# From Information to Communication: The French Experience with Videotex

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### Abstract

The sociological theory of the "information age" promised early success in the development of public videotex systems. In fact, most videotex experiments failed despite the glowing predictions. Only the French Teletel system has achieved large scale success, and it has grown into something quite unexpected. This outcome is due to design decisions that opened a space within which users were able to redirect the system away from the distribution of information toward human communication. It is thus no accident that the only videotex success story deviates so sharply from the information age theories which have up to now given videotex its raison d'etre. It is time to take a closer look at the French experience as an indication of the bias of the dominant conception of postindustrial society.

### INFORMATION OR COMMUNICATION?

In the past decade, the prediction of a coming post-industrial or information age has been taken up by political and business leaders with the power to realize it (Bell, 1973). One learns the value of such predictions of the future from real life attempts to create it. When, as in this case, the realization strays far afield from the theorists' first conception, then careful analysis must identify the biases that prevented a more accurate forecast.

The idea of postindustrialism is a deterministic projection of the process of computerization. Computers are supposedly creating a new form of society in which the trade in goods will decline in relative importance as knowledge becomes the foundation of the economic system. The management of social institutions and individual lives will depend more and more on swift access to data. Computer mediated communication (CMC) will penetrate every aspect of daily life and work to serve the rising demand for information.

Videotex is the CMC technology best adapted to the rapid delivery of data. An on-line version of a library, it stores huge numbers of "pages" in the memory of a host computer where users equipped with a terminal and modem can consult them. Videotex is "interactive" and can also mediate transactions such as ordering from an on-line catalogue. Although primarily designed to give users access to material stored on the host, some systems also give them access to each other through electronic mail, "chatting," or classified advertisements. This, then, is one major technological concretization of the dream of a postindustrial society.

The theory of the information age inspired the expectation of an emerging videotex marketplace. Experience with videotex, in turn, tested some of that theory's major

assumptions in practice. Early predictions had most of us linked to videotex services long ago (Dordick, 1981). By the end of the 1970s, telecommunications ministries and corporations were prepared to meet this confidently predicted future with new interactive systems. But today, a decade later, most of these experiments are regarded as dismal failures.

This outcome may be due in part to antitrust rulings which prevented giant American telephone and computer companies from merging their complementary technologies in the development of large scale public CMC. The FCC's failure to set a standard for terminals aggravated the situation. Lacking the resources and know-how of the big companies, their efforts uncoordinated by government, it is not surprising that smaller entertainment and publishing firms were unable to make a success of commercial videotex (Branscomb, 1988).

These generally disappointing results have been confirmed by all foreign experiments with videotex, with the exception of the French Teletel system. The British, for example, pioneered videotex with Prestel, introduced three years before the French came on the scene. Ironically, the French plunged into videotex on a grand scale in part out of fear of lagging behind Britain!

Prestel had the advantage of state support which no American system could boast. But it also had a corresponding disadvantage: over-centralization. At first remote hosts could not be connected to the system and growth in services was severely limited. What is more, Prestel relied on users to buy a decoder for their television sets, an expensive piece of hardware that placed videotex in competition with television programming. The subscriber base grew with pathetic slowness, rising to only 76,000 in the first five years (Charon, 1987: 103-106; Mayntz and Schneider, 1988: 278).

As I will explain below, the Teletel story is quite different. Between 1981, the date of the first tests of the French system, and the end of the decade, Teletel became by far the largest public videotex system in the world, with thousands of services, millions of users, and hundreds of millions of dollars in revenues. Today Teletel is the brightest spot in the otherwise unimpressive commercial videotex picture.

Until the arrival of Teletel, the successful applications of CMC had all been organized by and for private businesses, universities or computer hobbyists. The general public still has little or no access to the networks aimed at these markets and no need to use such specialized on-line services as bibliographic searches and software banks. This state of affairs is widely viewed as normal. After a brief spurt of post-industrial enthusiasm for videotex, CMC as a whole is now regarded as suitable for work, not for pleasure; it serves professional needs rather than leisure or consumption (Ettema, 1989).

But how can this pessimistic evaluation be correct if there is even one exception, such as the French case, in which CMC is widely used by the general public? Could it be that the French are somehow different from everyone else? That rather silly explanation has become less and less plausible as the Sears/IBM Prodigy system has grown to its present 900,000 subscribers (as of 1991). While the final evaluation of that system is not yet in, its sheer size tends to confirm the existence of a home videotex market. How, then, can we account for the astonishing success of Teletel, and what are its implications for the information age theory that inspired its creation?

Teletel is particularly interesting because it employs no technology not readily available in all those other countries where videotex was tried and failed. Its success can only be explained by identifying the social inventions which made the French system so different from all other systems that it alone could arouse widespread public interest in CMC. A close look at those inventions shows the limitations not only of prior experiments with videotex, but also of the theories on the basis of which the information age has so far been defined (Feenberg, 1990).

There is now a considerable body of literature on Teletel, based on historical and sociological research. I have drawn on that literature extensively and do not pretend to offer new data here. What I will do is cast what we know about Teletel in a theoretical framework for the study of technological development in postindustrial society. The approach is loosely based on a social constructivist view of technology which Teletel illustrates well. My goal is to illuminate tensions in the very project of postindustrialism.

