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SOME THOUGHTS ON THE INFORMATION REVOLUTION AND TELIDON

SUBMISSION TO THE

ROYAL COMMISSION ON NEWSPAPERS

(KENT COMMISSION)

BY

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I am pleased to have this opportunity to talk with you this evening and in particular to deal with both Telidon and the broader perspective of what is called the "information revolution", the impact that this may have upon our society and thus upon the subject matter of your enquiry. In this connection I shall be drawing heavily upon the contents of a paper entitled "Universal Access to Computer/Communications Services - the Challenge to Society (R&P.1), that I delivered last October in Atlanta upon the occasion of my election to the Presidency of the International Council for Computer Communications.

This paper, which incidently was made available to your staff some time ago, begins with the following quotation for a work by Thomas Carlyle.

"He who first shortened the labour of copyists by device of moveable types was disbanding hired armies and cashiering most Kings and Senates, and creating a whole new Democratic world; he had invented the Art of printing".

Thomas Carlyle, 1834 (Ref.2)

Carlyle's words, I believe, have a special relevance for us today, since they call attention to the enormous impact that developments in information technology can have upon human affairs. In fact, much of the continuous, often revolutionary change that has been so much a part of our lives since Gutenberg, can be attributed to the way in which the invention of the printing press lowered the unit cost and facilitated

the widespread dissemination of information. This "democratization" of communications and thus of knowledge helped break the stifling intellectual bonds of Church and State and changed the course of all future history.

In our own time, we have seen an enormous expansion of the Gutenberg revolution as manifested first by the growth of the vast integrated publishing empires that concern you, by radio and television broadcasting and more recently by satellite communications. The impact of this second information revolution for both good and evil is everywhere apparent whether it be the ending of the American Vietnamese adventure and the exposure of Watergate or on the evil side, the cynical manipulation of public opinion by totalitarian governments and assorted private interests.

Even as this revolution approaches its climax with the advent of direct to the home satellite broadcasting, a third information revolution is rapidly gathering momentum. Catalyzed by a host of new technologies like fibre optics, micro-computers, digital communications, low cost memory systems and very large scale integration, this revolution is carrying the process begun by Gutenberg to its ultimate manifestation. "All information in all places at all times" (Ref. 3) is the inevitable result predicted by my friend David Godfrey, from whom you heard earlier, and if he is right, then there is no individual and no institution on earth that will not be affected. Indeed I believe that the information revolution as it is now developing constitutes a fundamental transformation of human capabilities that is doing for the realm of the mind what the industrial revolution of the nineteenth century did for the physical world.

In its potential for profoundly altering our lives this makes the current phase of the information revolution one of the most significant events in the evolution of mankind. For remember, when we talk about information, we are really talking about the essence of human life - that whose communication and application in billions of different forms determines the nature of society. Consequently, the sorts of impacts that Carlyle referred to are implicit in any development that improves the economics or ease of information distribution and access.

In fact, there is now good reason for believing that we stand on the threshold of a new way of life in which most activities, whether in the arts, sciences, education, business or government will be augmented by and function through the ubiquitous global computer/communication networks, now spinning a web of services across the globe.

The opportunities and threats presented by such a development have now been well documented and I will not waste your time by repeating them here. It is sufficient to note that they span the entire spectrum of human imagination from heaven to hell. Thus, on the one hand, we are tantalized by glimpses of a utopian society in which our new computer and communication resources are exploited so as to produce large scale improvements in the quality of life for all mankind - improvements which could lend new dimensions of freedom to our lives and create an environment in which human intelligence will be free to develop to its ultimate limits.

On the other hand, those whose imaginations run towards nightmares are haunted by spectres of massive unemployment, de-industrialization, growing gaps between the information rich and the information poor and the emergence of Orwellian societies, in which our shiny new electronic tools

have degenerated into the ultimate instruments of total political control. The nations have become giant concentration camps, dissent is all but impossible and conformity is the price of survival.

