Denis De Rougemont

INFORMATION IS NOT KNOWLEDGE

One of the principal reasons for the confusion in which recent technological developments, and developments in the physical, chemical and biological sciences generally, have plunged us, consists in our inability to harmonise our means and our ends, to subordinate the former to the latter, to verify constantly their appropriateness or their incompatibility, and to evaluate their overall relation to man's final ends.

I propose to consider the science of data processing not in its immediate problematic—certain usefulness, possible dangers, short-term or middle-term economic and social aspects—but in its relation to thought processes, ethical and spiritual values, cultural formation and to the education of future generations.

1. A Cry Has Gone Out Across the Land

Data processing is to be a real revolution! Watch out for this metaphor; there are few which are more misleading for our contemporaries.

In the true scientific domain, Europe has experienced only one revolution in the proper sense of the term and that was the demonstration by Copernicus that the earth turns around the sun. All other scientific discoveries or technological inventions

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have only metaphorically been "revolutions," by which was meant profound changes with widespread effects or sudden social upheavals; but not at all a simple return to the original position, as the term revolution meant initially. Yet every "revolution" in the metaphysical sense, which has taken on a particularly political significance since the end of the 18th century in France, can be seen in two contradictory manners: by those who foment it and by those who suffer through it. In the eyes of the former, a revolution appears as a liberating surge for mankind in general or for an oppressed class; for the latter it means an increase in public constraints and control over individuals. And it is true, as Lenin wrote in 1917, that bourgeois revolutions have only led to the strengthening of the central State and the powers of the police. But Lenin erred in his choice of adjective by attributing these evils to "bourgeois" forms of revolution, as he then proved beginning October 17 with his own so-called "proletarian" revolution.

And here we have enunciated the two major dangers which seem to have struck the general public suddenly confronted with the "computer revolution": the increased powers of the central government and its police through that which the Council of Europe terms "the automated processing of data of a personal nature," i.e., a computer file on every citizen.

One can object that the general public understands nothing of these matters, that in fact the public is badly informed. No doubt, but we all know well that every technical innovation, whether or not we call it "revolutionary," for publicity or for brainwashing reasons, bears the same ambivalent characteristics, the same antinomic potential for liberation or for increased constraints in varying proportions according to the breadth of its effects and their correspondence (or not) with one or another general bent of human nature.

If the arrival of computers should truly be described as a revolution then we have the absolute obligation, and the right as well, to raise several questions in this regard, particularly the question of the real purposes which are intended by their development.

The psychologist and pediatrician, Bruno Bettelheim, when asked to give a lecture on film for the American Film Institute,

hesitated a great deal, finally accepted, read or skimmed (he said) some five hundred volumes on the subject, and then began his talk by saying, "My starting point preparing for the lecture was: why should anybody go to the movies? *What do they do for the soul?*"

My question with regard to computers is more modest. "*How do they further personal liberty and its inseparable counterpart, responsibility?*"

2. And First, Where Did They Come From?

The first computer, ENIAC, constructed and completed in 1945 at the University of Pennsylvania, had been ordered by the ballistics research laboratory of the American army. This technology was not created with wisdom in mind nor to satisfy a general human need. It was born, like so many others, of war and as a response to particular armament needs.

And then? According to Simon Nora and Alain Minc, "*the history of data processing can be written as a series of technological innovations.*"[1] It would seem then, reading this sentence, that at no point in its development did computer science answer the call of a *specific end*, whether that of increased personal peace or happiness, balance, liberty or responsibility.

3. The Ambivalence of Technology

I am not, and I have never been, for whatever reasons or prejudices, against what today is called the very latest in technology, such as data processing, telematics and all the rest. I have decided to use these inventions as much as possible for my personal research, and by that I mean wherever that might seem "possible" for me. An example to explain what I am trying to say: one day I was conversing with Louis Armand and we were discussing the incredible complexities which a federalist policy would have to face, at the national or the pan-European level;

[1] S. Nora and A. Minc, *L'Informatisation de la Société*, Paris, La Documentation française, 1978.

and I said to him (paraphrasing the famous dictum of Lenin about "the Soviets plus electricity,") "Federalism is regional autonomy plus computers." And in reply, of which I am quite proud, he said, "Well there, I am jealous that I didn't say that myself!"

But let us never forget *the inevitable ambivalence of all our technologies*.

—The technical "revolution" of *automation* was supposed to bring on the age of leisure, and we find ourselves in the age of unemployment.

