced with answers to such questions.

Our work relationships would be an example of what the GAMMA group has called "intermediation" -- the replacement of face-to-face social contacts by mediated relationships. It so happens that there is a current movie based on a book by Jerzy Kosinski which imagines just such a hero of intermediation, a gardener called Mr. Chance (played by Peter Sellers) who has been housebound all his life and has learned all he knows from television. He is a holy idiot, an innocent with nothing but rice-pudding between his ears. The movie is called Being There. But in a city of intermediated workers, their not being there could well have attenuating effects on culture, particularly if their habit of not being there extended to leisure pursuits. They would be like the man in the rhyme:

> As I was going up the stair
> I met a man who wasn't there.
> He wasn't there again today,
> I wish to Christ he'd go away.

The truth is we do not know enough about what community is to be able to say for certain what it would do to people to spend their working life among voices and shadows. I don't want to get sloppy about this, but does not our sense of community depend in some measure on being able to touch and smell and clink glasses with each other? So that we cannot count on people opting for work at home just because there are computers and communications that make it possible. They might just say the hell with it. We shall see soon what our field trials in Toronto and major commercial projects like those in Saskatchewan will tell us.

You may have noticed that we cannot go very far in this exercise of imagining the future without blundering into the territories of fear or desire. We decided, if you remember, to forego what a friend of mine calls the rich pleasures of prophesying doom; and also to avoid the other kind of high, the joy of singing hymns to progress and universal enlightenment. This does not mean that we should not try to imagine some of the dangers and some of the rewards that the new technologies may bring.

The dangers are revealed in a nightmare in which the information revolution entails loss of political and economic sovereignty, erosion of culture by foreign influence, totalitarian invasions of personal privacy, progressive de-industrialization, massive unemployment and the transformation of just about everybody into alienated electronic hermits and computer freaks. It is a pretty bad nightmare and the worst of it is that some of it already seems to be coming true. That is to say sovereignty and culture are already threatened, unemployment is a reality, factories are already being turned into warehouses, and there are families where children are locked into the basement with the TV and thrown a few fishheads now and then to avert physical starvation. And if I am exaggerating a little, it is because I want you to feel the nightmare.

The rewards are a little harder to imagine, perhaps because we seem to be going through an anxious time or, more likely, because our imaginations are fettered. But the technology revolution could bring new industries and jobs to Canada, improve our competitive position abroad and bring the knowledge and art of the whole world into every living room in our country. It could solve some of the problems of education and entertainment in remoter regions, do much to keep our scattered population in touch with one another, and enable them to find new friends and new interests at home and abroad. It could remove much of the drudgery from work and the home. It could enhance human intelligence as machines enhance muscle-power. It could provide help to the handicapped and provide expert medical attention and advice for individuals in remote locations.

But having confronted the dream and the nightmare, we shall do well to remind ourselves that all these dangers and blessings are merely possibilities, not concrete realities. The existence of a technique does not mean it has to be used (though it often is); the existence of a technology does not mean it can be brought to the marketplace in the form of products (though, if profitable, it usually is); nor, with all respect to the power of the advertising community, does the existence of products mean that they will necessarily sell at once or indefinitely (though there is little that advertisers won't try).

It is possible that scepticism about nightmares and dreams may appeal to a school of thought that believes in muddling through. From this point of view computers are useful only for serving up information as a bland pablum of statistics, while telecommunication is no more than a delivery system for situation comedies and a means of keeping in touch with the grandparents. In this light, advances in computers and telecommunications just mean more of the same. After C. Wright Mills, I call this the school of crackpot realism. I see it characterized by short-term parochial thinking.

We should ask ourselves why there is so much confusion about these technologies. If you would allow me a little poetic licence, I would like to quote from the brilliant American anthropologist Gregory Bateson who remarked in the mid-1960s in a somewhat different context that "...cybernetics is the biggest bite out of the fruit of the tree of knowledge that mankind has taken in the last 2000 years. But most of such bites out of the apple have proved to be rather indigestible -- usually for cybernetic reasons." For myself, I don't think it is quite our biggest bite, even in the relatively short term, though it is a little disturbing that one of the best-selling home computers on the Canadian market is called "Apple" and that it operates, like all computers, by taking bytes of information. Bateson did have a point, though: the implications of the new technologies are so far-reaching, various and diffuse that they are hard to digest. And the reason may itself be

cybernetic, in that our thoughts on the subject lack a focus, a frame of reference.

The Department of Communications has been studying the social, economic, political and cultural implications of computer-communications since the late 1960s. Some of you have seen such documents as Instant World, the Telecommission studies, Branching Out and numerous others published by the Department. We probably have more expertise in this area than any other government department in Canada and most such departments in the industrialized world. But I'm sure some of you have felt that, with each new publication, we are starting again from scratch, not building on what we knew. Constant rethinking was, however, necessary if we were to come up with an acceptable frame of reference, a systematic framework which would include the full reality of the new information technologies with all their implications. In a sense, the problem was a simple one. We had to ask ourselves the same question everyone else is asking: what do Canadians want from the new technologies?

This is where the third wish comes in, the wish that what we most cherish should not be lost. And what is it that we value above all else? Since these are information technologies, the answer, in terms of public policy, can best be expressed, we believe, as freedom. But what kinds of freedom? Over the years, successive governments have isolated five types, which have served as guiding principles for telecommunications policy. They function as our strategic principles, though it would be wrong to regard them as mere inventions of government. I believe they reflect some of the most deeply held values in our society. They are: freedom of expression, freedom of access, freedom of enterprise, freedom to develop and the freedom to enjoy privacy.

These freedoms provide touchstones by which we can judge the results of new information technologies. They can provide governments with a comprehensive framework for long-term planning and help public servants to raise questions such as whether government intervention might be necessary in certain circumstances.

These freedoms do not, however, provide an automatic guide to policy. Sometimes they conflict with each other. For example, there is an obvious tension between the individual's right to privacy and the need for freedom of access to information stored in computer-communications systems. Such tensions between fundamental principles highlight our knottiest policy issues for debate and consideration. Reconciling these principles should not be the responsibility of public servants and legislators alone, but of the community at large. This debate is the public equivalent of the marketplace, where contending ideals are tested by the dialectic of free and open discussion. Hence no principle can be intrinsically superior to another. Conflicts have to be resolved through public debate.

The first principle is freedom of expression, which encompasses both freedom of speech and freedom to create. It is a freedom so well understood by Canadians that on the face of it we hardly need to discuss it. But we often forget its practical implications. For example, it does not mean much to have freedom of expression if you don't have an audience. A man alone on a desert island in the mid-Pacific can say what he likes, but it won't do him much good; he won't really be communicating. Similarly, an artist's or journalist's freedom of expression means very little if he has no access to galleries or media. Such practical implications could well become a continuing concern of government as new information services become available. This freedom is vital to the development of Canada's cultural industries.

The second principle is freedom of access, by which we mean public access to the full range of interactive and one-way telecommunications services. Quite properly, Canadians now view it as their right to send telegrams, make telephone calls, use mobile radios. At this point one cannot tell just how individual access will be assured to interactive services like Telidon. But my Department's objective since 1970 has been to make available "the widest possible range of services to all social and regional groups in Canada". That objective stands; and as services multiply and improve, it may be easier to carry out in the future.

Access does not mean just the passive reception of TV or other signals. It also means active involvement, whether through community channels or interacting with a Telidon system. One of our major concerns in the future should be to improve both passive and active access to a wide choice of services, to a diversity of voices.

Access also implies that Canadians should be free to choose between providers of information services. In broadcasting, for example, public access to foreign channels and programming has been, hitherto, restricted through CRTC regulations. Such restrictions, while remaining, may aim, judging by current voices in the media, as much at improving the quality of Canadian programming as at increasing its quantity. We also are witnessing that governments place more emphasis on providing incentives to Canadian program-producers. In the new technologies room should be made for our own programmes.

Our third guiding principle is freedom of enterprise. True, our industry includes a large public sector, and is characterized in part by monopoly and duopoly. Extensive regulation and public agencies like the CBC apparently have been necessary to provide services and opportunities which market forces or the private sector could not supply. Moreover the efficiency of our telecommunications networks has been increased by standardization of communications protocols, network and terminal interfaces, data formats,

access rules and tariffs. Such constraints on freedom of enterprise, however, apply rather to carriage services than to the information which is carried. As to content, it has been the government's policy to ensure open access to the telecommunications system. Where a carrier also provides its own information or programming services, it has been argued that regulation may be needed to preclude the danger of unfair advantage or discrimination against competing services.

Our fourth fundamental principle is freedom of development, by which I mean national development. More than one observer has warned that the new technologies may pose a threat to Canada's integrity as a nation.

The first concern here is political sovereignty. It is endangered when vital information is stored outside our borders, beyond our control. Privacy, as well as economic and national security, could be compromised. The Clyne Committee, of which the publisher of the Toronto Star was a distinguished Member, has already spoken eloquently and in practical terms on the subject. Indeed there is a growing chorus concerned with the need to ensure our economic independence should there be evidence that it is being threatened by the new technologies and their particular application. Some studies outside and within the federal Department of Communications have suggested the possibility that the new technologies could increase unduly the power of multinational corporations for example. But none of this work is conclusive. The pessimists would have us believe that there might be a danger of our becoming a warehouse economy in which Canadians will be reduced to wholesaling and retailing goods manufactured abroad; that there is a danger of losing highly skilled jobs, and of such policymaking functions as planning, financial management, administration, marketing and research and development. Canadians are not alone in such fears and should the facts warrant it, no doubt governments will wish to act to avert such dangers.

We are already introducing programs to protect our technological sovereignty. We want as much as possible of the new technology to be developed and manufactured right here in Canada. The federal government is providing millions of dollars to the Canadian electronics industry. Procurement policies are stimulating research and development in Canadian industry. With government support, Canada has become a world leader in the development, manufacture and operation of communications satellites and fibre optics transmissions systems. Our telecommunications system is already one of the most sophisticated and extensive in the world. Telidon, now widely acknowledged to be technically superior to any other videotex system, was developed in a government lab. We are transferring much of this technology to private industry and providing substantial encouragement for field trials, as well as working with industry to have Telidon standards widely accepted in other countries. Such activity will continue, and could form the basis for an industrial strategy to ensure that Canadian business can take full advantage of the new information technologies.

These efforts will help us strengthen our cultural integrity in the face of a deluge of external information. For if we develop the technology here, we are likely to have a little more control over its use, and be better placed to make it responsive to our own needs.

The fifth and final guiding principle in this comprehensive framework is the freedom to enjoy personal privacy. This freedom extends equally to national security and to the safeguarding of industrial and trade secrets. My department, as the record shows, has been concerned since its inception with the issue of privacy. But even privacy is not an absolute, and must be weighed against the public's freedom of access to information. In the public service, one must confess, it is too easy for officials to classify the embarrassing as confidential and keep vital information out of the public forum. We hope for continued public debate on questions where the citizen's freedom of access conflicts with the equally legitimate desire of others to preserve their privacy.

These then are the elements of the third wish, the wish that could take the harm out of the unbridled development of new technology. And those of us who want to limit possible harm will want to try to put the wish into effect as soon as possible. But one cannot but be concerned at times that any concerted effort by government alone to assume these freedoms may become lost in a welter of competing jurisdictions.

That is why there is need for extensive consultation and debate with many federal departments, provincial governments, potential information providers and the entire computer and telecommunications industries. And in fact that is the way we have hitherto conducted the search for policy. Symposiums like this will continue to play an indispensible part in the process. But even these are not enough. All of us have known each other pretty well. We keep meeting and sharing our views and experiences and we do enjoy ourselves. But we cannot hope to arrive at wise policies all by ourselves. We need the help of all interested Canadians. That is why I am offering these views for discussion and for public debate. And in this enterprise I keep thinking of a Hungarian proverb, quoted by Oppenheimer to Dyson in another context. The Hungarian proverb says "It is not enough to be impolite; one must also be wrong."

Perhaps I have lived up to that.

The Arts in Canada and Their Relationship to the Emerging Information Society

Peter Sindell

[Peter Sindell, an anthropologist by training, is the coordinator of Project Delta, a co-author of a major study on the Conserver Society, and is currently working on a large scale Information Society Project.]

1. Introduction

In this paper I would like to raise some issues and questions with regard to the impact of the emerging information society on the arts in Canada, on the one hand, and the constructive role the arts could play in such an information society, on the other. Based on my paper (Sindell 1979) and other reports from Phase I of GAMMA's Information Society Project, I shall sketch very briefly some of the dangers which arise and some possible scenarios for such a society. Then, I shall note some of the roles which the arts could play in ensuring that the advent of an information society benefits Canadians more that it harms them. Finally I will discuss some of the ways in which such a society could harm or benefit the arts: performing, visual, and literary.

2. The Information Society

The fundamental assumption underlying this paper is that Canada, the other countries of the western industrial world, and Japan are moving toward a new kind of society, the "Information Society". The economics of such a society will be based much more upon the creation, transmission, processing, and storage of information, rather than the production and consumption of industrial goods. This historical transition is technologically driven by innovations in the rapidly converging technologies of communications and information and stimulated further by dramatic decreases in the cost of those new technologies and advances in miniaturisation. (Houle 1979). Today, one can hold between two fingers a computer on a chip of silicon which costs less than ten dollars and can do the same number of calculations as the first computer in 1946, which occupied a room of 200 square metres, required 18,000 vacuum tubes, and used 175 kilowatts of energy per hour of operation. My colleague at GAMMA, Kimon Valaskakis, has noted that comparable improvements in the automobile industry in terms of cost-efficiency would yield automobiles today capable of travelling 160,000 kilometres per hour, which could go 360,000 kilometres on a litre of gas, and would cost about five dollars ($5.00).

In my opinion, the economic, social, political, and cultural changes, which will flow from the development and use of the new information technologies based on advances in microelectronics will be structural in character and as a whole, will be so profound as to be legitimately labeled an "information revolution". The microprocessor will have the role in this revolution that the steam engine had in the industrial revolution.

At present in Canada about 40% to 45% of our labour force is engaged in information activities -- education, government, banking, insurance, the cultural industries, communications, and so forth.

These figures become positively electrifying when one considers the potential impact of telecomputerisation on the service sector in terms of labour displacement. Computerisation in banking, retailing, and offices of all kinds, is picking up momentum and will accelerate dramatically as equipment costs fall in line with the swiftly decreasing unit costs for computer components.

Dickson and Marsh (1978) state, for example: "The trend in all advanced societies has been for the total proportion of the working population employed in manufacturing industry to decline steadily with a corresponding increase in the proportion employed by the service sector. However, the application of microelectronics to the service sector has created the fear that, it will not only be unable to absorb redeployed industrial workers but that it may contribute itself to the growing class of the unemployed." (1978:35)

Manufacturing will also be dramatically affected both in terms of processes and product development as described in McLean (1979) and other works. Zeman's recent report (1979) documents similar concerns in several European countries and provides little room for complacency.

Our international competitiveness, our balances of payments, and our level of employment are all potentially threatened. Other threats at a cultural level can be discerned. Our present problem with the predominance of American programming on television may become just part of another much larger problem -- foreign domination of many new spheres of content -- computer software for personal and business use, home videotapes, video-discs, computerized information banks, etc. As our communications system becomes even more and more interconnected it allows greater penetration into every sphere of our life together -- homes, business, universities, libraries.

Potential threats to our privacy as individuals also abound. Just to take one example, with the rapid advances in electronic funds transfer and the establishment of the electronically-based Canadian Payments Association, transactions made by an individual will be identifiable and trackable. Already some cable systems have the capacity to monitor exactly what television programmes one has watched.

Storage of confidential or sensitive information in foreign countries also poses many problems. This latter aspect of transnational data communication is just one of many raised by the increased interdependence made possible by satellite and other forms of international data communication. Sovereignty as well as individual privacy can be called into question when data are transmitted to another country for processing and/or storage. These issues have been cogently discussed in the Clyne Committee Report (1979), the 1978 Science Council Paper on Communications and Computers as well as in the various reports of Gamma's Information Society Project, particularly Kimon Valaskakis' integrating report (1979), Iris Fitzpatrick-Martin's work on social costs and benefits (1979), and my own study of public policy (1979). Consequently, I shall not discuss further here the potentially negative effects of the emerging information society.

I would like, however, to mention briefly the three scenarios and their variants which Kimon Valaskakis has developed vis-a-vis the information society in the 1980s.

His three scenarios are as follows:

[A] The Telematique Scenario (from the French Tele-informatique which refers to telecommunications-computer linkage) characterised by a central electronic highway linking offices, homes, factories, schools, etc., the ubiquitous presence of terminals and computers in production and consumption activities, and international interconnection via satellite.

Variants:

T1 - with trivial content

T2 - with totalitarian content

T3 - with socially desirable content

[B] The Privatique Scenario characterised again by the omnipresence of computers but interconnection via satellite and the central electronic highway is minimal.

Variants:

P1 - individual symbiosis with the computer and personal dependence on it

P2 - small group interaction using computers based on the local (geographical) community

P3 - small group interaction using computers based on (non-geographical) affinity

[C] The Rejection Scenario characterised by the rejection of high-technology machines and a return to direct non-technologically mediated communication.

Variants:

R1 - emphasis on individual interaction with others

R2 - emphasis on interaction within a cult or religious movement

(For further details see Valaskakis 1979).

Those scenarios illustrate nicely the range of possibilities, some negative, some positive, which an information society might entail. They provide a context for the rest of the discussion. Although some negative effects are inevitable, in my opinion, increased foreign control over our media and economy, severe economic problems, trivial or totalitarian content in our new networks, and a diminished quality of life are not the inevitable consequences of our transition to an information-based economy and society.

I have argued extensively (1979) for the need to develop explicit, coherent public policies in this area so that we can adapt successfully to the new technology and develop export markets and, thus, obviate many of the economic problems, while

at the same time exploiting the positive new possibilities for individual and collective growth, creativity, and artistic development.

The key to seizing the opportunities offered by the new technology rather than being submerged by it lies in adopting a whole new 'optique' or way of looking at these information machines. Gordon Thompson has led the way in pointing this out (1979 a,b) and has argued that most of our present ideas for ways to use the new information technology reflect old habits shaped by our experience with industrial technology. Industrial technology assumes bigger is better, is based on economies of scale, mass production of identical goods and low unit costs, and reinforces central control. The old computer utility idea, conventional radio and television all reflect these values.

In contrast, information technology can be easy to use, "convivial" in Ivan Illich's terms, non-centralist in character, and can facilitate the individual conversion of labour into capital without massive investments leading to the development of unique goods and idiosyncratic products tailored to one individual's needs, interests, and joys. Frank Branscomb, the Chief Scientist at I.B.M., has coined the term "personalized manufacturing" to describe the way information technology can serve to respond to individual differences rather than to some abstract standard individuals. He relates the example of a person going into a shoe store and having foot measurements taken by a computer which then transmits the information to another computer along with style, colour, and leather preferences. The computer then directs one computer to instruct machines to make the shoes while a second computer prepares a bill, which is then printed out at the retail store when the shoes are ready. Much more important in the long run, of course, in Thompson's view and in my own is the development of the content side of the equation.

There are two vital facets to this question. One is the role that the arts can play in developing the positive aspects of the scenarios alluded to the above. The other is the way in which the arts and artists can benefit from the new technologies and new systems for the dissemination of information -- using the word in its broadest sense. This latter aspect will be dealt within the next section of the paper.

Artists, artistic organisations, and the works which result from their individual and collective actions play many vital roles in our society. Our literature, our paintings, our films, our television and radio programmes not only tell us about each other and reflect our diverse cultural heritage to ourselves, they also preserve and create that historical sense of roots and identity which is so important to both individuals and nations. At other times they satirise and criticise, a recent example being the Mummer's musical about the Newfoundland oil boom and its social impact. The C.B.C.'s Riel reminded us not only of the Riel Rebellion but of the prejudice which still exists against many of our native peoples. Furthermore the arts stimulate, provoke, and celebrate individual creativity. In all of these ways and in many others the arts relate to our emotions, our importance as individuals and our human relationships. In the context of the information society these aspects of ourselves and the central artistic value of creativity and imagination are essential if we are to avoid scenarios which are totalitarian and dehumanising or degrading to our humanity.

The role of the arts then will be vital in dealing with the increasing integration of people and machines. They will remind us of our humanity and individuality, help us remember who we are, where we come from, and where we want to go as people and nations. With these values hopefully we can make our technology more convivial and make sure it serves us and not us it.

Television is a good example of a medium which has come to serve others -- networks, advertisers, government far more than it serves us as human beings. It consists primarily of mass common denominator programming which ignores the diversity of human experience and induces passivity. My psychologist colleague Scot Gardiner says often that too much impression without expression is dangerous to your health and, further, that if there is another North American revolution its byword will probably be "No impression without expression!" Only the arts can provide people with real, direct, immediate, unmediated opportunities to participate, cooperate, create -- either vicariously or in actuality. Thus in the next section where I suggest using the new media to expand the reach of existing artistic activities in no way am I suggesting that live theatre, dance, poetry, reading, exhibitions, etc., be replaced by media productions. Cooperation and collaboration, not substitution, must be the guide here. Television, Cable, and Satellite must play Mercury but not Jupiter.

3. Arts and the New Information Technologies

The first point which needs to be made is the central importance of the cultural industries if Canada is to achieve success in dealing with the impact of the new information technologies. We are uniquely blessed in Canada with satellite, broadcasting, and cable facilities equal to or often better than those elsewhere in the world. Because we are so heavily cabled (60% of households vs 15% in U.S.A.), we also have an extraordinary advantage vis-a-vis other countries in developing content for these networks and cable systems. We could recoup much of the investment, in Canada, and then export "cultural products" appropriate to the new network-oriented electronic

media. One can also envision transferring films and programmes to videotapes and video-discs for sales to other markets which depend on stand-alone equipment.

Let us take some of the problems faced by artists and arts organisations in turn and see if the new optique and the new technologies could help. We must start with the problem of foreign (principally American) content. On the one hand, unless we move fast (and it may already be too late) the videotape and video-disc markets may go the way of the paperback book market which is almost wholly controlled by the Americans. There is an opportunity here but it must be seized entrepreneurially — because of the technology it is not possible to regulate it even if we thought it desirable. On the other hand, because of some enlightened policy and actions by the federal government the broadcasting and cable industries are firmly owned and controlled and regulated by Canadians.

With the advent of Pay Television -- particularly pay-by-the-programme -- interactive television (especially sophisticated versions with voice capacity and so forth), and the possible development of C.B.C.'s TV2, the foreign content problem could decrease. Using a judicious mix of tax incentives and regulation and with a firm grip on the distinction between cultural and commercial objectives these new services could help to substantially develop the Canadian programme production industry just as the feature film industry has been aided by incentives (56 feature films, $165 million invested in 1979).

Taking TV2 as an example, according to the C.B.C. presentation to the CRTC in May of 1978, pages 57, 58, 454-456, it would show again the best programmes from TV1 at a different time so more people could see them; it would develop original productions -- often building on the best materials produced in the various regional centres and by the provincial educational broadcasters; it would create programmes for special groups such as those interested in international affairs, the arts, and business; and finally, it would give the National Film Board the increased distribution it so richly deserves. Because satellite receiving stations have dropped so much in cost, it is now economically feasible to distribute a signal by satellite to the headends of cable television systems at relatively low cost. These signals would then be delivered to the home via cable. Ideally, new programming for children, and TV2 could be coordinated with the Pay TV and other plans of the Cable Satellite Network.

Using Telidon and Pay TV, poets, writers, scientists, dancers, artists and many others could gain direct access to an enormous network of consumers, again improving the distribution network for cultural products and helping to build the critical mass of people needed for artistic viability. Telidon could have databases on creative people's addresses, availabilities, skills, credits, training and so forth as well as, for example, databanks of slides, information on grant programmes, upcoming events, etc.

The chronic financial problems suffered by artists and artistic organisations could, in theory, also be ameliorated by extending audiences electronically. Direct feeds from Stratford, Place des Arts, the O'Keefe Centre, the Manitoba Theatre Centre, the Vancouver Playhouse, the Charlottetown Festival, etc. could be distributed by satellite and then cable, thus bringing in revenues to the artists and their institutions, while bringing the citizen some of the (literally) untold cultural riches of our country at a small price. Labour problems, copyright problems and many other kinds of problems will occur, but with good will and with an image of the importance of the task, I am sure that we can succeed in using new and existing information technologies to achieve both old and new cultural and economic goals.