## THE EMERGENCE OF A NEW MEDIUM

While Teletel embodies generally valid discoveries about how to organize public videotex systems, it is peculiarly French in many respects. Much that is unique about Teletel stems from the confluence of three forces: 1) a specifically French politics of modernization; 2) the bureaucracy's voluntaristic ideology of national public service; and 3) a strong oppositional political culture. Each of these factors contributed elements to an outcome no single group in French society would willingly have served in the beginning. Together they opened the space of social experimentation that made Teletel possible.

### Modernization

The concept of modernity is a live issue in France in a way that is difficult to imagine in the United States. Americans experience modernity as a birthright; America does not strive for modernity, it defines modernity. For that reason, the United States does not treat its own modernization as a political issue but leaves it to business and consumers to elaborate the future in what is supposed to be a chaos of creativity.

France, on the other hand, has a long tradition of theoretical and political concern with modernity as such. In the shadow of England at first and later of Germany and the U.S., France has struggled to adapt itself to a modern world it has always experienced at least to some extent as an external challenge. This is the spirit of the famous Nora-Minc Report which President Giscard d'Estaing commissioned from two top civil servants to define the means and goals of a concerted policy of modernization for French society in the last years of the century (Nora and Minc, 1978).

Nora and Minc called for a technological offensive in "telematics," the term they coined to describe the marriage of computers and communications. The telematic revolution, they argue, will change the nature of modern societies as radically as the industrial revolution. But, they note, 'Telematics', unlike electricity, does not carry an inert current, but rather information, that is to say, power (11). Mastering the network is therefore an essential goal. This requires that its framework be conceived in the spirit of

a public service" (67). In sum, postindustrial development is too important to be left to businessmen, and must become a political affair.

Nora and Minc paid particular attention to the need to win public acceptance of the telematic revolution, and to achieve success in the new international division of labor through targeting emerging telematic markets (41-42). They argued that a national videotex service could play a central role in achieving these objectives. This service would sensitize the still backward French public to the wonders of the computer age, while creating a huge protected market for computer terminals. Leveraging the internal market, France would eventually become a leading exporter of terminals and so benefit from the expected restructuring of the international economy instead of falling victim to it (94-95). These conceptions influenced the Teletel project which, as a peculiar mix of propaganda and industrial policy, had a distinctly statist flavor from the very beginning.

## Voluntarism

Given this ideological background, it was only natural that the government turn to the civil service to implement its strategy of modernization. This choice, which seems strange to Americans contemptuous of bureaucratic ineptness, makes perfect sense in France where business has an even more negative image than government.

When it is the bureaucracy rather than the corporation that spearheads modernization, the esprit de corps of the civil service leaves its mark on the outcome. In France this is not such a bad thing. French bureaucrats view the nation as a socio-economic unity characterized by the uniform provision of services such as mail, phone, roads, schools, and so on. The provision of these services is a moral mission predicated on the "republican" ideals of egalitarianism and national independence. The French call this bureaucratic approach "voluntaristic" because, for better or worse, it ignores local situations and economic constraints in serving a universal public interest.

One must keep this voluntaristic sense of mission in mind to understand how the French telephone company, charged with developing Teletel, could have conceived and implemented a national videotex service without the care and attention a normal business would give to users' wishes and to the likelihood of profitable operations. In fact, Teletel was less a service to commerce or consumers than a link in the chain of national identity. As such, it was intended to reach every French household as part of the infrastructure of national unity, just like the telephone and the mails (Nora and Minc, 1978: 82).

This conception of Teletel was implemented through the distribution of millions of free terminals, called "Minitels." It was expected that eventually all phone subscribers would be equipped. France would leapfrog out of its position as the industrial country with the most backward telephone system, right into the technology of the next century.

Although early advertising was mainly directed at prosperous neighborhoods, anyone could request a Minitel without regard for economic or social distinctions. The excuse for this unprecedented bounty was the creation of a national electronic phone directory, accessible only by Minitel, but in fact the main point of the exercise was simply to get a huge number of terminals into the hands of phone subscribers (Marchand, 1987: 32-34). Free distribution of terminals preceded the development of a market in services, which it was supposed to bring about. Just as roadside businesses

follow highways, so telematic businesses were expected to follow the distribution of Minitels.

The first 4000 Minitels were delivered in 1981 (Marchand, 1987: 37); ten years later over 5,000,000 have been distributed. The speed and scale of this process are clues to the vulgar economic side of the great telematic adventure. Under the ambitious modernization program implemented by Gerard Théry, head of the General Direction of Telecommunications, the PTT had become the largest single customer for French industry. The daring telematic plan was designed to take up the slack in telephone production that was sure to follow the rapid saturation of that market, thereby avoiding the collapse of a major industrial sector.

## Opposition

As originally conceived, Teletel was designed to bring France into the "information age" by providing a wide variety of information services. But is more information what every household requires (Iwaasa, 1985: 49)? And who is qualified to offer information services in a democracy (Marchand, 1987: 40ff)? These questions received a variety of conflicting answers in the early years of French videotex.