—The *productivity* of industry heralded the age of abundance, and we have increasing penury in the West and famines in the Third World.

—Computers today offer to "think for us," quicker than us, but they also create the risk of withering our powers of memory, judgment and creation while creating a prosperous species of functional mentally defectives.

4. Repression of the Question of Ends

Certainly we should not accuse technology of the responsibility for progress which is at cross purposes with man's finality, but rather a society which refuses to envisage radical transformations (in the distribution of profit particularly) which are without any doubt necessary in order that innovation can develop its beneficial effects for the entire human race.

The source of our present problems with scientific-technical civilisation in the West is a certain general refusal, before any industrial or commercial application of an invention, to envisage its consequences which are too easily termed "revolutionary", although they are perhaps only disruptive at great risk and expense to man. I note, for example, something like a general refusal to imagine, to calculate, to study seriously the social regimes which might allow a transformation of unemployment into leisure-time or productivity into the means of enhancing life and not of killing, that is into nourishment for the mind and body rather than into armaments. But here I wish to make absolutely clear that when I speak of a general refusal, I do not

at all suppose that, after consultation among philosophers, scientists, industrialists, educators and technocrats, a negative decision of the type "the question will not even be asked" has been made consciously. Much more than a deliberate refusal, there is a reflex of fleeing from the problem, of repression in the Freudian sense of the term, of a kind of closing of minds to that which is sensed as being the alarming complexity of the problem and its possibly sinister aspects.

Westerners in this industrial, scientific-technical and presumably rationalist era seem to me on the whole to adopt typically infantile behavior: faced with the "very latest" technological toys which are offered to them and in which they are persuaded they should take pride ("Thanks to you we feel like giants once again," said President Reagan to the Columbia astronauts), they see at first only the facility and the power which this technology can bring them and not the dangers, and even less the increased responsibilities which are thereby created. They see only the innovation, ephemeral by definition, but they refuse to anticipate the frequently irreversible damage which can be its cost.

This is only too evident if we think of the avalanche of contradictions which engulf the greatest specialists of so-called scientific futurology in their economic and political forecasts. Whether it is the automobile, oil or energy crises, the Japanese economic invasion, Iran, Afghanistan or Lech Walesa, we have been taken by surprise in every significant event of the last decade.

And so, before this dizzying future of systematic unknowns, must we then simply throw up our hands and continue to do as before, that is *to act first* when it is too early to foresee anything, and *to reflect later* when it is too late to change anything? (This is what has happened with nuclear energy; the power plants were built, and then the question was raised: how to reduce their radioactive wastes? We still have not answered that, and things are worsening if we believe the Globe 2000 report. Nuclear wastes are accumulating inexorably. To shut down the power plants now would create, it is said, an unprecedented lack of electric energy; the planned waste treatment methods raise increasingly insoluble problems of both a political and technical nature).

The situation does not yet seem as serious in the case of data processing. But the predictability of its long-term consequences, direct, indirect or induced, and their combinations, convergences or conflicts, invites us also to renounce any futurological or even reflective effort on the future of computer science. For my part I reject that invitation.

I have always thought that we are not on earth to try to divine the future but to create it. Here is the moment to apply my formula.

Not being able to know the distant consequences on man, society and nature of our technological innovations, I propose then the following plan:

1. To understand the true nature of an innovation and its aims by verifying *the definition of its basic terms*;

2. To submit to a certain number of *criteria for use* any technological innovation which seeks certification, i.e., which aims to be produced and marketed;

3. To evaluate with the help of these *criteria for use* the *advantages* and the *dangers* which can already be determined for an uncontrolled use of data processing and which can still be prevented.

5. A Little Semantics

For a *definition of terms* relative to data in general and to data processing in particular, I think that English lends itself to a first lexical choice better than French. A very clear distinction can be made immediately between:

data - news - knowledge.

The first two terms designate two kinds of information and the third the results or the resulting effects in an individual of this information.

For the word *information*, the dictionary (Littré) definition is, "Philosophical term. Act of informing, of giving a form." Example, "*Man is the supreme information and the living synthesis of the creative forces of the globe*," D. Stern, *Essay on Liberty*. (The author of this phrase, D. Stern, is the pseudonym of the Countess d'Agoult, Richard Wagner's mother-in-law and friend

of Liszt). Traditionally since Aristotle, information has signified *formation* by observed factual data and lived experiences integrated into the individual's memory. The meaning which the word "news" has taken on in the age of mass media is more arguable, but it predominates.