Given our cabled environment, another more technological innovation which could bring enormous cultural and economic benefits to Canada would be to create a new terminal for use as a stereo radio and television, a stereo record and tape recorder, and an information computer terminal. Even if we changed our present television receiver to a resolution of 1050 lines (double our present 525 lines), built in a high quality stereo audio feature and added a capacity for videotex services, and, finally, changed the reception capacity to 50 channels without a converter, we might be able to recapture our 500 million dollar television receiver market (almost all imports now) and, at the same time, stimulate our market for music, interactive services, and so on. Right now our receivers can only receive channels 2 to 12 without a converter even though our cable systems transmit from 30 to 52 channels.

There are many other examples which one could give of the positive effects on the arts, artists, and the cultural industries as a whole, potentially available to us through the new information technology. I will not give away any more now since the opportunities and issues should be clear.

References

Consultative Committee on the Implications of Telecommunications for Canadian Sovereignty, Telecommunications And Canada. March, 1979, Ottawa, Canadian Government Publishing Centre, Department of Supply and Services Canada.

Cundiff, W.E. and Mado Reid, Eds., 1979, Issues in Canadian/U.S. Trans-Border Data Flows. Proceedings of a conference held in Montreal at the Four Seasons Hotel and sponsored by the Institute for Research on Public Policy, September 6, 1978. Toronto: Butterworth and Co.

Dickson, Keith and John Marsh, 1978, The Micro-electronics Revolution: A Brief Assessment of the Industrial Impact With a Selected Bibliography. Occasional Paper, Technology Policy Unit, University of Aston in Birmingham.

Fitzpatrick-Martin, E.I. 1979, Social Implications of the Information Economy. Paper 5, Phase I, GAMMA, Information Society Project, Montreal: GAMMA, Universite de Montreal/McGill University.

Houle, Jean-Louis, 1979, Poussee Technologique et Couts Decroissants en Teleinformatique. Rapport No. 3, Phase I, Project: Societe Informatise Montreal: GAMMA, Universite de Montreal/McGill University.

McLean, J. Michael, 1979, The Impact of the Microelectronics Industry on the Structure of the Canadian Economy. Occasional Paper No. 8, Institute for Research on Public Policy.

Science Council of Canada, 1978, Communications and Computers. Information and Canadian Society. A position paper. Ottawa: Publications Office, Science Council of Canada.

Sindell, Peter S. Public Policy and the Canadian Information Society. Paper 4, Phase I, GAMMA Information Society Project. Montreal: GAMMA, Universite de Montreal/McGill University.

Thompson, Gordon B. 1979a, Memo from Mercury: Information Technology is Different. Occasional Paper No. 10, Montreal: Institute for Research on Public Policy
1979b, Two Scenarios for an Information Soociety in Canada and Their Technological Implications. Paper prepared for Delta Seminar No. 11, October 25, 1979, Montreal: GAMMA, Universite de Montreal/McGill University.

Valaskakis, Kimon, The Information Society: The Issue and the Choices. Integrating Report, Phase I, GAMMA Information Society Project. Montreal: GAMMA, Universite de Montreal/McGill University.

Zeman, Z. 1979, The Impacts of Computer/Communications on Employment in Canada: an Overview of Current OECD Debates. Report to the Department of Communications, Montreal: Institute for Research on Public Policy.

Urban and Rural Planning Information: The Prospects for Participation

Ron Keeble

[Ron Keeble teaches in the Urban and Regional Planning Department at Ryerson Polytechnical Institute. He has had wide experience in computer applications in planning, citizen participation programs and environmental design of human settlements.]

Introduction

One particular pressing issue facing planners today is the issue of participation, of having access to the planning process and the information upon which it is based. This is the topic to which this paper will respond in effort to link communications and computer innovation to the prospects of greater participation in planning. To do so however, will necessitate a brief setting of the context in planning. A brief outline of the relationship of communications innovation and planning, and of information and planning, will set the stage for our analysis of participation prospects.

Responding to Urban Growth

Planners have long appreciated that a fundamental rationale for urban centres has been their role in fostering human communication. Be it for the exchange of information, or goods and services, cities have for many centuries been the venue for business and social interaction. What began at the level of face-to-face conversation and bartering has evolved through the development, standardization and machine processing of written symbols to their transmission by several generations of communication devices. From the perfection of the telegraph to telephones, radio and television, and now coaxial cables, micro-wave relays and satellites, these advances have dramatically extended both the distances and volumes of information flows and the speed of their movement. The locus of these developments were cities. And in concert with transportation innovations, they have fueled the processes of urban population and economic growth. The pace of this urbanization process has in turn accommodated the proliferation of communications technology, as expanding urban populations created new demands for continued advances. Planners have had to both respond to and attempt to direct the effects of transportation and communication innovation in their efforts to allocate and regulate urban land uses and provide essential public investments. The competitive and social advantages provided cities by improved transportation links and expanding communication capabilities have resulted in a series of major alterations in urban structures in terms of increasing densities and outward expansion. With each innovation new patterns of spatial expression have resulted, and new demands have been placed on urban governments to respond with the necessary planning, financing and regulatory commitments.

But with increasing densities and the expansion of urban activities, cities have also experienced a range of externalities which have slowed and often stagnated the pace of urban growth. Congestion and associated increases in time expenditures to move people, goods, and information have detracted from the economic efficiency of major urban centres. Planners have been hard pressed to respond to these conditions. The application of new and varied technologies to ameliorate these difficulties has had a two-fold effect. First, with the resultant increase in the accessibility of the urban core, new densities in both built form and urban activities -- particularly corporate activities -- have been accommodated. This has resulted in a new round of demand for improved transportation and communication systems. And while such innovations have improved our abilities to interact at higher densities, they have also promoted population dispersal with its own unique form of communication and transportation requirements.

From what were originally quite nuclear development patterns, cities have expanded outwards. Where once we spoke of urban and rural, we have changed to urban-suburban-rural, the urban fringe, and now the urban region which goes beyond the old relations of economic dominance and dependence in the settlement pattern. We are now faced with replacing our concept of urban sprawl with the notion of urban splatter, a new fragmented form of urbanization of small settlements scattered across a region. With the continued

extension of urban influence, our rural populations have dramatically declined, and in many instances the role of local farm service centres has been transformed to one of a focus for new urban expansion.

Communication and information dominance is now an advantage held by major urban centres. Direct communication links to larger cities, often at the expense of improved lateral linkages, have reinforced the dominance of a select number, and contributed to the relative stagnation of lesser centres. The significance of information as a generator of urban growth has added new complexity to a range of planning issues from regional economic development to the continual reshaping of urban structures to the delivery of community and social services. Regional planning strategies in particular are now highly sensitive to the growing dominance of major centres in terms of their control of communication links and information and their influence on population distributions. And planning in the context of rural transition has taken on new significance in light of the renewed interest in the resource wealth of rural areas and the related complications of the migration of rural populations to urban environs.

Yet planners have also contributed to this centralization trend in their formulation of planning strategies to accommodate and utilize computer and communications innovations. Growing public expenditures on the development and maintenance of central computer-based information systems to meet dramatic increases in the demand and complexity of information provision has brought about a withdrawal of such services from their local base. This is particularly significant in rural areas where access to information has become increasingly difficult. And more importantly so since the expansion of urban lifestyles into rural environments, helped in part by better communication and transportation linkages, has caused a tremendous increase in demand for information on social and community services, education, employment, planning and so on. The prospects for responding to this rural demand by utilizing computer storage and retrieval systems integrated with current and expected telecommunication technologies to provide information in the home, are clearly worth further investigating. As are local information service systems based on the telephone network or powered by micro-computers and programmed by local personnel. The planning issue here, of course, is to implement an organizational structure integrating these local information 'clearing houses' within an overall system of storage, retrieval and distribution which provides for the non-local based information needs.

The significance of this rural information need is clearly augmented by our current context of escalating energy costs, uncertain supplies and spot shortages, and the obvious need to significantly reduce travel in rural environments characterized by dispersed points of information need, a decline in points of information provision and deteriorating or non-existent public transportation systems. However, this is also a significant urban planning issue as well with the new evident interdependency of population distribution and energy policy issues.

While energy models have routinely considered population size and growth rates in the forecasting of future energy demands, there has been little consideration given to the changing distribution of the residential population over space, and its impact on energy demand. Canada has traditionally been quite lavish in its consumption of energy, and the trend continues today with Canadians being the second highest per capita energy consumers in the world. In the last fifteen years we have witnessed a subtle shift in consumer demand for the outputs of production in our economy to a new demand for more energy-intensive public and private goods and services. The dispersal of urban populations in part reflects a decline in the transportation cost sensitivity of households. And combined with an increase in the energy content of household consumption, it has permitted the outward migration of urban lifestyles characterized by large energy allotments to compensate for increased distances from employment and commercial activities and increased social isolation. While this signifies a new type and scale of urban living, the question of whether it can survive in an era where increasd energy costs are passed on to consumers remains to be answered. Increasing sensitivity to transportation costs on the part of this residential group will no doubt place new demands for alternative modes of informational services to these households.

Our response to this energy context has generally been of two forms. The first concentrates on increasing supplies either through new technologies or through stepped-up exploration. The second focuses on energy demand, specifically its reduction, and means for conserving energy supplies such as the retrofitting of housing for better energy performance, the design of fuel-efficient vehicles and improvements in the design and operation of office and retail facilities. For planners however, there is a third perspective which focuses on the relationship of energy consumption and land use.

From this perspective several questions are significant. Will a population policy promoting dispersal necessitate increasing energy use to allow a spread-out, multi-centered settlement pattern? Will a policy that transfers higher energy costs directly to the consumer promote a greater degree of population concentration, and in so doing, aggravate or perhaps relieve the economic, fiscal and social problems of cities? How might greater energy costs and the move to energy conservation be expressed in terms of the physical structure of our cities and future needs for moving people, goods and information?

Planners, now aware of the link between energy costs and land use, acknowledge that due to present land use arrangements and transportation patterns certain levels of energy consumption are required. And as a result of changes in future energy sources and consumption patterns, changes in land use and transportation will occur. Planning our Canadian cities in the near future may need to alter its focus from attaining economic efficiency, to an approach tempered by energy efficiency. This would entail energy conservation by land use achieved through compact, higher density, contiguous development oriented to public transit, where energy saving through the utilization of technologies applicable only in higher density clustered developments can be achieved. The onus will clearly be on land use relationships organised to minimize trip generation.

The possibilities of interactive telecommunication systems satisfying some portion of these trip requirements takes on new significance in light of the possible policy directions for future planning. Should, through the provision of infrastructure, planning agencies pursue clustered development at the regional scale and reinforce the urban splatter settlement pattern, then demand for information provided locally by relocated urban lifestyles will increase dramatically. This in turn will require the decentralization of information sources -- As will the increased energy cost burden placed on rural dwellers and low-income urban groups, should costs be passed on to the consumer. However, this runs counter to the tendency to centralize information sources which is now prevalent within planning. As the complexity of generating the information base for planning has increased, reliance on electronic data storage and retrieval has grown, and information for planning has changed considerably.

Information for Planning

With the first applications of computers in planning settings, and the recognition that the arduous tasks of storing and accessing data could be greatly relieved through computerization of databases, the profession embarked on several years of experimentation with centralized information systems. The sixties and early seventies were 'heady days' in planning, as the profession came to believe that computer-based data systems would give them the advantage necessary to respond quickly and effectively to the multitude of economic and social problems they faced. Large public expenditures on data banks followed as municipal, regional, and national planning agencies pursued the information system option. Integrated Municipal Information Systems (IMIS) were the next generation as cities attempted to develop unified multi-functional data bases shared by all authorized users and generators of municipal information. Large-scale computer-powered models appropriate for the testing of alternative planning strategies were next as the profession, greatly excited by the seemingly unlimited potential, charged full speed into the computer age.

It was not until the mid-seventies that the euphoria began to die down. The significant levels of funding necessary to sustain the operation of data banks and modelling procedures, the static nature of information plus the difficulties of acquiring it, and the limited applicability of data stored in predefined aggregations, altered the profession's views on computer modelling. However, there still remains a strong commitment to the continued evolution of centralized information systems. Indeed the cost consideration has resulted in their further centralization as higher level governments -- the provinces in particular -- have assumed from municipalities much of the funding responsibilities. The availability of long distance data transmission through telephone network and microwave relays has also fostered this relocation of information to a few central information distribution points.

Larger municipalities able to fund the necessary hardware and software have extended their information systems capabilities. They now include financial and budgeting systems, geoprocessing, land use, housing and planning systems, criminal justice systems, transportation and human resource and social indicator information systems, in addition to basic administrative functions. Smaller centres, unable to finance such developments, have been forced to rely more and more on information available only from external sources such as Regional Municipalities or the Province. And this is particularly an issue for rural municipalities, as much of their data originates from regional or provincial information systems. With these developments, the character of local planning has been altered to the degree that often assessment and taxation rolls and notification responsibilities are handled by a higher jurisdiction. And the data is further removed from planning agencies which must now rely heavily on computer professionals to access and manipulate data.

While many computer innovations coupled with telecommunications capability have greatly eased the generation and accessing of data useful for planning, they have also been responsible for a smaller segment of the profession being able to make direct use of such information. A lack of understanding of the technology itself has impeded planners. For many, the half-day demonstrations of systems and their data display, graphics and analysis capabilities is the extent of their exposure to the technology. Making use of an in-department terminal is problematic for many who have difficulty in coping with system sign-on and search procedures. And more and more this area of responsibility has been turned over to computer and statistics sections who perform the role for multiple departments and agencies. Since planners have for the most part been unable to state their

information needs clearly in terms of system capabilities for these specialists, the potential of the system developments are seldom realized.

For smaller municipalities, the answer may lie in smaller-scaled systems development, focussing on housing or land use specifically, and structured on geoprocessed data. The application of micro-computers with graphic display capabilities may be the first step towards planners being able to signify their particular data needs in the context of their actual usage of data. The potential of a network of micro-computers also provides the opportunity to restructure the current organization of information for planning from a highly centralized format to one based at the local level with an in-house capability of accessing data from potentially unlimited sources.

Having briefly summarized the planning context in terms of communication and computer applications, and the major informational issues now or about to be faced by the profession in the near future, let us consider the prospects for greater participation in planning.

Prospects for Participation

Information itself is becoming a contentious issue in planning. With the increase in the degree of community input into governmental planning decision-making in recent years, a number of information-specific issues have arisen. Public concern for planning issues are often clouded by technical information over which there is some disagreement even among experts. The public is increasingly being deluged with information, much of which is easily misconstrued as a result of complex, incorrect, or poorly interpreted data. But such information generates emotional responses from the public, and opinions are quickly formed and stubbornly adhered to. [1]

In this planning environment, an accurate reflection of public opinion is difficult to achieve and effective planning and decision-making is almost impossible. As a result of the inability to effectively communicate with the public, and the progressive hardening of public opinion in light of poor or often inaccurate information, the planning process is severely hampered. This is particularly true for developments which are themselves contentious: prison relocations, hazardous waste management facilities, refuse dumps, expressways and so on.

What is required is an ability to establish an environment of reasoned discussion and public decision-making by creating a community that is receptive to accurate information and prepared to enter into a collaborative decision-making process. [2] Public information programmes which make relevant information available to all concerned community residents, in an easily accessible and comprehensible format is an important first step. Cable networks which utilize computerized screens to display TV listings, news and so on could provide a mode for public information dissemination. As would locally televised planning hearings, community meetings, and discussion sessions to inform those unable to travel to the session location.

However, for such information programmes to be effective, the public must be provided with a means of feedback to request clarification and react to the information provided. Telephone conferencing and polling in concert with local TV cable programming are possible interactive options. Interactive television is of course now in the developmental stage, and its application to planning situations in terms of achieving instantaneous public opinion reaction, will be an important breakthrough. But adding a keyboard to a TV also opens up the possibility for data and information accessing as the citizen requires it. It will also allow the public to search for the specific area and detail of information they require to make an informed judgement on planning issues, and allow planning agencies to monitor public reaction in specific areas of interest requiring further information development.

The potential for such applications in rural environments in particular is significant. Here distance and increasing energy costs are effective blocks to participation. However, rural information needs are no less important than those of urban dwellers. Specific rural user groups such as farmers [3], native people, the handicapped and the socially isolated, require not only access to central information but also local communication capabilities to share information, summon assistance, monitor market and crop conditions and so on. The development of small, inexpensive devices for such access will much improve the life conditions of such users and link them with local information on services, planning issues, public events and the like. Some experimentation has been conducted in Britain [4], and the United States in servicing these rural information needs with FREEPHONE services, videotext, teletext, mobile community information vans, and citizen band radio operations. A concept of microcomputer networks oriented to rural users has also been formulated. [5]

Through better informing the public of planning issues, much is to be gained in the improvement of public participation in planning. The ability to acquire immediate public comment and respond to specific informational needs of citizens will assist the public decision-making process and move towards a 'democratizing' of information. And being able to better serve the specific informational needs of rural populations will assist significantly in improving the service response capabilities and performance of planning agencies.

However, there are other means by which the advances in computer and communications technology can improve the immediate prospects for participation in planning. I will briefly discuss three.

While at the University of California at Berkeley, I had the opportunity to participate in the Berkeley Simulation Lab [6] which prepared visual presentations of possible development schemes for both rural and urban settings. These simulations assisted local residents in visualizing the nature of the design, circulation systems and architectural forms of the proposed development at "full-scale". By preparing a scale model of the development which depicted topography, local landmarks and so on, a videotape was prepared using a miniature camera propelled on a boom and directed by a micro-computer according to a preprogrammed route. The camera followed road patterns and depicted the new development at a scale close to that of someone driving through the development site. And by preparing the proposed development in this fashion, community members were able to place the site into a context with which they were familiar. Community reaction to the proposal, the design of built form, landscaping and so forth, were then passed on to the planners and architects for their review and the preparation of alternative designs, changes in site plan, road patterns, etc., in response to the community concerns.

Making this form of presentation available can do much to assist the sharing of information, opinions and concerns among citizens and professionals; often a major difficulty in urban planning situations. By allowing the community to participate in the preparation of the video presentation they can acquire knowledge and expertise not only in the technique of simulation, but also about the constraints, issues and requirements faced by professional staff in the development of plans. Since these video tapes are transportable, they can be used in other urban centres where similar development issues are being faced.

The second example involved graphic displays for micro-computers which depict alternative built forms. By introducing scale and shape, participants were able to design housing units by combining a variety of room configurations on the screen. This speeded the process of introducing community members to the various designs of built form, and provided them with some "hands on" experience at laying out housing units. In addition to the educational possibilities of better informing community residents on design issues, this approach also accommodated specific user groups in depicting for professionals their specific housing needs. For example, the handicapped, who were able to identify the significance of a range of design conflicts to architects in the preparation of guidelines for retrofitting public buildings for unlimited access to those confined to wheelchairs.

The final example also stems from the experiences of the handicapped. In a number of social service agency situations in particular, various levels of government are now actively considering the reprivitization of selected services. In some instances, these service responsibilities are being taken over by consumer-managed centres. The case of the Centre for Independent Living in Berkeley is a specific example. Here handicapped residents of the city assumed much of the servicing responsibilities for the substantial handicapped population living there. While supported by an initial three-year funding arrangement with the Department of Rehabilitation, this Centre and the seven others like it in California, had to assure its own long-term funding support. Here the significance of client contact and outcome data was a major consideration, and the Centre needed a continuous internal records and auditing capability. With the help of a micro-computer and the short-term assistance of a programmer, the CIL was able to establish this records system. In this way, the Centre hoped not only to be able to document their activities, but also to devote more staff time to the provision of services instead of report writing and record keeping. The micro-computer application was proposed for the seven other centres serving the handicapped in the state, as was the possibilities of establishing a micro-computer network among the centres for inventory processing of parts required for wheelchair repair. Also under consideration was the use of micro-computers in the home, connected to the local centre, to assure the allotment of medication in proper form, provide service information and transport schedules, and contact with those unable to use the telephone. [7]

Conclusions

While all three of the examples described above are clearly in the developmental stage, they do indicate how communications and computer technologies can assist residents and specific user groups in taking a greater role in the planning decisions that affect them directly.

By bringing accurate, current information into the planning debate, planners can do much to improve the responsiveness and effectiveness of participation. If coupled with means to acquire immediate public reaction, this information provision can and will assist planners greatly in responding to a range of planning issues. A significant portion of the time-allocations necessary within planning review procedures is invested in identifying and informing public opinion. Gains made through the application of computer and communications technologies are both highly desireable and immediately feasible.

Notes

1. James P. Morgenstern, The Design of a Public Information System, Institute of Environmental Research, Toronto, 1978.

2. ibid.

3. R.F. Sausburg, "Group Needs in Canadian Communications: An Example: Canadian Farmers", GAMMA, University of Montreal/McGill University.

4. David Clark and K. Unwin "Community Information in Rural Areas: An Evaluation of Alternative Systems of Delivery". (pp. 147-165)

5. Cited in Salisbury.

6. Donald Appleyard, "The Berkeley Simulation Lab", Institute of Urban and Regional Development, University of California at Berkeley, 1977.

7. Subsequently all three of these CIL applications were significantly cut back as a result of the fiscal austerity stemming from Proposition 13 in the State of California.

The Computer Must Speak Chipeweyan

Chuck Feaver
(presented by Maureen Matthews)

[Chuck Feaver and Maureen Matthews have worked on communications projects in La Ronge since 1970. Their work has included developing a CBC community access project, setting up a local community station and a two-way radio network for the La Ronge native band. Chuck is Director of Community Development for the Department of Northern Saskatchewan.]

North-South communications is not always an easy process. Radio, telephones, and television have all been introduced to the North as off-shoots of southern systems. Radio and television have been strictly a one-way street; the southerners produce, and the northerners watch. While they have provided lots of entertainment, they have done little to benefit northern communications.

On the other hand, the telephone system, not being a mass medium, has resulted in a different development, northerners talking to each other.

Interactive telecommunications and computer systems provide an interesting mix of mass- and person-to-person communications. But, if such systems are to be introduced into the North for the benefit of native northerners, the technology will have to be backed up with a network of people who have been specifically trained to communicate northern needs to southern information providers.

* * *

Martin Smith is a prominent Metis fisherman in the community of Pinehouse in northern Saskatchewan. Mr. Smith doesn't actually do a lot of fishing himself, but rather he has young men from the community drive his skiff and his skidoos to set gill nets on several lakes in the Pinehouse district. He performs a role of expediter; calling the airplanes to haul fish, buying gas, procuring groceries, and paying his helpers. He also sat on the Central Board of Co-op Fisheries for many years, and he is often consulted by government officials on fishing matters.

Mr. Smith cannot read or write.

He operates his business on a cash basis. Every Friday, Co-op fisheries sends him his fish cheque, having deducted the cost of gas and fishing supplies purchased from them. For the rest of his business, Mr. Smith walks around with a wallet full of cash, paying his bills until he runs out of money.

This system worked fine until Revenue Canada received computer printouts from the Freshwater Fish Marketing Corporation which indicated that his gross income was over $50,000, and they demanded that he file a tax return. As many people in Pinehouse are functionally illiterate, and nobody has ever seen any need to keep books for their fishing or trapping operations, neither the store nor the fishermen's helpers gave out receipts for the money they received.

As a result, Mr. Smith and several of his fellow fishermen paid a lot of money to the Federal government. Some fishermen had to sell their outfits and quit fishing because Revenue Canada had put third party demands on their fish cheques, and they could no longer operate with 30% of the cheque missing.

* * *

Thomas Sha'Oulle is a member of the Chipeweyan Lac La Hache Band at Wollaston Post. There was no school in the community when he was a child, so he cannot read or write. In fact, he can speak only very little English.

Mr. Sha'Oulle fishes during the summer, delivering trout and whitefish to the fish plant in the community. As there is very little work available in Wollaston in the winter, he depends on hunting and trapping for his livelihood between fishing seasons.

A few years ago, when he discovered Unemploy-ent Insurance, Mr. Sha'Oulle went down to the Band office and asked the band secretary to help him fill out the necessary forms. She had never done anything like that before, but after several tries, she got the forms filled out properly, and Mr. Sha'Oulle started receiving cheques. Every

two weeks he would take his computer card down to the Band office, and the secretary would fill them out, send them away, and a new cheque would arrive.

When spring came, and the fish plant opened, Mr. Sha'Oulle got a computer card in the mail, and simply sent it back, because he didn't need it anymore.

