Jean-Gabriel Ganascia *

Erratic progresses: Model of the erraticism

(1) Introduction

It is now a commonplace to point out both a speed up of time and an increasing complexity of the world. Nobody contests the acceleration of the scientific and technological production which generates a considerably growing amount of new results. At first sight, it has to decrease the distance beyond which it is hazardous to make previsions. However, in the field of IST — Information Science and Technology — things are not so obvious. In a way, even if it can be surprising, the upcoming future is more difficult to predict than the long term future.

More precisely, a retrospective look on the IST history proves that short and mid term anticipations, i.e. five or seven years forecasts, where very often denied, while many long terms previsions are achieved. For instance, let us throw a glance on the history of the cybernetics, automatic translation, artificial intelligence, expert systems, virtual realities, communication networks, minicomputers, micro-computers, web etc. We regularly mistook about the evolutions and the social consequences of those techniques. Meanwhile, many long term predictions, at 20, 30 or 40 years, have been carried out in accordance with the anticipations. To be convinced, one can read 1950 Alan Turing anticipations[1], in his famous paper about machine intelligence, or 1979 Jean-François Lyotard's book[2] relative to the status of knowledge in the post-modern societies etc.

The difficulty to forecast imminent evolutions comes simultaneously from the multiplicity of actors participating to decisions and from the generalized interactivity that characterizes the modern societies. Indeed, social interactivity is becoming crucial in the high technology developments — especially in the IST field —; social practices play a more and more important role in the design process. The success of "user-center design"[3] in information technology is a sign of this evolution. Since retroactions come constantly and modify anticipations, planning production turns out to be far more difficult. As a consequence, short term predictions happen to be very hazardous. Therefore, the structure of time is somehow changing now; as we shall see, the contemporaneous structure of time is neither linear, nor cyclic, as were the traditional time structures. This paper constitutes an attempt to elucidate this structure. To do this, it confronts examples coming from the history of the IST development to previous anticipations. Then, it proposes to build a model to understand those evolutions of the time structure.

Apart this introduction, the paper is divided in four parts. The first shows how erroneous were past short term predictions in the field of IST. The second treats mid and long-term anticipations which were carried out. The third part provides an explanation of this phenomenon, while the last one brings some conclusions about the new structure of time, which results from the broad dissemination of information and communication technologies.

(2) Short term predictions

The history of data processing is marked out of a long succession of errors of appreciation. The forecasts in the short or medium term, for a very great part, appeared completely erroneous. To be convinced of this, it is enough to throw a glance on the great stages of the data processing development and in particular of the software technologies. The examples are innumerable. Here are some.

* Laboratoire d'Informatique de Paris 6 (LIP6), University Pierre and Marie Curie, Paris, France; email: Jean-Gabriel.Ganascia@lip6.fr.

[1] See Alan Turing, "Computing machinery and intelligence", *Mind*, vol. 59 (1950), p. 433–460.

[2] See Jean-François Lyotard, *La condition post-moderne* (Paris: Minuit, 1979).

[3] Donald Norman, *The Psychology of Everyday Things* (Basic Book, 1988).

(2.1) Cybernetics

At the very beginning of the 40s, the cybernetics, enthused many researchers who believed to see there some perspectives radically new. The first automata networks imagined by Warren McCulloch and Walter Pitts[4] as well as the notions of feedback and of teleological machines introduced by Arturo Rosenblueth, Norbert Wienner and Julian Bigelow,[5] seemed to open new horizons; according to many, a bridge between engineering sciences on the one hand and the brain or the social simulation by means of streams of information on the other hand, was being to achieve. So, people thought of being capable of establishing the laws of the complexity which govern the phenomena of biologic order, in particular the functioning of the brain, the physical phenomena, for example the spontaneous organization of atoms in the crystals, the political and social phenomena, which would allow to establish laws of the government based on rigorous founding and, finally, the thought. The first attempts were quickly followed by some disappointments. For example, the attempts to create an artificial retina by Frank Rosenblatt[6] (what was called the PERCEPTRON) failed on many obstacles, which has been put in light in the end 60s by Marvin Minsky and Seymour Papert.[7] Later, at the beginning of the 80s, many perspectives opened by the cybernetics, and which had seemed to lead to failures, were reopened.