Modernization through national service defines the program of a highly centralized and controlling state. To make matters worse, the Teletel project was initiated by a right wing government. This combination at first inspired widespread distrust of videotex and awakened the well known fractiousness of important sectors of opinion. The familiar pattern of central control and popular "resistance" was repeated once again with Teletel, a program that was "parachuted" on an unsuspecting public and soon transformed by it in ways its makers had never imagined.

The press led the struggle against government control of videotex information services. Fearing a loss of advertising revenues and independence, publishers reacted negatively to Gerard Théry's announcement (in Dallas of all places) of the advent of the paperless society. One irate publisher wrote, "He who grasps the wire is powerful. He who grasps the wire and the screen is very powerful. He who will someday grasp the wire, the screen, and the computer will possess the power of God the Father Himself" (Marchand, 1987: 42).

The press triumphed with the arrival of the socialist government in 1981. To prevent political interference with on-line "content," the telephone company was allowed to offer only an electronic version of the telephone directory. The doors to Teletel were opened wide by the standards of the day: anyone with a government issued publishers' license could connect a host to the system. In 1986 even this restriction was abandoned; today anyone with a computer can hook up to the system, list a phone number in the Teletel directory, and receive a share of the revenues the service generates for the phone company.

Because small host computers are fairly inexpensive and knowledge of videotex as rare in large as in small companies, these decisions had at first a highly decentralizing effect. Teletel became a vast space of disorganized experimentation, a "free market" in on-line services more nearly approximating the liberal ideal than most communication markets in contemporary capitalist societies.

## Communication

But surprisingly, the phone subscribers, although equipped now for the information age, made relatively little use of the wealth of data available on Teletel. They consulted the electronic directory regularly, but not much else. Instead, the heaviest users seized on an obscure functionality of the system, person to person synchronous communication. In 1982, hackers transformed the technical support facility of an information service called Grétel into the first major messaging service (Bruhat, 1984: 54-55). After putting up a feeble (perhaps feigned) resistance, the operators of this service institutionalized the hackers' invention and made a fortune. Other services quickly followed with names like "Désiropolis," "La Voix du Parano," "SM," "Sextel." "Pink" messaging became famous for spicy pseudononymous conversations in which users sought like-minded acquaintances for conversation or encounters.

In the summer of 1985, the volume of traffic on the French packet switching network exceeded its capacities and the system crashed. Transpac, the champion of French high tech, was brought to its knees by hundreds of thousands of users skipping from one messaging service to another in search of amusement. As banks and government agencies were bumped off-line, the ultimate demonstration of the new telematic dispensation was made (Marchand, 1987: 132-134). Although only a minority of users were involved, by 1987 40% of the hours of domestic traffic were spent on messaging (Chabrol and Perin, 1989: 7).

The original plans for Teletel did not quite exclude human communication, but they certainly underestimated its importance relative to data banks, on-line transactions, and even video games (Marchand, 1987: 136). Messaging is hardly mentioned in early official documents on telematics. (E.g., Pigeat, et. al, 1979.) The first experiment with Teletel, at Vélizy, revealed an unexpected enthusiasm for communication. Originally conceived as a feedback mechanism linking users to the Vélizy project team, the messaging system was soon transformed into a general space for free discussion (Charon and Cherky, 1983: 81-92; Marchand, 1987: 72). Once communication became a major functionality of the system, its social definition was radically changed. From an original image as a 'cold' medium, based on wholly impersonal individual transactions between users and machines, Teletel evolved toward a new, 'warmer' image based on communication with other human beings.

Small telematic firms reworked Teletel into an instrument dedicated to human communication. They designed programs to manage large numbers of simultaneous users emitting rather than receiving information, and they invented a new type of interface. On entering these systems, users are immediately asked to designate a pseudonym and to fill out a "curriculum vitae." They are then invited to survey the vitaes of those currently on-line to identify like minded conversational partners. The new programs employ Teletel's graphic capabilities to split screens for party-line conversations. This is where the creative energies awakened by telematics went in France, and not into meeting obscure technical challenges dear to the hearts of government bureaucrats, such as insuring French influence on the shape of the emerging international market in data bases (Nora and Minc, 1978: 72).

"Pink" messaging may seem a trivial result of a generation of speculation on the information age, but the case can be made for a more positive evaluation. Most

importantly, the success of messaging changed the generally received connotations of telematics, away from information toward communication. This in turn encouraged--and paid for--a wide variety of experiments with telematics in domains such as education, health, and news (Marchand, 1987; Bidou, et. al., 1988). Here are some examples:

* television programs advertise Teletel services on which viewers can obtain supplementary information or exchange opinions, adding an interactive element to the one-way broadcast;

* politicians engage in dialogue with constituents on Teletel, and political movements open messaging services to communicate with their members;

* educational experiments have brought students and teachers together for electronic classes and tutoring, for example at a Paris Medical School;

* a psychological service offers an opportunity to discuss personal problems and seek advice.

Perhaps the most interesting experiment in new social forms occured in 1986 when a powerful national student strike was coordinated on the messaging service of the newspaper, Liberation. The service offered information about issues and actions, on-line discussion groups, hourly news updates, and a game mocking the Minister of Education. It quickly received 3000 messages from all over the country (Marchand, 1987: 155-158).