The Unemployment Insurance Commission computer was programmed to interpret blank cards as "no change in employment status".

Mr. Sha'Oulle was rather surprised to receive a cheque in the mail, and, figuring it was a mistake, he sent it back along with the usual computer card, left blank.

The Unemployment Insurance Commission computer responded by sending back the first cheque and adding a new cheque for the blank card.

Upon receiving these two cheques, Mr. Sha'Oulle figured the U.I.C. wanted him to keep the money, so he did.

At the end of that year, when the U.I.C. computer compared the co-op fisheries' records of employment to the records of U.I.C. payments, they found a "cheater"; Thomas Sha'Oulle. Subsequently, the U.I.C. collections division wrote several letters to Mr. Sha'Oulle, which he could neither read or answer, and which the Band secretary certainly didn't know how to handle. Finally, U.I.C. put a 30% third party demand on his cheques the following summer, and they drove him out of business. Fortunately, he found a job building houses for the Band.

* * *

Both these stories provide examples of what the introduction of computers in southern agencies has meant to northern people; suddenly southern administrators' ability to control the economic lives of northerners has outstripped their ability to communicate effectively with these people. Incidents like these are being repeated daily throughout northern Saskatchewan.

As a result, most northerners would probably be glad to throw every computer card they ever see into their wood stove, not because the machines have failed them, but rather because the systems have been inconsiderate of user needs. In theory, interactive telecommunications systems could solve many of these problems, but the most important part of any new system would be the interface between the northern user and the southern agency. Any system designed to promote communications between northern people and southern Canadians will face two major problems:

1. Differences in language and culture: 75% of the people in northern Saskatachewan speak Cree or Chipeweyan. Many of the older people do not speak English at all. Their cultures are entirely based on the spoken word. Whereas the history of southern communications is based on letters and newspapers, the only written communications in the history of northern native people came with the development of syllabics by the southern churches.

2. Differences in education: most northern people were educated on their parents' traplines and in their homes. Schools are a recent inovation in the North. For instance, the school of Wollaston Post was built in the early 50s. Also, education has not been a priority for people in isolated settlements until recently. There is an average educational attainment of grade 3 with a drop-out rate of 50% before grade 8.

   Northerners have no way of understanding how a computer works; they have not studied electronics, (white man) logic, or even reading and writing. Most northern people will not be able to sit down in front of a home terminal and start to access and process the information they need as will southern consumers.

   There is a fairly simple and traditional solution to the problem of interfacing northern people to the terminal: each community could hire a well-educated local person and train him or her to translate between the spoken messages and the computer. Similar tasks have been done for centuries by village letter-writers located in market places throughout the developing world, but this kind of service is seldom provided on an organized basis in the North because none of the agencies who would use the service are willing to pay the cost, and the local people cannot afford it.

   If the interactive system is going to communicate with a larger system developed for southern users, then there will be a third problem:

3. Differences in economic and social systems; very few people in southern Canada are actually aware that the commercial fishing and trapping industries are the biggest employers in northern Saskatchewan, and of those who do know about these industries, fewer yet have any concept of how they operate. Therefore, when administrators from Regina, Saskatoon, or Ottawa, extend programs to this area, their application forms are based on prairie farms or on ocean fishing operations. (Northern fishermen

have a very good time with one form that asks for the name of the captain of their vessel; this always triggers a big debate on whether to put down the name of the guy at the front of the canoe who is lifting all the fish, or the guy at the back who is doing all the paddling!)

If northerners are to receive access to southern databanks, they will have to communicate with southern information providers who understand conditions in the North, and understand the questions which will be asked. Therefore, any interactive telecommunications system to be introduced into the north will have to include "special northern interface personnel" at both ends of the line.

If all communities had local operators who could communicate with each other and with specially trained operators in parent systems in the South, this would create a worthwhile communications system.

There is some question, however, whether these people would have to be equipped with the most up-to-date interactive telecommunications and computer equipment in order to handle the kind of business which most northern users are currently generating.

Since the postal service is particularly slow in the North, the major need at present is for an electronic means of transmitting hard copy to one or more locations at a time. Also, since northerners are better equipped to handle visual materials than printed matter, telecommunications equipment capable of sending simple pictures and diagrams would also be useful. Given the low volume activity in most northern communities, these requirements could be handled by a telephone system backed up with facsimile transceivers and a teleconferencing bridge.

The only kind of service which is in great demand at present, and which interactive systems could provide, would be long distance banking. What future possibilities open up remains to be seen, but all too often elaborate systems which are set up in the South are of little or no interest to northerners. The mass media have an appeal in the North, because entertainment shows are designed to appeal to a broad cross-section of people. Interactive communications, however, is specific by its very nature so the services offered will only be appealing to northerners in isolated communities if they are designed to meet northern needs. Given the small population in the North, the high cost of telecommunications resulting from great distances between northern communities, and the low income of the average northerner, it is hard to imagine who will design a system specifically for northerners.

If any progress is to be made toward tying northerners into new communications networks, so that they will not be forced to remain "information poor", then information providers and agencies dealing with the North must start organizing community information and communication centres in remote northern communities. If these are locally controlled, and organised on a regional basis, then they will be best able to pick the hardware and software their people need.

Inuit Communication Needs

Lindsay Green and David Simailak

[Lyndsay Green and David Simailak are working to make a dream come true -- an Inuit communications system that would stretch all across the North and would enhance the strength and dignity of the people. Partial fulfillment of that dream is the Inukshuk Project of which David Simailak is the director.]

The Communication Program of Inuit Tapirisat of Canada

Inuit Tapirisat of Canada (ITC) is a non-profit organization representing the 22,000 Inuit in Canada. It was founded in 1971 when a committee of Inuit decided it was time for the native people of the Artic to speak with a united voice on a host of issues concerning the North. The organization is dedicated to preserving the culture, language, identity and way of life of Inuit and helping them establish their role in a changing society. One of its organizational aims is to improve communications to and between Inuit settlements.

To this end, ITC established a communications program in August, 1975 to define the areas of greatest need for improved communications from the Inuit point of view and to carry out specific projects to meet these defined needs. Activities have included appearances before the CRTC with regard to the services of Bell Canada, CBC and Telesat Canada. Money has been raised to purchase communications equipment requested by communities, workshops have been held and ITC staff have provided communications information and advice. ITC is currently carrying out the Inukshuk Project which will be using the Anik B satellite to further ITC's knowledge and gain additional communications experience.

The Inukshuk Project will use the Anik B satellite to connect six Inuit communities in three regions in a teleconferencing network. One-way video will be transmitted from Frobisher Bay to the five other communities. All six communities will have interactive audio capability. The network will operate from October 1, 1980 to February 16, 1981 for seventeen hours per week, experimenting with teleconferencing and tele-education. A distribution system has been set up to circulate video-tapes in Inuktitut (the language of the Inuit) among Inuit communities and a regional production centre has been established in Baker Lake.

The ITC project will provide an opportunity for Northern users to test different communications configurations in a variety of situations to assess their relative merits. This will assist the Inuit in designing an operational telecommunications system that responds to their needs.

Background — Needs

The Yellowknife Communications Conference, held in 1970 as part of the Federal Department of Communications Telecommission Studies, set out the following communications priorities for the North which are still valid ten years later. The numbering reflects the ordering of priorities, number one being the most important.

1. There is an urgent requirement for reliable two-way telephone and teletype services. Good facilities are needed for:

   a) intra-regional communications

   b) inter-regional communications

   c) local exchange connections

   This service should be available to permanent communities having population greater than 25 or 50 on a 7-day 24-hour basis and not be subject to outages due to climatic or other natural variations.

2. Each community should have a radio program service for education, information, entertainment and social action purposes. Programming in native languages should be encouraged. Full participation and operation by local people is recommended.

3. Low-power community broadcast stations should be connected intra-regionally and to the national radio CBC network. Northern orientation of programming is essential. Radio coverage should be available to everyone as the essential means of mass communication in the North.

4. Nomadic or hunting groups should be provided with low cost radio units to contact their resident community in emergency or other urgent situations.

5. More extensive use should be made of technology for educational and social development purposes. Videotape recorders are particularly valuable and should be widely distributed for local use. Videotapes can be exchanged between communities for regional dissemination of news and affairs.

6. Live television and Frontier Package Coverage service should be extended to more communities in the North with programming suited to Northern needs. This may mean an additional channel on Anik to ensure:

   a) that the transmission medium exists for carrying northern network programming

   b) the feasibility of programming originating in the North can be developed

Concern is expressed by native people that programming designed for southern audiences would distract and disturb their culture. It would also widen the generation gap between the older traditional groups and the younger people who have been exposed to the southern way of life. [1]

Background — Anik

The communications needs of the North were clearly articulated before the launching of the Anik satellite in 1972. Eric Kierans, Minister of Communications, optimistically called the satellite "a northern vision for the 1970s". Anik, with the Inuktitut name of "Brother", was supposed to bring "the North and underdeveloped regions into the mainstream of Canadian life by high quality telecommunications". [2] Jean Chretien, then Minister of Indian Affairs and Northern Devel- opment, said:

> "Anik has tremendous importance for Northern Canada, for its inhabitants and especially for the Eskimo and Indians. For the first time in their whole life, once the system is established, those people will really be in a position to communicate with the other Canadian citizens and to take part in all aspects of Canadian life." [3]

Anik did provide some communities with high quality telephone service but the cost of this service was such that Bell Canada only extended Anik telephone to all communities in the N.W.T. after the Federal Government provided them with a subsidy under the Northern Communications Assistance Program in 1978. Telex is still only available in the large administrative centres because of prohibitive costs.

In 1975 the Canadian Broadcasting Corporation used Anik to bring CBC radio and television to all communities of 500 population and over as part of the Accelerated Coverage Plan. When the service began, it consisted entirely of English language, southern programming. Now, four years later, there is one hour a week of native language programming. The inconsistency between this service and the original Northern priorities was most clearly experienced in the Inuit community of Rankin Inlet which received colour network television in 1973 before satellite telephone service was installed. The people of Rankin could watch "The Edge of Night" but had to use the erratic HF radio-telephone to try to contact a doctor.

In the eight years since the launch of Anik, ITC has argued that the Northern communications system can be adapted for Inuit needs but major changes must be made. In the following sections we'll follow the order of the priorities set by the Yellowknife Conference and look at each of these needs separately.

Local Telephone Service

Public telecommunications services in the Northwest Territories are provided by two common carriers. CN Telecommunications, through its subsidiary Northwest Tel, serves the area west of the 102nd longitude. Bell Canada provides services to the east of 102nd longitude in the NWT and Northern Quebec. Newfoundland Telephone serves Labrador.

All Inuit communities now have local exchanges but the equipment is acknowledged by Bell Canada to "have a higher than normal report rate", which means it breaks down a lot. Northern Telecom is in the process of building a small digital switch, the DMS10, which will be modified for use in small exchanges. According to Bell this equipment will provide a remote maintenance facility which will allow it to be monitored and corrected from Frobisher Bay, reducing the down time of the local exchanges. Inuit have been urging the carriers to provide local maintenance men in each community because they are totally dependent on the proper functioning of the local telephone service. They also find that where there is no local telephone company employee, it can take months to get a telephone installed.

In conclusion, local exchange equipment has been installed in accordance with the Yellowknife priorities, but more work must be done before service is reliable and trouble-free.

Inter-community Service

The high cost of satellite transmission has made the common carriers reluctant to extend satellite telephone service to northern communities. In 1978, six years after the launch of Anik, when ITC made its intervention before the CRTC in opposition to Bell Canada's rate increase, there were still twelve Inuit communities served by HF radio. All Inuit communities but two now receive satellite (or satellite quality) telephone service, thanks to the Federal Government's subsidy program of $9 million to the common carriers (Northern Communications Assistance Program) and to ITC's lobbying efforts. The two communities that still rely on HF service are Aupaluk and Akulivik, two recently formed settlements in Northern Quebec.

Once satellite service is installed in a community, the availability of telephone circuits becomes crucial. As a medical doctor described to the CRTC, in an emergency when all the telephone circuits are in use, there is no alternative but to run around the community telling people to get off the phone. According to Bell Canada's information in 1977, fifteen out of nineteen Inuit communities had a circuit blockage greater than ten per cent. ITC has urged Bell to upgrade northern service to the company's southern blocking standard. CNT has the same blocking problems in the Western Arctic.

According to Bell Canada, significant blockage reduction will be achieved through a combination of increased circuit installation and the result of a research program being carried out by Bell Northern Research to increase the number of circuits that can be handled on one satellite channel by changing the mode of modulation. This could increase the capacity of the thin route channel, which is now limited to 250 circuits, by an additional 100 circuits.

Another problem that reduces the reliability of satellite service is the frequency with which calls are interrupted and customers cut off, the amount of conversation lost, clipping of words, etc. Satellite echo can also be annoying to the user and Bell Northern Research is investigating an echo-canceller which may improve the situation.

All Inuit communities want to have direct distance dial (DDD) services. Long distance calls from all Inuit communities (except Frobisher Bay and Inuvik) must go through the Ottawa operators and during operator strikes the North is dangerously isolated. DDD will make service available to non-English speaking customers. Currently there are no operators in Ottawa who speak Inuktitut, and although Frobisher Bay operators can be called for translation, unilingual Inuit are reluctant to call long distance without the help of someone who speaks English.

The introduction of DDD should reduce the number of billing errors which have been a source of customer complaints and will also make services such as WATS availale to northern customers.

Even though all Inuit communities now have satellite service, a requirement remains for community-owned HF radio systems. The seven communities in the Keewatin are linked by a community-owned HF radio system which carries a great deal of non-commercial traffic. The system is often used to alert communities when a hunting party has left one community and when they expect to arrive at the next. Since all the radio sets operate at the same frequency every community can be reached at the same time.

Telex

There is an urgent need to provide Telex or TWX service to Northern communities. The mail system is inadequate, dependent as it is on unpredictable air service. Mail can take anywhere from a week to a month depending on the time of year, the amount of mail, the number of passengers, etc.

ITC has been trying for many years to incorporate Northern communities into the CN/CP Telex network. Currently, only Frobisher Bay and Cambridge Bay have telex facilities. Bell Canada charges CN/CP tariffed rates based on a per mileage cost to lease the circuits necessary to provide telex to specific communities. For example, to provide telex to Eskimo Point or Rankin Inlet would cost CN/CP $5,065.95 per month for the Toronto-Eskimo Point circuit and $5,343.45 per month for the Toronto Rankin Inlet circuit (1977 figures). On this basis, CN/CP concluded that the service could not be commercially offered to ITC.

Telex-type service is an essential tool for rapid transmittal of information and its use is sorely missed. The Makivik Corporation in Northern Quebec has found the lack of telex-type service an impediment to economic development. Makivik has developed a shrimp fishing industry with the assistance of Norwegian specialists and finds that the lack of telex-type facilities between Oslo and Fort Chimo hampers efficient commercial operations.

Inukshuk plans to use facsimile in each of the six Anik B ground-station locations and staff have been testing out transmission between Baker Lake and Ottawa. The transmission quality is excellent and the major advantage of facsimile

over telex is that correspondence can be exchanged in syllabics. The big drawback is slow speed of transmission which leads to increased costs. Facsimile also monopolises the use of a telephone circuit and circuits are at a premium in most communities. Facsimile was used to transmit a 70 page Federal Court judgement to Baker Lake. This judgement was the result of the community's attempt to stop the Federal Government from issuing land-use permits to exploration and mining companies working around Baker Lake and on nearby hunting grounds. The press wanted an immediate reaction to the decision from the community and facsimile was the only way to transmit this document rapidly to Baker Lake.

Land to Settlement Communications

The need for trail radios is an ever-increasing communications need. Interest is rapidly growing in the idea of moving back to the land. Nearly every community has a few families who have left the settlement to stay in outpost camps year-round. And virtually every family spends some time out on the land every year hunting and fishing.

The Yellowknife Communications Conference recommended that a pool of portable equipment be made available in every settlement to be leased or loaned to all hunters and trappers. People would also like to have a waterproof trail radio developed that could be taken out on fishing boats. Some trail radios are currently available in each community but a much greater number is required to adequately meet the needs.

In the spring and summer many communities are emptied because people are out on the land, hunting and fishing. People have said they require higher powered radio stations that could be picked up out on the land. The story is told in Pond Inlet of a family who ran into an accident while on the land in the old days when the community had a 25 watt radio station. They had a trail radio and got the message to the nurse that they needed to treat an injured person. She got on the local radio station and broadcast her instructions, which they were able to receive on their transistor radio. CBC has installed FM rather than AM radio transmitters under the Accelerated Coverage Plan but the FM signal is not strong enough to be received at any great distance on the land.

Broadcasting — Radio

Many communities in the NWT do not yet have a community radio, nor do they receive CBC. Nineteen out of thirty-three Inuit communities in the NWT receive CBC radio. Of these communities, sixteen have local access or their own community radio station. A further five communities have a community radio station and no CBC feed. Most have purchased the equipment and run the station with a hard-earned combination of council grants and local fund-raising.

Inuit communities in Northern Quebec have rejected both CBC radio and television but eleven out of thirteen communities have community radio stations. The Northern Quebec communities have community radio stations due to the combined efforts of local initiative and the Northern Quebec Communications Society, Taqgrmiut Nipingat (TNI). TNI used the CTS and Anik satellites to link eight community radio stations together in their own Inuktitut network for a two-month period last year. This is seen as a much-needed permanent service.

Inuit have had a history of creative use of radio broadcasting. The private Pond Inlet radio station CHPI - voice of the Artic set up in 1967 was the envy of many a southern local broadcaster. The radio was always on in everyone's home and served as a hardy communications network circulating local news, finding lost children, discussing current affairs and announcing plane arrivals.

In radio, the CBC has respected this tradition and honoured the requirement for a mix of local, regional and network programming. Every community that receives CBC radio service is offered a local access radio studio package for local programming at prearranged times. Fifty percent of the spoken word of the CBC Northern network is Inuktitut. There are regional production centres in every region of the Northwest Territories except the Central Artic.

The CBC's administrative problems have however served to fragment the Inuit population. Northern Quebec Inuit are served by Radio Canada but have totally rejected the CBC broadcasting services offered to them in French. Inuktitut is their first language and English is their second. Labrador Inuit are served by CBC-Newfoundland and receive only a few minutes per day in Inuktitut. The Inuit need a Pan-Arctic radio service that unites rather than fragments them.

Television

At present CBC television is received in 19 Inuit communities with a total population of approximately 17,000 people. The CBC surveyed listening and viewing behaviour in the Keewatin, in March 1979, and found that 9 out of 10 people own a television and people watch an average of 3.5 hours of television each day. Inuit fear that the CBC television service with its 16 hours a day of glossy, southern, English language programming is posing a powerful threat to Inuit language and

culture. Fearing that it is too late to stop television's encroachment, they want to use TV to achieve Inuit objectives. They want to start seeing Inuit on TV addressing Inuit issues and concerns, and they want the language spoken to be Inuktitut in order that older people who are mainly unilingual may also share in this medium.

There is currently a little over one hour a week of Inuktitut language television programming out of the 112 hours of CBC Northern Service Programming, Inuit have asked for this to be increased at a minimum to two hours a day. They have asked for local access to t.v. transmitters, for regional Inuit production centres, for training as film-makers and video producers.

Developments paralleling and supporting ITC's efforts have taken place in Inuit communities. Nunatsiakmiut was set up in Frobisher Bay in 1975 to produce Inuktitut language television programming and to sell a 15 minute program weekly to the CBC. The community of Pond Inlet set up PIC-TV, a community television station in 1977 to air a half-hour a week of Inuit programming for local airing over the CBC transmitter. Both the Inuit of Northern Quebec and the community of Igloolik rejected television outright because it did not begin to communicate adequately to its audience. Northern Quebec is now installing its own television service with programming culled from a variety of sources.

A Keewatin regional production centre has been established in Baker Lake through ITC's project Inukshuk. It is selling programs to CBC to increase northern content. Inukshuk has also set up a videotape distribution system to allow videotapes to be used in an educational and community development context. These tapes are now mailed to communities for playback on 3/4" video-equipment. We see the potential for use of satellite for distribution of this video material to Inuit communities. A video-taping centre could be co-operatively run by interested groups such as Department of Education, National Health and Welfare, ITC and other groups with an education or community development mandate. Local use of videotape permits a level of community control that is impossible with network programming. Videotapes can be played when the information is most useful. They can be stopped, slowed down, and replayed. Inuit see an enormous potential for the use of videotapes in the schools. There is a desperate shortage of Inuit teachers and Inuktitut curriculum and the local school has asked the Baker Lake Production Centre for copies of everything produced for use in the Inuktitut curriculum.

Inukshuk will be installing low power t.v. transmitters in five Inuit communities to give people additional control over the medium. All five locations have some production capability with three having full production centres with complete 3/4" video editing facilities. The communities will be able to use the local transmitters to air programs to certain segments of the community. A weekly course could be given to nurses' aides, for example, or a series on marketing could be shown to the members of the co-op. If a program required the whole community's attention, the CBC program could be blacked out, as PIC-TV now does in Pond Inlet, and replaced with the special item.

The current discussions of extending still more southern English-language television channels to the North is posing yet another threat to the establishment of an Inuit communications system. What Inuit want is not more access to undesirable alternatives but the creation of one genuine Northern Television service. CBC uses the Anik satellite to distribute network programs from Toronto to the west and east coasts of Canada. The CBC Northern Service is given 10 hours a week of this network programming for northern programming slots. The rest of the schedule is fixed. If Vancouver wants to air Mary Tyler Moore, then the North automatically receives it.

A Northern Television Service can only be created if the North is given its own satellite channel for the distribution of television signals. Certain hours per day of the satellite transmission time could be used by the CBC for distribution of national and regional programming to the North. And certain hours could be made available to the Inuit Broadcasting System to transmit programs done for and by Inuit. What has stopped the CBC from getting its own Northern satellite channel to date is the high cost. At hearings, CBC management say that the costs of Anik at approximately $3 million a channel are an impediment to the development of a Northern television service.

Another need expressed by Inuit is for the south to be better informed about the North. They don't want programs about the North restricted to Northern viewers. They want Southerners to see them too. CBC says it has difficulty incorporating Northern television coverage into the national network because of the high costs of satellite time. For example, more than one half of the $70,000 direct costs of the television news special in May, 1976 on the Berger Report went to getting a live program insert from Inuvik. [4]

Other Needs

1. The Department of National Health and Welfare must have reliable communications to support their medical facilities. The average distance between some 35 nursing stations in the NWT and the nearest hospital is 608 km. [5] Given the success of the CTS tele-medicine experiments, it is time for a permanent communications system of medical support to be implemented.

2. Inukshuk will explore the effectiveness of the delivery of tele-education via satellite. The lack of Inuktitut curriculum and the scarcity of Inuit teachers means that children do not receive instruction in Inuit history and culture. A way must be found to extend the effectiveness of these resources, and tele-education may provide some solutions.

3. Teleconferencing may prove to be a valuable tool because Northerners are spending too much of their time travelling. People put up with hazardous, expensive, and time-consuming travel conditions to attend board meetings, do field-work, or participate in workshops. Inuit resource people are becoming seriously over-extended by the number and variety of demands on them and the need to travel extensively to meet these demands. Not only is travelling hard on the individual but his family and his community are deprived of his skills when he's away.

4. The need for rapid transmittal of information and community feedback is crucial because of the land claims negotiations that are currently underway for the NWT Inuit. Makivik has found that this need accelerates once the land claims settlement is in place and Inuit organizations are responsible for administering their own affairs. Communications will be a valuable tool in assisting Inuit with a small population base to administer such a large territory.

5. Inuit-owned community stations and production centres would like to access libraries of Inuktitut audio tapes, records, videotapes and films.

6. There are no Inuit university graduates. Some Inuit who have attended university in the south have given up because of the difficulty of living in the south. Great interest has been shown in correspondence courses which would enable Inuit to take university courses in their own community. The University of Regina has been talking to ITC about using Anik B to conduct a degree course in management training for staff of northern co-operatives.

Questions

1. Will Telesat's rate-structure permit the potential of satellite communications in the North to be realized?

2. What effect will the launching of the Anik C, which is not designed to extend to the North, have on the improvement of communications facilities in the North?

3. Could some Northern communications needs become cost-effective if they were aggregated with needs of southern users?

References

[1] Telecommission Study 8(c), Northern Communications Study, Department of Communications, 1971.