(2.2) Automatic translation

In the beginning the 50s, considerable sums of money were invested in automatic translation projects. Many people believed that the resources of computers, in particular their storage capacity and their ability to manipulate character strings would allow to quickly and cheaply build a machine able to automatically translate all the texts from one language to another one, for instance texts written in Russian or French would automatically be transcribed in English. In support of this thesis, came the possibility to conceive dictionaries. Today, it seems obvious that it is not enough to have a dictionary for being able to correctly translate; it is above all necessary to understand, what supposes a parsing followed by a semantic analysis and then a pragmatic analysis, many phases of which the engineers thought they could free. As a consequence, they were quickly disabused. However, these general considerations did not prevent the American government from engaging important amounts of money in automatic translation. And it also was the case of many European governments. It has been necessary to wait until the year 1966 so that a report commanded by the American Senate states the impasse in which were the efforts of machine translation. In return, all the American laboratories of machine translation were closed; their sources of funding quickly dried up.

However, this did not mean the end of the automatic translation. In Europe, laboratories continued to pursue researches on this question. There are even today European programs that support basic research on the machine translation. The ambitions a little moderated and the used methods henceforth appeal to knowledge of linguistics and semantics. Nevertheless, whatever what may be the actual future of the machine translation, the anticipations that were imagined at the beginning of the 50s appear now totally erroneous.

(2.3) Artificial intelligence

From its beginning, in 1957, the artificial intelligence aroused many hopes. It was imagined that a machine would be able to simulate almost all the superior faculties of the intelligence; for instance, that a computer would be capable of perceiving the outside world, of arguing just like a man, of speaking and of understanding. Very first works fed such expectations: a machine automatically proving most of the theorems of logic contained in the work of Alfred Whitehead and Bertrand Russel entitled *Principia Mathematica* was built. These successes incited the pioneers of the artificial intelligence

[4] Warren Mc Culloch & Walter Pitts, “A logical calculus of the ideas immanent in neuron activity”, *Bulletin of Mathematical Biophysics* (New York, 1943).

[5] Arturo Rosenblueth, Norbert Wiener and Julian Bigelow, “Behavior, Purpose and Teleology”, *Philosophy of Science*, vol. 10 (1943), p. 18–24.

[6] Rosenblatt, Frank (1958), “The Perceptron: A Probabilistic Model for Information Storage and Organization in the Brain, Cornell Aeronautical Laboratory”, *Psychological Review*, vol. 65, No. 6, p. 386–408.

[7] Marvin Minsky and Seymour Papert S.A., *Perceptrons* (Cambridge, MA: MIT Press, 1969).

to go farther; they began to dream. So, Herbert Simon, who became Nobel Prize of economy and who received the Turing awards, has made with his colleague Alan Newell deafening statements. According to them, in 10 years (we were in 1958), if they were not excluded from the international competitions, computers would doubtless have to become the world champions in the game of chess. And, in the same order of ideas, a computer would be certainly capable, always in a lapse of time of 10 years, of composing music endowed with an unmistakable aesthetic value, of demonstrating totally original mathematical theorems, of feigning the psyche to the point that all the psychological theories would have to take the shape of computer programs etc. It goes without saying that these predictions were quickly denied. So, in 1965, a chess game computer program was defeated by 10-year-old child.

Nevertheless, in 1997, that is to say not more than 40 years later, a computer had succeeded in challenging and in overcoming the chess game world champion titular. Computers are used a lot by musicians. They take an important part in the activity of mathematicians to demonstrate new theorems. The psychologists also use many computer models. It means that most of these announcements, even if they were contradicted, were not totally absurd. But the periods of time were not respected.

Always in the field of the artificial intelligence, many people were enthused at the beginning of 1980s by what was called “expert systems”, which are pieces of software including, instead of the traditional computer programs, some specialized knowledge referring to knowledge detained by experts. Even there, the anticipations were disappointed: the industrial development of expert systems or knowledge-based systems has been much slower than what all the specialists of forward-looking had imagined.

(2.4) Computer networks

More generally, to whom who wants to examine it closely, the history of the data processing presents a surprising succession of errors of anticipation. So, in the 60s, experts imagined that the data processing would develop on a centralized model with a huge computer on which everybody would be connected. According to many engineers of that time, the capacities of calculation should be viewed as the water or electricity flows: a central production had to irrigate a whole company, even a whole city or a whole state. As a consequence, the professional buildings, for instance the offices or the universities, which were built in that time, were cabled: each, from his office, was to be able to have access to the computing center and to the calculation resources.