The human spirit being what it is, it is unlikely that either the dreams of the Utopians or the nightmares of the apostles of doom will become reality. The blessings and dangers are still merely possibilities and a certain degree of scepticism may not be a bad thing. Nevertheless there can be no denying the reality of the information revolution and given the intrinsic importance of its subject matter it would seem to be the height of irresponsibility to ignore it and leave its unfolding to either blind chance or the manipulations of vested interests. To do so could well preclude many desirable futures or at least make them prohibitively difficult to achieve. Consequently, I believe that it is important that we act now, while the revolution is still in its early stages to implement those policies that will, in the words of one of the widely quoted Canadian Telecommisison Reports "make the potentially revolutionary benefits of computer power available to everyone and at the same time, provide effective safeguards against the misuse of that power". (Ref. 4).

THE CASE OF VIDEOTEX AND TELETEXT

When it comes to fostering such general access to computer/communications services, the technologies of videotex and teletext are particularly important. Consequently a short overview of their salient characteristics might be useful at this point.

The terms refer to systems that are intended to open up a mass home and business market to a wide variety of different information services. These include, in the case of videotex, information storage, retrieval and processing, computation and communications, or for that matter, any service of which a time shared computer system is capable. For the most part they employ ordinary TV receivers, as output terminals, either modified or connected to special adaptors, although in the case of the advanced second generation Canadian technology, which we call Telidon, many other terminal devices in addition to TV sets can be used.

Teletext and Videotex, are not synonymous and in fact differ markedly in both technology and capabilities as well as in the policy questions that they raise. Thus, Teletext is a "broadcast" system in which the information flow is in one direction only - from the information source to the customer - while Videotex is an "interactive" or "two-way system" in which the customers interact directly with the central facilities.

In Teletext systems, the information is transmitted in the form of an endlessly repeating sequence of individually coded frames or pages. By setting a code corresponding to the desired subject matter, a subscriber can seize or "grab" the appropriate page as it passes by his receiver, store it, and subsequently display or print it on his terminal. Such systems are selective in the sense that the subscriber sees only the information that he has requested, but are non-interactive, since there is no communication back from the subscriber to the information source.

Since successive requests for information can require waiting while the entire database passes by, the amount of information in that database is severely limited by the permissible user waiting period. Ideally this should not be longer than a comfortable human reaction time, about ten seconds.

The fraction of the broadcast channel available for transmission also directly impacts upon the database size. In most systems, the Teletext service is shared with the normal TV transmission and data is transmitted only on certain unused scanning lines during the vertical blanking interval.

This limits the total database from which the subscriber makes his choice to somewhere between 100 to 300 pages. On the other hand, if a full channel is available as might be possible with Cable delivery systems and conceivably with certain over-the-air services, then as many as 10,000 pages might be offered without running into excessive waiting times.

The applications of course are limited to information retrieval functions. However, in addition to conventional graphical and textual teletext, these could include facsimile, electronic newspapers and tele-software delivery. One way electronic mail delivery is also possible.

In contrast to the broadcast systems, two-way systems permit users to interact directly with the databanks and make their selections from a theoretically unlimited number of pages. Moreover, instead of being limited to information retrieval, given the appropriate terminal equipment, users can also originate information and either send it for storage and subsequent retrieval or carry on a conversation with other subscribers. In addition, they can also access information processing and computing.

services and carry out a myriad of combined processing/communications functions such as banking, shopping, bill paying, playing games, going to school and making a reservation. In fact, interactive systems can be concerned with almost any service or function which can be related to the processing, storage, collection or distribution of information.

TELIDON

Extensive tests of both videotex and teletext are now under way throughout the world and in Britain a full public service is now operational. The potential financial and social rewards for the successful participants in the developing worldwide industry are astronomical. The Canadian government consequently is involved with the private sector in a cooperative national program designed to create a viable Canadian industry and ensure that Canadian consumers derive maximum benefit from the new services.

The basis of the Canadian program is the second generation technology called "Telidon" that was developed under my general direction by a small dedicated research team at the Department of Communications headed by Herbert Bown. Herb's achievement represents an enormous advance over the first generation technologies typified by the British Prestel/Ceefax/Oracle and French Antiope/Teletel systems. Unlike the latter, which are essentially textual systems with a rather cumbersome addition of rudimentary graphical capabilities, Telidon employs modern computer graphic techniques to achieve remarkable improvements in image quality, flexibility, storage and transmission economy, and adaptability to terminals with different resolutions. These improvements are summarized in the following set of seven basic parameters which we believe are essential to the general acceptance of videotex/teletext services.

