INFORMATION IN WONDERLAND: MARCH HARE OR QUEEN OF HEARTS.

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If we look back at the evolution of the information industry, there have been two distinct and fundamental revolutions: the first was initiated around 1450 by the printing press of Gutenberg, which allowed information-bearing artefacts to be acquired by all who had the means and to be stored indefinitely. Broadly included in this were books, whether factual or fiction, newspapers, journals. Access required minimal capital investment, if you exclude the cost of learning to read.

The second revolution is still with us and can be termed the electrical or electronic information age which started with the telegraph around 1840: information is no longer available as an artefact, but can be listened to, displayed, transmitted. Access requires a vast paraphernalia and significant capital investment: the process has been going on for about a century, and the modern home may possess a telephone, a typewriter, a record player, pocket calculator, disks and cassettes (both audio or video), television sets (with possibly a videorecorder and a cable attachment, probably also capable of decoding Teletext and Videotex signals), and a home computer: many may even have modems to allow their home computer and or television set (if of a sufficiently modern design) to be linked to other computers and computer networks. The owners of these gadgets are generally not aware of the linkages that exist, or can exist, between all of these artefacts.

The current information revolution largely consists of the increased trend for these text and moving image machines to converge and interact. It is also interesting to note that some of these everyday items were conceived for totally different purposes to those to which they are currently applied. Thus Edison invented the phonograph as an aid to the telephone, to allow the recording of messages and delivering of "talking" telegrams to nontelephone subscribers. In the end, Edison was not that far wrong, for today we are beginning to see the synthesis of telecommunication with information storage.

The telephone itself might at one stage have become an entertainment medium, especially as it was neither intimate nor reliably private (after all, operators checked whether connections were indeed made - that was before tapping became a matter of debate). It was even noncompetitive, in its early days, for business purposes: messenger boys were cheaper (and possibly more reliable). It was also viewed with suspicion by telegraph carriers and there were proposals to charge by the number of words transmitted (analogy to telegrams): fortunately then there was no known measuring mechanism. (The current character or packet charge is a carry-over from that mentality - alas the measuring mechanisms exist).

Where are we then in the current information revolution:

Currently analogue telecommunication networks are those available to the general public. Thus although digital lines can be leased, cost in relation to usage means that most users will have to live with the limitations of analogue systems for at

least the next five years. Then, when digital lines become the norm, communications will speed up by several orders of magnitude and , e.g. video conferencing, will become an everyday reality.

Private networks and satellite systems will offer tangible economies, and fibre optics (with cables one tenth of the size of conventional copper ones but 500 times the capacity) will be a further step. Thus the proposed Mercury private network in the U.K. will use optical fibre almost exclusively.

Interbank electronic fund transfer has been a reality for some time, but the use of bank or credit cards with chips in them will be here sooner rather than later and allow, by use of suitable terminals at sales points, of instant debiting and private fund transfers: cash dispensers are only the beginning.

The "wired city", previsaged in Orwell's 1984 is also almost a reality: thus in Japan the Hi-ovis system connecting households into a video entertainment system allowing interactive video-conferencing is operational; in Columbus, Ohio, the Qube system provides 30 tv channels and allows communication with a central station and other users, as well as with a central data base; the French have their electronic telephone directory; and British Telecom have an experiment linking homes by optical fibre to tv stations and Prestel (the Fibrevision system which has a capacity of 100 channels and transmission speeds of 25 million bps); there is talk of voice messaging being available commercially from Radio Suisse.

A further French experiment involves some 2500 homes at Velizy which will be connected to a system allowing interactive communication with data bases and services of some 200 organizations, including government and commercial groups, railways, airlines, mail order houses and banks. Personal banking transactions will be feasible online from the the terminals (special television sets) provided, as well as direct ordering, not to mention conventional information retrieval and Mailbox facilities.

In March this year a computerized home banking and shopping service was started by British Telecom in cooperation with a building society and a bank: this system, called Homelink, is the first to give people throughout a country the opportunity to carry out financial transactions and buy a wide range of goods and services using domestic television sets with special terminals: these latter, although costing LS 225 each are being supplied free to subscribers to the system, which is expected to attract 1000 new users each month. Users will be able to transfer funds, pay bills and book theater or airline tickets, all from the comfort of their armchairs.