These applications have in common a basis in the nature of the new medium. Rather than imitating the telephone or written documents, they bring into play the unique capacity of telematics to mediate highly personal, anonymous communication, creating surprising new forms of sociability. These experiments prefigure a very different organization of the public sphere in advanced societies (Feenberg, 1989a: 271-275). The nature of these changes is discussed in the concluding sections of this chapter. (For recent French sociology of messaging, see Jouet and Flichy, 1991.)

## The System

Although no one planned all its elements in advance, eventually a coherent system emerged from the play of these various forces. Composed of rather ordinary elements, it formed a unique whole that finally broke the barriers to general public usage of CMC technology. The Teletel system is characterized by five basic principles:

1. **Scale**. Only a government or a very large corporation has the means to initiate an experiment such as Teletel on a scale sufficient to insure a fair test of the system. Short of a huge initial investment in transmission facilities and terminals, there is no way to escape the chicken and egg dilemma of videotex: one cannot create a market in services without users and one cannot attract users without a market in services. The solution, demonstrated in France, is to generate a sufficiently large market of new and occasional users at an early stage to justify the existence of enough services to bring those users back for more.

2. **Gratuity**. Perhaps the single most revolutionary feature of the system is the free distribution of terminals. The packet switching network and the terminals form a single whole, in contradistinction to every other national computer network. It is as though a system of toll roads were built with the idea of loaning automobiles to customers in the hope that they would make sufficient use of the system to defray

its costs. Gratuity dictated wise decisions about terminal quality: durability and relatively simple graphic capabilities. It also insured service providers a large base to work from very early on, long before the public would have perceived the interest of the unfamiliar system and invested in a costly terminal or subscription.

3. **Standardization**. The monopoly position of the French telephone company and the free distribution of Minitel terminals insures uniformity in several vital areas. Equipment and sign-on procedures are standardized, and service is offered from a single national phone number at a single price, independent of location. (There is now a slightly more complex price structure.) The phone company employs its billing system to collect all charges for on-line connections, sharing the income with service providers.

4. **Liberalism**. The decision to make it easy to hook up host computers to the packet switching network must have gone against the telephone company's deeply ingrained impulse to control every aspect of its technical system. However, once this decision was made, it opened the doors to a remarkable flowering of social creativity. Although the Minitel was designed primarily for information retrieval, it can be used for many other purposes including transactions and messaging. The success of the system owes a great deal to the mating of a free market in services with the flexible terminal.

5. **Identity**. The system acquired a public image through its identification with a project of modernization and through the massive distribution of distinctive terminals. The issuance of a special Teletel phone directory, the emergence of a graphic style associated with Teletel's alphamosaic standard, the adoption of typical videotex screens instead of scrolling displays, and the social phenomenon of the "pink" messaging services also contribute to the shaping of a unique telematic image.

## THE CONFLICT OF CODES

This interpretation of Teletel challenges the deterministic theory of technological development that it was supposed to realize. The logic of technology did not dictate a neat solution to the problem of modernization; instead, a very messy process of conflict, negotiation, and innovation produced a result that is obviously contingent on social factors. What are these factors and how did they influence the development of CMC in France?

### Social Constructivism

Unlike determinism, social constructivism argues that the technical characteristics of an artifact do not explain its success. According to the "principle of symmetry," there are always alternatives that might have been developed in the place of the successful one. What singles out an artifact is its relationship to the social environment, not some intrinsic property it possesses such as "efficiency" or "effectiveness."

As we have seen in the case of videotex, that relationship is negotiated among inventors, civil servants, businessmen, consumers, and many other social groups in a process that ultimately fixes the definition of a specific product adapted to a socially recognized demand. This process is called "closure"; it produces a stable "black box," an artifact that is treated as a finished whole. While the process of closure is going on, its social character is evident, but looking back on its later development, the artifact appears purely technical, even inevitable. Typically, the original ambiguity of the situation in which the "black box" was first closed is forgotten (Latour, 1987: 2-15).

Pinch and Bijker illustrate this approach with the example of the early evolution of the bicycle. In the late 19th Century, before the present form of the bicycle was fixed, design was pulled in several different directions. Some customers perceived bicycling as a competitive sport, while others had an essentially utilitarian interest in transportation. Designs corresponding to the first definition had high front wheels that were rejected as unsafe by riders of the second type. They preferred designs with two equal sized low wheels. Eventually, the low wheeled design won out and the entire later history of the bicycle down to the present day stems from that line of technical development. Technology is not determining in this example; on the contrary, the "different interpretations by social groups of the content of artefacts lead via different chains of problems and solutions to different further developments" (Pinch and Bijker, 1984: 423).

This approach has several implications for videotex:

first, the design of a system like Teletel is not determined by a general criterion such as efficiency, but by a social process which differentiates technical alternatives according to a variety of case-specific criteria;

second, that social process is not about the application of a predefined videotex technology, but concerns the very definition of what videotex is and the problems to which it is addressed;

third, competing definitions reflect conflicting social visions of modern society concretized in different technical choices.