- 1) Terminal/database/transmission independence: The implication of this characteristic is that displays having widely varying resolutions, line standards, and picture generation technologies should all be able to utilize the same database and transmission system. For example, a North American standard 525-line TV receiver, an European 600-line set, future advanced high definition displays - perhaps with several thousand lines, and displays employing non-TV technologies should be able to simultaneously access the same database with the resolution in each case being dependent solely upon the characteristics of the display in question. This total upward and downward compatibility has important implications for the information provider business since it means that regardless of how technology may change in the future, information stored today will still be accessible. Likewise, in today's environment of differing national TV standards, a databank in any country will be accessible from any other country without any need for special conversion equipment. It also has important marketing advantages, since systems having varying resolutions can be tailored to meet different user needs and budgets.
- 2) Artistic flexibility: This characteristic is of paramount importance to both the information providers and the customers, and implies that the technology should impose no inherent limits on the types of images that can be handled. Thus, an ideal system should have the capability of handling any alphabet including ideographic systems and cursive script. It should permit high quality graphics limited only by the characteristics of the display in question and, of course, both full color and black and white reproduction. The picture capability, however, should not be limited to graphics and should

also include halftone imagery. Finally, we also believe that both multiple overlay and animation capabilities are essential.

- 3) Simple, flexible information generation procedures: Briefly stated, this characteristic means that the system of inputting material should be such as to maximize the freedom and productivity of the artist by permitting him to function in a natural manner so that the input machinery multiplies rather than constrains his creative capabilities.
- 4) Efficient data transmission and storage: Data storage and transmission tend to be expensive, particularly when large amounts of information must be handled. Consequently, in the light of scenarios which envisage millions and someday billions of pages of information being handled by videotex, it is essential that the coding structure be as efficient as possible. In this connection, the computer graphics derived coding scheme, which we call "Picture Description Instructions," gives Telidon the highest overall storage and transmission efficiency of any currently known videotex/teletex system.
- 5) Open-ended service capability: In addition to information retrieval, users of a videotex system, given the appropriate terminal equipment, should be able to originate information and either send it for storage and subsequent retrieval or carry on a conversation with other subscribers.

In addition, they should be able to access information processing and computing services and carry out any conceivable mixture of combined processing/communications/ retrieval functions such as banking, shopping, bill paying, playing games, going to school,

and making reservations. In the limit, in fact, they should be able to perform any task which can be related to the processing, storage, collection, or distribution of information.

- 6) Delivery system flexibility: A videotex system should be able to employ any electromagnetic transmission medium: cable, radio, TV, telephone, optical fiber, satellite, etc.
- 7) Open-ended growth: The inherent characteristics of the videotex technology should not impose any arbitrary limits upon the future growth and performance of the system. Thus, as technology advances, it should be possible to incorporate improvements as desired without being constrained by some fundamental limitation inherent in the original specifications.

Telidon was first demonstrated to senior officials within the Federal Government in May 1978. The first public demonstration took place on August 15, 1978 and in 1979, Herb and his co-inventors, Bill Sawchuk, Doug O'Brien, John Story and Bob Warburton received the Public Service Merit Award for their invention.

Telidon is now the basis for an integrated national program that involves broadcasters, telephone companies, cable companies, both the manufacturing and information supplier industries and the Canadian Government, and is coordinated by the Department of Communications with the advice and assistance of the Canadian Videotex Consultative Committee. This committee, which includes consumer, university and labor representation, in addition to industry and government people, has spun off a number of working groups dealing with such subjects as standards, industrial development,

social implications, legal aspects, and educational services.

Representation on these groups is open to any interested party and they are already playing an extremely productive and important role in the national program.

An extensive program of Telidon field trials is now under way. Every month seems to bring a new announcement concerning a trial and it is expected that by the end of this year a number of commercial services will also be operational. The current trials, planned and operating, are probably the most extensive and diversified undertaken anywhere in the world and are characterized by the fact that they:

- 1) cover the entire country from coast to coast;
- 2) involve many different transmission media, namely conventional telephone, switched optical fiber, satellite, cable (both broadcast and two-way packet switched), and over the air blanking interval TV.
- 3) include both rural and urban environments;
- 4) include material in both French and English;
- 5) involve dozens of different information providers from both the private and public sectors and
- 6) are jointly funded by the Canadian Government and the sponsors.