In Viewdata or Prestel there are two main commercially available developments: the Mailbox and Gateway. for Mailbox, there are preformatted frames with standard messages for those

with numeric keypads only, whilst free text is available with alphanumeric pads. Uses include simple messages of the "meet you at ..." type to placing orders, confirming these etc. The Gateway links Prestel with external data bases: thus all Esa-Esrin files can be accessed in this way.

The technological advances are, however, also accompanied by some unwelcome phenomena. In particular, the international flow of information is subject to political, social and economic factors, some of which, in some parts of our globe have the effect of totally invalidating the benefits which could accrue from the technological progress. Not so long ago it was assumed in documents such as the U.N. Human Rights covenants and the European Convention on Human Rights that States were not entitled to exercise an influence over the content of information transmission. As a corollary, no independent economic value was attributed to the content of information and the Treaty of Rome for instance does not include information as a commercial good (that value added tax is being charged in some countries of the European Community is really in breach of the Rome treaty).

The interplay of modern communication systems with commerce and culture has thus created novel relationships between countries, bringing both unprecedented opportunities and problems. Two arguments appear to be most commonly voiced: lip service to a free exchange of information (and hence technology and all that implies) and political vulnerability consequent on imagined or real international information dependencies. Amongst other effects, these concerns led to the setting up some years ago of the Mcbride commission by U.N.E.S.C.O., whose work culminated in the report entitled "Many Voices,One World", which has been subject to much publicity and heated argument. I do not like to quote at length from such documents, but there are some passages which deserve special attention. Thus on page 260 it is stated:

> "The flow of technical information within nations and across national boundaries is a major resource for development. Access to such information is as crucial as access to news sources".

Further on (page 265), we find:

> "Freedom of speech, of the press, of information and of assembly are vital for the realization of human rights. Extension of these communication freedoms to a broader individual and collective right to communicate is an evolving principle in the democratization process; defence of all human rights is one of the media's most vital tasks."

It is perhaps regrettable, that there were some dissenting comments to these principles appended to the report, which in other respects appears to erode some rights of journalists - but that does not concern us here. However a Statement (see page 279) that the "notion of free flow of information is a trite formula shocks", as does the admission that "the right to communicate has not been recognized in all countries."

It is therefore regrettably not surprising to find that fear of international information dependence is becoming a real factor in debates on national information policies.

When Nora and Minc submitted their report on "The Computerization of Society" to the then French government in 1978 (yes really, five long years ago), the main conclusions reached by the authors were that any national policy in this field:

a) should provide for an overall organization of society such that the strains of the societal transformation into a computerized society are made acceptable,

b) should provide for national independence in all affected sectors and

c) should increase exports and thus stimulate domestic markets.

One of the direct results of the report were massive investments by the French government in all aspects of the information and computer scene: Telesysteme and its data banks are one result, the computerized telephone directory experiment another. We heard of plans to produce up to 5 million terminals (of a simplified design) annually. But .... with the growing economic recession, coupled with the change in political direction, some of these ambitious plans have been shelved or postponed. An initiative which could have given France at least an European leadership role in this sector was allowed to slip, and the information age looks like being the proverbial March Hare - arriving too late to reap the full benefits.

In other countries Nora and Minc were read and noted with some surprising results. In England, a future was seen for telematics, but the benefits were not to be reaped by the State; on the contrary, that venerable institutions, the British Post Office spawned an offspring - British Telecom, which handles all the informatics traffic and development. Soon it will be sold off to private industry, and then, naturally, maximum return rather than public service will be the watchword. As a first step, there are now no more telegrams in the United Kingdom: the oldest electronic message medium has breathed its last.

There are other aspects of the second information revolution which should be examined. One of the great virtues of online data bases and data banks is the ease and speed with which information can be retrieved. Searches in Chemical Abstracts which might have taken as long as a week can now be completed in less than one hour. The search output, in the best case, will however be a series of abstracts and the old problems of how to obtain the full texts quickly persist; actually they are made worse, since the information seeker has become used to a quick response.