At the end of the 70s, minicomputers were developed. It meant that the data processing might be decentralized, that is to say that every service of a big company might have its own computer. The networking of all the offices was not justified any more in this context; it was enough to have, inside every service, a local area network allowing each to reach the computer resources appropriate for the service.

Then, a few years later, workstations came: they were very expensive personal computers with whom experts thought of equipping the engineers. And the appearance of these personal computers was closely followed by the microcomputers that are desktop computers. Their moderate cost changed totally the game. All the engineers, the administrators, but also all the secretaries had then a computer on their desk. As a consequence, it was necessary to establish networks to connect the whole park of microcomputers.

Note that these evolutions were not at all predictable. So, it took a certain time to IBM, the biggest company of office computers, to be convinced of the place which microcomputers would take in office organization. The first Personal Computer, i.e. the first IBM microcomputer, was only made and marketed in 1981, that is to say more than nine years after the design of the first personal computers and four years after the Apple II commercial success.

In this respect, the history of the human computer interfaces shows the hesitations preliminary to the use of the mouse and to the adoption of the desk, files and trash can metaphors. For a long time, the big computer firms considered that the calculation has only to be a specialists’ affair. It was not envisaged to make the computers accessible to a large public. Developed by the firm Xerox Park from 1972, the first machines that had to be usable by non-specialist, in particular the Viola, the Dolphin and the Star, included a mouse and high definition screen. However, they had no commercial success. And it was the same with the first machine developed in 1983 by Apple on these same principles, the so-called Lisa. It has been necessary to wait for 1984 and the appearance of Macintosh so that these new human computer interfaces conquer the world.

(2.5) Internet and the Web

That is the same story for the telecommunication networks between computers. Remind us that the first attempts of digital communication have started at the end of the 60s; the ARPANET network began to be developed at the beginning of the 70s in the United States. And, simultaneously, in France similar projects were conducted, for example, the Cyclades project. Always in France, the Minitel, which rests on the use of the telephone network, was operational at the beginning of the 80s. Many people spoke about on-line data processing. All the principles of networks were already there. And the duality, very current, between a computer network and a telephone network already existed. It is advisable, on this matter, to remind that the Web, which consists in the coupling of the hypertext techniques to the computer network, is a European invention made in Geneva by a European, on the site of the CERN. It is nevertheless in the United States that it soared in its beginnings. Finally, closer to us, the craze for the Internet at the end of the 90s and the speculative bubble, which has followed, also resulted from an error of anticipation.

(3) Long term expectations

In brief, a retrospective glance on the recent history of IST — Information Sciences and Technologies — shows that the short and medium term anticipations, that are five or seven years anticipations, for many, have been denied by the reality. According to a general principle saying that it is easier to apprehend what is close than what is far, more the future is far away from us, more it seems difficult to foresee what it will be. As a consequence, if the short or medium-term forecasts are false, then the long-term forecasts will be all the more unpredictable. Does it mean that it is not more possible to anticipate in this domain? The reality seems to contradict these intuitions. Indeed, we can notice that many long term forecasts, for example at 20 or 30 years anticipations, came true in almost correspon-ding way. Here are some illustrations.

(3.1) The Moore's Law

The Moore's Law stipulates that the speed of processors and their storage capacity double every 18 months. This empirical law was emitted in 1965 by Gordon Moore, co-founder of the company Intel (manufacturer of microprocessors); it comes true for 40 years; certainly, the physical principles on which the conception of the current electronic circuits are based ask to be revised if we wish to pursue this progress on an identical rhythm beyond the year 2015 or 2020. The fact is that this law remains still valid and it should stay valid at least during the next 10 years. Here is a completely empirical anticipation law which relies on no rigorous scientific foundation. Nevertheless, this has been confirmed by the long term experience.