[2] House of Commons Debates, April 14, 1969.

[3] House of Commons Debates, April 14, 1969.

[4] "Touchstone for the CBC", June 14, 1977.

[5] Dateline: Telesat, Vol. 3, No. 3 and 4, Fall-Winter, 1976, pg. 6.

Co-operative, Communications, and Computers

Norm Bramberger and John Jordan
(presented by John Jordan)

[Norm Bromberger is the Chief Executive Officer of the Credit Union Central in Saskatchewan and John Jordan is the Research Director of the Co-operative Future Direction Project.]

In generic terms, co-operatives are an organization formed to aggregate and express the shared interests of users. The nature of the interest may vary from being a consumer or a supplier of a good or service. In Canada, co-operatives are common in many economic sectors, and are especially prominent in agriculture, personal finance, general insurance and retailing. Specialized co-operatives exist in many sectors such as fishing, housing, the arts, and crafts. These very diverse forms of co-operative activity are bound together by general adherence to a set of co-operative principles and a value system centred on the importance of the user interest and democratic control of enterprises.

In effect, we can use these dual dimensions to categorize the perspectives that co-operatives bring to this conference on communications, computers and human settlements. As organizations, co-operatives have information needs for planning and managing similar to any other enterprise. As democratic organizations, they also have needs for more means to enable their members to engage in effective two-way communication with the organization and its governing mechanisms.

In order to give concrete illustration to the nature of the issues we encounter, we shall focus the presentation on credit unions in the province of Saskatchewan, which form a well-developed co-operative system.

In Saskatchewan, co-operatives and credit unions are a major part of the provincial economy. Credit unions and consumer co-operatives operate throughout the province in centres of all sizes. The province is a large area covered by a small and dispersed population. Local and autonomous co-operatives and credit unions must relate both to the member in the community and also to the provincial organizations which they have developed in order to supply certain services and means of province-wide representation of their interests.

There are 244 credit unions in Saskatchewan, with over 100 branches. These credit unions own and control Credit Union Central, a provincial organization. The Credit Union Central also includes in its membership co-operatives to whom it is a lender. Credit unions, on the other hand, have a much wider range of interaction with the Credit Union Central. The Central provides a means of balancing liquidity within the provincial credit union system, supplies cheque clearing, training, data-processing, and many other pooled services so that the individual credit union may serve its members more effectively. The Credit Union Central has also the means whereby Saskatchewan credit unions relate to the national and international credit union and co-operative organizations.

The Credit Union Central is controlled through a representative electoral system of 112 delegates who in turn elect a 17 member Board of Directors. The purpose of the Board is to establish policy and to monitor ongoing operations. As we well know in an age of considerable disillusionment about the effectiveness of representative democratic processes, effective democratic structures entail considerable two-way communication.

We also experience tremendous operating needs for telecommunication and computer communications between unions in particular and the Credit Union Central. One example is the process of cheque clearing, one which we are apt to take for granted. To further provide member services, credit unions in Saskatchewan have established an interactive automated teller network. For example, a member of a Regina credit union can go to an automated teller in another centre and access his or her account to make a deposit, withdraw cash, make a utility bill payment, make a loan payment or transfer funds between accounts. These activities would be impossible without interactive communication and computer technologies.

During the past decade, we have made considerable progress in designing quite sophisticated systems to enable credit union members to have their financial service needs met by their credit unions. During the decade we are just entering, we recognize the need for this progress to continue. We also recognize that the technology is advancing at a tremendously rapid pace, likely outstripping the awareness of most of our elected

leadership and professional staff. By our nature, we are committed to technology, and the institutions which supply it, being deployed in the interests of the user, rather than the user becoming a function of the technology and the motivations of those who develop it. During this decade, we will need to equip thousands of active co-operators with sufficient understanding of the dynamics of emerging technological and institutional possibilities that they can make informed and future-oriented decisions. We recognize the irony that our ability to do this is in considerable measure a function of how well we will be able to use the technology in processes of informing and educating this leadership about computers and communications, and in developing more adequate processes for them to express and aggregate their views on the directions the credit union system should take. In short, effective use of the technology at this stage will be important in maintaining mastery of it in the next decade.

During the past year, we have in Saskatchewan taken a step which will serve as an example of the direction in which we think we must go. Saskatchewan has a population of less than one million dispersed over a very considerable area. Much of the processes of member education and decision making in co-operatives is based on the technique of bringing members together into a forum for discussion, debate, and decision. In an era of increasingly expensive transportation and increased demands on the membership's time and attention, alternative means of communication must be sought. This was our rationale for entering the area of closed circuit television networks.

The province of Saskatchewan has passed, but not yet proclaimed, legislation generally allowing the establishing of closed circuit television networks. A few years ago, the province encouraged the formation of an organization (a provincial-controlled co-operative) for developing such a service on a province-wide basis, initially in the larger urban centres. When this organization got into financial difficulty, central co-operatives in Saskatchewan, on behalf of their members, expressed to the government their interest in acquiring this closed circuit network. After prolonged discussion and negotiation, the network was acquired by a group of four co-operatives, privately-owned cable companies and the provincial crown investment corporation. The initial purpose of the cable network is strictly home entertainment.

However, the group of co-operatives, and to a lesser extent, the provincial crown investment corporation, are interested in seeing the cable network as an opportunity to develop a wide range of interactive telecommunication and computer services within Saskatchewan.

We visualize a number of ways in which such a network might be put to use:

1. The Credit Union Central now conducts a series of six information meetings in different parts of the province. The purpose of the meetings is to identify issues and to aid in policy formation. We do not believe that the annual face-to-face meetings can be superseded, but we would like to experiment with teleconferencing as a potentially economic means of enabling more frequent discussions with local credit unions.

2. The Credit Union Central, as well as other credit union organizations, prepares and delivers staff and member training seminars of considerable variety. A recent seminar, for example, deals with the training and development of members of credit union boards. With 244 credit unions, the resources required to meet this demand adequately are enormous. A closed circuit instructional program with interactive closed circuit follow-up would help to resolve some of this resource pressure.

3. The technology is available to carry out many financial services from the member's home. This includes not only bill paying, but also budgeting, accounting and financial planning. We would like to experiment with varied applications of these services, while recognizing the needs for member protection, confidentiality, and privacy.

4. With a scattered rural population, there is a large and rather unexplored area of interactive telecommunications used for fire alarms, medic alerts, burglar alarms, energy conservation, etc.

5. Systems allowing retrieval of information by subscribers could enable active members of co-operatives and credit unions to remain current on issues and decisions of their co-operative. This would be an enormous advance over news-letters and other techniques currently being used. If this were linked with an interactive capacity, it would become much simpler to test member views at regular points in the process of developing a policy, thus ensuring that the organization remains responsive.

In addition to the ways in which co-operatives might use these emerging technologies in order to meet the needs of their members, there are additional questions as to whether these technologies offer further opportunities for co-operatives to be an effective way of aggregating and expressing a user interest. For exam-

ple, much of the consumer concern with point of sale terminals using magnetic stripes is due to the recognition that such approaches enable the supplier to develop a tremendous data bank on consumer patterns. Even though the consumer in effect generates this information, the consumer has no access to it. Should we be thinking about co-operatives as a means whereby consumers would have access to aggregated information which they in effect generate, as well as to the staff who could help them understand it? In this way, they would not just be at the receiving end of marketing decisions based in large measure upon the retailer's analysis of this information.

In conclusion, we would like to mention some of our concerns, as laymen, about the technology. It is the problem of being sold by the suppliers of the technology. We often experience concern about their extravagant claims, and about their intellectual and conceptual marriage to the technology. They often seem, in the process, to overlook that the ultimate interest and purpose should be to serve people, or more specifically, to meet people's needs without mystifying them with the technology.

Let me give you an example of what we mean. We heard in Saskatchewan about the failure of automated teller machines and about the surveys demonstrating consumer resistance to plastic cards and impersonal technology. Based on our own research, we began about 18 months ago to install automatic teller machines in credit unions. We now have about 25 installations in centres throughout Saskatchewan. Our break-even usage per unit is 3,000 transactions per month. We have found we have no units below this level, except at start up. In fact, a number of our installations are very busy at 11,000 to 12,000 transactions per month, among the highest in North America. People, when confronted with better service for 18 hours a day, seem to solve the survey's problem for us.

A second example is word processing. In Saskatchewan, we are looking at installations we could use for credit union and co-operative communications, information updates and so on. Because it is perceived as a peripheral area, Saskatchewan is often among the last to be served by suppliers. At the pace at which hardware and software development is proceeding, a lag of one to two years can have very negative impact, especially when it occurs in areas where we want to interface with systems in other cities. On the other hand, the suppliers concentrate on the efficiency of their equipment. We of course want that efficiency but we also feel that the equipment should be viewed as extending human capabilities by making the job more varied and enriching. The suppliers of the service seem to concentrate on the one dimension to the neglect of the other.

As we said earlier, we recognize that we are in the paradoxical position of needing to use these emergent system capabilities even to develop our ability to guide our decisions on further development and use of computers and communications systems. We think that the issues we encounter are central and illustrate well the challenge presented: the need to enable users to play a significant role in shaping the emergent technologies that will do so much to shape our institutions and ways of thinking in the years ahead.

Information Provider Activities in Canada

Gerald Haslam

[Gerald Haslam is President of the national organization of the videotex information providers, VISPAC.]

There are, in my view, three key factors relating to the development of videotex in Canada which make the situation of the Canadian information provider slightly different from that of his counterparts in other countries:

1. The Nature of the Country and Its Communications Industry.

Canada is a nation of 23 million people, most of whom live in a ribbon of population 4,000 miles long and about 100 miles wide. Along this ribbon there are significant differences in climate, culture, topography and economic activity, so that Canada, in terms of information flows, is not really a national market, but more a series of regional markets which have some things in common, but a great many facets of life which are different.

(By way of example, Canada has only one daily newspaper which distributes significantly beyond the area where it is published, but has more than 100 local and regional newspapers. The country has 1,045 television stations, and 965 AM and FM radio stations. No two have exactly the same programs.)

Next, Canadians are served by 11 principal companies providing telephone service, each on a territorial monopoly basis, some owned by government, some privately held. Hence there is no national PTT and therefore no single approach to new developments. As well, Canada is heavily served by coaxial cable for delivering community antenna television. In the principal urban centres, more than 85% of homes can receive cable service.

In a videotex context, this means there are two available means of delivering interactive services to the home, each in potential competition with the other. It also means that there is no single videotex trial in Canada, but rather a number of trials run in different places by different people.

At the time of writing this paper, four videotex field trials have been announced in five Canadian provinces, involving placement of terminals in as many as seven different cities. I expect that up to three more trials may be announced in a matter of months: quite a challenge for the information provider, who, if he wishes to participate in videotex on a national basis, must be prepared to operate right across the country, and with a significant variety of material to suit different markets.

2. The Integrated Services Approach Interactive Communications.

If Canada's sheer size and variety of markets is a considerable challenge for information providers, a second factor is just the opposite. In three of the four interactive communications trials planned to begin this year, consumers will be offered not simply videotex content, but also a package of home security services: remote monitoring of intrusion alarms, smoke detectors and medical alert buttons. Market demand for these services, and their economic viability, has already been established in a number of locations in North America.

The implication is this: much of the two-way network cost for providing videotex in the home can be applied to these other interactive services, thereby increasing the odds that videotex can be supplied at a reasonable price to the consumer. That, in turn, means an enhanced opportunity for more rapid market penetration; a clear motivation for involvement of information providers.

3. The Telidon Technology

Canadian IPs also have the advantage of operating with a highly sophisticated and very flexible videotex system. Like those in other countries, we have been on a steep learning

curve, but we can now see the Telidon Mark 2 Information Provider System as an ideal vehicle for efficient use by the information provider. The capabilities of the full system are very considerable:

a) Telidon is highly adaptable to automation of both generation and update, and functions well in a variety of computer-assisted preparation applications. That means a lowering of production costs to the IP in at present a highly labour-intensive field.

b) Telidon is well-known for its superior graphics. But for the information provider, that means the ability to design pages to meet demand. For example, Telidon today gives you choice in the order of appearance of material on the screen, provides animation, multiple overlays, colour variety and high or low resolution. It has the capability for using pattern recognition techiques in the acquisition of photographic images and highly-detailed artwork, as well as flexibility of search on either a tree structure or key word basis.

c) In terms of access to markets, Telidon is again a flexible system. Despite its greater capability, the user terminal is price-competitive in market volume with other systems around the world. It can receive data from a variety of networks: paired wire, coaxial cable, satellite, broadcast, and fibre optics. In addition, it can offer downward compatibility, as well as the option of upgraded resolution. The system can be made available at varying levels of sophistication, and at varying prices, depending on market need.

What does all that mean to an information provider? To answer that let me suggest as a premise that no one in the world is sure today in just what form videotex will develop into a mass market medium. So the kind of flexibility that we in Canada have with Telidon means that we can adapt to virtually all the videotex options, all within a compatible system. And in straight commercial terms, that's a tremendous advantage.

Having outlined the context in which we operate, let me now give some details of information provider activity. The four announced videotex trials have attracted some 35 organizations from all regions of Canada at the time this paper is written; included are publishers, educational institutions, travel and entertainment companies, libraries, broadcasters, retailers and public service organizations. This is a broad base which I anticipate will get larger as time goes by.

Information providers have formed a national association, called VISPAC, to represent their mutual interests and promote the orderly growth of videotex across the country. We perceive that there are and will be a number of short term and long term issues of vital importance: while in the short term IPs are primarily concerned with matters relating to field trials, we are acutely conscious of the need to help develop this new industry in a rational and socially responsible way. VISPAC has also been active in the formation of IVIPA, the International Information Providers Association.

In Canada itself, the IP community is gearing up for the field trial phase of videotex development. It is of course difficult to be precise in advance, but it is entirely possible that 100,000 or more pages will have been created before this time next year. One field trial begins in the spring of 1980, three more in the autumn. There is a considerable degree of secrecy between information providers concerning exactly how many pages of what kind the various organizations are preparing. But the nature of the information provider enterprise is quite similar to that in Great Britain: some IPs are preparing only their own content while others are preparing material on behalf of organizations which choose not to set up their own videotex operations.

When the various Canadian field trials begin, I anticipate a very wide variety of content to be available, going well beyond the provision of pure information to a truly interactive involvement of the consumer in a transactional process. We won't know exactly who has done exactly what until the day when each field trial begins, but since Canadian IPs are conducting themselves in a free choice, highly competitive environment, I think we are likely to see some excellent material, even though there may be some duplication. We also anticipate a very significant amount of government information to be placed on the systems, primarily through private-sector IPs, since videotex lends itself clearly to the provision of government material to citizens, particularly in a country the size and shape of Canada.

Finally, what of the future? Like IPs in other countries, we in Canada are also members of that new eternal triangle: system operators, set manufacturers, and IPs. We want field trials to be expanded and public service to be offered, and the sooner the better so we can recoup our investments. But we recognize as well the experimental nature of videotex. Most of us are involved because we see either a threat to or opportunity for our present activities. Like others around the world, we enjoy being pioneers and we're highly optimistic about the future of videotex. Through our association, we are involved in the Canadian Videotex Consultative Committee, which advises the federal government on coordination of the industry. The result, we

hope, will be development on an orderly basis across the country.

In Canada, as elsewhere, there are a great many unanswered questions about videotex, questions which will gradually be answered as we go through the process of trials and then public service. From the point of view of information providers, we are of course vitally interested in knowing:

- precisely what kinds of content are most valuable for consumer and business applications?
- exactly how much are consumers willing to pay for looking at videotex material?
- How soon will banks, travel companies, direct mail operations and other retailers see videotex as a worthwhile, cost-efficient medium?
- in a mass market sense, what form will videotex hardware take: will we continue to use the home television set as the screen, or will a separate unit evolve; will existing paired wire be used for transmission, will it be coaxial cable; what will be the impact of fibre optics?
- Can international standards be developed to permit the growth of a truly international industry?

As I said earlier, we in Canada are fortunate to have a technology which offers us enormous flexibility in adapting to the answer to these and many other questions. It goes almost without saying that we have been encouraged and excited by developments in other countries and look forward to further international cooperation.

APPENDIX

Objectives of the Videotex Information Service Providers Association of Canada

The objects for which the Association is established are:

a) The promotion, development and representation of the interests of its members with regard to their involvement in the Videotex industry and similar Videotex systems;

b) To provide for the exchange of information between members;

c) To promote standards leading to compatability of videotex systems;

d) To encourage the unrestricted flow of electronic information;

e) To promote the protection of the intellectual properties of information providers (e.g. copyright);

f) To stimulate the growth of videotex systems which are economical and easy to use;

g) To ascertain the views of and provide facilities for conferring with and for encouraging the exchange of views of all Videotex information providers in relation to all matters which may affect their interests whether directly or indirectly and to communicate with Government whether national or local, the Legislature and any public body or authority or any other person or institution in relation to any matter which may affect the interests of the Videotex information providers whether directly or indirectly;

h) To develop and maintain standards of conduct which are in the public interests of the Videotex industry as a whole. To advance public education as to the uses of the Videotex industry and to educate those who are involved or interested in the Videotex industry in all aspects of the industry;

i) To propose equitable forms of contracts and other documents used in the Videotex industry and to promote the adoption of such forms of contract.

Telidon, A New Medium

John H. Syrett

[John H. Syrett is the Telidon Program Manager for the Ontario Educational Communications Authority.]

Recently, a panel of educators from a county board of education in Ontario summed up their first impressions of Telidon. They described it as a "computer-assisted information" system rather than a "computer-assisted instruction" system.

That observation can serve as a point of departure for an exploratory examination of possible perceptions of Telidon as a distinctive medium. The perception that these educators expressed doubtless found its source in several factors. I assume that one of these factors was the mindset of teachers much concerned with courses of study, with instructional technique, and with the potential of home computers as instruments of instructional technique. I assume that another factor was the configuration of Telidon technology at the time they observed it, limited as it was to key-pad responses and therefore appearing less capable of textual dialogue between the user and the computer than home computers fitted with keyboards. In this context, it was logical to perceive Telidon as primarily an information retrieval system.

But is it? With the addition of a keyboard to a user terminal, and with appropriate software in the computer, does Telidon not comprehend both computer-assisted instruction and information retrieval? With the upgrading of a user terminal to a transceiver capable of communicating with other transceivers without the intervention of a central computer, does not Telidon suddenly move to yet another plane of activity, one freed from the confinements of mobilized, programmed, and stored intellectual responses?

What existing medium is Telidon most like? In the transceiver mode, is it perhaps a visual telephone? In its linkage to central data bases, is it perhaps a visually augmented networking device? In its ability to transmit complex graphics, is it perhaps silent television? It is all of these or none?

I am, at this writing, inclined to respond to that question, "It is all of these and none." None, in the sense that it is distinctive. It cannot be dismissed as "nothing but" this or "nothing but" that.

How, then, is Telidon distinctive?

While it is too early in the evolution of the technology to attempt a definitive answer, we may be helped by studying the attributes of other well-known media. By comparison and contrast, the attributes of Telidon may emerge.

Let's begin with television. There are those who would define television as film-at-a-distance. The casual observer of the television scene, noting the extent to which recent TV is a carrier of third-run, not to mention thirty-third-run, movies, might well see the merit in that definition. The student of film, moreover, could seize upon the parade of facsimiles, the flow of images to the eye and to the ear presented by both media, to argue that film and television are alike in their ability to convey experiences.

The parallels break down, of course. Film -- large screen and stereophonic sound in a theatre setting -- is more of a substitute experience. Television -- small screen in a home setting -- could be called an additional experience. Besides, television is more topical, more involved with events and eventfulness.

The so-called immediacy of television, however, is not apt to change the fundamentally passive attitude of the viewer in relation to the screen, a characteristic of both film and television. By contrast, Telidon is dependent upon a response from the user. Indeed, there will be no "experience" unless it is initiated by the user.

The nature of the Telidon experience called up by the user is apt to be more textual, perhaps more left-brain-centered, than what film and television convey. On the other hand, it need not be lacking in right-brain appeal. Colour graphics and, in future, colour photographs, can convey primitive impressions, as contrasted with logical connections.

Telidon, like some of the more advanced home computers, promises a distinctive blend of logic and illogic, codes and configurations, all served up, increment by increment, under the control of the user. The possibilities for building surprise and humour into the juxtaposition of Telidon pages are worth thinking about.

If it is not like television, is Telidon perhaps like existing information retrieval networks: Infomart, Infoglobe, and the New York Times Information Service, for example? While I have not worked extensively with any of these services, I have been impressed with what I've seen, especially by their ability to deliver an extraordinary range of textual information in response to key-word searches. The cost is not negligible, but for the skilled researcher the results can be expeditious and rewarding.

From time to time, we hear about the production of software interfaces that will give the Telidon user access to these information services. The point would appear to be to make such services available to people in their own homes. It's a worthy idea, and with the addition of keyboards to Telidon terminals, may yet prove feasible. But where, in this concept, does the ability of Telidon to communicate in graphic terms figure?

At present, Telidon is designed to present not much more than 80 words on the screen. In the context of reading the television screen from your living-room chair or sofa, Telidon is not a book or a newspaper. It conveys information, certainly; it communicates; but in Telidon languge.

What "Telidon language" is will emerge as creative "designers" explore applications of the medium. From what I have been able to observe thus far, Telidon language will comprehend more than text and tables, and even these will be presented in relatively small increments, conveying meaning in economical terms, perhaps distinguishing discrete thoughts through changes in colour. Not only will the language tend to graphic expression and illustrations, but there will be a degree of animation. Visual transitions, visual sequencing (over time) will underline the difference between this form of communication and the more static presentation characteristic of books, magazines, and newspapers. While the latter present language spatially, Telidon presents it in both space and time.

In such a form of presentation, something is lost, but something is gained. Detail may be lost, but comprehensive access gained. One kind of continuity may be lost, but another kind of continuity gained. Among the gains we must surely count a responsiveness of the medium to the inquiries initiated by the user. That characteristic finds expression in, among other things, forms of dialogue having a gamelike or playful quality to them.

It will be pointed out that much of what has been described in the last two paragraphs could as reasonably be applied to the latest generation of home computers. That is true. What distinguishes Telidon from these is the PDI -- Picture Description Instruction -- or rather the principle underlying it. That principle, as I understand it, is the employment of small signals to produce complex effects. The way in which this is done, to oversimplify somewhat, is to concentrate considerable "intelligence" in the user terminal's decoder, so that a small amount of data transmitted from a central processing unit will trip a complex response. It has been contended that the principle can in due course be extended to permit not only manipulation of visual elements on the screen, but also transformation of such elements, to produce effects comparable with those achieved with computer-controlled video.

In short, narrow-band means of signal transmission -- voice-grade telephone lines, or several lines in the vertical blanking interval of a television set -- can be used to display complex effects at remote locations. In the case of broadcast, this means that instead of requiring another wide-band channel like the one needed for television transmission, Telidon messages can ride along with an existing television signal. One TV screen can therefore be used to display a television image, or a Telidon image, or, in the so-called transparent mode, both together! That makes possible, among other things, closed captioning for the hearing-impaired, subtitling in a second language, intermittent news bulletins or weather map reports, follow-up information related to the television program you're watching, and other services.

The principle underlying Telidon also makes terminal-to-terminal dialogue possible. Someone at the office can send to someone at home a textual or graphic message, which can be immediately edited by the recipient and conveyed in the altered form back to the originator. Remote chess anyone?

To recapitulate, what we have in Telidon is an efficient means of textual-graphic communication over distance. Tied in to microcomputing capability at the terminal, Telidon presumably moves closer to textual communication of a sort characteristic of the present generation of home computers, but its inherent character, in whatever hardware it finds expression, favours a special kind of language. That language, in turn, favours a "popular" curriculum, carried on Everyman's network.

It may be of interest to hypothesize what this means, in everday terms. Is Telidon a sort of blackboard? Yes, but a better one. Is it a kind of slide presentation? Yes, but a more commodious, far-reaching, and responsive one. Is

it a tabloid? Yes, in a way, but with newer news and older information. Is it a kind of letter? Perhaps more like a lot of postcards. Is it a conversation? Yes, but less time-sensitive, more sporadic, more deliberate. Is it a library? More like a portable encyclopedia. Is it a telephone? To the hearing-impaired, the best one. Is it a personal service? More of a coping device. Is it an entertainment? A source of intellectual play. All these attributes will go into the mix that will make person-to-person exchanges possible on a grand scale, encompassing everything from barter -- including learning exchange -- to electronic tutorials at a distance.