These three points indicate the need to apply the same methods to technology that are employed in history and sociology to study social institutions, customs, beliefs, and art. The first point widens the range of empirical investigation of alliances and conflicts to include technical issues which, typically, have been treated as the object of a unique consensus. The other two points imply that meanings enter history as effective forces, not only in the domains of cultural production and political action, but also in the technical sphere. To talk about the social perception or definition of a technology one needs a hermeneutic of technical objects. The interpretative methods usually applied to art, design and myth must therefore be extended to technology as well.

Technologies are meaningful objects. From our everyday, common sense standpoint, two types of meanings attach to these objects. In the first place, they have a function and for most purposes their meaning is identical with that function. However, we also recognize a penumbra of "connotations" that associate technical objects with other aspects of social life independent of function (Baudrillard, 1968: 16-17). Thus

automobiles are means of transportation, but they also signify the owner as more or less respectable, wealthy, sexy, etc.

In the case of well established technologies, the distinction between function and connotation is usually clear. There is a tendency to project this clarity back into the past and to imagine that the technical function preceded the object and called it into being. However, the social constructivist program argues that, on the contrary, technical functions are not pregiven but are discovered in the course of the development and use of the object. Gradually these technical functions are locked in by the evolution of the social and technical environment, as for example the transportation functions of the automobile have been institutionalized in low-density urban designs that create the demand automobiles satisfy.

In the case of new technologies, there is often no clear definition of function at first. As a result, there is no clear distinction between different types of meanings associated with the technology: a bicycle built for speed and a bicycle built for safety are both functionally and connotatively different. In fact connotations of one design may simply be functions viewed from the angle of the other. These ambiguities are not merely conceptual since the device is not yet "closed" and no institutional lock-in ties it decisively to one of its several possible functions. Rather, ambiguities in the definition of a new technology must be resolved through interactions between designers, purchasers and users in which its meaning is finally fixed.

Technological closure is eventually consolidated in what I will call a "technical code." Technical codes define the object in strictly technical terms in accordance with the social meaning it has acquired.For bicycles, this was achieved in the 1890s. A bicycle safe for transportation could only be produced by conforming to a code which dictated a seat positioned well behind a small front wheel. When consumers encountered a bicycle produced according to this code, they immediately recognized it for what it was: a "safety" in the terminology of the day. That definition in turn connoted women and older riders, trips to the grocery store, and so on, and negated associations with young sportsman out for a thrill.

Technical codes are interpreted with the same hermeneutic procedures used to interpret texts, works of art, and social actions (Ricoeur, 1979). But the task gets complicated when codes become the stakes in social disputes. Then large scale interests and ideological visions are sedimented in technical design. It is this which explains the "isomorphism, the formal congruence between the technical logics of the apparatus and the social logics within which it is diffused" (Bidou, et. al., 1988: 18). The investigation of these congruences offers a way to explain the impact of the larger socio-cultural environment on the mechanisms of closure, a still relatively undeveloped field of technology studies (Pinch and Bijker, 1984: 409). Videotex is a striking case in point.

## A Technocratic Utopia

The issue in this case is the very nature of a postindustrial society. The "information" age was originally conceived as a scientized society, a vision that legitimated the technocratic ambitions of states and corporations. The rationalistic assumptions about human nature and society that underlie this fantasy have been familiar for a century or more as a kind of positivist utopia.

Its principal traits are familiar. Scientific-technical thinking resolves all the major issues of the day. Politics is merely a generalization of the consensual mechanisms of research and development. Individuals are integrated to the social order not through repression but through rational agreement. Their happiness is achieved through technical mastery of the personal and natural environment. Power, freedom and happiness are thus all based on knowledge.

This global vision supports the generalization of the codes and practices associated with engineering and management. One need not share an explicit utopian faith to believe that the professional approaches of these disciplines can now escape confinement in particular organizational hierarchies or technical artifacts to become the logic of the whole social system. The spread to the policy arena of ideas of social engineering based on systems analysis, rational choice theory, risk/benefit analysis, and so on testifies to this new advance in the rationalization of society. Similar assumptions influenced the sponsors of Teletel, not surprisingly given the cult of engineering in the French bureaucracy.

At the microlevel, these assumptions are at work in the traditional computer interface, with its long menus full of one-word descriptors of "options" arranged in neat hierarchies. A logical space consisting of such clearly defined alternatives correlates with an individual "user" engaged in a personal strategy of maximization. Projected onto society as a whole in the form of a public information service, this approach implies a certain world.

In that world, "freedom" is the more or less informed choice among preselected options established by a universal instance, such as a technocratic authority, which defines those options and maintains the data base. That instance claims to be a neutral medium, and its power is legitimated precisely by its transparency: the data is accurate and logically classified. But it does not cease to be a power for that matter (Feenberg, 1991).

Individuals are caught up in just such a system as this one at work and in their interactions with government, medical and scholastic institutions. Videotex streamlines this technocratic universe. In fact some of the most successful utilitarian services on Teletel offer information on bureaucratic rules, career planning diagnostics and advice, or examination results. These services play on the "anxiety effect" of life in a rational society: individuality as a problem in personal self-management (Bidou, et. al., 1988: 71). But the role of anxiety reveals the darker side of this utopia. A system which, viewed from above, embodies a higher level of social rationality, appears as a nightmare of confusing complexity and arbitrariness viewed from below. This is the "Crystal Palace" so feared and hated in Dostoievsky's "underground."