(3.2) Alan Turing's Test Anticipation

In a famous paper that he wrote in 1950, Alan Turing tried to clarify what we could call to "think for a machine". According to him, the thought and more generally the intelligence have to see neither with the physical appearance, nor with the voice texture, nor even with the lines of the face. It has nothing yet to see with the consciousness. A machine will be said intelligent if what we observe of its behavior seems to emanate from an intelligent being. And to clarify what he understands exactly by the intelli-gence of machines, Alan Turing imagined a subterfuge, called the "imitation game". This game is for three: a man, we shall call him A, a woman, B, and an examiner, C, whose sex is indifferent. A, B and C are in three separate rooms so that they do not perceive their respective voices nor their physical appearances. The game consists, for the examiner, C, to ask questions to A and to B in order to distinguish the man from the woman, knowing that the man, that is A, imitates a woman. Up to there, it enters no computer and not more machines in the imitation game. What happens now if we replace the man who imitates the woman by a computer which imitates the man who imitates the woman? According to Alan Turing, a computer could be considered as intelligent if it was capable of deceiving the examiner as long as the man who imitates a woman. We shall not extend here over the relevancy of this test of intelligence, which was commented a lot. Let us focus on Alan Turing's comment: according to him, we had to be capable, before 50 years (let us remind that we were in 1950), to conceive a computer capable of deceiving an examiner in more than 70 % of the cases on an exchange of five minutes. In spite of all the critics that have been addressed to artificial intelligence, we are actually capable now of conceiving machines (that are called "chatbots") with which all can exchange and discuss through Internet. These machines play the imitation game and their performances exceed largely those which had foreseen Turing. Competitions are regularly organized between these machines in homage to Turing.

(3.3) "2001, a space odyssey"

The Stanley Kubrick's movie went out on screens in 1968 but the script was written some years earlier, in 1965. If we take away what is relative to the myth of the all-powerful computer and if we scrutinize the various techniques which were shown there, it appears that the movie reflects rather faithfully the state of the researches that were pursued at that time, i.e. in 1965, in the American laboratories. Now, at 40 years of distance, we can notice that many of these techniques, which appeared at that time very sharp, are now totally achieved. Let us take some examples. The spaceship was piloted and regulated by a computer as are today many planes, as is the space shuttle or as are rockets. What seemed at that time very innovative appears totally commonplace today. Also, the security is insured by confronting the results obtained by three computers: If two of them are in conflict with the third, then it is the third which is questioned. This principle is used now to insure the security of complex systems; we try even, when it is not too expensive, to make different teams build several computer programs and activate them in parallel.

We remember that in the film the spaceship computer was playing chess and was systematically defeating all the men, whereas at that time, that is to say in 1965, a 10-year-old child beat one of the first computers playing chess. Since, we all know that a computer is capable, repeatedly, of defeating the world champion titular.

Finally, the small androids inside the spaceship were able of speaking, of understanding the speech of the astronauts and of talking with them. In that time, the researches on the automatic speech recognition and on the natural language processing were in a very preliminary status. Today, many progresses have been achieved in this matter. Now, machines are able to transcribe our speeches and to improve their performances by automatically adapting their behavior to our voice and to our vocabulary. Some people, as the philosopher Dan Sperber, think that we enter in a society without writing where there will not be any more need to write or to type, which means that following the example of the ancient, we shall just have to dictate to computers. The machines will then take the place of the scribes in the Antiquity. Still let us underline that, in numerous laboratories, android robots endowed with speech and vision, and similar in all respects to those of the spaceship of "2001, a space odyssey", are at present commercially available.

As a matter of fact, studying science fiction movies, when it does not restrain with the myth, but when it examines what is made in research laboratories, is capable of making long-term forward-looking anticipations completely satisfactory.

(3.4) The knowledge status in a postmodern society

At the end of the 70s, a French philosopher, Jean-François Lyotard, published a book entitled *The postmodern condition* that concerned the status of the knowledge in post-modern societies. This book had followed an inquiry ordered by the Canadian government on the long-term consequences of the development of on-line data processing. Without entering in the detail of Jean-François Lyotard's analyses, let us remind that it was a question for the philosopher of examining the consequences of the development of information and communication technologies on the knowledge status. It was a question of wondering how the individuals would be capable of reading and interpreting the knowledge recorded in immense data bases without passing through traditional well-established mediations. More generally, Jean-François Lyotard wondered how would evolve the social link and how would be reconstituted great narrations legitimizing the knowledge in a totally decentralized society. While the term of on-line data processing used at the time seems totally out of service, while the techniques to which Jean-François Lyotard made reference, in particular the Minitel, are not yet up to date, the questions that he treated are not projections on the future; they are henceforth of ardent current events.

In summary, whereas we showed, by the means of some examples, that the short-term forecasts are more and more hazardous, we see here that the long-term forecasts can rather often turn out to be more relevant. We are thus in a strange situation where the near future is more difficult to predict than the distant future. We are now going to try to understand the origin of what appears to be a paradox.