A popular and functional medium, then. And like all media, it needs the artist, and the artist's materials. At this writing, the materials are centred on a entry terminal that in its very nature obstinately declines to relegate itself to mere processing of designs laid out on paper. Even when text, rather than graphics, is the visual content to be applied, a layout in colour on a paper grid often fails to translate to the screen without further design judgments and alterations. Graphics require more such judgments.

One obvious consequence of the entry terminal's being both a design instrument and a production instrument is that the page creation is affected. Aesthetically appealing pages will not emerge automatically upon the screen. Time is needed. And time is money. It is also employment. The question of design time therefore leads straight to the question: who is the ideal type of person needed for page creation?

My intuition is that a certain kind of writer is about to emerge upon the communications scene. A wordsmith alone will not do. A graphic artist alone will not do. The new breed of writer will have a sense of colour composition and spatial layout, a knack of using few words to maximum effect, and an imaginative grasp of how the juxtaposition of pages will have impact on the sensitivities of the Telidon user.

Telidon: An Educated Guess

Dr. Maria L. Cioni

[Maria Cioni is the Manager, Telidon Liaison for the Ontario Educational Communications Authority (OECA).]

It is most difficult to write a paper on the OECA Telidon field trial when it has yet to begin officially. On the other hand, the realization that it will be the first field trial in Canada encourages even the timid to forge ahead. To outline for the conference the problems of establishing a field trial of Telidon would only describe the frustration of working with a new and advanced technology. It is far more rewarding to grapple with the Telidon challenge, its potential, and how the potential can be met. This paper will discuss the challenge involved in the OECA Telidon and Education field trial.

Part I:

The OECA field trial is a composite experiment consisting of:

1. A broadcast Telidon trial
2. An interactive Telidon trial
3. Participation in the Bell VISTA trial
4. Participation in cable Telidon trials

A total of 55 Telidon terminals, operating in both the interactive and broadcast modes, will be deployed in schools, colleges, universities, libraries, science museums, and individual homes. The initial aim will be to expose educational information providers to the system and encourage them to create educational content. Some public exposure will be obtained through libraries, museums, and home use.

The Broadcast trial started on January 11, 1980, and is operating during network hours, that is, 16 hours per day, 7 days per week. The TV Ontario educational network broadcasts reach 85 percent of Ontario's 8.3 million people, utilizing nine television transmitters.

By April, we anticipate a nominal page capacity on the broadcast Telidon service of 300 to 500 pages with about 20 percent devoted to OECA purposes. The remaining pages will be used by other educational institutions and information providers for a generalized service.

For example, a broadcast cycle could include news, weather, financial markets, sports, etc. We don't intend to carry information of a non-educational nature, once other broadcasters start offering general teletext services. In terms of information related to OECA's activities, we would carry program listings, organized by time but also by subject area program notes and teachers' guides, program prospectuses and so forth. News concerning education, such as school bus status, school administration, and educational job opportunities, would be carried. Other educational institutions will provide pages concerning their course offerings, course registrations, correspondence courses, and other distance education.

In addition, we intend to offer Telidon materials directly related to the television program. Captioning for the hearing-impaired, and multilingual subtitles are simple examples. However, we believe that methods will be found in which each medium reinforces the other in conveying learning experiences.

In addition to integrating Telidon and television, we intend to interrelate the broadcast and interactive modes of Telidon.

The 55 terminals noted above will be able to access a 10,000 page computer facility in Toronto via telephone circuits. This arrangement will enable us to explore the advantages of the interactive mode and to examine the interrelation between it and the teletext mode.

The information content of these interactive trials will tend to be all educational, since users will, we hope, have access to other data bases with generalized information. Later on we

will describe some of the interactive applications we foresee. We believe they will tend towards information retrieval, computer-assisted instruction, computer-managed learning, heavier use of graphics and symbols, and the involvement of educational institutions in the mediation of learning materials.

We are slated to participate as an information provider in the Bell VISTA/Telidon trial. Bell will be utilizing 1,000 interactive terminals and a 100,000-page computer to be located in Toronto. In addition to creating content for the VISTA data base, we anticipate acting as an umbrella Information Provider (IP' for smaller educational institutions in the VISTA trial. We hope that our 55 terminals will also be able to access the VISTA data base, but some doubt exists at present.

We have reached agreement in principle to participate in the Canadian Cablesystems Telidon trial. Cable television systems in Canada, with penetrations of about 67 percent of urban populations, represent an interesting alternative for the distribution of interactive and broadcast Telidon. By utilizing the vertical on one of their cable channels, they can duplicate a broadcast Telidon system. By using a full television channel, they can step up the transmission rate by a factor of 250 over teletext, assuming they have the computer capacity. With the advent of two-way cable, they can offer interactive services.

Objectives of the OECA Field Trials

With such a brand-new technology and with very little experience of applications of public information dissemination systems to draw from, our field trial objectives are diverse and wide-ranging. We hope to find out a lot of things, in terms of the technology, the management of information, the development of educational applications, and the evaluation of user response.

In the technical area, we are using the TV Ontario broadcast network to transmit Telidon in the teletext mode. We are working with DOC to determine the highest data transmission rate under North American television system propagation conditions. TV Ontario transmitters operate at UHF and VHF frequencies in urban and rural areas, and on mountainous and flat terrain. A variety of distribution systems are used, including microwave, off-air repeaters, direct broadcast satellite, and cable television.

OECA is currently conducting with DOC one of the world's first operational trials of a direct-broadcast satellite. We are feeding 87 hours per week of TV Ontario programming to 46 receivers in remote northern Ontario, located at individual homes, institutions, cable television headends, and a low-power repeater. So we're using two new technologies, direct-broadcast satellites and Telidon, to deliver educational materials to remote locations.

We are initially trying three different data transmission rates: 3.95, 4.57, and 5.19 megabits per second. The final choice of a data transmission rate will of course affect the number of pages that can be transmitted, and the waiting times for those pages. The rate will depend on acceptable service areas and levels of error detection and correction.

We are also going to investigate the use of various lines in the vertical interval to transmit Telidon and other signals such as test signals (VITS), source identification signals (SID), and PBS captioning signals (Line 21) on an integrated or time-shared basis. The objective is to make greatest use of the available vertical interval.

We are concerned about several aspects of information management, in particular: creation of pages and sequences, organization of data base, dissemination of materials, and presentational considerations. Information management appears to be the most labor-intensive and costly aspect of any videotex service. Under page creation, we want to look at input terminals, the provision of text-editing techniques, the possibility of automatic data enty from other data bases such as news, weather, commodities, etc.

Under organization of data, consideration will be given to various indexing schemes, tree structures, broadcast cycles, accessing techniques, and relative versus absolute referencing.

Under dissemination of data, we are concerned about the logistics of the broadcast cycle, but also the interrelationships between interactive and teletext data, and the movement of data between various videotex data bases. Our intention is to use each mode of delivery to its advantage, and to capitalize on the interrelationships.

Finally, under presentational aspects, we will be examining the use of colors, formats, designs, waiting times, graphics, grammar, legibility, standard headers, and identification.

In program content, OECA is developing some materials specific to its own requirements, particularly in educational broadcasting and non-institutional education. In addition, we are developing sample materials for use by conventional educational institutions.

We will explore the role of the educational institution as an information provider both within the community and the institution itself. We are examining the role of the public library in providing public access to Telidon, at least initially.

Educational information providers have been encouraged to regard Telidon as a medium in itself and to consider the design of program material

accordingly. As a result, for example, less text and more graphics and animation are being used to convey complicated mathematical relationships.

Our evaluation objective will be to get user responses before we work on the technology, the software, and the applications. These field trials are not market tests, but will enable us to lay foundations for in-depth testing in future years. With a total of 55 terminals being moved through a variety of settings (Homes, schools, colleges, universities, libraries, and museums) we hope to get information on an extremely broad cross-section. However, this will be only a prelimary response to Telidon in education.

Part II: The Potential of Telidon

The "Information society" has been a buzzword for some time. Transborder flow of data was recognized by the Organization for Economic Cooperation and Development (OECD) some years ago as a major issue and one that required immediate investigation (with as yet no results). Videotex and teletext might be considered the harbingers of this revolution, but Telidon, with its ability to display intricate graphics besides text, and potential for terminal-to-terminal contact (a common visual space), puts us on the precipice of the information transition.

Whether or not Telidon itself evolves as the tool of the informed society is not an issue. What is important is that it has a potential to lead to an ever more sophisticated type of home communications centre. It may be the catalyst needed to assure that an altered lifestyle due to fuel shortage and the subsequent high cost of transportation is made acceptable. It may well provide the electronic highway to bring and send information and computer software programs to and from homes and businesses. If the coding of graphics and text evolves to render the Telidon network an economical, quick, and spectrum-saving means of communication, then the information society may become a reality.

Cost to the user of a Telidon service is an important unknown that affects the technology future. The British experience has shown the costliness of using telephone lines for transmission. The situation in Britain is unique, however, and we must take into account such circumstances as the British Post Office's monopolistic character, the way in which videotex and teletext developed quite separately because of institutional politics, and the simple fact of Britain's being the first to develop teletext and videotex. It would seem advantageous for Telidon not to follow the same developmental path as Prestel.

The cost of getting and sending information may be the stumbling block for Telidon; on the other hand, the necessity of making the cost affordable may be incentive for innovation. Our early experience with setting up the field trial makes us quiver when long-distance charges are a consideration. Granted, there are foreseeable remedies to the long-distance cost problem: data line sharing and routing, fibre optics, and down-line loading of information and software into the memory of the local decoder. These solutions may never reach fruition simply because during the field trial period the cost to the user (whether absorbed or not) is judged to be too high. Certainly, a field trial in one location with the host computer in the local call area is the ideal, but when the user has to pay long-distance charges, what then? If Telidon is used primarily to transmit games and quizzes, will the user be willing to pay for this type of content?

One way to tackle the problem of cost is to concentrate on the broadcast mode of delivery and to consider ways in which the shortcoming of that form of delivery may be negated. By using more lines than one or two in the vertical blanking interval, the capacity for carrying data may be significantly increased. Also, faster rates of data transmission and more sophisticated computers and software and higher memory capability in the decoder will augment the number of pages to which a user may have access and decrease the waiting time for information delivery. A hybrid mode of delivery, e.g., broadcast of a set of pages one way, and touch-tone telephone request of additional pages the other way, may reduce costs while permitting the user to exercise choice from a large data bank (either teletext or videotex).

Cost and content are intimately related. It is assumed that businesses would pay a premium price for the latest information pertinent to their operations. In France, the state-owned telephone authority will replace telephone books with small viewing screens (CRT) so that citizens will be forced to use the system. This certainly should encourage the use of videotex!

For ourselves, the focus on a particular application, the educational use of Telidon, gives our field trial a certain cohesiveness. The delivery of university correspondence courses, terminal-to-terminal tutorials, schools in different parts of the province interacting and exchanging information with each other, all sorts of information available to students when and wherever they want: facts such as these would make Telidon a valuable educational tool. Would people pay for such information? Should people pay for such information? Do people have a right to information or is it a private, salable commodity? This is a question that will often be debated in the next few years.

For some information, legal, medical or business, there is a fairly clear-cut understanding that a user would be willing to pay the going rate. Is educational material in the same category? Here, the debate would be on fertile ground. What is educational information? If it

tells us how to apply for social insurance, it may be classified as public information; but if it is a highly developed pedagogical sequence, it may not be public information nor would it be free. As we would pay for a textbook to obtain specific information, so we may be paying either directly or indirectly for specialized material.

Who is going to decide what material is offered on Telidon? The field trial initially affords a shelter from this question. One solution would be to say that the market decides on what it wants. To some extent this is the principle behind private television progamming. If the people are willing to pay for something, give it to them. On the other hand, what about information that is not popular in either the entertainment or business sense? For educational material, for example, should there be an editorial board such as publishers have, should the ministry monopolize formal programming, or should the marketplace decide here too? It may be argued that with this particular sort of medium poorly devised educational material may prove more harmful than good. If this is so, will there be a change in the ministry and various higher educational institutions to "publish" electronically or to revise their correspondence areas? Perhaps some teachers' prime concern will be to devise course material for this medium on a sound pedagogical basis.

Content and applications of the content will either give the impetus to the acceptance of Telidon or signal its demise. The challenge, without doubt, lies in the building of the data banks, but ironically, the content is so largely dependent upon the technology that unless the technology can meet the demands of the users the "information society" will not exist. We have come full circle. The technology itself, if it cannot be adapted quickly to the perceived uses, will not precipitate the information society, but disillusion its advocates and confirm the fears of its opponents.

What are some of the ways that Telidon must evolve, and evolve rapidly, from its current state? The following list should be considered as soon as possible:

* The option of the full keyboard on the user terminal to make a transceiver, i.e., random word accessing of information

* More sophisticated production means to build up the data bank:

  - drawing tablet

  - imprinting a video picture into the computer memory

  - picture manipulation (scaling, rotation)

* Incorporation of sound

* The placing of hardware production in the hands of a competent manufacturer after the research and development work is done

In sum, Telidon is extremely versatile, since as a protocol it is independent of the terminal. In principle, a user could select from a wide range of Telidon terminals, from a simple text-only type to an alpha-geometric one with varying levels of graphic resolution, to the sophisticated alpha-photographic terminal. Several components would be manufactured, and the users would choose terminals for their level of sophistication. Ideally, upgrading of the terminal would be relatively simple, perhaps like buying stereo components now. This scenario is at least five years in the future. To an uncomfortable degree, the manner in which the field trials are conducted now will greatly influence the continued existence of Telidon. The next five years may be an eternity for telidon.

The Ecology of Information or Avoiding the Pollution of Reality In the Information Age

Doug Seeley

[Doug Seeley is an assistant professor in the Department of Computing Science at Simon Fraser University. He is actively involved in community memory projects, computer networking and the social implications of telematics.]

Introduction

This conference has been called because many of the participants, organizers and professionals in the computing field sense that the current heralds of a "new technological age" are not more false alarms. We have been invaded by hordes of micro-processors that have sprouted legions of word processors and personal computers. At the same time, the telecommunications, computing, and information industries have truly discovered each other. We are currently in the blush of this infatuation.

What is also rampant is the enthusiasm, should I call it a longing, for a new technological mythos...the de-centralization of communications and networking. It is kindled by the realization that more and more jobs are information based (or is it that we are getting lopsided with bureaucracy?), and that information is some new force with different properties than market commodities. The hope is that a technological force has finally arrived that will herald political and social change in the direction of sharing, co-operation, and humane application. Free flow of information is the desired ethic. However, major problems lurk about these new possibilities; widespread job displacement could happen, but so could an expanded electronics and software industry. Finally, there is that great Canadian political motivator, national sovereignty and the fear of cultural colonization by our large neighbour next door. But what about institutional colonization?

Many of these issues came to a head for me last June, when I intervened at a CRTC hearing on a major merger. A huge broadcasting conglomerate was about to join with an equally huge cable conglomerate and save B.C. from cultural imperialism from Eastern Canada. What I learned however, was that they planned to form a company to deliver information services over cablevision, amongst other things. It seemed outrageous that their application blithely ignored that they were asking for a major extension of their monopoly privilege into information content, without even describing how they were going to go about it. It shocked me that this could so easily be done. What shocked me even further was that even the major shareholders were at odds with the next largest shareholders, who just happened to be one of the major Information Providers for Telidon. Any illusions I had about a new de-centralized medium where every person could be their own publisher went out the window.

What I have since discovered makes matters worse. Some DOC employees demonstrating Telidon have incredible misconceptions that there will be a single all-embracing categorization of all Telidon information. Telephone companies are tempted to centralize the information storage of such systems; systems are designed in such a way that only the well heeled can become information providers. If Telcos extend their incredibly perverse yellow page methods of categorization for all to follow, God help us. What ever happened to the Common Carrier concept that Prestel for one has gone for?

One difficulty is that when several technologies merge, it requires new metaphors and models and some competence in each, in order to keep a handle on the result. Another major problem is that information is routinely spoken of as some form of physical energy. Information is far from being an absolute. We need much more refined models that will allow us to diferentiate information and follow its unending complex interactions. Moreover, there is far more to knowledge and wisdom than large flows of information.

Noise and Information

Information is unlike a physical commodity, as McHale [1] and Parker [2] have pointed out. It can be indefinitely copied, since only its form is important, and not its particular physical manifestation. It should be pointed out here that the most basic of computer operations (at the machine language level) is the copy instruction (also assignment, replacement, etc.). Some workers have noted that the more information is used the more valuable it becomes. This only applies to some information; the opposite can also be true. For instance, the access codes to a community computer bulletin board become more valuable, the more people use them; while on the other hand a stock market tip depreciates in value as it is spread.

It should be obvious that information is in the interpretation of the beholder. One person's noise is another's profound meaning. Information is valued by receivers to the extent that it enables the receivers to improve their goal-seeking. Because of this, and the fact that some goals are to acquire knowledge and skills, information transmission implies personal values. This in turn suggests that any measure of information flow must include a model of human goals and values. Of course I am not talking about Shannon's entropy measure of information here. Abraham Maslow spoke convincingly of an ordering of values from survival and shelter, through social and interpersonal, to the self-actualizing and spiritual. What then of multiplying your accessible TV channels by 10 and being able to teleshop without moving your legs?

Another approach to the relative value of information is in its systemic role in the goal-seeking behaviour of individuals. At the low end is raw data: that is, measures and values of various categories. Next, there is information that structures this data into models that are the beginnings of knowledge (data structures). Further up, there is information that enables other information to be manipulated and processed (the programs). Finally, there is information that exchanges models (knowledge) with other goal-seekers and even influences the setting of the overall goals of individuals. It should be clear that by the very nature of life, information is part of vast interdependent feedback cycles of activity.

Information, in the sense that it is used in current economic statistics simply is neither knowledge nor wisdom. It may contribute to these, depending upon its quality and where the recipient is at. But more often than not, knowledge and wisdom are acquired through complex exchanges (dialogues) with one or more others over what can be an extended period of time. In a dialogue earlier chunks of information set the stage for later breakthroughs in understanding. Since interactivity is a key watchword with the new computer-mediated services, we should also take a careful look at the role of dialogue in interactive computing.

Interactive or Reactive?

Two-way communication processes can incorporate vast differences of interactivity. On time-sharing computer systems, interactive programming has been a major stimulant to effective use of people resources. They just work much more productively and creatively when they are able to see the consequences of their actions quickly. In these systems, there exists a rich feedback loop with short delay. An even more stimulating computing environment is that of interactive computer graphic terminals operating interpretively. Here one can create by hand (with the computer imitating the human) complex simulations-animations that can be played back instantly, or create on the screen an imaginary world that can be walked through or played with. In such highly creative environments, there is a high premium on the quality of the interaction, especially in tactile and visual modes, and coherence of presentation. Much has been learned here in empowering the user with effective but personal computing tools. But many of us have not had the chance to play with such powerful tools and our relationship with machines and media might be largely as passive consumers.

It is easy to be distracted by the power of a computer system's apparent interactivity and variety. You should however, be aware of who is providing the choices, and whether the choices are meaningful. CAI (Computer Assisted Instruction) appears to provide individualized learning, but it restricts choice strongly; it cannot manage alternative interpretations of knowledge, and is far from understanding personal language, let alone the student's way to see the world. Systems that purport to lead to participatory democracy through computer voting suffer from similar delusions. Indications of more creative directions are the learning environments of the languge systems, LOGO and SMALLTALK. The following details the full range of the degrees of interactivity.

The Spectrum of Interaction

reactive

> the user may only vote or select once from a single group of options such as with the CUBE system, electronic voting, monitoring for fire, safety, and energy consumption ...only passive consumption.

selective
: the user is seeking some particular information record and may search for it using such soft devices as menu-trees in Telidon I ...passive relationship to the data-base and its "knowledge"

provision
: the user may provide actual content to a data-base, or generate displays, as in videotex information providers, community computer bulletin boards, computer conferencing (e.g., EIES), and Telidon II.

dialogue
: the user can actively control the flow of interaction, he/she is not bound by a pre-programmed sequence, but can select instructions as they wish. This requires an attitude switch on the software designer's part... User-oriented programs should empower users, not control (allow, permit, etc.) them. More command languages are being written this way (e.g. Community Memory)

Structure
: the user can inform the information system how he wishes items to be categorized. This means not having to follow a standard categorization that places one particular world-view into digital concrete. Community Memory encourages users to freely and manifoldly associate items in their own ways.

access structure
: users can interlink message categories in ways that they choose, not the one manner imposed by the system, e.g., hierarchic, network, associative or others.

functional freedom
: users can expand the system's repertoire of operations essentially enabling them to construct new program tools from a workbench of programming tools.

knowledge dialogues
: many "artificial intelligence" researchers are working on programs that might "understand" some micro-universe of discourse. Such systems implicitly use a model of how the world works. A "knowledge-dialogue" system would attempt to model how the user sees the world. Synthesizing the two world-views, could lead to the "communion" interaction suggested by Arnold Rockman.

Information Flow and Power

There is much talk of "free information flow" and its necessity for a robust democracy. In general, I agree strongly, but recalling the earlier discusion about the nature of information, should we really measure such flows in terms of gross numbers of symbols? What I think is much more important is the flows of "access to information" and "opportunity to provide (create)". The high volume of one-to-many systems, such as broadcast, are hardly free at all, since only a privileged few can provide information. Bureaucracies that have much flow of data but restrict access of citizens to it, are not very free and are engaging in power accumulation.

In fact, in the overall interlapping circuits of information flow, where there are nodes that 1) filter and restrict, 2) structure and bias, 3) accumulate, and 4) control access and provision, you have nodes of information power. The great rush into information utilities such as Videotex, will mask the fact that information providers could rapidly become oligopolistic, and could very well pre-empt smaller providers from getting started. The only solution to this premature fossilization of information sources and budding "radical monopolies of Knowledge", is to ensure that any control over access and provision be distributed to the community and individual levels.

Hierarchy and Holarchy

Civilization has been dominated by hierarchy as a form in which to structure social exchange. Industrialism maintains it through the bureaucracies of large institutions and corporations. The de-centralizing potential of the new media networks cry out for alternative forms. Cooperatives, communes, and kibbutzim, are candidates, but these are not particularly encouraged by our society and economic system. Institutional power demands its tithe, and cannot comprehend sharing as a motive for social organization. Why do we think that the new media will change all this?

Examining the computer software itself, we cannot have truly de-centralized systems as long as the information access structure remains hierarchical, and as long as some computer languages continue to force us to use hierarchy as the only way to achieve structured programming.

Another form, proposed by Koestler in "The Ghost in the Machine", is the holarchy. If we add to it, the notion of "appropriate spheres of autonomy", such structures can have both the management power of hierarchy, with the co-operation of networking, while at the same time, preserving high levels of participation and freedom. However, such models cannot be forced upon society. They are unfamiliar images with no cultural context to encourage them. But let us hope that they will be given a chance to evolve naturally, not stamped out by the prevailing ethic of hierarchic control and bureaucratic rationalism.

Centralization of Information Provision

While I personally abhor such an outcome, I think that a high degree of centralization of information provision is inevitable. Two very good reasons are that our economic system encourages and is dominated by high degrees of centralization, and that this process has already started in the preparations for Telidon. Where and how will the small information providers be encouraged? Moreover:

1. There is much lack of awareness about actual software systems constraints; thinking habitually falls into centralist models.

2. The broadcast model (1-to-many communication) dominates our media.

3. Communications legislation is archaic and extremely cumbersome for many-to-many forms of communication.

4. There is no prohibition, in general, on carriers providing content with all of the resulting cross-subsidization.

5. Regulations, when they do come will only give the illusion of protecting citizens. What will instead happen is that threats of invasion of privacy, computer crime, and copyright violations will constrict access, provision, and exchange by individuals. This, of course, will protect only the small circle of very large providers, and will ultimately encourage anarchistic communication nets.

The Ecology Model

Discussions of the role of information in our society often come from statistics that have an economic basis. Economics employs archaic models of processes in the real world, as anyone seriously examining this pseudo-science's record of prediction might suspect. Economics is the emperor with no clothes. Its models are linear, based on incredible aggregations of statistics over time and space, and always out-of-date. It ignores the rich interactive complexity of the real world. An indication of this was the virulence with which economics attacked the Limits to Growth studies, which did make heavy use of interlocking feedback structures. The attacks were pointed at poor data and incorrect assumptions ...the pot calling the kettle black.