Much effort has been and is being expended on this aspect of the information chain. The various projects have at least one thing in common: they all have mythical names - Adonis, Artemis, etc. Briefly they all store in machine- readable form, the whole

text of articles; there may be an interim stage of storage on a laser-produced disk. On demand, a copy will be produced and sent to the requestor, initially again by conventional means - the progress offered over current services appears to be minimal at this stage, except that the profits from the operations will go the the publishers of the primary articles, at least in the case of Adonis. With faster Telefax facilities, copies may reach the recipient more quickly - at a cost. Ultimately, online full text retrieval will be possible and there should be no fears that colour photographs will not be able to be transmitted in this way.

It is, however, worth noting that for scientific publications, escalating costs have reduced readership, resulting in further price increases and so on. At the same time it is known that the actual readership of any one article on publication is small. There thus appears to be some logic in arguing: Why print the whole article anyway. It is this thought which underlies the so-called electronic journal. Subscribers will receive at a low charge a set of abstracts of papers which are stored in full on some computer, plus all the pages which currently are the ones really read: news items, job vacancies, lists of new books, etc. Anyone wishing to see the full text of an article will be able to ask for this and receive it either through the post or on his terminal at a page rate which will make it economic to the user and also profitable to the publisher.

This scenario may well operate for scientific and similar publications in the not too distant future - especially as more and more periodicals are now computer set: frequently even the manuscript submitted is already machine-readable, and could be or is transferred as such. In other areas there may be different considerations and the evolution of the New York Times data bank sheds some light on possible future developments: the 1972 version of the "Information Bank" gave titles (headlines) of all articles in the New York Times and some 60 other journals, together with citations and some index headings. By 1977 there was competition available through one of the information wholesalers, Dialog. By 1982, the New York Times had added the full text of articles. In a recent "Monitor" article a future scenario is sketched where use of Videotex will vastly expand the market for use of such data banks as the New York Times one. It is speculated that well-known contributors might be induced to submit articles directly to Videotex vendors and thus increase substantially their active readership and hence income.

In this context it is also worthwhile noting that the New York Times has decided with effect from end of January 1983 to transfer its networking operations to a "specialist" in transmission and dissemination, but is retaining the compilation end. The unfortunate user of the New York Times data bases will now have to renegotiate contracts with the new vendor, and what is worse, acquire specialist hardware, dedicated for use with the new system, which furthermore is not yet available in Europe - a high-handed and discriminatory action which ultimately, I believe, will certainly not benefit the New York Times.

It will be interesting to watch developments in the

machine-readable storage of full texts. I almost suspect that we will see analogous trends to those now becoming apparent in the bibliographic data base field. When first made available, these were accessed at 300 bauds, and the imposition of time of use charges appeared to offer a reasonable financial return to both producers and spinners of data bases. As transmission speeds increased to 1200 bauds and higher, online time became shorter and income less; use of intelligent terminals and/or systems reduced online time even further, and what is more made economic retrieval of large chunks of data bases for subsequent in-house manipulation by the user possible. Naturally the drop in revenues is alarming the industry: how should one proceed to protect income. In many cases the loss of hard copy income has not been compensated by normal online usage, let alone by the higher speed access and the illegal file dumping. There have been various reactions: variants currently in use or under discussion are a front-end charge, i.e. a subscription, without which there will be no permission to access online; data base producers becoming their own hosts to maximize income, e.g. New York Times; added facilities (abstracts) by Chemical Abstracts; special files by Institute for Scientific Information; hit charges being raised; and finally the actual provision on discettes or floppy discs of part of the file by the producer for in-house use by a purchaser (Biosis).

Personally I believe that the last variant is the way ahead: it allows the producer of a file to have some control over his income and the cash comes in in advance like for subscriptions to hard copy in the bad old days. What is more it allows sales to areas where telecommunication difficulties have made online access troublesome, prohibitive or impossible, and also removes one of the persistent objections of the developing countries to online as a facility for the industrialized nations only which cuts the developing countries off from access to information. I would even venture to guess that the full-text data banks will evolve the same way, with sales of subsets to actual users or national centres. How long this evolutionary process will take is certainly subject to debate, but it will be shorter than we believe. We will come full cycle, except that the information carrier will not be paper but some magnetic medium.