From this initial semantic examination several evident, or nearly so, conclusions result.

a) Information (data + news) is not at all synonymous with *knowledge* which can only be registered by a person. Information does not tell us what is or is not in conformity with the major goals which religions assign to humanity: peace, liberty, love. To inform in the sense current today (the media) is not to form the mind, but even to deform it. Information is not knowledge. Knowledge is not yet wisdom, just as wisdom is not yet love. (This "love which will give us back our liberty," as a sublime folk song puts it).

b) When someone says, "Now I *know* what fear is!" or "Now I *know* what love is!," he is not talking about information which he just received but of an experience which he has just lived through.

c) The dictionary defines *knowledge* as "gained from study and from experience." It is remarkable that knowledge exists only in the singular, i.e. that it represents the globalisation of pieces of knowledge, of data stored in computers or in brains.

d) I would also like to introduce into this definition words such as *judgment*, or expressions such as to *judge with keenness,* to *have judgment,* where it is evident that a computer can only *do*.

e) But if information (data + news) increases our physical powers, it becomes imperative and vital to increase simultaneously and proportionately our moral and spiritual wisdom which is the meaning of the final ends to which our means should be ordered.

Basic principle: it is mortally dangerous to increase the material powers of man, which he will certainly place at the disposal of his passions for power over others and destruction, if we do not increase *at the same time* the spiritual powers which serve the final ends of the person, the freedom to obey his particular vocation.

f) We must be careful not to give in to the journalistic or

clearly promotional temptation to assign metaphorically to the computer faculties which are specifically human, such as "memory," "thought," "intelligence." I will limit myself here to the word "memory."

The supposed memory of a computer is radically distinguished from that of a man in that it is not the history of an individual which is registered in its brain, and even less that of an entire species registered in its genes, but a simple storage of pieces of data filed without a date. If there is a human memory process which a computer will never be able to duplicate it is no doubt the one described by Proust in reference to the maleleine cake dipped in tea whose odor brought back to him in a slow crescendo of almost anguished emotion all the sensual, sensitive and sentimental magic of his childhood in the village of Combray.[2] To state that a computer's "memory" has a "capacity ten times greater than human memory" means absolutely nothing. We need only think of Proust, or of our own childhood.

6. Some Criteria for the Use of Any Innovations

When Henry Ford in 1899 inaugurated the first automobile factory, no one thought of making a prediction of what the future would be like under the hypothesis, at the time scarcely probable, of a huge success for this machine. No one imagined our choked cities jammed with traffic, the unbreathable air, the countryside disappearing under concrete and asphalt, tanks and aviation, the oil companies and the automobile industry regularly occupying the top ranks of *Fortune* magazine's listings and the fate of all Western industry dangling from decisions made by a few Persian Gulf emirs.

The first question to ask of a technological invention, then, will be: *what will be the effects of this invention in the case of a total success?*

2. If moral criteria honored in all the Western world had been followed, assembly line production would have been rejected; for this reduces a person to the condition of being a simple

[2] See *Du côté de chez Swann*, Vol. 1.

instrument, contrary to the fundamental precept of Kant, justifying Marx's phrase about the worker who is reduced by industrial labor to nothing more than "the living complement of a dead machine." Hence the second criterion: *to discard deliberately any innovation one of whose conditions for success is deemed incompatible with human liberty.*

3. The idea of creating large production centers was born from the sole desire to increase profit at the expense of labor.

Our third criterion will be the complement of the second, just as responsibility is the complement of liberty: *to reject any innovation which would necessarily lead to, or which would favor by its nature, gigantic enterprises and ever-increasing concentrations of power, at the expense of the autonomy of local and regional communities and of the participation of citizens in their management.*

4. The fourth criterion has become familiar to us only in recent years. It enjoins us *to avoid anything which can pollute our social or natural environment and likewise whatever risks exhausting non-renewable natural resources in the short run because of artificially provoked exponential growth of needs.*

5. Several authors[3] have noted that it would be better if *industry took as its point of departure not technological possibilities but existing needs* (contrary to the quotation of Nora and Minc, above, on the history of data processing which "can be written as a series of technological innovations.")

6. When a new technology shows itself capable of changing or of suppressing a rhythm, a pattern or a temporal structure of human life and human creation, it is not necessarily progress, but perhaps an aggression against the species or against its creative elite. *We must refrain from applying such technology as long as doubts are not erased by extensive experimentation.*

7. *We must avoid anything which risks entailing an excessive vulnerability of industry* by a too narrow dependence either on national political powers or on exhaustible natural resources which we do not control ourselves (oil and uranium today; water, forests, food tomorrow).