It is the rich and complex behaviour that feedback control systems exhibit that more closely matches reality. Models of information flow must be therefore cybernetic. An ecological understanding will turn out to encourage a robustness and diversity of information sources and flows. Monopolistic information sources will lead to a vulnerable civilization, just as single-cropping makes the farmer vulnerable. They will promote single viewpoints of a world, whose wholesale consumption leads to nothing less than the colonization of reality. But our governments and institutions insist on using these illusory kinds of statistics in order that no one lose their position in the fantasy.

The Finger is not the Moon

There is an old Zen saying that the finger that points at the moon is not the moon. And so it goes with words, and with the symbols of information flow. The Narcissus/intellect would like us to believe that our symbols are the world. The symbolic-token world of information so touted in our visions of the "information age" is so beguiling that we lose sight of the fact that the real world is our direct experience of it. Any other kind of knowledge other than direct is mere spectator stuff, implying separation from the world. This bias can lead us to de-value personal experience and interpersonal contact. We tend to believe more in mass-produced symbolic worlds we are meant to consume, rather than infinite precision (analogue, holonomic) nature of our own direct experiences. This egotism of industrial-technological-rationality has begun to suffocate our humanity.

What kind of actors in this incredible opportunity called life, are we, that we continue to create technologies that attempt to make us believe that consuming some mass-produced reality "out-there" is the key to a life of happiness? Why not develop technologies that enable more and more folks to directly engage creatively in life?

The Colonization of Fantasy

MacDonald's already packages knowledge about nutrition and ecology to teachers, in the same manner that it markets its ugly clown. The new media have the hype-potential through personal news, CAI, and interactive fantasy worlds, to offer us any reality that we might wish. If mass TV programming has offered us a vast wasteland, soap opera participatory fantasies will offer us a barren universe. If these are combined with lotteries (it's a natural), it will lead to the world described by Borges in "the Lottery in Babylon".

Perhaps however, we are compelled to exteriorize our fantasies through the acceptable mode of technology rather than touch upon our creative resources inside. As we project ourselves and our consciousness outwards through our technological extensions, so it is inevitable that our right-hemispheric processes will find their expression as well.

Networking as Cortical Projection

Computer networking and conferencing, and the new media have opened out a vast new potential for many-to-many communication. The most obvious example of this in nature is the incredible interconnectivity between neurons in our own cerebral cortex. In the past 6 years of computer networking, I have witnessed the tremendous excitement that it produces. The synchronicity of multifaceted connectedness to so many other minds is energizing. Our technological culture has been a lop-sided projection of our linear, rational left-hemispheric cortex. This has strained reality. It seems that networking foretells of the inevitable projection of the intuitive, creative, and imaginative properties of our right hemispheres. Perhaps as this technological evolution proceeds, more of us will experience the truth of what David Bohm, the distinguished quantum theorist and Krishnamurti associate, has said. "There is no there, out-there!"

References

[1] John McHale, The Information Society, the Westview Press, 1976.

[2] Edwin Parker, The Social Implications of Telecommunications, Telecommunications Policy, Vol. 1 No. 1, 1976.

Public Service Uses For Videotex: The Vista — Toronto Field Trial

Jeff Campbell, Bell Canada
Michael Gurstein, Socioscope Ltd.

Introduction

Videotex -- interactive computer assisted telecommunications -- appears to offer the possibility of the "information society". Most discussions of videotex and the information society have concentrated on the "information" element rather than the "society" element. An information society would be one in which access to information and its use in its multiple facets would be as common and generally accessible as access to clean water, electric lights or public education are in our society. It would be a society where information in its origination as well as its reception would blind the society closer together rather than divide it further along lines of wealth and poverty, ethnicity, region, etc.

It is coming to be a truism among many of those most closely involved that videotex will find its first acceptance among commercial closed user groups and as a high cost novelty, for the affluent families of urban society. Most videotex field trials are targetting into the supply of service to one or another of these groups. An exception to this practice will be found in Bell Canada's Toronto Vista trial.

Bell, in conjunction with the Federal Department of Communications, will be setting up a field trial of its Vista version of the Telidon technology and providing certain videotex services to 1000 receiver terminals in Toronto beginning in Autumn 1980. The majority of these terminals will be assigned to determine commercial and consumer acceptability and use of the system. Ten percent (100) of these terminals are being assigned to the exploration of possible "public service" uses of videotex, including special services and uses for the deaf, for the physically disabled, for the blind, as well as Consumer advocacy, community information, specialized information for the aged, etc. Bell will also be providing support services to this part of the trial including computer storage space (up to 8,000 pages) and other technical assistance. It is expected that the entire field trial will continue into 1982 by which time decisions regarding the need for further testing, commercial feasibility, etc. will have been made.

Background

The Vista public services field test grew out of Bell's on-going concern with the telecommunications needs and problems of the handicapped and with its program for examining the "social impact" of its new technologies. A recent paper prepared for Bell identifying areas of social impact concern for the systems suggested that the social "uses" of the system might be of considerable importance [1] and that they should be examined.

Just as other media have qualities which lend themselves to particular kinds of uses so videotex's interactive, information storage and retrieval, switched network and graphic display characteristics suggest public service uses over and above those which might in the short run be commercially self-supporting. It has clear potential for use as part of a computer assisted learning system and significant advantages over existing systems because of the low cost of the hardware. It will clearly be of use to the hearing impaired through providing access to information in a text format. It will be of benefit to the bedridden or home-bound by providing potentially such services as shopping, banking, message receipt delivery, etc. It can assist the blind since the digital format of the information transmission may be used to produce a braille print-out. It will be of assistance in language learning for both literacy training and second language training. It should be useful in the provision of certain forms of information regarding social service entitlement and be of considerable benefit both in terms of cost and efficiency in the provision of public service information both to the communiy at large and to particular groups in the community.

The potential uses of the system are vast and new ones will develop as the system comes into widespread use and its unique characteristics develop and evolve. Most of the uses mentioned,

however, are possible now and may prove in fact to be cost-effective in comparison to existing forms of providing the same quantity and quality of service.

It is Bell's intention as part of its Toronto field trial to explore some of these uses and perhaps more important to facilitate and support the exploration by others of these uses.

A background consideration to this approach is the evident significance of one or another level of government both as information provider and as supporting and promoting the provision of public services. If government can be persuaded that Videotex should be supported because of its capabilities for providing certain services to the public in an efficient and economical manner and thus that government should purchase or support the purchase and distribution of terminals so as to ensure the provision of certain services then the popularization of the system will be accelerated enormously.

To Date

Following the preparation of a general background over-view document a meeting was held with a number of those involved with Videotex field trials to discuss possible public service applications for the system as well as areas of potential social concern. [2]

Subsequent to that meeting, contact was made with a number of public service organizations in the Toronto area to discuss with them a possible involvement with the field trial. The Ontario March of Dimes took the initiative in calling a meeting in Toronto of representatives from some 20 groups and agencies to discuss the field trial and public service applications. [3] A working group from this meeting drafted a proposal for the formation of a public service umbrella group to become an information provider for the Toronto trial, to make recommendations concerning the experimental use of the 100 public service terminals and to become a pressure group in the Videotex area. [4] The group is expecting to reconstitute itself at a further and more inclusive meeting and will begin to prepare the necessary infrastructure for becoming an information provider soon after that.

The Future

The development of the public service field trial will provide information in a number of areas:

1. Information Providing

   a. Who should provide information and how should information be provided for public service uses?

      In this trial the non-profit sector is taking the initiative in developing an information provider umbrella group. One could foresee public service information being provided in a number of different ways as for example, directly by government, through the subsidization of the non-profit sector or on a fee for service basis by the commercial sector. The results of this trial will give an indication of the pros and cons of the direction currently being taken.

   b. Type of information

      Bell is providing information storage and some consultation on information development but within limits (as yet to be defined). The information to be provided will be the responsibility of the public service information providers themselves. Bell may propose that certain areas or types of information be presented so that certain technical applications may be examined, but beyond this the "umbrella" will have to establish its own priorities and information packages. Joint Bell-umbrella group studies will examine the consumer response to the information provided and give indications for future developments. The results of the trial will give some indication of the desirability and value of this medium for public service information provision.

   c. Information regulation

      The development of means for ensuring accuracy, restraining libelous or obscene or seditious material will at least initially be the responsibility of the information provider. Thus, they will have to establish internal means for regulating the content of input information. In addition, methods will have to be developed for ensuring accessibility of input for information from a wide range of possible sources, some of which may be in competition with or political conflict with one another. An example of this may be found in possible differences between organizations for the handicapped and organization of the handicapped. This latter concern is in part an artifact of currently limited information storage capability on the system, but given that public resource information providing may always be limited, problems of conflict and competition may be expected to continue.

d. Cost

It is hoped that the field trial will provide information to indicate what longer term funding might be required for videotex as a public service. Comparative cost figures for videotex as a substitute for existing services, as for example, printed information sources, referral services, etc., will be developed.

2. Technical research

a. Hardware related

In the course of the field tests, we expect to examine certain of the technical aids for the handicapped which may be linked into the system. Among the aids which may be included for testing are a braille printer for the blind translating the digital messages into braille print-outs; large format key-pads for use by the physically handicapped; image expanders for the sight impaired, etc. Studies will be conducted jointly between Bell, the umbrella group and other interested organizations on areas of mutual concern directed towards ensuring the widest possible access to full use of the system by all in the community.

b. Human factors related

Information will also be gathered on such matters as "scrolling speed", colour and display qualities, language and format limitations, to determine if these might present particular problems for certain individuals or groups. Formal experiments may be conducted or information may be gathered through open-ended interviews of terminal users.

3. Consumer

a. Use of information

The information available on the system will be tested as to acceptibility, usefulness and importance. An attempt will be made to determine what type of information might be most appropriately provided for public service uses and lessons drawn as to possible sources of funding support for this on a more permanent basis.

b. Additional services

Videotex is a highly flexible system. Attempts will be made through in-depth interviews with users to determine which other possible uses for the system might be developed.

Conclusion

Bell Canada and non-profit agencies providing services to the public are only just beginning a co-operative exploration of Videotex. Uses are only just developing. Problems will arise and new opportunities will emerge. What is important, however, is that the social uses for the system are being included at the beginning in the development plans and studies. This should help to ensure that the evaluation of this important new medium will reflect the interests and needs of all segments of the community.

Footnotes

[1] Michael Gurstein, Social Impacts/Social Uses of Telidon/Vista, prepared for Bell Canada, December, 1979.

[2] Fernande Faulkner, Vista/Telidon Seminar, Dec. 1979 Transcript. (A summary is available from Mr. Jeff Campbell, Bell Canada, Montreal.)

[3] Minutes of this meeting may be obtained from Mr. Lee Rullman, Ontario March of Dimes.

[4] The text of this document is appended to this paper.

Bell Canada — Telidon/Videotex Communications System (Draft)

1. Issue

Bell Canada and the Federal Department of Communications are co-jointly sponsoring trials of a Videotex Communications System in Metropolitan Toronto in 1980/81. Commencing in September, 1980, 1,000 terminals are to be located in homes, institutions, and agencies within the City of Toronto. 900 are designated for commercial use and 100 are to be designated for social and community services. Bell Canada is therefore requesting that those groups, agencies and institutions organized by and for disabled and handicapped citizens establish an umbrella organization to maintain, review and negotiate a presence for such groups during the trial and eventual on-going program. The primary responsibility of such

a group initially would be to act as the primary information provider for the social use segment of the trial. In support of this function Bell is prepared to make certain resources available including "hardware", training, etc...

2. Urgency

It is essential that a consensus be achieved by mid-March 1980 on the structure, function and workings of the proposed umbrella group. Failing to achieve such a consensus may result in the available resources reverting to purely commercial interests and this unique opportunity for participating on the ground floor of a major communication innovation will be lost.

3. Background

At a meeting on February 12, 1980, arranged by Bell Canada in cooperation with the Ontario March of Dimes, the Videotex System and the proposed trials were described.

The Videotex System utilizes the telephone/television systems available in nearly all Canadian households (96% have telephones, 98% televisions). The system allows for obtaining access to computer-stored information by means of the home telephone system, controlled by a separate keypad. The information requested goes through the telephone lines and is displayed on the home television set after having gone through a "decoder". Information can be displayed using script and full colour graphics.

Information is currently put into the system by means of special "information provider" terminals. Eventually individuals will be able to communicate between themselves directly by means of this system.

Bell Canada and the Federal Department of Communications recognize that the major users of the system will be commercial. However both agencies are looking for leadership from social service agencies and groups representing the disabled and handicapped to develop and maintain a real presence for such groups in this aspect of the information society.

Videotex promises a major breakthrough to communication/information access. The impact on education, services and industry is unknown. Access to information for the mobility restricted/handicapped and sensory deprived has an equally unknown impact.

The Commercial Sector has already organized an association, VISPAC (Videotex Information Services Providers Association). Established in 1979 with over 40 members, VISPAC membership fees are currently $1,000 annually. It is hoped that the proposed umbrella group will develop and maintain an active presence within this association during the 1980-81 trials and beyond.

It is expected that 50,000 pages of information will be coded and classified for display by September 1980 with 80,000 pages anticipated by January 1981. To meet the request of Bell Canada within the time deadlines, a working group was established to draft a paper for presentation and discussion to groups, agencies and institutions wishing to jointly participate in the umbrella organization.

4. Purpose of umbrella group

- Coordinate Videotex related interests of social service agencies, groups and institutions representing the interests of the disabled and handicapped.
- Act as central clearing house for social use information inputting during trials.
- To negotiate with other provincial national groups, agencies, institutions when Videotex Systems are developed nationally.
- To negotiate with international groups as necessary.
- To assist Bell Canada in developing and maintaining presence of social services in field trials and beyond.
- To assist in assessment of equipment, coding and information access for special needs and interests of individuals represented by groups, agencies and institutions and to promote additions and modifications where necessary.
- To coordinate policy review and develop recommendations on information provided during trials and on-going.
- To promote interest in Videotex and encourage other groups to join the federation of groups, agencies and institutions under the umbrella organization.
- To provide a central focus and access point for funds during trials.
- To provide a central focus for efficient and effective services and viability on-going after trials.
- To provide a focal point for marketing special devices and aids required by consumers of the system.
- To maintain an open and accessible focal point for the public at large.

5. Recommended structures under umbrella group

Develop and designate working structure, procedures and terms of reference for umbrella group to carry out needs in section 4. Two major groups with the assistance of a coordinating secretariat are suggested under the umbrella group.

5.1 Policy review committee

To develop and maintain on-going policy review on issues such as

- gatekeeper(s) responsibilities
- accessibility of the system
- evaluation of services
- continuity of services
- updating of information
- monitoring services
- legal and ethical issues
- financial responsibilities

To promote employment of disabled and handicapped within Telidon Communication System.

5.2 Technical review committee

- To assess, review and test impact of services.
- To monitor acceptance of services by consumers.
- To assist Bell during trials in designation of terminals and to assess the special needs and interests of the disabled and handicapped consumers.
- To identify gaps, modifications and changes to the equipment, aids and structures of Videotex systems.
- To promote services to consumers and to present the consumers' interests and needs to the providers of services.

5.3 Secretariat

- To provide active on-going coordination for umbrella organization and recommended committees.
- To input information into the system.

Symposium Summary

How Should the Government Deal With New Technologies and Services

- The history of communications in this country is that the same problems are replicated with each successive technology and service. There already are difficult problems with the existing situation in telecommunications and broadcasting, and we should not look towards new technologies and services to solve these.

- It may be that there is too much broadcasting in this country. Government should concentrate our resources instead of dissipating them.

- But the new technology can help to correct some of the problems that exist with the old. Inherently, the new techology is more decentralist, small-scale, user funded, and more interactive than the present one-way, mass media. The caveat is that the use of the technology in these directions must be planned for, through coherent and determined policy making and implementation. If this direction is not accepted, Canada in a very short time will be overpowered and dominated by the American and Japanese technologies of videodiscs and personal computers, hardware and software. Ignoring the new technologies and services will just compound our problems.

- As Thompson has pointed out in Memo From Mercury, the trouble with the mass media centralized concept is that the individual user cannot, himself, contribute as a full participant. There is an unequal relationship between those people who have access to tools of production in broadcasting and the user. What turns people on to this technology, and why they feel there is something radically different here, is that this technology is in principle -- although there are obstacles in practice -- a way for people to control both what they generate and what they receive.

what and they?

Eavesdropping on a Conversation

Z: It is not that the technology is going to solve our problems, but rather the new technologies give us opportunities which could help us economically and culturally, so that we do not become dominated by IBM and Twentieth Century Fox.

Y: Why assume that the outcomes in new services will be any different?

Z: I am not assuming. I am saying if we plan for it, then it will be different.

Y: It is as if you are into science fiction; in other words, let's concentrate on out there and ignore the current system. But the current system is certainly more important in terms of consumption than any of these new services that we have been talking about.

Z: But the current service is breaking down and with other new services coming on line, most people will spend less time with the traditional ones. CBC research shows that 20 percent of the people watching TV watch 40 percent of the programming, and the 20 percent who watch TV the least watch four percent of the programming. So while it is clear that there is a large number of people participating in the mass media system, there is also a large segment who are looking for or doing something else.

Y: I agree that the current system is breaking down, but I don't agree that our current policies and our current regulatory structure recognizes that. It seems to me there is a hell of a lot of work to be done on the current system to bring about that realization.

Public Policy and Conflict Resolution

. Public policy is developed to ensure that some people aren't unjustly injured by other people, that some people have an opportunity to make money in socially sanctioned ways, that the opportunities for crime and violations of property are minimized. These various conflict situations impact policy far more than references to motherhood statements such as: "We should have a public policy that encourages diversity." But in the area of communications and information it seems that the conflicts have blocked the process.

. These conflicts arise from several factors. There is a lack of trust throughout the system: the federal government doesn't trust Bell Canada, Bell Canada doesn't trust the federal government. There are federal/provincial feuds, broadcasters vs. cable, etc. We have an adversarial system at every level. We are the only country in the world, besides the United States, that doesn't protect our manufacturers. We have not resolved the issues about what's more important, free enterprise competition or having one strong national manufacturer in each area, that can do everything at a cheap price and export. We are not clear about the value of an industrial policy that develops a new terminal which allows for Pay TV and Telidon, interactive video, electronic funds transfer, and so on.

. People continue to talk about the information sector as if it were just the telephone, Telidon, television, broadcasting, cable, etc. This perceived information structure is a consumer luxury which has to be supported by the industrial sub-structure. We should be more aware of changes occurring in office technology, computer directed manufacturing, computer aided design, robotics, etc.

. The government seems to have abdicated its responsibilities entirely. It has just stood still by trying to be fair to all sides. There are complaints from all sides: "at least if we had some kind of a decision, then we would know where to go."

. The CRTC has done a pretty good job, in certain selected areas, of developing at least some policy. Sit down and read the CN/CP decision. Whether you agree with it or not, it's a thoughtful decision. There is a genuine attempt to try to evaluate some of the values and combinations of communications which now exist. What we should be trying to think about is ways of trying to channel this conflict model into more constructive solutions. That should be the starting point, rather than positing some ideal which is never going to be obtained. The CN/CP decision is an incremental but positive step.

. The ability to resolve conflict seems greatest in areas where the questions are principally industrial and economic. The CRTC has always had problems where a cultural element is involved. At that point, the whole thing begins to flounder. And it will flounder unless there is a cultural objective. There may not be an absolute or total consensus, but at least if there is a sense of direction about the cultural objectives, you have some basis for looking at the conflict and beginning to resolve it one way or the other.

Would Somebody Please Play a Game of Concertation

. France, The United Kingdom, Germany, Sweden, Japan all have coherent policies that deal with the impact of micro-electronics, robotics, satellites and terminals. For example, France has given a high level of attention to the whole problem of the computerization of society, and has an image of the way they want France to look in ten, fifteen years. In March when Thorne, a U.K. company, wanted to buy a television rental company in France, the Government intervened and said no. Why? Obviously because the development of new terminals that are made in France meet French needs; the software is French and compatible with French information systems. Giving an English company entree into French homes would put all this in jeopardy. With a coherent policy, decisions can be made. In Canada we can't even decide whether we need a new terminal or not.

If we had industry, labour, and government working in concertation and they decided that there is a need for an excellent videotex terminal, the various electronics firms could work together and produce a product which could compete on world export markets. The firms would still compete with each other within Canada, but when they go outside the country, they would support each other in the form of a consortium as in Japan. If the major competing firms in Canada do not learn how to work together, they will lose their world market positions and be gobbled up by the Americans or the Japanese. [* See the work of Kimon Valaskakis and Peter Sindell, Industrial Strategy and the Information Economy: Towards a Game Plan for Canada, Gamma, University of Montreal, 1980.]

. If the Canadian government had a policy of concertation, it could offer a carrot to the Canadian electronic firms through its procurement policy. The Government and the public sector represents 30 percent of the office equipment market in this country and that market could be used for the development of information network products.

. In order to make something like that work in Canada, you would either have to redesign the Canadian culture or set up a dictatorship. Canadians want the freedom to buy the best product; whether it be manufactured in Canada, Japan or the United States.

What is DOC's Policy?

. There may be an implicit Department of Communications policy to promote certain technologies, to be at the frontier of the technology, in a technical sense. If that task is accomplished, mission completed. This appears to be illustrated perfectly by Telidon developments. One might learn a lot by examining what happened with satellites. Canada was at the frontier of satellites and look what happened with them. The major barriers to efficient development and use of satellites were institutional. As a result there are now enormous costs in using a satellite. As long as the federal government ignores the problem of the institutional barriers, Canada can expect to be at the frontier of technologies which it cannot then implement efficiently.

When Should There be a Regulatory Response?

a question of timing

. We should be able to set up an order of priorities. No matter what form the technological revolution takes, we know that there is a privacy problem. We don't know the exact details, but surely we can respond to it even at this stage. You cannot wait until the technology is a certain distance down the road and then try to stamp on it and control it. Surely it would be better to select where the beginnings of a regulatory-legislative response are possible. (But premature regulation would be a tragedy, because then you're trying to shove the technological genie back into the bottle.)

. There appears to be a trend towards deregulation. In addition, the decisions that were handed down recently facilitate network attachment and terminal attachment. It appears that the entire industry is heading towards deregulation.

. Maybe deregulation is coming, but in Canada it is coming at a glacial pace rather than with hurricane force.

Will Political and Social Institutions Make the Necessary Internal Changes?

. The privacy issue is an interesting one because it points to a number of dangers. A couple of years ago, a consultant was hired to link several French government data banks. When he succeeded, the decision makers in the government departments discovered that their individual empires and bailiwicks were threatened. With each department linked into the system, one could find out how the Ministry of Transport was spending its money or how Foreign Affairs was doing and vice-versa. The end result was

interesting, because those same decision makers came up with a suggestion: to protect public privacy the linkages should be removed as they were a threat to the individual Frenchman. The project was stopped stone-cold dead, and the consultant was looked at as some form of pariah who was threatening the public interest. In reality, the only interest that was being threatened was the control of society by the people who held the information in the various databanks of the ministries.

- In a major review of trials using the new telecommunications services, it was found that it wasn't the people who rejected the technology; it was the social institution which felt that technology did not fit in comfortably with its previous way of doing things. When looking at the components of a new service, we must not only examine how it affects the end user, but we must look carefully at how it affects the social institution providing the service.

- Technology could be used to inform people and to collect feedback and build links into the government process. A U.S. experiment with two-way cable in Redding, Pennsylvania trained the elderly in the community to develop and produce television programs. The results showed that the politicians liked the system because they could get a high profile, but social service agencies did not like the programs because they lead to increasing demands for service which the social service agencies were not prepared to meet.

For developments such as Telidon, we need policy addressed to the institutional relationships, the structures of the industries involved, the economic incentives of the industries involved and the relations between the government regulatory institutions and the industry.

Equity of Access

- Why not straightforward accessibility, common standards and interconnection possibilities? The large institutional players in this game should be encouraged, (coerced?) into a consistent common carrier role, and prohibited from doing anything more. Also, these players would be under obligation to make sure that minority groups, people in remote locations, and people living in areas of low density, have the same access rights and opportunities as those living in urban areas. The carriers would be expected to recover the costs in those areas out of the revenues they make from the highly populated areas. After all, these are familiar concepts in telecommunications regulation.