(4) The interactive society

(4.1) User-centered design

Let us begin with a first observation: the unpredictability of the short-term evolutions does not equally touch all the domains of the industrial and economic activity. As an illustration, the development of electronic components seems relatively predictable at short-term whereas it is less predictable in the long run, so it follows the classic law according to which the knowledge of future degrades as it goes away. It so goes away with the development of traditional industries, where the technological progresses do not interfere with men. For example, in the production of electricity, in the nuclear, in the chemistry or in the metal industries, it seems that the projection on the future occurs according to our common intuitions, which is that the immediate future is more easily forecasted than the distant future.

Let us note, besides, that it is neither the complexity, nor the profusion of results that forbids the anticipation. Indeed, in many domains which we mentioned, there are a considerable number of results that are both practical and theoretical. And these do not forbid the short-term anticipations.

On the other hand, we can notice that in all the spheres of activity where intervene either the cognitive faculties of the users or the modes of appropriation of the technologies by people, the evolution does not obey the classic laws. Let us take for example the domain of the motor transport. The technological development of cars is dependent on technological progress in the field of materials and in that of the engines. As such, it obeys the traditional laws of the progress; as a consequence, we can foresee it with the same degree of uncertainty as the one with which we foresee the evolutions in the domains of physics, materials, mechanical engineering industries or engines. Nevertheless, the strategic choices depend on social perception connected, for example, to the ecological concerns of a society. At some point now these remain totally unpredictable. In the particular case of the motor transport industry, the actual evolution depends mainly on exogenous factors, which have nothing to see with the technology but, for example, with the will to limit the road accidents or with the sensibility of the population to the noise and to the atmospheric pollution.

Everything is going similarly in the field of information and communication technologies. This explains why the man-machine interfaces, the personal computers, the personal digital assistants or the telecommunication networks have developed in a very unpredictable way.

More generally, this means that in a certain number of industries it is not any more enough to plan brilliantly the evolution, as it would have been the case with traditional industries at the beginning of the 20th century. Today, we would not know how to foresee everything; it is necessary to consider all the potential users, and this cannot be done without their actual participation. We thus have to proceed to dialogues and to preliminary inquiries. More exactly, it is advisable to commit the users to the design process; it corresponds to what is called the “User-Centered Design”. It results a kind of solidarity between the actors involved in the first stages of the design; the notion of users’ clubs, very frequent in the computer domain, answers completely this first requirement. But this communication strategy is coupled with a practical requirement: the designer not being capable of mastering all the factors occurring in the satisfaction of the customers, he resorts to the willingness of voluntary users, who have very often the feeling to have been elected because they benefit from a usufruct for free. This is the only way, for the designer, to become aware of the weaknesses of the devices that he conceived. The taking into consideration of these returns of usage allows the designer to adapt his devices to the exact needs of the main part of the users.

(4.2) The Second Newcomer’s Law

To give evidence of the importance of the returns of usage, there is even a law known under the name of “second newcomer law”, which stipulates that, on the markets of very high technology, the second newcomer possesses a major strategic advantage if he can learn from the failures of his predecessors. Many already mentioned examples come in support of this law. So, the success of Macintosh in 1984 and the popularization of microcomputers with graphic interface and mouse, which followed, had been preceded by numerous fruitless attempts, which nevertheless spread out, even if all the ingredients that made the fortune of these machines were there. More recently, some remember maybe the particularly innovative machine invented by the company Apple and called "Newton". This computer without keyboard but with a touch-sensitive screen and a stylet, prefigured what are the current pocket computers (that are usually called "palm" computers) and tablets PC. "Newton" anticipated a whole new generation of machines having a graphic interface and having resorts to the recognition of the manual writing. It had nevertheless no success. And, we could multiply the illustrations of this law. What matters here, is that a traditional principle, which wants that the precursors adopt a dominating and dominant place on markets is becoming wrong in the field of information and communication technologies. So, for example, in the field of electronics, there are patents in extremely important number, what makes impossible today for anyone to get into the market when he does not already own a big quantity of technological knowledge, because the cost of purchase of all these licenses would be prohibitive. The strategic advantage thus goes, in traditional industries, to the pioneers that are those who, by their know-how and their intelligence, knew how to be the first ones there. Now, curiously, in the most modern industries, when the design requires a kind of mutual participation of all the actors, it seems that the pioneers have rather a handicap; and it is thus the second new-comers who defeat the first comer.