[3] For example, Pierre Drouin, *Le Monde*, 12 November 1980. "In certain sectors—and such is the case for electronics—progress in technology is going much faster than needs."

7. Advantages of Data Processing

These are absolutely evident. Who could deny the usefulness of data processing in the ever increasing domains where computers can operate? Calculation time reduced from twelve months to one week for the construction of a dam. Hospital services. Statistics and census information prepared almost without the use of paper, whence saving our large forests. Calculation of taxes. Launching rockets in space. Not to mention (even though it is perhaps the decisive factor) the advantages, if one can call them such, which computers have given from their very inception to every "national defense system" of the globe.

I will not go on any further. The case has been heard, and several thousand engineers are in a better position than I am to defend and illustrate the argument.

I will speak at greater length about the dangers, or rather of the possible risks, which I imagine and where it seems to me still possible to alert the attention of those responsible.

8. The Dangers; or Rather, The Risks

—*Speed.* The most frequently cited argument in favor of computers is the one which seems to me the most disturbing as soon as we leave the realm of pure quantitative numbers. This is the argument based on the fabulous rapidity of the logical operations or the calculations of which computers are capable. In all the areas which I have just cited where data processing is without any doubt advantageous, the time saved in an operation can be expressed in terms of lower cost and increased efficiency. But in all other areas—biological, emotional, artistic, pedagogical, ethical, spiritual—the length of time involved in the operation plays a positive role, real and existential, frequently *constitutive* of the phenomenon considered, as is evident in the case of music.

We learn that man can normally absorb 80,000 pieces of information per day, although he is now being stuffed with 200,000 per day.[4] This "information overload" is negative, use-

[4] See the article by Dr. Klaus Schrape, "Psychologische Folgen der neuen Informationstechnologie," *Neue Zürcher Zeitung,* 20 May, 1980.

less and can even become poisonous. It is a communications jam.

We are told that the computer, when questioned about a psychological problem, "thinks" much more rapidly than the human brain. But this is of no use to the person who asks the question, for he needs the same amount of time to *understand* the answer as he would have taken fo find it himself, that is, to *live the process of change* which allows him to realise it. (I presume that the answer is known, as in most psychological or ethical problems. The difficulty is not in kowing the answer but in living it out until arriving at the real solution).

The almost instantaneous solution—calculated in nano-seconds, billionths of seconds—of a problem is useful only in those areas where a time period is not experienced and has no part in the nature of the problem or of the actual process of its solution. But in all those areas where the human person is involved by his biology, his psychology or his emotions, speed infinitely multiplied becomes a destructive factor working against everything required by an activity of assimilation, digestion, integration or appropriation. It would be stupid to nourish the body and the mind more quickly and more often than they can digest and assimilate. To "cook the family dinner in one minute in a micro-wave oven"[5] can be of help to the housewife, but the success of most recipes depends on the chance to simmer gently for a good long time. To reduce a meditation to a time as quick as a wink makes no sense, and the act of love which lasts two nano-seconds seems to me totally without interest.

In the entirely computerised society which is being readied for us, man will no longer have the time to taste the flavor of life, and no one will be able to give this to him, even at the rate of billions of bits per second. "Until the dav when humanity, in the footsteps of a great spiritual leader, will discover an unheard-of luxury: slowness in the heart of silence."[6]

[5] Example quoted by J. Maisonrouge before the Academy of Moral and Political Sciences, 13 October, 1969.

[6] D. de Rougemont, *Lettres sur la bombe atomique*, New York and Paris, 1946.

—*The reduction to the rational.* Technology became a part of daily life of Western man at the beginning of this century with the introduction of electricity, the automobile, the airplane, the telephone, radio and television. This has prepared us, it is true, to think or to imagine according to patterns deduced simply from physical reality and its technicians, but it does not seem to me to have substantially modified our modes of thinking, feeling or believing. Data processing can go much, much farther between now and the year 2000. By enabling us to calculate and to combine other than in our brains everything which can be expressed in logical or numerical terms, this technology brings us into a world where computers will "process" our problems and give us a reality which is increasingly reduced to the rational level, purified of all mystery, more and more depersonalised and pre-digested in order more easily to establish connections between computers and human brains, the latter being progressively integrated into the system of the former. This will no doubt facilitate communication, but the communication of what? Of that which is absolutely similar for each and every one and not of that which might reveal the uniqueness of a person, of that which would consequently be the most interesting to know.