The guarantee of access would include making sure that there is a standardized common carrier system that provides interchange across all media. Not just the telephone, but telephone to computer, cable to videodisc, etc. In principle, any piece of technology should connect to everything else, given that this is what the user wants -- and that he is willing to pay for the simple and low cost hardware.

. A problem in this country is geographical dispersement of the population. We tend to get delivery systems which serve parts of the country, urban concentrations specifically, but not others. If one goal is to provide public service, you are stuck with a distribution system that works in some places but not others. We already have the same principle with hydro-electricity. We have seen the log-jam in pay-television, satellite stations, and cable, because there are two functions: the common carrier function and the content function dispersed among three players. Broadcasting which is a production and exhibition sector, a common carrier sector, and the cable sector which is a hybrid. The log-jam is: how do you resolve those functions among three players? If you could leap ahead ten years, you might not need three players. At this point, government simply does not know how to resolve that.

Freedom From Access

. John Brunner in Shock Wave Rider eloquently depicted a society in which "technology-free" zones were created to which people could voluntarily go and cut themselves off from the government and all services provided by the government. If people were willing to take the risk, they did not have to live with the technology.

. In certain areas of the North, technology (in this case CBC television) is introduced into communities even though a majority of the community may not want the technology. CBC television is seen by some Inuit observers as an assimilation attempt to bring them into the wage economy by helping them become better consumers, by getting them to see the benefits of a different lifestyle, so they would be less threatening to southern energy and mineral requirements. From this perspective, if the government, mining interests, and southern society in general were successful in getting these people to accept a southern style wage and consumer way of life, it would be easier for everyone (except perhaps the Inuit).

The older Inuit prefer the old ways, because to them everything seems out of control. They don't speak English, young children don't have as much respect for them, and their world is changing very fast. The elders are

saddened because the land can no longer support the increased population, and they see that their grandchildren are useless on the land. The elders realize that a change must come about. One of the sayings of Inuit culture is "It can't be helped". It is part of the culture to accept what is and adapt. It is a fundamental tenet of the culture. The elders definitely see change taking place, but they want to try and influence it in terms of their own values, not outsiders' values.

The negative impact of the technology (CBC television) created a new desire to fight it off. One response in Baffin Island was to black out particular CBC network programs and allow others in. However, the Islanders used community surveys to make sure that they were not blacking out something really popular. They knew there would be a community uprising if they blacked out "Hockey Night in Canada". The Inuit are also saying they want to put in their own programs as well. In addition to freedom from access, there is freedom to access your own thing.

The object is to use community development and organizing techniques at the community level to help people use the system to do what they wanted to do anyway. For example, the technology can be used to help six communities to share and exchange information and use resource people to help them pull together their own presentation in response to the gun law proposal. The object is not to supplant the work that community organizations and communities in general have to do themselves, but to facilitate the work. However, there is a very difficult line between absorbing everybody's energy in the medium itself versus making it simple enough for community members to do what they want to do.

What Makes the Canadian Telidon System Unique and/or Competitive?

On the software side it is a coding scheme or a graphics transmission protocol developed by the Communications Research Centre, a branch of the Federal Department of Communications, which permits greater graphic resolution than other systems such as the English system Prestel.

The visual features of the system are arranged in a Layered Capability Structure (LCS). That is, there is a hierarchy of visual features beginning with alphanumerics, then mosaic graphics, then geometric graphics and finally photographic imagery. The initial Telidon system includes the first three visual features which means that the Telidon system can use Prestel mosaic graphics, but at present the Prestel system cannot use the geometric graphics of Telidon. LCS can be extended upwards to include animation, and non-visual features such as sound can be added to any layer of the structure.

Telidon can be used with any type of telecommunication channel including telephone, microwave, satellite dedicated television, cable, fibre optics and the broadcast mode.

With the addition of some memory and additional software the Telidon terminal could function as a storage and preparation device, so "telesoftware" is possible as well.

The telephone connection inherent in the system makes connecting with computer networks easily feasible.

It is relatively simple to provide a common viewing space. That is, the same information from a central computer could appear on both screens at different locations and with the addition of audio links it would be possible to display, for example, educational programs that have been prepared in advance.

Another possibility is that of an interactive common visual space. The same images could appear on two screens in different locations and the participants would be able to interact by drawing on an added line, changing a color, etc. Also, as each person draws on his or her screen the changes would appear on the other screen.

The broadcast mode becomes quite powerful with a dedicated channel. With the bandwidth of a TV channel, the Library of Congress could be sent every twenty four hours and if you had enough local memory and software you could catch the pages of a book you want, store it and play it back when you wanted it.

The Other Side of the Coin

- Many of the possible services mentioned with Telidon have not been developed to the point that they can be manufactured. People who have had access to a terminal report frequent delays and breakdowns.

- To some extent, which services are developed will depend on the needs expressed by users of Telidon. But if the users can't imagine alternatives, we are back to chicken-and-egg questions.

- The heavy emphasis on telephone companies as a carrier could mean that technological development will be restricted by the inertia of the carriers.

. It appears that the first devices available to users will be keypads with a limited number of keys, but the terminal needs a full keyboard and local intelligence to be a useful device.

. Users should have the capability to enter, process, store and retrieve data with light pens, joysticks for entry and touch-sensitive screens for retrieval. These are all elements that exist now in mainframes, and mini-computers, and are appearing in micros or personal computers. In its current implementation, Telidon is already out of date.

Constraints in Videotex Development

The major constraint on the speed of technological development is the development costs. The start-up costs of videotex are very high, so the initial investment comes from large companies or consortia, and governments, which limits competitive alternatives and diversity of services. Most of the development to be done is in software which is very labour-intensive and expensive. It will be several years before a full range of videotex services are in place.

Are the Graphics as Good as They Have Been Cracked Up To Be?

. It has been argued that Telidon was designed to have very good graphic capabilities, that it's a superior system to all of the others, and one of the reasons you should adopt it is because it is so good in graphics. Somebody should have told the people who designed the system that it takes hours even for skilled people to put graphics on Telidon. If you want to sit down and attempt to put graphics on Telidon at the moment, and I don't mean just circles or triangles or funny little stick men, but imaginative use of graphics, it takes three or four hours to do a task which in technical terms was solved in different ways 10 years ago in the field of computer graphics.

X: Why it is so difficult to put graphics on a system that was designed to be graphically oriented?

Y: The system itself could do graphics, but not enough time, energy and resources were available to figure out "how do you get the graphics in there?" One of the great limitations of the field trials is that in producing user terminals for the field trials, they didn't quite appreciate that the number of production units which enable information to be put into the system, should be almost as great, if not greater, than the number of user terminals. The other problem is that even if

you have an "information provider" terminal or have access to it, it is incredibly slow. Large corporations will spend the money to get a proper system working in-house, but smaller users or public service users are going to have a mountain of difficulties to overcome.

What are the Possible Services and Content?

. To succeed, the user interface should be simple to use, should maximize the utility of the system, should give a natural response and should be organized in such a way as to minimize learning time and confusion in use.

Here is a list of possible services requiring as minimum equipment a TV set, and adaptor module interconnecting to the transmission system:

With a hand-held keypad, we could have
- Information retrieval
- Interest matching
- Commercial transactions
- Questionnaires
- Computer games

With keyboard, the list expands to
- Calculations
- Education
- Personal Database
- Local storage & intelligence
- Software distribution for local execution

The services have to be tied to content. It is easy to assume that every kind of information known to mankind will be available on videotex and theoretically it will be, but only if somebody puts it there, and they are only going to put it there if there are enough people who want to access it. It thus appears that the content for the first services will grow quickly in some obviously lucrative areas and other areas such as public service areas will grow slowly unless the government provides subsidies.

. There will never be a single large, central data bank to serve the whole country. As use of any information system builds up, the information that has the highest level of usage will be located and centralized near the people who use it. If the information is rarely used, then it will be in some other hierarchy, much like your Public Library. The library nearest you carries the books that are used the most by people in the neighborhood. If you want a book that people in your community don't

read very often, you may have to keep searching until you finally get to the National Library where the single copy exists.

- The obvious types of general content are news, weather, sports, advertising, price lists, etc. and also customized or more specialized information such as stock prices on shopping information. However, a key question concerns the billions of dollars worth of information held by the government which is now available for free. Will government begin to charge for this information or will they let private databanks take the data and charge for the information?

- Telidon will not be a very efficient educational tool unless the user's terminal has local storage and intelligence for receiving tele-software and/or a common visual space that can be manipulated.

Are There Lessons to be Learned from the Personal Computer Phenomenon?

- As of January 1980 approximately 400,000 personal or micro computers had been sold in North America and 20,000 to 25,000 of these sales were in Canada. Telidon systems designers would benefit from observing how a free-form exchange of ideas through magazines, newsletters and personal computing clubs has led to very rapid growth of quality software and hardware. Hobbyists publicize information through a network that traverses the continent and expertise is developing in all directions. People who are interested in "doing their own thing" are able to access information which supports individual creativity and inventiveness. Personal computing generates enthusiasm, high motivation and continuous learning. It both supports and is supported by the involvement of the individual in a community based on common interests.

- In contrast, it has been extraordinally difficult to get information about Telidon hardware and software which would enable individuals to experiment with and develop the technology for their own goals.

- In DOC and Bell Canada's defense, one could argue that DOC and Bell Canada have been bending over backwards to hand out their research to far too many people. The information which people need is available, if they can figure out who is the right person to ask. It is not going to be kept locked up.

- A close review of the chronology of software developments and contents in personal computing might give important clues as to how Telidon content might evolve. The first wave was games that were updated versions of video games. The second wave of software emphasized graphics or music.

"Be your own creator, create your own design or your own music". Then after about a year, the utility programs began to appear such as tax reports, accounting, etc. About six months later, software to improve basic skills such as arithmetic, spelling, etc. began to appear. At the end of 1979, text-editing and word processing software emerged, and most recently software and articles began to appear for the development of community bulletin boards, community memories, mailboxes and personal computer conferencing networks.

Who are the Information Providers?

. The largest Information Provider (IP) is Infomart which is made up of the Torstar and Southam companies. They are investing six million dollars. Videotex is seen by them as both a threat and an opportunity. The threat is that this new medium will replace a piece of their revenue base. Their revenue base is 75 per cent advertising and 25 per cent circulation revenue, and once the advertising revenue is reduced by only five per cent, the whole economic structure of a newspaper changes for the worse. The flip side is opportunity, but the only way the medium will become a viable public medium is if the data base is large, varied, and fits user needs.

. There are really two questions. One is whether the consumer will accept videotex in his home, and the other is whether those who are signing the cheques in our society, in business and in government are willing to sign cheques for videotex. The former can be researched but the latter is the bigger question at the moment. Is the government of Canada, which is the nation's largest information provider, going to plunk down its money in large amounts to put its information on a videotex system? If it isn't, then the data base isn't there, and with no data base you have nothing to market. The same is true for commercial organizations, educational institutions and so on.

. VISPAC, which was formed in late 1979, is an IP association with 25 members. Fifteen of the members pay 1,000 dollars with voting rights and 10 pay 250 dollars for non-voting membership. This association has several large corporate members as well as smaller organizations, two universities and a library. If the organization is able to attract members which are not in business for profit, that will strengthen the organization, so they can speak with a unified voice as they lobby with the DOC, Norpak and Bell Canada. There is also an educational sub-committee of the Federally organized Videotex Consultative Committee which may or may not become an educational information-providing association.

- To get involved in the IP business at this stage you must either have people, or money, or both. At present the page-creating machine designed by Norpak costs approximately $30,000 and the preparation of pages and/or software is very labor intensive -- especially when graphics are included. It is possible to marry personal computers to the Telidon system and this might become a rather crude way of producing a limited number of pages. In situations where classified ads or advertisements with graphics are being produced, the Apple, or a $30,000 input terminal could be efficient for a few pages of low-quality graphics. However, if you want hundreds of pages, the company will probably develop an expensive integrated unit in which the cost of producing pages is very low. There is a large consuming public who are used to high quality graphics and if expensive equipment is required to produce that, it will be put in place. Large companies will use page creation units costing from a hundred thousand dollars up to a million dollars.

Who will the Users be?

- The universities, libraries, businesses and schools which have access to Telidon receivers do not really constitute a test market. They were parts of experiments to check out hardware, software, transmission, and develop pages for field trials. Conventional wisdom in videotex is that for the first stage of five to ten years, the business market is where people are going to try to make money, while at the same time spending money to get a home market underway. At the moment there are businesses in Canada and the United States which have accepted internal videotex systems as part of closed user group for free field trials, but it has not yet been proven that videotex will save an organization time and money.

- While no one is sure who the users will be, one videotex demonstration at the Toronto Home Show brought out an unexpected response. Several terminals were set up and people could walk up and use the terminals as they wished. The keypad was blue and when a white button was pressed on the pad, it sent a signal to the terminal, completed the dialing and password procedure and the first page came on the screen automatically. On that first page, there was a set of brief instructions that explained how to use the keypad and the back of the pad explained the more esoteric keys, such as an arrow to the right if you wanted to advance a page, an arrow to the left to go back a page and an arrow pointing up if you wanted to go to the top of the index. In short, there were a number of simple graphic symbols in a logical format to steer people in and out of the data base -- the system was <u>user transparent.</u> The observers thought that the "users" would be teenagers and families in the twenty to

thirty-five thousand income bracket who saw it as a new electronic toy they could play with. Well, those were not the people who became interested. They were little kids who sat down, figured it out in two seconds flat, and senior citizens who didn't want to go outside in the dead of winter for services, entertainment and information. It appears that the more you demonstrate the system the more your apparently logical predictions turn out wrong. Many observers seem to believe that there will be large customer resistance at first, but if the service becomes truly convenient, the reaction may be surprisingly positive.

- Those reactions are due to the novelty effect. The keypad system assumes the person to be an idiot; if you want to sell it to intelligent people you need different input equipment. If you want to sell to both populations, where do you compromise? One response -- make the system as modular as possible so that software, hardware, services and applications can be as diverse as possible. The difficulty will be in introducing these systems in a way that they become part of a person's daily routine.

What Method of Search Will Work?

- Tree branching is simple to learn but very tedious to work through if there is a large data base. On the other hand, keyword searches require more thinking, study, and trial and error testing, to learn the quirks of the system, and they often produce more data than is needed or they ignore crucial information. So we are still faced with the conceptual problem of how you find information and how you put a package of information next to another package in a way that provides a conceptual map for the user and a key that allows the user to narrow down interesting side roads or a superhighway if time is important. It appears that the tree branching technique will work if you are only interested in short segments such as one day's Globe and Mail or Toronto Star, one-page messages or lists.

What About Government Subsidies?

- By August 1978 the federal government had spent $2.4 million on videotex development and $1.4 million of this sum in outside contracts. In April 1979, the federal government announced that it had decided to devote $9 million dollars over the next four years to further the development and establishment of Telidon. In addition Bell Canada was investing $6.5 million and Informat was investing $6 million dollars. This money is separate from any invested by Manitoba Telephone, Alberta Government Telephones, Grand River Cable Company, TV Ontario, British Columbia

telephone, Telecable, Videotron and La Presse, for technical development and field trials.

Y: If we keep on going after government subsidies are we going to have the problem of being dependent on a process which tends, due to the slow working of government, to lock us into an old technology?

Z: If you examine the game plans of Sweden, France, U.K., Germany and Japan, you find that most of them have, in fact, a clear understanding of the fact that there is an information revolution and they have coherent policies for action. Government subsidy can be slow, but it can also be, as in the case of Japan, proactive and anticipatory. Government subsidies do not have to lag; they can, with proper technological forecasting, be there when you need them which is in the beginning when it is very risky. I think it is happening in Canada in a very minor degree, far too little, far too late.

Where is the United States Going?

- In the U.S., it appears that they lean towards the broadcast or teletext version because of down-loading. As an individual, you identify what it is you want to see and hear, and, having done that, it is really the same technology as a telephone paging unit. That is, the information-providing organization uses, for an example, an entire TV channel during the early hours of the morning when there is no programming. They send down the broadcast stream the collection of the National Library. Your teletext unit catches the book that you want and when you sit down the next morning and turn on the TV, you can read your book, or if you had a printer you could pick up your book. That raises a question. Does your book or newspaper stay in a computer as with videotex and get accessed a page at a time, or is there a slightly different technology where every day your newspaper is electronically delivered to your home via a TV or FM radio broadcasting channel?

- The privacy issue tends to favour teletext. The messages are sent over the airwaves and your system plucks out the information you want. In that case, nobody knows what you are looking at, but if you use a central computer (videotex route) it is relatively easy for the provider or the government to know what you are reading. So the Americans are saying "We're very biased towards broadcast, because we sense that once we start putting in these interactive systems, various citizens' action groups may really jump in and say 'We don't like the idea that people can see exactly what we are reading.' So we'd rather, if we could choose, have a broadcast system, if it will provide the same kind of service."

Here is Telidon, What Are We Going To Do With It?

. Somewhere there has to be a line drawn, to try to achieve a balance between what the needs are and what can Telidon do. For example, President Carter has a domestic Information Display System which is similar in ways to Telidon. That is, there are terminals linked up to a central databank and it is accessed via a keyboard. An individual may ask any question about the domestic economy of the United States and the reply is in text, graphics and color. You might ask, show me the black population; show me the distribution of black World War II veterans for the country; show me the area of Florida where these are concentrated; how many people do this and that? The response is almost instant. There are only fifteen terminals, one in each agency that is using the system. However, here is an example of a system that meets the clearly defined need of a user. "Give me a tool which allows me to get the information I need on what is happening in the United States". The user wants to make real decisions. So here is a need, and the technology has responded to that need.

In Canada, we have the hardware, and now we are searching around for things to do with it. Telidon is, in theory, very different from the Domestic Information Display System in the following critical way. It is supposed to be a system that is available widely, to the public, as opposed to a system that is designed purely for the convenience of decision makers. But that makes the problem of defining a need or market much harder.

. If this is a technology in search of a need, is it not going to be very vulnerable to technological obsolescense or displacement? Following up on the previous example, the users of the Domestic Information Display system are not really going to care if tomorrow somebody comes up with a bell or a whistle or a completely different type of technology, because they have, in fact, what it is they wanted in the first place. That system is independent of technological displacement until such time as there is an economic or performance trade-off, and then you just replace the entire system. But when you have no sense of what is being addressed, what is to be provided to a person in the home through this keyboard, then the thing is totally vulnerable to technological displacement because it is basically just a novelty.

How Could Telidon Respond to Public Service Needs?

. What seems to be happening with Telidon is that there is a discussion of a market, and something is being thrust into that market to tickle it. The first idea is to get the market's attention and that is done by color, graphics, novelty and a new toy. Since today people have high sales resistance to being tickled with technological stimuli, Telidon is given to them free in the hope that it will raise their expectations and generate a demand. The question that isn't asked is, given the present economic, political and social circumstances of people in Canada today, can we imaginatively and creatively think of things which would make a difference for us and, if so, could we invite people to share our perceptions and if they agreed that the system is worthwhile, could they then participate in the development process?

. That kind of systems design means that hardware is always the least important part. The only thing that must be known about the hardware is that we are beyond a certain threshold. For example, the system has a proper keyboard that allows fairly sophisticated operation and is supported by local intelligence. Once that is done, a large set of technological questions can be put aside and talk can continue about purposes and functions, and those can be matched in economic terms against a range of technological possibilities. One of the things that should not be done is build an economically constrictive system with parts deliberately left out that many people think are important. So when you ask the question: "Why did you leave that out?", you don't get the answer "Well, we did not have the money for that." Rather, the answer is, "We are trying to tap into a very particular set of needs for which we have decided that you do not need this widget."

. From an outsider's point of view, it appears that what people said was, "Let's put this stuff out as fast as we can. Let's do a field trial, and them maybe all these questions will somehow get solved." They will not get solved. In the nature of that type of field trial, people will be asked to speculate as to the kind of uses they can make of something, when they have no background for that kind of speculation, and if the background is colored in that way, the field trials will give the answers the administrative people want rather than a true picture.

The process should begin at the other end. What is it that people want to do and what technology is available now? If it is not available now, what will it cost in R and D to generate it? There should be a social commitment to develop a technology, for example, which helps the handicapped and is maintainable through stores like Radio Shack, because we know those people have an interest. We do not have to go ask the

handicapped persons, "Is there something you would like to communicate, to read? Would you like to talk or walk?" The questions that should be asked are "Is there anything that we have around that we can give them which will work?" and "what will be the cost, and how do we make it cheaper? If it is not good enough, how do we improve it?", etc. That is what technological development in a society means. That appears to be the reverse of what is happening with Telidon.

. There is also the practical question of who does all the work? Is it handed over to the people who are prepared to work directly with the hearing impaired, for example, or do you say no, that is a function for the universities, or research labs? The answer is that you do both. The problem with universities is that they are not taking sufficient initiative, and at the same time are not receiving enough support from outside agencies.

. If you can find a cheap, socially acceptable way of delivering what the deaf need and find a way of paying for it, why stop there? Maybe there are other services. The analysis should begin with X service and Y service and then seek to integrate, but at least at every stage of the process the system is related to a known well-defined group of their users, and you would be evolving towards an integrated system from the ground up. That does not appear to be the situation now; we do not know who the potential users are and why we are doing what we are doing.

. One of the reasons why there is n effective policy in these broad areas is because nobody has sat down an said, "This is an area we can deal with; let's cut it off. There is another area we can deal with; let's cut it off." Policy makers are stuck saying that everything is related to everything else so they are not able to deal with anything at all.

A Short Diversion

Y: Who developed Telidon?

Z: The Department of Communications.

Y: The last time I looked, the Department of Communications was part of the Canadian Public Service. How do we move from a publicly developed service, funded by taxpayers' money, to a situation where all of a sudden it's Bell Canada and Infomart which are involved in the process of utilizing the technology? Did they buy this from DOC?

Z: It wasn't a question of buying. Grants were given to major operators to promote field trials. I think that the rationale was that the system to be successful, had to be commercially successful. That is, it had to generate sufficient revenue at some point to be self-sustaining. The alternative would be to have it as a public utility, with no commercial support, which would have been an enormous drain on the public purse.

Y: It could have been developed as a mixed economy for a combination of usages. \ public/private.

Z: It still may be.

Y: But who is going to do the pushing in terms of the side which is not oriented to the market?

Z: That's really hard to tell.

Y: In technology development, things happen very quickly. In a very short time you don't have freedom of choice. The pattern is set. The pattern is then geared to make a profit for somebody. I really believe that the way things are going, Telidon as it currently exists will be dominated within the next two years -- unless there are substantial shifts -- by Infomart, Bell, stockbrokers' groups and related business activities.

X: If you look at the early documents, you see repeated references in DOC documents which clearly outline two main concerns: technological sovereignty and jobs.

Y: Isn't it also part of the game to be able to get the communications protocols and Telidon software adopted across North America and, hopefully the world?

Z: The main problem that the DOC has is that it is running on a hundred fronts at once. One very important area is the field of international standards because, in order for Telidon to be at least minimally successful, it has to be adopted as a North American standard.

Y: Let's get back to content. Isn't content what is really important?

Z: That is the business that Informart is in, the other information providers and the government whether it likes it or not. Government can play it either directly as an information provider or indirectly through providing the opportunities for citizens or citizens' groups to become information providers, or ensuring that they can become information providers. But no matter how you cut up the cake, the cost of providing information is going to be very expensive.

Y: If Telidon does not remain largely in the public domain, where individual Canadians have an opportunity to make their opinions known, then, in my view, it will be a desperately wasted opportunity, because who controls the technology, the financial services, and the information that is provided, will determine to some degree what kind of a society that we have. The idea of letting Telidon fall where it may, because it's a technology which is open to private enterprise which can compete with it in all directions, without an individual Canadian having the opportunity through his vote to determine if he likes or dislikes this particular policy, is a missed opportunity.

How Do We Develop Peoples Awareness?

. There are two reasons for public awareness. One is to have the public aware of the possibilities and potentials so that the public can play an informal role in setting the goals for development, and the other is that we have to demystify the technology for the public so that we can sell it to them.

. In those countries which are the most advanced, in terms of public awareness, debate and policies, there has been a crystallizing event which triggered that awareness. In France, it was the publication of L'Informatisation de la Societe; in Britain, it was the BBC film "Now the Chips are Down". Canada, as yet, has had no crystallizing event.