## The Spectral Subject

There is another whole dimension to everyday experience in postindustrial societies masked by these utopian fantasies. As the gap between individual person and social role widens, and individuals are increasingly caught up in the "mass," social life is reorganized around new types of impersonal interaction. The individual slips easily between roles, and identifies fully with none of them, falls in and out of various masses daily, and belongs wholly to no community. The solitude of the "lonely crowd" consists

in a multitude of trivial and ambiguous encounters. Anonymity plays a central role in this new social experience, and gives rise to fantasies of sex and violence that are represented in mass culture and, to a lesser extent, realized in the individuals' lives.

Teletel was caught up in a dispute over which sort of modern experience would be projected technologically through domestic computing. The definition of interactivity in terms of a rationalistic technical code encountered immediate resistance from "users" who redirected the emphasis away from the distribution of information toward anonymous human communication and fantastic encounters.

Just as videotex permits the individual to personalize an anonymous query to a career planning agency or a government bureaucracy, so the hitherto inarticulate relationship to erotic texts can now achieve personality, even reciprocity, thanks to the telephonic link supplied by the Minitel. The privacy of the home takes on functions previously assigned public spaces like bars and clubs, but with an important twist: the blank screen serves not only to link but also to shield the identities of the interlocutors.

As with newspaper "personals," individuals have the impression that the Minitel gives them full command of all the signals they emit, unlike risky face-to-face encounters where control is uncertain at best. Enhanced control through written self-presentation makes elaborate identity games possible. "Instead of identity having the status of an initial given (with which the communication usually begins), it becomes a stake, a product of the communication" (Baltz, 1984: 185).

The experience of pseudononymous communication calls to mind Erving Goffman's (1982: 31) double definition of the self as an "image" or identity, and as a "sacred object" to which consideration is due: "the self as an image pieced together from the expressive implications of the full flow of events in an undertaking; and the self as a kind of player in a ritual game who copes honorably or dishonorably, diplomatically or undiplomatically, with the judgemental contingencies of the situation." By increasing the individuals' control of image, while diminishing the risk of embarrassment, messaging alters the sociological ratio of the two dimensions of selfhood and opens up a new social space.

The relative desacralization of the subject weakens social control. It is difficult to bring group pressure to bear on someone who cannot see frowns of disapproval. CMC thus enhances the sense of personal freedom and individualism by reducing the "existential" engagement of the self in its communications. "Flaming"--the expression of uncensored emotions on-line--is viewed as a negative consequence of this feeling of liberation. But the altered sense of the reality of the other may also enhance the erotic charge of the communication (Bidou, et. al., 1988: 33).

Marc Guillaume (1982: 23) has introduced the concept of "spectrality" to describe these new forms of interation between individuals who are reduced to anonymity in modern social life, and yet succeed in using that anonymity to shelter and assert their identities. "Teletechnologies, considered as a cultural sphere, respond to a massive and unconfessed desire to escape partially and momentarily both from the symbolic constraints which persist in modern society and from totalitarian functionality. To escape not in the still ritualized form of those brief periods of celebration or disorder permitted by traditional societies, but at the convenience of the subject, who pays for this freedom by a loss. He becomes a spectre...in the triple sense of the term: he fades

away in order to wander freely like a phantom in a symbolic order which has become transparent to him."

A very different image of social advance emerges from this analysis, not the generalization of technocratic elements in daily life, but of the commutative logic of the telephone system. To fully understand this alternative, it is once again useful to look at the technical metaphors that invade social discourse. National computer networks are based on the X25 standard which enables host computers to service distant "clients" through the telephone lines. The X25 network differs in structure from the regular telephone network because it is not primarily designed to link all the computers on the system to each other, but rather to enable clusters of users to share time on particular hosts. In the usual case, the users are not in communication nor are the hosts connected.

Teletel was designed as an ordinary computer network in which the individual is a point in a star shaped interaction, hierarchically structured from a center, the host computer. But in the practice of the system, s/he became an agent of general horizontal interconnection (Guillaume, 1989: 177ff). This shift symbolizes the emergence of "networking" as an alternative to both formal organizations and traditional community. The pragmatics of personal encounter are radically simplified, reduced, in fact, to the protocols of technical connection. Correspondingly, the ease of passage from one social contact to another is greatly increased, again following the logic of the technical network that supports ever more rapid commutation. "Pink" messaging is merely a symptom of this transformation, punctuating a gradual process of change in society at large.

A whole rhetoric of liberation accompanies the generalized breakdown of the last rituals blocking the individuals in the redoubt of the traditional self. Personal life becomes an affair of network management as family and other stable structures collapse. The new individuals are described as supple, adaptable, capable of staging their personal performances on many and changing scenes from one day to the next. The network multiplies the power of its members by joining them in temporary social contracts along coaxial pathways of mutual confidence. The result is a "postmodern" "atomisation of society into flexible networks of language games" (Lyotard, 1979: 34).