In short, technology tends by its very nature to favor and propagate a form of communicating what is already common to all men, whatever can be expressed in computer "languages," but nothing which would be radically new, created, unique, waiting to be revealed. It tends, then, to favor and to propagate a kind of rationalised and antiseptic thinking, protected from "mental problems" and from "Utopian manias," (that is, from political or social non-conformity under certain regimes), but also from lyricism and poetry in general, and all this in a language which will have been made systematically incapable of communicating the inexpressible.

In this sense a certain "robotisation" of minds is to be feared, a rational-materialist conformity, and the loss of any spirit of resistance to the central offices of whatever administrative, national, industrial, commercial or banking powers have been able to monopolise data processing and telematics.

9. The School Without Teachers: "Plato" or the Guru?

The example of the school of the future will allow me to illustrate in a few words the essence of what has preceded.

Today, with increasing insistence from all the press, we are offered the *school without teachers.* This is an idea formed in the brain of the director of Control Data which he then named *Plato.* It is a means of learning the data and structures of any subject using computers to replace books and teachers. This could even take place in the home of the student if he had the uso of a terminal. And in this case the school without teachers would not even be a school, much like Lichtenberg's famous knife, which was bladeless and whose handle had been lost.[7]

Let us note at once an error in the definition of *Project Plato.* This is no school without teachers since, in fact, it is the teachers who will have programmed the computers. Simply the teachers are not there; in other words they have betrayed their principal function.

Every professor, and I have been one in various countries and at various universities for twenty years, one day discovers to his great surprise that the elements of his teaching which stay with his students are not the things which were "in the program," but those other things he has communicated unknowingly to his best students. Jaurès said it well (and I just read this after having experienced it myself): *One does not teach what one knows, but what one is.* The computer knows many things, it can even know everything; but it is not. It is incapable of forming minds since it has no ends to offer them. But it is quite capable of reducing minds to an official conformity. Look at what *Le Figaro* wrote in December, 1980, in reference to the school without teachers. "The students adapt almost unconsciously to the computer... They acquire automatically a *computer mind*... Already the results are spectacular... High school students can create teaching research programs whose value and originality have made possible their application for practical purposes."

[7] Georg C. Lichtenberg, 1742-1799, physician and author of aphorisms, admired by Goethe, Kant and Nietzsche.

Those in favor of the school without teachers assure us that it will be able to multiply by sixty the possibilities of the brain. But if we give this equipment to adolescents of less than 18 years of age (the synapses are developing up to that age), we will make their brains lazy and the brain can atrophy the same as the legs of those who no longer think of walking 500 meters but who take their car or their motorcycle.

The students of computers will fall into a state of increasing passivity before their machine and will dispose of fewer and fewer possibilities for doubting, for questioning a teacher, for criticism and discussion with classmates which up until yesterday formed the essence of school training.

Finally, the pretention of *Plato* to replace the memory of its students with gadgets is in flagrant contradiction with all observations of psychologists which tend to demonstrate that the memory is a faculty which is cultivated and developed or which atrophies just like a muscle. "Memory develops through use," the dictionary reminds us pointedly. Ivan Illich at the University of Kassel forces his students to memorise passages from historic writings. It is he who is in the vanguard of true progress and not the computer with its so-called "memory," independent of persons—and of the past!

Instead of *Project Plato*, I would propose the method of the Hindu ashram where everything depends on the instruction of the guru, the unpredictable, personal director of meditation and mediator of transcendence. I would give as title to the problem of the education of tomorrow, "*Plato or the Guru.*"

It happens that the question was already dealt with by the real Plato some 2300 years ago, as is described in the beginning of Part IV of *Phaedra.*

Socrates is describing how Theuth, the Egyptian god whose symbol is the ibis, "was the first to invent numbers and arithmetic, geometry and astronomy, not to mention backgammon and dice, and finally letters for writing." Theuth went to see King Thamous who lived in Thebes and showed him his inventions. "The King inquired about the usefulness each of them might have. ... When he got to letters for writing, Theuth said, 'Here is something which will give the Egyptians more knowledge and more memory, for the lack of memory and the lack of knowledge

have found their remedy!' To which the King replied, 'This invention, by dispensing men from exercising their memory, will produce forgetfulness in the minds of those who will learn to use it; so much so that because of their confidence in writing, they will seek outside of themselves, in these strange characters, and not within, the means for remembering things. Consequently, it is not a remedy for memory which you have discovered, but rather a remedy for the process of remembering. As for knowledge, it is an illusion of knowledge and not its reality which you give to your students. For when they will have succeeded, thanks to you, in acquiring abundant information without being taught, they will think themselves competent in many things, when actually they will be incompetent in most. They will also be insufferable in their relations, for instead of being wise, they will have acquired only the illusion of wisdom."