Internationally, Telidon has already won widespread acceptance and numerous trials and operational systems employing the technology are operating or planned in Europe, South America, and the United States. The CCITT has also recognized Telidon as one of the approved world videotex standards and this year the DOC was honoured by being selected as the only Canadian recipient of the prestigious Touche-Ross Award.

TELIDON INDUSTRIAL SECTORS

The Telidon industrial structure is a complex one involving many different enterprises, some of which are regulated monopolies and others fully competitive enterprises. All of these elements however, must function together as a system if the industry is to develop. In this connection, it is an important role of the Government to perform the catalytic function of bringing these diverse elements together in a viable industrial infrastructure with common standards. The basic elements are as follows:

1. Manufacturing Industry which includes the manufacturers of consumer and business terminals, the manufacturers of information provider terminals, computers, telecommunications equipment, the broadcast inserter equipment for teletext systems, cable interface hardware, etc.
It is assumed that the companies involved are competitive and non-regulated but build their equipment to common standards.
2. The Distributors - These include Telephone Carriers, Cable Companies and Broadcasters who supply the communications links over which the services are distributed. They are all regulated and in the case of Telcos and Cable Companies are natural monopolies.
3. The Information and Service Providers - In theory there can be an unlimited number of such competitive, unregulated enterprises ranging in size from individual "cottage industry type" businesses to multi-national corporations and government departments. They produce the content either on behalf of others or for direct sale to the public over the media at prices which they set.

4. The Public Data Base Operators - These organizations store information and programs and run programs on behalf of those Information and Service Providers who do not have their own computers. They are logical outgrowth of today's time shared computer service bureaus and like them are likely to remain competitive, and largely unregulated except perhaps with respect to privacy protection and data base integrity.
5. System Operator - This is a vaguely defined term which at one extreme is sometimes applied to the data base operators but at the other could include an integrated complex of terminals, computers and communications links. Examples of the latter include the Federal Government's Public Information Service in which the system operator is the Infomart Corporation, and Teletext Systems in which the TV station is the System Operator.
6. Miscellaneous
This includes a variety of functions such as directory services billing services, tele-mail, etc. In addition, it could include organizations that perform a combination of the more fundamental functions, for example, electronic publishers who perform both an information generation and an information storage function. It could also include providers of turnkey systems.

THE IMPORTANCE OF ACCESS

Given such a complex industrial structure with so many different players, it is not surprising that TELIDON should present a number of important questions of public policy. In my view however, none in the long run are likely to be more important to a democratic society than the question

of access. In this connection, the authors of the previously mentioned Telecommission Report saw many benefits flowing from widespread access to the sorts of services that Telidon makes possible. These included major increases in the quality of life, the productivity of industry (especially the service sector) decentralization and new opportunities for individual development. They also saw education, the mechanisms for transfer of funds, trade practices, culture, public administration and transportation all becoming more efficient, more pleasant and more responsive to individual human needs.

Given the attractiveness of such benefits it would seem to be a fundamental goal of any democratic society to maximize public access to computer/communication services. Such a goal can be defended upon many grounds and three are mentioned in References 1 and 5.

- "1. A matter of simple equity for a society which valued equality of opportunity and subscribed to the democratic idea of "the greatest good for the greatest number".
2. The economic viability of most of the postulated information services depends upon widespread access.
3. The enormous impact that the "universal availability of information power would have upon the economy of the country and the quality of life".

As a matter of fact, in the case of Canada, this goal was actually given formal recognition as far back as 1970 when the Canadian Government created the Canadian Computer/Communications Task Force and described one of the primary objectives of a national system as:

"Ensuring the widest possible range of services to all social and regional groups in every part of Canada". (Ref. 6).

I think it is safe to say that in the ensuing years this objective has remained as a key element in the policies of successive Canadian governments and indeed is now recognized by all parties as being even more important with the advent of services like Telidon that were still to be invented in 1970.

In addition to the right to be a passive subscriber to computer/communication services, "access" has another dimension which if anything is even more important. This is the right of access to the distribution media by anyone for the distribution without discrimination of one's service offerings. In other words, it is the "right to publish" reaffirmed in electronic terms. The analogy here is with the concept of "freedom of the press" as developed so laboriously and in the face of such virulent opposition ever since Gutenberg made "access" inexpensive enough to be a matter of concern to authority. Its importance arises from the previously mentioned comments concerning the nature of information and the fact that the information services with which we are concerned represent potentially all of the infinite varieties of human thought. Further, as times goes on it is likely that the services provided by Telidon will become important alternatives to such orthodox media as newspapers and magazines, and even the postal service, as basic mechanisms for both mass and personal communication.