I have already referred to the use of Videotex in conjunction with normal data bases or banks using the Gateway technique. What this does is to display the retrieved information in the Videotex style, i.e., not like on a normal terminal, but in colour with capitals for titles, and other visual enhancements, should you wish for these. Whilst this may be perhaps only a gimmick to the information specialist, it has nevertheless opened up new markets and applications of information. In particular it seems to have made Management Information Systems acceptable to a large number of senior managers in industry, who would not have a terminal in their office. The simple trick of presenting information in a more colourful manner has suddenly made online presentation respectable, and not unexpectedly, possession of one's own private cathode-ray tube screen has become a much sought after status symbol.

Equally predictable, operation of such systems has become an

area to be fought over in large and small companies: should they be under the control of the data processing (computer) department who know all about hardware and complicated management information system program packages, but little about office management, let alone information handling in the conventional manner. Or should such systems be under the supervision of office managers who know nothing about the computing aspects and to whom information handling is merely a filing cabinet. Certainly the last person to be consulted in the how and why of such systems is the information specialist who for years has been providing management, office managers and computer staff with information.

What is perhaps surprising are the effects of such office uses of Videotex. Large companies have suddenly realized that this form of telecommunication does away with the need for a huge central office in the centre of a city, the address being required for prestige purposes. Operations can run just as smoothly (and more cheaply) from several smaller offices scattered at the periphery of the city with a small central prestige headquarters. Added impetus to this is being given by the high taxes and rents demanded for prime office accommodation. Also, the number of staff can be reduced, whilst actually increasing efficiency and speed of communication. I remember the days in the mid 1960s, when bulky management information reports were produced weekly in innumerable copies and distributed to all departmental heads of the multinational company I then was employed by: we took several years to reduce the number of copies by the simple expedient of forgetting to send reports to individuals; if these did not protest, the reports were never sent again. In the end we had reduced the weekly weight of paper distributed from 3 tons to less than 50 kg. Such tactics will certainly not be necessary in a Videotex based system, which additionally is also interactive.

A further attraction is that access to the system is not space bound: the manager need not be in his office to consult his files or even to see what messages there are. Virtually any television set with a Videotex adaptor will allow communication from anywhere given the right password. Sales personnel should also be able to exploit such systems by ascertaining instantly stock positions and production schedules. Credit balances or limits of customers too should be available instantly.

Naturally, the efficiency of the system will depend on the way information is stored, and it is here that the information specialist will be able to prove his worth. It appears, however, in practice that because information specialists in the past have taken a very passive role, that they are the big loosers of this modernization. It has been one of the major failures of our profession that we have always waited to be asked for information and not anticipated demands. It is for instance very rare for information staff, including librarians, to participate in research planning meetings or in senior management teams. Yet information gathering and dissemination for and within any organization, requires knowledge of intentions and interests, and also a voice in reporting the state of the art, outside activities and new developments. Our profession too can be blamed for not utilizing all the tools available to the best advantage: citation analysis can be a positive aid in discerning research directions

and even intelligent recruiting, but appears to be little used for these purposes. The consequences are dire: at the first sign of a downturn in business, it is libraries and information departments which suffer, whilst the opposite really should be true.

There are two further issues in the information industry which I should like to discuss: data privacy and transborder data flow. The two at first sight are two totally different concepts, yet they are closely related, if only in degree. Data privacy is the right of an individual to be protected from the misuse of information relating to his person and activities. We all accept as beneficial that our social security data and medical records are stored in such a manner that when we need to make use of the services offered, they are readily available. We all like to know that our car insurance data are correctly stored and used. We are happy to have our accounts at mail order houses kept in order. One could go on quoting examples with which we all agree. Yet do we really accept that by putting all the data relating to one person together it is possible to draw a picture which may not be to that persons advantage: who for instance has not at some time forgotten to pay a gas bill promptly - should that fact be recorded in such a manner that it can readily be retrieved when we want a loan to purchase a car ?

One of the earliest examples of misuse of stored personal data related to library records: at the time of protest against the Vietnam war, some American university library records were used to find students who had read more than a certain number of books considered by the Administration as seditious. Students thus identified were subsequently victimized by withholding of financial support and other related measures. There are many subsequent examples where correlation of computer-stored data has been against the interest of the individual.