CMC profoundly alters the spatio-temporal coordinates of daily life, accelerating the new individuals beyond the speed of paper which is still the maximum velocity achieved by shuffling corporate and political dinosaurs. They achieve thereby a relative liberation: if one cannot escape the postindustrial nightmare of total administration, at least multiply the number of connections and contacts so that their point of intersection becomes a rich and juicy locus of choice. To be is to connect.

The struggle over the definition of the postindustrial age has only just begun.

## THE SOCIAL CONSTRUCTION OF THE MINITEL

As we have seen, the peculiar compromise that made Teletel a success was the resultant of these forces in tension. I have traced the terms of that compromise at the macrolevel of the social definition of videotex in France, but its imprint can also be identified in the technical code of the system interface.

## Wiring the Bourgeois Interior

The Minitel is a sensitive index of these tensions. For the system to gain acceptance, millions of ordinary people had to admit a terminal into their home. Those charged with designing the Minitel carefully considered the "social factors" as well as the human factors involved in persuading them (Feenberg, 1989b: 29). The designers feared public rejection of anything resembling a computer, typewriter, or other professional apparatus, and worked consciously with the constraints placed on them by the social context of the domestic environment

Earlier videotex systems had employed very elaborate and expensive dedicated terminals, television adapters, or computers equipped with modems. So far, outside France, CMC has only succeeded where it is computer based, but its spread has been largely confined to a hobbyist subculture. No design principles for general domestic distribution can be learned from these hobbyists, who are not bothered by the incongruous appearance of a large piece of electronic equipment on the bedroom dresser or the dining room table.

Functionally, the Minitel is not even a computer in any case. It is just a "dumb terminal," that is, a video screen and keyboard with minimal memory and processing capabilities and a built-in modem. Such devices have been around for decades, primarily for use by engineers to connect remote sites to mainframe computers. Obviously designs suitable for that purpose would not qualify as attractive interior decoration. The new technological invasion of domestic space had to look elsewhere for models.

This is a design problem with a long and interesting history. Its presupposition is the separation of public and private, work and home. This separation begins, according to Walter Benjamin, under the July Monarchy:

For the private person, living space becomes, for the first time, antithetical to the place of work. The former is constituted by the interior; the office is its complement. The private person who squares his accounts with reality in his office demands that the interior be maintained in his illusions (Benjamin, 1978: 154).

The history of design shows the extent to which these intimate illusions come to be shaped by images drawn from the public sphere through the steady invasion of private space by public activities and artifacts. Everything from gas lighting to the use of chrome in furniture begins life in the public domain and gradually penetrates the home (Forty, 1986: chap. 5). The telephone and the electronic media intensify the penetration by decisively shifting the boundaries between the public and the private sphere.

The final disappearance of what Benjamin calls the "bourgeois interior" awaits the generalization of interactivity. The new communications technologies promise to attenuate and perhaps even to dissolve the distinction between the home and the public sphere. Telework and telemarketing are expected to collapse the two worlds into one. "The home can no longer pretend to remain the place of private life, privileging non-economic relations, autonomous with respect to the commercial world" (Marchand, 1984: 184).

The Minitel is a tool for accomplishing this ultimate deterritorialization. Its designers attempted to "connote" it acceptably as an enhancement of the telephone rather than as an enhancement of the computer or the television, the two existing

models (Giraud, 1984: 9). Disguised as a "cute" adjunct to the familiar telephone, the Minitel represents a kind of Trojan horse for rationalistic technical codes.

It is small, smaller even than a MacIntosh, with a keyboard that can be tilted up and locked to cover the screen. At first it was equipped with an alphabetical keypad to distinguish it clearly from a typewriter. That keypad pleased neither non-typists nor users familiar with typing and was eventually replaced with a standard one, however, the overall look of the Minitel remained unbusinesslike (Marchand, 1987: 64; Norman, 1988: 147). Most important, it has no disks and disk drives, the on-off switch on its front is easy to find, and no intimidating and unsightly computer cables protrude from its back, but just an ordinary telephone cord.

The domesticated Minitel terminal adopts a telephonic rather than a computing approach to its users' presumed technical capabilities. Computer programs typically offer an immense array of options, trading off ease-of-use for power. Furthermore, with the exception of the Windows world, most programs have such different interfaces that a special apprenticeship is required with each new acquisition. Anyone who has ever used commercial communications software, with its opening screens for setting a dozen obscure parameters, can understand just how inappropriate they would be for general domestic use. And in the early 1980s, when the Minitel was created, the software was much more difficult to use than it has since become. The Minitel designers knew their customers well and offered an extremely simple connection procedure: dial up the number on the telephone, listen for the connection, press a single key.

Another fortunate adaptation resulted from the design of the function keys. These were developed to operate the electronic telephone directory. At first there was some discussion of giving the function keys highly specific names suited to that purpose, e.g., "City," "Street," and so on. It was wisely decided instead to assign general names, such as "Guide," "Next Screen," "Back," to the Minitel function keys rather than tieing them to any one service (Marchand, 1987: 65). As a result, the keyboard imposes a standard and very simple user interface on all service providers, something achieved in the computing world by Windows and Icons, but only with much more elaborate equipment.