Unlike the conventional print media however, where a multitude of delivery alternatives exist, the distribution mechanisms for Telidon are natural monopolies, telephone and cable companies, for example. Consequently, without proper safeguards the operators of such monopolies

would be able to both control the content of the information delivered over their networks and decide whose information would be carried.

The dangers that such control would present to freedom of expression and thus to the life blood of democracy were emphasized in the following often quoted words from a provocative OECD paper by Parker. (Ref. 7).

"The difference between George Orwell's 1984 and a hypothetical participatory democracy with widespread sharing of political power lies in the question* of who controls the sending and receiving of information in the society".

For a free society, the appropriate response surely is that no controls are either needed or desired other than those which ensure the free expression of thought in a truly open market place of ideas. The objective of public policy consequently must be to ensure for Telidon the same freedom to publish and distribute and the same freedom from censorship that lies behind the time-hallowed slogan "Freedom of the Press". This freedom though is meaningless unless all publishers, or "information suppliers", as they are called in the Videotex world, have guaranteed access to their customers. Therefore, it is critically important that our developing "Electronic Highways" be just as open to everyone's electronic messengers as are to-day's physical highways to the transport trucks of conventional publishers.

REDUCED COST OF ACCESS

Even though all enjoy equal rights under the law, it must be admitted that when it comes to access to their customers, conventional publishers to-day are very far from equal. The inequities arise from the differences in people's pocketbooks and one of the most exciting promises of the new electronic technologies in their potential for minimizing the importance of such differences.

Consider for example the factor of capital investment. For a large publisher this can easily amount to hundreds of millions of dollars and includes not only office facilities, printing plants, composition and photographic equipment etc., but also a complex distribution network of vehicles, warehouses and sales outlets. In a world of electronic highways however, many of these financial barriers would disappear and the threshold cost of starting a newspaper or magazine consequently would be significantly reduced.

In the case of Videotex, information reproduction is performed by the customer's TV equipment or attached hard copy printer and there is no requirement for investment in printing facilities by the publisher. Distribution is based upon the switched telephone network or its cable equivalent and this system of course is equally accessible without individual capital investment by every would-be publisher. In the limit, in fact, the only capital equipment needed by the publisher is the "information provider terminal" used for preparing and inputting information to some sort of public access data base. Thus, for an investment of say 15 to 20 thousand dollars, and a nominal storage charge per frame of information,

anyone could become a publisher with direct access, independent of personal financial resources, to a market that potentially includes everyone in the world with a telephone.

CONTENT/CONTAINER SEPARATION

The preceding discussion has assumed two fundamental principles of open access:

- (1) Equality of access to computer/communications services insofar as this is technically and economically feasible.
- (2) Non-discriminatory access to the distribution systems at tariffed rates by anyone for the provision and distribution of services.

Because the services are distributed by regulated entities like telephone and cable companies whose conditions of licence require that they meet all reasonable demands for service in their franchised areas, the equality of access principle should not cause too much difficulty. In fact, in the case of the telephone companies, both principles are implicit in their legal status as "common carriers".

In this connection, the non-discrimination condition in particular has received a great deal of attention in both Canada and the United States with respect to the issue of "Carrier participation in public data processing". This issue first came to prominence in the late sixties and early seventies when it was argued that a carrier should not be permitted to compete with its own customers in providing remote data processing services. This, it was claimed, would constitute an intolerable breach of its obligations as a public utility and lead to serious abuses.

These could include "a potentially dangerous concentration of power, cross subsidization of the unregulated competitive services from the regulated monopoly sector, unfair competition and above all, opportunities for discriminatory treatment." (Ref. 3).