The recent history of the development of the search engines illustrates very well this principle: many financiers considered necessary to invest very early in the first firms which proposed search engines, because they believed that these would dominate the market, without sharing. It is doubtlessly this fear which fed the speculative bubble around the development of the Internet. Now, an attentive exam of the development of the technologies shows that these fears were not based. It is even the opposite that occurred; to be convinced, let us remind the date of appearance of some of the most known search engines: incite 1993, Lycos 1994, Yahoo on 1994, Altavista on 1995, Hotbot 1996, Google 1998 ... It appears there that the advantage went rather to the last new-comer than to the first ones.

(4.3) Retroactivity

As soon as we consider this interactive model of conception and industrial development, the evolution cannot answer any more simple authoritarian orders that were emitted by expert panels possessing an established and recognized competence. We have to consider all the interactions of all the possible users during the design and manufacture process. To summarize the current evolutions, let us quote the comments of a big manufacturer of computers who, about twenty years ago, asserted that those who would not learn the language of the technology would be left away, abandoned at the edge of the road of the modernity. To this traditional vision of the progress as entailing the whole society, one can oppose another view for which there would be mutual dependences between the designers and the users. The answer of another manufacturer of computers to the one that we just mentioned, illustrates perfectly this new attitude: according to this last one, the manufacturers who would not know how to propose tools adapted to needs and to the capacities of the users risk to be left away of the economic development and to meet itself bankrupt.

Let us now suppose that, to understand the causes of the above mentioned paradox, we attempt to model the evolutions. One has to consider neither one isolated promoter — the chief engineer —, nor an interdependent group of people acting jointly — the producers —, but a set of actors — including both different producers and consumers — interacting mutually each others, with dissimilar competencies and different goals. It follows that laws of change don't anymore obey to classical causality, where the effect occurs as a consequence of the cause; one has to consider all possible retroactions, which necessitates to have recourse to the dynamic system theory where short term behaviors may be chaotic whereas long term evolution converge to attractors. Briefly speaking, one can clearly explain this strange above mentioned phenomenon according which short term forecasts are more hazardous than long terms predictions, by making reference to dynamic system theory. Even if we do not pretend to reach a science or a theory of scientific progresses, we are at least able to propose a model, which enlighten the erratic character of predictions.

(5) The plaited time

In manner of conclusion, let us try to examine the new structure of the time which results from taking into consideration such interactions.

On one side, the time of the progress is linear; it runs without ever returning behind. This rectilinear time evokes an arrow flying forward, which pursues infinitely its race without ever knowing what has to be its term. This linear time of the perpetually renewed modernity opposes to a cyclic traditional time in which the future is never that the return of past. The time is then excellently predictable because nothing really new can happen.

In the present case, it seems evident that the time cannot be conceived as being cyclic, because the technological and industrial development imposes a ceaseless renewal: nothing is today as yesterday. And, the contemporary imperative, which orders to be modern, gives evidence of the singular novelty of the modern. As a consequence, the present could not be considered as the return of a former present.

Does it mean that the current time must be seen as being strictly rectilinear? It is undoubtedly a time of progress, which accumulates the results and which, as a consequence, opens every day on new perspectives. In this respect, we could be tempted to see it as being linear. Nevertheless, the reduction of the time to a straight line would be misleading. Indeed, as we have just seen in this article, the present time surprises us; its progress sometimes takes chaotic looks. It returns behind. Directions which were investigated, then abandoned, reappear successfully. Some lineaments of the evolution are divided and subdivided to the point that the thread of time appears rather as forked and bearded than as simply linear. And, in spite of bends and forks, the long-term forecasts are relatively stable. So, it turns out that, very often, too premature anticipations are rejected for a while, before they occupy again the front of the scene. Therefore, the structure of time does not appear really as shelf space but rather as tangled. This means that at some point several alternatives can be envisaged; some mobilize most of the brilliant minds, whereas the others seem to be behind, hidden to the general public. Then, time to time, what seemed hidden reappears and what is appearing progressively disappears. Therefore, the time appears as a tangled hank. As in a plait, its lineaments scatter and some even move away from the eyes of all before reappearing under a new day then hiding anew. It is in the sense that we can speak about the time of the modernity contemporary as of a plaited time.