. Discussing this area with Members of Parliament at both the federal and provincial level as well as with local government is a most disillusioning experience. We may not want to model ourselves on the United States, but we should recognize that the regulatory reform that has come about there has resulted in a large number of complex and detailed congressional hearings which are not to decide anything, but to educate the elected representatives. A Royal Commission does not seem the way to go. The only way to force action is through public pressure.

. Go to where the public is? The public, generally, has a very negative image of computers. To get over this, you need a number of "hands on" displays. These are generally expensive and technically difficult to make available and you cannot display it to a large number of people at one shot. However, it is the experience that wins people over and TV talk shows do not substitute for that experience. This "hands on" experience should take place where people go to transact business activities or intersect with government such as shopping malls or government buildings.

Field Trials and Frustrations

. The people who are conducting field or market tests have their frustrations too:

- How do you ask people to evaluate a technology they have never heard of?

- How do you deal with people who do have some computer background and dismiss the system as "old hat" technology? If you give potential users or potential IPs "hands on experience", what should the equipment be? The keypad which is currently available in quantity or could the interface be a keyboard, a joystick, or a touch-sensitive screen?

- How can people define their needs with respect to a system that undergoes continous change and modification?

- How do you run a field test when you are not sure that the problem a user is having is due to faulty transmission lines, or errors in the software, a fractured disc, etc?

- How do you set up a flexible organizational framework for the field tests that will be able to respond to constant crises?

- How do you initiate trust among the carrier, the IPs, the equipment manufacturer, and the users so that information needed to solve common problems will be shared?

Is the Field Trial the Testing Stage or is The System Already Set in Concrete?

. The field trial stage is in essence a promotional stage. You don't have to worry about the terms and conditions of access to get your information in, or how much it's going to cost. However, sooner or later someone has to make a set of very specific decisions relating to those problems.

What aggravates this situation is that this technology is positioned right at the interface between one industry that has historically been a monopoly and directly regulated, and another industry which historically has not. So very basic policy questions are raised:

- Is formal regulation going to be extended over the new services and, if so, how?

- Who is going to decide the terms, conditions and prices of access to databanks, both for those who put the information in and those who get the information out?

- If a goal is diversity of access, then there are fundamental questions of the scope and extent of government reform and regulation? Are these new services going to be developed in a competitive or monopoly environment?

In theory the issues should be a lot easier to address now, before any group has acquired a strong economic vested interest in developments. For example, by the time Bell et. al. have completed the field trials, have established the initial services, are running the show and have substantial investment, then it's really too late to come along and say, hey, we've decided a better policy for you.

. It is already too late. The major investment by Bell and by the federal government is already in place.

Social Impact Studies Are Usually Cop Outs

. The fallacy and, in a way, "cop out" of social impact research is saying: "Well, we are going to do a social impact study," and then, by the time the study is done, the real impacts have taken place and it is no longer possible to do anything about the negative consequences which the study identified. The costs are too high, the organizational and institutional structure have solidified and the plastic technology has been put into a cast-iron mold. The mechanical model of isolating the elements in an experimental way does not work, because the technology is moving too fast. It is impossible to say "we are doing a controlled experiment." What you have to do is some crystal-ball gazing and try to project where it's going and what the consequences are going to be. The actors have to decide, on the basis of some agreement, the direction of the values which they want expressed and then orient the technologies, services, content and organizational activities in that way. If the actors decide that the choice is made for quality and that access to new communications is a worthwhile social value, then there are people who could sit down and predict what would restrict access, and something could be done about it now. If all the interested actors wait for two to five years when all of the instrumentation is in place, it is going to be impossible to achieve those ends. For example, if we were to sit down now and develop a

strategic plan to achieve equality of access for people who have cerebral palsy, through required instrumentation, it can be done now, because there is still a degree of flexibility in the technology, and all the regulations, restrictions, bureaucracies and administrators are not yet in place. Also, technology is going so fast that you can't freeze it. What you should try to do it make the system modular enough so that you can change some parts without doing a complete scrap, and, at the same time, try to figure out what the hell do users want out of it? To do that you have to get something out there so the user can kick it, mutilate it, scramble it, have fun with it, and do other things that the researchers can observe and learn from.

- Unless you freeze the technology for a space of time you will never get adequate feedback. If you don't do this, you will always be stuck in cycles in which the capability of the technology develops twice as fast as the user reacts to it. The user never gets to develop a consistent response to a stable system.

Pitfalls in Demystifying Computers

- When you sit down at a typewriter, your whole training has told you that when you push a key, you will in fact, get a specific letter on the paper. However, when you sit down at a terminal, you could get any arbitrary symbol, depending on how it is programmed. You get the feeling that the system is capable of undertaking actions which are extremely difficult to foresee. It is very hard to understand the chain by which if a button is pushed here, something will happen over there. And, at the same time, these systems seem fundamentally fragile; they seem quite capable of breaking down at any number of critical points. Recently, a crisis was only narrowly averted in the command and control computers of the U.S. defense command. The newspapers reported that the system always worked except during a crisis.

- One answer is to sink or swim. A secretary is hired under the condition that she use the CRT. Two days later she has forgotten that she ever had a problem or a fear.

- There is however, a real question about the wisdom of asking people to become committed to certain systems. For example, a farm cooperative should not become committed to a highly computerized system, if the users are not prepared to live with the enormous discontinuities that may arise for a period of four days when absolutely no information gets in and out of that system. They have to be psychologically and institutionally prepared to deal with a major breakdown, or pay the cost of completely

redundant back-up systems. When we discuss demystifying, we're perhaps missing the possibility that people have, in fact, perceived quite correctly what the minus of all this is, namely the lack of control, the unpredictability, the erratic quality, and the fragility.

Computers in the North

- The failures of computers in the north are human failures. They're applications of set programs which, when they reach a remote community, make no sense at all. What is required is human input at both ends by the operators of the computers, so that if people have to fill in slots in order to be eligible for some kind of subsidy, there is a person at the other end of the technology who interprets that for users.

- It's very easy to call the computer the instrument of most of these people's woes, because the damn thing just keeps chugging out electronic forms. However, if you take a peasant living on a small farm in rural Britany about 300 years ago, he would have been screwed around by Louis XIV's government just as impersonally, even though there was a person writing the letter at the other end. The great problem of centralization is the treating of people in large standardized batches without any sensitivities to their differences.

- People of the north are not in fact in a position to cut themselves off. It is much more complicated than just saying do not let that technology come up. They want their unemployment cheques. How are they going to get them? The problem is that people who need to be consumers of the information are cut off from all the interactive possibilities in a situation where interaction is the only thing that will save you. Any technology could be useful and adaptive but the theory and the actual application are too far apart.

- If we look at community structures, we find that the people living in cities are in some ways much happier than people living in rural areas because they have more scope to manipulate their communities. If they don't like this group of people, they can get involved with that group of people. Urban dwellers can choose their communities of interest. In small rural areas it's much tougher to manipulate those kinds of connection. And even if you're happy where you are, it's much tougher to develop effective linkages elsewhere. The cost of travel, the cost of even finding people is much more expensive. There are computer conferencing systems in which novices can learn the rudiments of the system in ten minutes which allow you to make connections with people either on an individual or interest group level. And the system is relatively inexpensive to use if you live in a large city.

Cooperatives May Provide a Valuable Area for Testing and Implementing New Technologies

- Historically, provincial cooperatives have attempted to set up their own organizational systems. In some cases, for example, credit unions, this worked very well. The credit unions' banking system was in many cases a generation ahead of other banks in Canada. Credit unions in Quebec were doing inter-branch banking about six years ago and in Saskatchewan three years ago; whereas inter-branch banking among private banks has only come on strong in the past one or two years.

  As cooperatives have developed more sophisticated systems approaches, the cost balance has shifted from hardware to software and it is becoming increasingly tough for each province to try and generate its own system. As a result there is major development work in progress to arrive at shared norms and common systems across the country. Saskatchewan and Ontario are basically working on the same system and it's beginning to spread into other provinces.

  CanFarm Cooperative Services was originally a government agency which government decided to privatize. Since there were no takers in the commercial arena, the farmers who were on the system, together with a group of cooperatives, took it over from the federal government and are developing its full potential.

  Some of the farmers using CanFarm hook in through their own small computer systems and other people fill out input forms and send them to CanFarm. It has been very successful in terms of developing packages designed for farmers and has a broad range of applications including feed mixers, basic accounting systems, capital investment planning, etc. And CanFarm may be able to move into supplying the basic system to other countries.

- The cooperatives are in a very strong position for innovation in new communication technologies. They have a degree of expertise through CanFarm. They have purchasing power through the resources of their members. They can enforce standards internally. They have the variety of applications to justify the expenditure, at least for smaller systems. One could argue that cooperatives would be a very interesting place to look for innovations which fall somewhere in between the mass market and the individual entrepreneur.

Urban Planning, Centralization and the Urban Advocate

In theory, urban planners plan the structure, form and design of human settlements through the hard services they provide (sewers, roads, etc.) and the policies, strategies and directives they implement. The development of the mainframe computer combined with the growing complexity of planning led to urban planning agencies which centralized all available information together with the hardware and software. Along with the transference of information from the local level, there was also a transference of power, and an unwillingness on the part of those who now have some control over that information to relinquish it to the local level.

Running parallel to this centralization process was also the "musclebound" approach to urban planning -- that is, rip down the old and push up the new. However, the rising cost and scarcity of energy signifies that the musclebound approach to planning is quickly coming to a halt, along with the realization that not only will we have to live with a lot of what we have built, because the cost of rebuilding is too high, but also, we will have to spend more time within the confines of what we have built because of skyrocketing transportation costs.

This means that planning is likely to be for maintenance and adaptation -- from an optimistic point of view, a "customization process" rather than a "let's start over again process." In a customization process, people tend to need very specific information and resources which must be drawn from the centralized information and resource center. However, very quickly these planning agencies will find themselves in a situation where they don't have either the material resources to serve everyone or any easy ways of getting the information to people so that they can help themselves.

In most cases, the information is stored in ways that is inappropriate for easy exchange and access. It appears that centralization has minimized the flexibility and usefulness of the data at a time when people are beginning to demand relevant and responsive information for a diversity of needs. An additional problem is that not only is the hardware centralized, but the software was designed for system in which only a privileged few would be asking for information. To make matters worse, citizens in both urban and rural areas are also becoming more sophisticated at being their own advocates and they are also willing to hire advocates, professionals and experts to work for them. As an example, for the last few years, citizens have been able to stop all relocations of prisons and the development of disposal sites for hazardous waste facilities. In addition, these people are also beginning to find ways to link other groups together and to combine resources.

Can You Aggregate Services as Economic Incentives or Opportunities

- Technology is a determinant of what services are to be offered, but so is the rate structure incurred by the user to take advantage of the service. Telidon should pay attention to the mix of service packages which have been developed for satellites in the United states. In the United States and Canada, the satellite industry for a long time appeared to take the position that it was too bad that smaller users couldn't afford to use their services, rather than saying they were a potential market if aggregated right. One way for rural and/or northern areas to get a service might be to bring together the needs of small and remote communities for local news, the need by certain members for some educational programs and the desire for entertainment programs. It could be possible to combine these interests together and, for example, lease a satellite ground station.

- It might be that there is one service that meets one consumer group's need but is too expensive. There might be a second one that some people want and no one knows about and something else comes along that a lot of people are willing to pay for. Isn't there a way of putting those different requirements together and offering them as a service? Another example: Les Ballets Canadien or a small business accounting program wouldn't be viable now as a product to be sold, because the number of viewers who would pay for that would not generate enough revenue to offset the transmission charges. However, if it were part of a package mixed with other programs that people are willing to pay for, it might be economically feasible. We should be looking at how to package these services and how to put a mix of what people are clearly going to pay for together with other things for which there is an interested audience, even if it is small.

- Another model, which might work for educational applications: make good programs and courses available on a national scale. Algonquin College might have a particularly good continuing education course and there is no reason, technologically, why that couldn't be offered in British Columbia. But could you get credit at a community college in B.C. for that, and could you in fact arrange to do it?

- This idea has been implemented by the Appalachian Regional Commission. They have leased transponder time on a commercial satellite, sharing with a pay-TV channel. They are distributing to cable companies all over the region, who are paying one cent per subscriber per month for the service,

and they are offering courses for which credit is granted by any of 57 institutions in the region. A student who wants to get credit for the course can register with an institution and pay tuition, and part of that tuition will go back into the communications system.

Participants

ATKINSON, Don, Director of Planning, Bell Canada, 25 Eddy street, Hull, Quebec J8X 4B5.

AUERBACH, Lou, Research Branch, CRTC, Ottawa, Ontario. K1A ON2.

BARTLETT, Bill, Coordinator, Direct Media Association, RR 1, Port Washington, B.C. VON 2TO.

BRECHIN, M., 27 Amcrest Road, Etobicoke, Ontario. M9C 3R7.

CAMERON, Catherine, Associate Professor, University of New Brunswick, Dept. of Psychology, Fredericton, N.B. E3B 5A3.

CAMPBELL, Jeff, Bell Canada, 1050 Beaver Hall Hill, Montreal, Quebec.

CARTER, John, Head of Mathematics, Parkdale College, Toronto Board of Education, 290 St. Clements Avenue, Toronto, Ontario. M4R 1H5.

CARTIER, Michael, Laboratoire de Telematique, UQAM, 10-265 Hamelin, Montreal, P.Q. H2B 2E7.

CIONI, Maria L., Manager, Liaison, Telidon Project, Room 603, OECA, P.O. Box 200, Station Q, Toronto, Ontario. M4T 2T1.

COLVILLE, David, Director, Office of Communications Policy, Nova Scotia, P.O. Box 701, Halifax, Nova Scotia. B3J 2T3.

COX, Kirwan, Director, Research & Policy Development, National Film Board of Canada, P.O. Box 6100-(A-24) Montreal, Quebec. H3C 3H5.

CRAIG, Jack, Cooperatives Future Project, York University, 4700 Keele Street, Room 567 Scott, Downsview, Ontario. M3J 1P3

DENZEL, Gene, Department of Mathematics, York University, 4700 Keele Street, N520A Ross Building, Downsview, Ontario. M3J 1P3.

DURLAK, Jerome, Associate Professor, Co-ordinator Urban Studies Symposium, N732, Ross Building, York University, 4700 Keele Street, Downsview, Ontario. M3J 1P3.

FALLIS, George, Division of Social Science/Economics, York University,4700 Keele Street,N727 Ross Building, Downsview, Ontario. M3J 1P3.

FEAVER, Chuck, Dept. of Northern Saskatchewan, Box 5000, La Ronge, Sask. S05 1L0.

FLETCHER, Fred, Department of Political Science, York University, Room S622 Ross Building, Downsview, Ontario. M3J 1P3.

FOURNIER, Jean, Sous-Ministre Adjoint Principal, Ministere des Communications, 300 Slater Street, Ottawa, Ontario. K1A 0C8.

FRISKEN, Frances, Department of Social Science/Urban Studies, York University, Room N725 Ross Building, Downsview, Ontario. M3J 1P3.

FRITZ, A.J., Manager, Corporate Planning, The Manitoba Telephone System, 489 Empress Street, Box 6666, Winnipeg, Manitoba. R3C 3V6.

GALLOWAY, Lucille, Chief Librarian, Burlington Public Library, 2331 New Street, Burlington, Ontario. L7R 1J4.

GILLIES, Don, Ryerson Polytechnical Institute, 50 Gould Street, Photo Arts, Toronto, Ontario. M5B 1E8.

GILLIS, Lynette, Research Supervisor, OECA, 2180 Yonge Street, Toronto, Ontario.

GOLDRICK, Michael, Department of Political Science, York University, S628 Ross Building, Downsview, Ontario. M3J 1P3.

GOMES, L., Ministry of Transportation and Communication, 1201 Wilson Avenue, Downsview, Ontario. M3M 1J8.

GREEN, Lyndsay, Operations Manager - Inukshuk, Inuit Tapirisat of Canada,176 Gloucester Street, 3rd Floor, Ottawa, Ontario. K1N 7T6

GURSTEIN, Mike, Suite 2, 94 Wurtenburg Street, Ottawa, Ontario. K1N 8M2.

HALINA, J.W., Executive Director, Cable Television, Research Institute, 85 Albert Street, Ste. 1100, Ottawa, Ontario.

HASLAM, Gerard, Director Videotex, Suite 801, 321 Bloor Street East, Toronto, Ontario. M4W 1H3.

HAYNES, Jane, Chairman, Division of Social Science, York University, 4700 Keele Street, S756 Ross, Downsview, Ontario. M3J 1P3.

HICKS, Dave, Project Co-ordinator, Ontario Federation for the Cerebral Palsied, (OFCP) Participation Lodge, Box 139 Holland Centre, Ontario. NOH 1RO.

HILL, Richard Chairman, Photo-Electric Arts, Ontario College of Art, 100 McCaul St., Toronto, Ontario.

HUDSON, Heather, Academy of Educational Development, Washington, D.C.

HUNT, Darlene, Canadore College, P.O. 5001, North Bay, Ontario. P1B 8K9.

JANISCH, H.N., Professor of Law, University of Toronto, Toronto, Ontario. M5S 1A1.

JOHNSTON, Linda, Policy Officer, Dept. of Communications, 19th Floor, 300 Slater Street, Ottawa, Ontario. K1A 0C8.

JORDAN, John, Cooperatives Futures Project, York University, 4700 Keele Street, Room 567C Scott, Downsview, Ontario. M3J 1P3.

KEALL, Marguerite, Division of Social Science/Urban Studies, York University, 4700 Keele Street, Room N729 Ross Building, Downsview, Ontario. M3J 1P3.

KEEBLE, Ronald, Professor, Urban and Regional Planning Dept., Ryerson Polytechnical Institute, 50 Gould Street, Toronto, Ontario. M5B 1E8.

KENNETH, Charles, Super "8" Film Maker, York Comunascope Inc., 350 Minona Drive, Toronto, Ontario.

LARRATT, Richard, Research Consultant, Infomart, 120 St. Patrick, Toronto, Ontario. M5T 2X8.

LEDUC, Nicole, Supervisor, Product Management, Bell Canada, Room 509, 1140 de Maisonneuve Blvd., Montreal, Quebec. H3A 1M8.

MARWICK, Stuart, Environmental Studies, York University, 4700 Keele Street, 546A Scott, Dowsview, Ontario. M3J 1P3

MASSAM, Bryan, Co-ordinator Urban Studies Programme, York University, 4700 Keele Street, Room N718A Ross Building, Downsview, Ontario. M3J 1P3.

MATTHEWS, Maureen, Northern Saskatchewan, La Ronge, Saskatchewan, S05 1L0.

MCBRIDE, Jim, Department of Computer Science, York University, 4700 Keele Street, N636 Ross Building, Downsview, Ontario. M3J 1P3.

MCCALLUM, John, Department of Computer Science, York University, 4700 Keele Street, N621 Ross Building, Downsview, Ontario. M3J 1P3.

MCDONELL, Don, Coordinator of Correspondence and TV Courses, University of Ottawa, 75 Laurier Street East, Ottawa, Ontario. K1K 6N5.

MCKAY, Bruce, Assistant Network Programme Director, CBC Television, Box 500, Terminal A, Toronto, Ontario. M5W 1E6.

MCKENDRY, David, Policy Analyst, Department of Communications, R-1910, 300 Slater Street, Ottawa, Ontario. K1A 9C8.

MCKERCHER, M., Ryerson Polytechnical Institute, 50 Gould Street, Toronto, Ontario.

MCMILLAN, Michael, District Manager, Indian Affairs, 511 Growe Ave., Fort Frances, Ontario.

MEAR, Annie, Directrice, Section de Communication, Universite de Montreal, 90 Vincent D'Indy, Pavillon Marie Victorin, Montreal, Quebec. H3C 3J7

MEDOW, Paul, Department of Economics, York University, 4700 Keele Street, Room S832 Ross Building, Downsview, Ontario. M3J 1P3.

MELAMED, Sam, Videoscan, 21 Markdale Avenue, Suite 4, Toronto, Ontario. M6C 1S8.

MELODY, William, Department of Communications, Simon Fraser University, Burnaby, British Columbia. V5A 1S6.

MURRAY, Alex, Environmental Studies, York University, 4700 Keele Street, Room 538 Scott, Downsview, Ontario. M3J 1P3.

NAGENDRA, R., Ryerson Polytechnical Institute, 50 Gould Street, Physics Department, Toronto, Ontario. M5B 1E8.

OAMAN, Dan, Co-ordinator, South Central Library System, 220 Dundurn Street South, Hamilton, Ontario.

PALLAVICINI, Stephen, Department of Communications, 300 Slater Street, Ottawa, Ontario. K1A 0C8.

PETAWABONO, Buckley, Mistassoni Post, Abitibi, Compte, Quebec.

PLOWRIGHT, Teresa, Policy Analyst, Broadcasting & Social Policy Branch, 300 Slater Street, Room 1930, Ontario. K1A 0C8.

RICHMOND, Anthony, York-IBR, York University, 4700 Keele Street, Room 261 Administrative Studies, Downsview, Ontario. M3J 1P3.

ROBERTSON, Edward, Senior Policy Advisor, Ministry of Northern Affairs, 10 Wellesley St. East, Toronto, Ontario. M4Y 1G2.

ROCKMAN, Arnold, Department of Sociology, York University, 4700 Keele Street, Room 324 Atkinson, Downsview, Ontario. M3J 1P3.

ROOSEN-RUNGE, Peter, Chairman, Department of Computer Science, York University, 4700 Keele Street, Room N620 Ross Building, Downsview, Ontario. M3J 1P3.

SCHAFER, J., Manager-Government Matters, CNCP Telecommunications, 740 Notre Dame Street West, Montreal, Quebec. H3C 3X6.

SCHWASS, Rodger, Dean, Faculty of Environmental Studies, York University, 4700 Keele Street, Room 553 Scott, Downsview, Ontario. M3J 1P3.

SCOTT, B., Ryerson Polytechnical Institute, 50 Gould Street, Photo Arts, Toronto, Ontario. M5B 1E8.

SEELEY, Doug, Assistant Professor of Computing Science, Simon Fraser University, Burnaby, British Columbia. M3J 1P3

SIEGEL, Arthur, Department of Social Science, York University, 4700 Keele Street, Room N731 Ross Building, Downsview, Ontario. M3J 1P3.

SINDELL, Peter, Co-ordinator, Project Delta, GAMMA, Universite de Montreal, Suite 210, 3535 Queen Mary Road, Montreal, Quebec. H3V 1H8.

SPECTOR, Norm, Director, Communications Policy, Communications Division, Ministry of Transportation and Communications, 1201 Wilson Avenue, Downsview, Ontario. M3M 1J8.

SPIVOCK, Ron, Algonquin College, 1385 Woodroffe, Nepean, Ontario, K2G 1V8.

STEVENS, Mary, Systems Librarian, York University, 4700 Keele Street, Downsview, Ontario. M3J 1P3.

STOLLARD, Bert, President York Comunascope Inc., 77 Kenwood Ave., Toronto, Ontario. M6C 2S1.

STOWE, Nancy, Communications Policy Branch, Ministry of Transportation & Communications, 1201 Wilson Avenue, Downsview, Ontario. M3M 1J8.

SYRETT, John, Telidon Project Manager, Telidon Project, Room 603, OECA, P.O. Box 200, Station Q, Toronto, Ontario. M4T 2T1.

TAYLOR, Fraser, Professor, Carleton University, Geography Department, Ottawa, Ontario. K1S 5B6.

TAYLOR, Monica, High School Teacher, Ottawa Board of Education, High School of Commerce, 300 Rochester, Ottawa, Ontario. K1R 7N4.

VALASKAKIS, Kimon, Director of GAMMA, Universite de Montreal, 3535 Queen Mary Rd., Suite 210, Montreal, P.Q. H3V 1H8.

VALLANCE, Jim, Super "8" Film Maker, York Comunascope Inc., Cherrywood Ave., Toronto.

WALLER, Fred, Project Coordinator, Council of Maritime Premiers, P.O. Box 2044, Halifax, N.S. B3J 2Z1.

WEINBERGER, Maria, A/V Supervisor, Hamilton Public Library, 55 Main Street West, Hamilton, Ontario. L8P 1H5.

WELLMAN, Barry, Department of Sociology, University of Toronto, Toronto, M5S 1A1.

WIESENTHAL, D., Department of Psychology, 282 BSB, York University, 4700 Keele Street, Downsview, Ontario. M3J 1P3.

COMMUNICATIONS COMPUTERS AND HUMAN SETTLMENT