In Canada, this problem, insofar as those carriers regulated by the Federal Government are concerned, was resolved back in 1975 and the principles then established I believe should be applied to Videotex services. In essence, this approach recognizes that in terms of regulation, the marriage of computers and communications leads logically to a new fundamental dichotomy: a total separation of Container and Content, of the distribution systems and of the services that they distribute. If we incorporate this dichotomy into our two fundamental principles, we then arrive at the following three conditions that seem to me to be basic to any open access policy:

- 1) A total ban on any Carrier involvement with Content except perhaps through the medium of a truly arms-length subsidiary, totally separated administratively and financially from the telecommunications operation and subject to rigorous control by the regulatory body to ensure that neither discriminatory treatment or cross subsidization exists.
- 2) An obligation on the part of the Carrier to meet any reasonable demands for service.

- 3) A legal requirement on the part of the Carriers to distribute the services of all suppliers on a non-discriminatory basis at authorized tariffs.*

Since these conditions are really basic principles of common carriage there should be no difficulty in applying them to any service where the delivery system is the switched telephone network. Similarly when Videotex services like interactive TELIDON are distributed by two-way cable or hybrid technologies, logic and fairness would imply that they also be applied to the cable companies. This is particularly important, since in addition to constituting a dangerous menace to human rights and free competition as explained earlier, any more relaxed policy for cable companies would give these monopolies an unfair competitive advantage over their competing monopolies - the telephone companies. This in turn could lead to probably irresistible demands for similar relaxation of the rules for the telephone networks.

THE TELETEXT PROBLEM

Unfortunately however, when it comes to teletext services, the solution is not as simple, since some fundamental technical factors are involved that create serious difficulties for the concept of open access. These factors are pretty basic and differ only in degree among the three principal broadcast media - TV broadcast stations, direct broadcast satellites and one-way cable.

*It is important to note that the price of the service to the customers is set by the information supplier, not by the carrier. The latter makes his money by charging a delivery fee to the information supplier who in turn recovers it from the subscribers as a part of his total charge. In addition, the carrier for an extra fee may also perform the billing and collection functions for the suppliers.

One aspect of the problem has already been discussed in connection with the use of the vertical blanking interval for information carriage on a conventional television signal. With a practical upper limit of less than 300 pages of information there is obviously no way in which a TV station could possibly meet all demands for service from information suppliers. Consequently, even with the best will in the world "open access" could not be permitted. Similarly, for full channel systems, whether cable, satellite or TV broadcast, the capacity, even though very much higher, is still finite and far below what would be needed in an open access situation.

The net result is that for teletext services we are forced into a controlled rather than an open access situation. This in turn leads to the question of how and by whom this control is to be exercised. In this connection, John Madden, Ref (8) from whom you heard some time ago, and who incidently played and continues to play an important role in the Telidon program, has suggested three alternatives for vertical blanking interval systems:

1. Separate licensing of the vertical blanking intervals for each TV channel.
2. When delivery is by cable, allowing the cable operator to insert his own information pages on any TV channel.
3. Giving the broadcast licensee control over the content of any information inserted into the vertical blanking interval of his channel. This would include the right to insert his own information.

Of these options my own preference is for alternative 3 on the grounds of ease of regulation, maximizing public choice (after all most communities have many TV stations) and fairness to the broadcast licensee who retains total control of his authorized channel assignment.

For full channel systems, the two obvious alternatives are either to leave control with the system operator (broadcaster or cable operator) subject to regulatory guidelines, or to have the regulator license special Information Providers who in turn would pay the distributor to broadcast their products.

I am uneasy with the first alternative because of the possibilities for abuse inherent in monopoly control of such a powerful information media. In this connection, I used the word "powerful" deliberately, since unlike the blanking interval case the capacity of a full channel system is quite substantial, of the order of 5,000 to 10,000 pages.

The second policy is more acceptable, particularly in the cable case, since a number of competing Information Providers could be licensed in each cable franchise area in much the same way as broadcasters are licensed to-day. The cable company would then become simply a carrier. The problem is that unless multiple channels are utilized, the number of pages available to any Information Provider could be too small for economic viability. On the other hand, with multiple channels each licensed Information Provider could be provided with his own channel. In addition to increasing the information capacity, this approach could make it possible for Information Providers to collect directly from the subscribers as well as from their advertizers. For this, special usage recording equipment would be needed on the subscribers promises, equipment which conceivably could be made selective enough to permit a charge by page service as in a Videotex system. Alternatively, subscription fees could be charged in the manner of a conventional magazine publisher. Thus, upon payment of the fees, the

appropriate channel could be opened to the subscriber for the subscription period as in a simple subscription type pay TV system.