Naturally this led to protests and eventually to legislation. Most European countries now have data privacy laws in being or about to be enacted. Yet again, some of these laws have produced strange effects: in Sweden for instance strict interpretation of the law forbids machine-storing of abstracts of scientific publications, since it is possible to correlate the name of an individual with his activities and interests - surely not the intention of the legislating body.

An amusing sidelight is the current French dilemma: since personal data are transmitted between computers they are considered to be vulnerable to unauthorized access. The suggestion has been made to overcome this by transmitting such data in code: but encoded data transmission is illegal in France. In this context I would recommend trying to order books across a border using only ISBN numbers in a public telegram or telex: not an easy task.

Overall however such legislation has been beneficial, except that the State has always reserved the right to have access to such data and to use them, usually with some pious limiting clause - in the national interest etc. The fact remains that it may be left to some minor official to construct a computer

biography of an individual.

Whilst the State thus reserves the right of access to such data, it becomes "protective" when it comes to transborder data flow. And transborder data flow seems to have many faces: there is the accepted transmission of information by the written or printed word - letters, books newspapers, indeed company reports and accounts can happily cross frontiers - yet put the same into machine-readable form and immediately there is talk of danger to the independence of a State, there are references to national dependencies, there is a threat to national cultures.

In any multinational organization, top management requires knowledge of the operations of the various national units: is there any difference, other than that of time scale, in passing such information across borders in written reports or down a wire: indeed many organizations exchange data by sending magnetic tapes from one location to another by air - that is accepted, but online access is a different matter. The argument that transfer of such data would e.g. be a disincentive for the development of an indigenous computer technology, is surely disingenous.

It is equally foolish to argue that access to machine-readable data bases or banks is a threat to some imagined national security, when such information stores contain only published and readily purchasable information. I can, if I could afford it, buy my own copy of Chemical Abstracts, yet to search the online version of this I may have problems if I happen to live in the "wrong" part of the world (here madness runs riot, for it is no problem to obtain a password to such a system by using a postal address that is in the "right" part of the world).

I believe that no amount of legislation relating to data privacy or transborder data flow will prevent deliberate abuses. Information will always be available to the determined seeker and there is no fully secure system: it is only a question of the value put on the information required which will be the factor controlling its availability: I agree, this is a cynical view, but appears to be backed by reality. No State or individual will ever be able to protect fully data relating to them, that State unfortunately having the advantage over the individual in that some actions are covered by law.

Do we however have to look upon the impending information age with fear or apprehension - I do not think so, as long as we do not fool ourselves with rose-coloured spectacles. There are some unpeasant realities, it is true: overall the benefits should however outweigh these.

Perhaps the greatest benefit will be that technological developments will lead to a society that is much better informed than that of today: an informed society has always been a greater safeguard to the quality of life than an ignorant one. It will provide a strong basis for correct governmental and social decisions. A well-informed public is less likely to be carried away through emotional appeals by demagogues or charlatans.

The developing systems will inevitably lead to cross-border

integration in tackling the real problems of this world: environmental quality, social security, cultural values.

The new technologies can accelerate the process of decentralization in decision-making allowing greater local autonomy in government and corporations, rather than excessive centralization.

I am sufficiently optimistic to believe firmly that the evolving information systems will lead to a greater humanization of society and not to a dehumanization, provided we remain alert and recognize any inherent dangers of information systems: it is not e.g. the fault of television that we have forgotten to spend our leisure time more profitably than sitting silently in front of the box.

We will have to develop a realistic and coherent public policy aimed at directing the new communication media along socially and economically acceptable lines so that we will create more opportunities for individual and national betterment.

At the same time there is no denying that the new information systems contain serious threats to our privacy and our individual liberties, and that under certain conditions could pose a danger to national cultures. Whether such dangers materialize or not will largely depend on the criteria by which developments will be governed: market manipulation and political power considerations will certainly lead to a realization of such fears.

It is we who must shape the new information age, and not the information age which moulds us. Let us hope that we are not the March Hare arriving too late only to hear the Queen of Hearts say : off with his head.