What can be added to Plato which his Socrates has not already said, and which condemns forever and ever *Plato*?

10. Vulnerability

> Certainly it is useful to learn to use a computer; but it is even more useful to learn not to have to use it any more.
>
> *G. Elgozy*

This brings me to the last of these remarks (which I intend only as introductory to the future discussions which they are meant to encourage, but with growing urgency): what about the *vulnerability* of a computerised society?

We are on the threshhold of a civilisation become fragile because of a number of potentially annihilating factors: nuclear explosions, irreversible pollution of lakes, rivers and oceans, and destruction of the planet's forests (already reduced by 40%) which can lead to a catastrophic decrease in the production of oxygen in the atmosphere.

Will men accustomed for one or two decades to information systems which dictate their every move still know how to cope if there are failures in the systems? Just as they can no longer

add without their calculators, they will remember nothing without their computers. Defenseless before every unforeseen turn.

Because of computerisation, society is running the risk of becoming more and more centralised by state monopolies or by large companies and thus of being less and less capable of autonomy and self-government in case of crisis. Here let me quote Joël de Rosnay. "It is a fact that the increasingly greater complexity of society and the use of telematics, telecommunications and data processing make the system more and more vulnerable and easily disrupted."[8] The same observation can be found in the *Revue Polytechnique*. "In case of breakdown, manual emergency solutions are unworkable; the availability and the operability of data processing equipment are uncertain. We are at the mercy of potential catastrophes: fire, flooding, sabotage, the unavailability of transmissions; the growing complexity of the systems increases our dependence on a few specialists."[9]

Just as pocket calculators already allow millions of people to find arithmetical results without having themselves to perform the functions or to assimilate them, more and more data processing will replace learning and simulation will replace knowledge with the result that if a central or general failure brought all data networks to silence, man would find himself unable to remake industry, helpless before Nature.

So-called *electronic crime* is a more immediate danger. In the United States, four 13 year-old students succeeded in destroying 10 million bits, one fifth of what the computer was supposed to record. Other young people render computers non-functional by pouring honey in them or by shooting them with machine guns.

This last example illustrates well the point which I wanted to raise in conclusion.

Technology in itself is neutral, a tool at the service of man, of all of man, both the good and the bad in him. But in fact the bad has the possibility of taking better advantage of this neutrality than the good. For technology has as a function to *facilitate* our efforts and to multiply their effects. However, evil is generally more easily done than good. Once a certain quantitative threshold

[8] *Le Monde*, 29 March, 1981.
[9] Lausanne, May, 1980.

has been reached, certain effects of evil become irreversible and thus fatal. (Let us note that this would not be so in the case of the irreversibility of good, if such existed).

Is it then necessary to destroy or to stop technology, in this case data processing? It is too late. We cannot uninvent something.

If we refer back to our criteria, we note that data processing complies quite well with numbers 1 and 4 (it is non-polluting and it does not contribute to the wasting of earthly resources and of energy), and that it can comply satisfactorily, if there is sufficient vigilance, to criteria 2 and 3: to avoid whatever leads to *gigantism* (although there again the illusions of fantastic speed and fabulous numbers may perhaps represent the equivalent). But we note that, on the other hand, data processing does not bear up well under criteria 5, 6 and 7, because *it does not belong to existing needs but to technical and commercial possibilities*, because it can favor veritable psychological and cultural aggressions against the individual, and especially because it makes our society terribly *vulnerable*.

If we can still influence the computer evolution (which already seems given over to its own accelerating force and beyond any human control) it is through this last point that we must do so.

To refuse and actively refute the imperialist viewpoint of the *general computerisation* of society, to assign to data processing the *limits* which it actually has by virtue of its scientific definition and its usefulness: this we can still do, and we must.

This is very little, it can be said. An infinitesimal effort, a totally invisible mental decision. But it is quite probable that on this little, this very minimal little, depends the fate of our Western civilisation.

Denis de Rougemont
(*Geneva.*)