There is something very disturbing however, in the idea of licensing or regulating information services, particularly when those services offer nothing more to either consumers or publishers than those provided over the completely open, infinite capacity, interactive systems. Consequently, I believe that we should simply require the cable operators to meet the same "open access" conditions that are imposed upon other carriers. This would give the cable carrier the choice of either providing a sufficient number of one-way channels to meet all demands (possible with Fibre Optic technology) or switching to an interactive technology.

THE COMPUTER AND STORAGE ELEMENTS

A Videotex or Teletext system of course includes many other functional elements in addition to the communications media. One of the most important of these from the access perspective is the electronic facility used for storing and retrieving information and in many cases, performing a multitude of information processing tasks. Such facilities, particularly if they are expected to satisfy many simultaneous demands for access, can be very large, complex and costly. For very large Information Provider organizations like major newspapers, the resultant financial burden may not be excessive. For other however, individual entrepreneurs and smaller companies, for example, and even those large organizations who may not relish the specialized management task of running a computer centre, other approaches are necessary.

In the case of the British Prestel system, the need is met by "public access" facilities provided by the BPO. All information Providers are permitted to store their data in these facilities for a monthly fee that is proportional to the number of pages stored. Consequently, the only capital investment required for an Information Provider is his Input Terminal - and even this can be rented.

The question of whether or not Carriers in Canada and the United States could provide such public access facilities directly or would be forced to adopt the arm's length subsidiary approach has still to be resolved. However, there is no reason why any of the myriad remote access service bureaus that now cover the country could not offer the service on a competitive basis. Indeed it would seem to be a lucrative and natural extension of their normal business. Further, since these companies compete vigorously with one another, at the present time, there would not seem to be any reason for regulating their offerings other than with respect to such matters as protection of privacy and file security.

IN CONCLUSION

Our new electronic technologies are now capable of making possible the final victory of that revolution in access to information that was launched by Johann Gutenberg over five centuries ago. To say that something is possible however is not to say that it will come to pass and between the dream of universal access and the reality of to-day the gulf is wide.

In fact, for much of the world, those fundamental rights of free expression and freedom to know, which we take for granted, are even for the conventional media, either non-existent or struggling to stay alive.

Likewise in many ostensibly free societies, the battle against censorship is still being waged. Thus, there remain among us those who, in the words of Robert Fulford, "do not accept, as the rest of us do, a pluralistic culture in which it is acknowledged that what dismays or appalls me may delight you and should be free to do so. They believe that what dismays or appalls them should simply cease to exist". (Ref. 9).

Consequently, as Telidon services evolve, we must constantly be on our guard to resist those who would limit access or freedom of expression. A constitutional guarantee of freedom of speech, limited only by the laws of libel, is one obvious measure. The content/carrier separation principles discussed in this paper will also help, as will the reduction in the capital cost of becoming a publisher. However, to further remove any limitations that an individual's pocket book might place upon his ability to exercise his constitutional rights, other measures may be needed. We might for example want to give serious consideration to the subsidization of Videotex rates to provide at least a minimum standard of service free of charge to everyone. In addition, both criminal penalties and civil redress may be needed to deal with those who attempt to breach another's privacy, manipulate the public files for private advantage, or improperly restrict an individual's right of access.

In conclusion, to return to the theme of the Information Revolution, I would like to leave you with some words that I wrote some fifteen years ago when computer communications was still in its infancy and Telidon a dream of the future.

"During the original industrial revolution, there may have been a general realization that something momentous was happening, but there was certainly no thought on the part of most people that the process could be subjected to rational control. The result was the brutal doctrine of laissez-faire with all that this implied in terms of human degradation, unnecessary suffering, and sterile class warfare.

Today, however, as we face a new revolution, the situation is very different. The need for rational control is taken for granted. Thus there lies before us the possibility of the directed rather than the spastic revolution - a revolution whose unfolding can be controlled by conscious planning instead of being left to the unpredictable workings of blind chance". (Ref. 10).

A combination of unforeseen and fortuitous circumstances has made Canada a leader of this revolution and how it evolves is to an unprecedented degree in the hands of Canadians. Consequently, it is imperative that we continue to accept the challenge and move quickly to take those measures and implement those fundamental policies that will make Telidon an example to the world of democracy in action.

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