Minitel design also testifies to the original scepticism with regard to communication applications of the system: the function keys are defined for screen-oriented interrogation of data banks, and the keypad, with its unsculptured chiclet keys, is so clumsy it defies attempts at touch typing. Here the French paid the price of relying on a telephonic model: captive PTT suppliers with no idea of consumer electronics markets, delivered a telephone-quality keypad below current international standards for even the very cheapest portable typewriter. Needless to say, export of such a terminal has been difficult.

## Ambivalent Networks

So designed, the Minitel is a paradoxical object. Its telephonic disguise, thought necessary to its success in the home, introduces ambiguities into the definition of telematics and invites communications applications not anticipated by the designers (Weckerlé, 1987: I, 14-15). For them the Minitel would always remain a computer terminal for data gathering, but the domestic telephone, to which the Minitel is

attached, is not primarily an informational resource but rather a social medium. The official technical definition of the system thus enters into contradiction with the telephonic practices that immediately colonize it once it is installed in the home (Weckerlé, 1987: I, 26).

Despite its flaws, to the extent that the Minitel did not rule out human communication altogether, as have many videotex systems, it could be subverted from its intended purpose. For example, although the original Minitel function keys were not really appropriate for messaging applications, they were incorporated into messaging programs as well as possible, and users adapted to the poor keyboard by typing in a kind of on-line shorthand rich in new slang and inventive abbreviations. The Minitel became a communication device.

The walls of Paris were soon covered with posters advertising messaging services. A whole new iconography of the reinvented Minitel replaced the sober modernism of official PTT propaganda. In these posters, the device is no longer a banal computer terminal, but is associated with blatant sexual provocation. In some ads, the Minitel walks, it talks, it beckons; its keyboard, which can flap up and down, becomes a mouth, the screen becomes a face. The silence of utilitarian telematics is broken in a bizarre cacophony.

In weakening the boundaries of private and public, the Minitel opens a two way street. In one direction, households become the scene of hitherto public activities, such as consulting train schedules or bank accounts. But in the other direction, telematics unleashes a veritable storm of private fantasy on the unsuspecting public world. The individual still demands, in Benjamin's phrase, that the "interior be maintained in his illusions." But now those illusions take on an aggressively erotic form and are broadcast over the network.

The technical change in the Minitel implied by this social change is invisible but essential. It was designed as a client node, linked to host computers, and was not intended for use in a universally switched system which, like the telephone network, allows direct connection of any subscriber with any other. Yet as its image changed, the Telecom responded by creating a universal messaging service, called Minicom, which will soon offer an electronic mailbox to everyone with a Minitel. The Minitel will finally be fully integrated to the telephone network.

Curiously, those who introduced the telephone a century ago fought a similar battle with users over the definition of the instrument. The parallel is instructive. At first the telephone was compared to the telegraph, and advertised primarily as an aid to commerce. There was widespread resistance to social uses of the telephone, and an attempt was made to define it as a serious instrument of business (Fischer, 1988a; Attali and Stourdze, 1977). In opposition to this "masculine" identification of the telephone, women gradually incorporated it into their daily lives as a social instrument (Fischer, 1988b). As one telephone company official complained in 1909:

The telephone is going beyond its original design, and it is a positive fact that a large percentage of telephones in use today on a flat rental basis are used more in entertainment, diversion, social intercourse and accomodation to others than in actual cases of business or household neccesity (Fischer, 1988a: 48).

In France erotic connotations clustered around these early social uses of the telephone. It was worrisome that outsiders could intrude in the home while the husband

and father were away at work. "In the imagination of the French of the Belle Epoque, the telephone was an instrument of seduction" (Bertho, 1981: 243). So concerned was the phone company for the virtue of its female operators that it replaced them at night with males, presumably proof against temptation (Bertho, 1981: 242-243).

Despite these difficult beginnings, by the 1930s sociability had become an undeniable referent of the telephone in the United States. (In France the change took longer.) Thus the telephone is a technology which, like videotex, was introduced with an official definition rejected by many users. And like the telephone, the Minitel too acquired new and unexpected connotations as it became a privileged instrument of personal encounter. In both cases, the magic play of presence and absence, of disembodied voice or text, generates unexpected social possibilities that are undoubtedly inherent in the very nature of mediated communication.

## CONCLUSION

In its final configuration, Teletel was largely shaped by the users' preferences (Charon, 1987: 100). The picture that emerges is quite different from initial expectations. What are the lessons of this outcome? The rationalistic image of the information age did not survive the test of experience unchanged. Teletel today is not just an information marketplace. Alongside the expected applications, users invented a new form of human communication to suit the need for social play and encounter in the impersonal, bureaucratic society that gives rise to postindustrial ideology. In so doing, ordinary people overrode the intentions of planners and designers and converted a system that was supposed to serve as an informational resource into a new type of social environment.

The meaning of videotex technology has been irreversibly changed by this experience. But beyond the particulars of this example, a larger picture looms. In every case, the human dimension of communication technology only emerges gradually from behind the cultural assumptions of those who originate it and first signify it publicly through rationalistic codes. This process reveals the limits of the technocratic project of postindustrialism.

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