MORAL AND SOCIAL IMPLICATIONS OF NEW TECHNOLOGIES IN INFORMATION SCIENCE

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INTRODUCTION

We have reached a point in the ever increasing development of mankind when we should perhaps pause and think of both past and present situations in an attempt to see where the future is leading us.

It has been said that the future does not belong to us and that reflections can only be made on what it can provide. Obviously, we cannot foresee mankind’s evolution nor those technological advances that condition both life styles and attitudes. Our mental powers of abstraction and synthesis, however, can enable us to imagine life in the future, if known and established conditions and parameters were to continue developing similarly. Experience and social awareness constitute a good basis for these mental processes. It is true that man rarely learns from the experience of others. The proverb says "to err is human". It can perhaps be argued that this saying refers to the human being as an individual, whereas within society he develops an awareness of the past which serves as a standard of behaviour for the future. However, this statement is not completely true. Throughout the process of development of nations, history has repeated itself in cycles of greater or lesser duration, as if there were a standard for collective behaviour, impossible to control even with scientific and technical advances, with their fundamental effect on the gaining of experience and their influence on behaviour.

Of course, the human being has in himself an intense and optimistic ray of hope that induces him, despite his past history, to at least attempt to mould and adapt patterns of behaviour that make for a more agreeable future.

This is the point where we find ourselves today. A tremendous technological development has taken place in a short space of time. This has led somewhat to an imbalance in human structures, in the individual, in the family and in society. Our aim in this paper is to attempt to analyse the present-day situation and its causes and hence be able to reflect upon them. Who knows whether we shall be able to contribute a tiny ray of light to those already proposed by other authors? It could be positive or it could be superfluous.

HISTORICAL EVOLUTION

The moral and social implications arising from "new technologies"
in each historical moment of their introduction have led moralists and sociologists to reflect upon this question and to both dictate and predict norms of conduct. Political and religious powers have also been considerably interested and concerned with the problem.

Based upon present-day situations, we can imagine with what distrust "the new agricultural techniques" of prehistoric ages were received by the nomadic farmers. We also know the respect instilled by fire, not only for its harmful and destructive properties, but also for its uses: against the cold, illumination at night and in making foods more palatable. Who knows whether the propagation of fire was also a political and economic factor that granted power to certain races, just as today with other natural resources? Whatever the influence of fire, it was such that it was worshipped as one of the principal gods.

In later ages, even the Greek philosophers warned the people about "new techniques" and advised caution in their use.

Throughout the Middle Ages multiple references were made regarding the sceptical way in which technical and industrial advances were accepted. Even Albertus Magnus, a great patron of science, who considered progress to be positive, advised its practice to be limited to the initiated few with a critical turn of mind and also recommended that certain experiments be kept secret.

Perhaps the Modern Age and present times are the periods in which "new technologies" have been most readily accepted, not without of course, moralists, sociologists, demagogues and rulers studying their social and moral implications on humans as individuals and as a group. Of the people who have made such studies, we can mention: E. Gabin, Ortega y Gasset, A.J. Meadows, A. Drexler, E. Terrón, A. Lafourcade, J. Castillo Castillo, P. Ferrer Pi, M.A. Laredo Quesada, M. Buder, G. Vowe, K. Järvelin, Y. Masuda ... The list could be interminable, particularly with respect to contemporary authors because the subject has such current importance.

However, most articles, books, communications ... publications of any sort, that we have found mentioned in recent bibliographies, approach the subject from economic or labour aspects. An important factor arises, brought about by the decreasing labour force which is caused by the introduction of machinery. Consequently, there is a subfactor to be taken into consideration: that of insecurity in one's job, the difficulty in adapting to new methods, unemployment ... It is a subfactor with a tremendous influence on the economic and social development of political institutions.

We shall attempt to concentrate purely on those social and moral aspects, affecting the individual as such, from psychological, social, cultural and political points of view and particularly in the light of information science.

INFORMATION TECHNOLOGIES

We feel that this would be a good instance in which to delve into the expression and meaning of the term "information technologies", and hence try to explain certain terminological confusions.
The word "technology" has been the object of several recent studies. Ferrer Pi, among other authors, refers to its Greek etymological origins, in that it is the study or treatment of techniques, where "technique" means Techné. It is also defined as the practical application of science, or study, by means of a logical and coherent method. Such study will lead us to the possession of truth and hence wisdom.

"Information", as a term, has been the object of study by various different authors, too numerous to mention individually, and there is consequently little to add regarding its etymology, sense and use. Nevertheless, a brief reminder of a few points could perhaps be useful.

Firstly, let us remember the dual sense of information in its two fundamental aspects:

- as a phenomenon which occurs independently of our own working activities
- as a process which is elaborated from a basis of certain facts, that are accordingly converted into data or news and contained in document form.

Information must always be transmitted and perceived.

The treatment of these two types of information involves the same processes. The same techniques can be applied, particularly those of computing and telematics. Because of this, the two types of information can be confused. Furthermore, when speaking of information technology, the term comprises all the computing procedures involved in document processing, so as to provide the information to the user. Examples of such procedures are: the storing and recovery of information in data bases. Other procedures that come within this ample term are: the ways in which information is stored, such as microfilm techniques, telex systems without memory, word processors, videotex, etc. Likewise included are all the systems for transmitting information, e.g.: teletex, video telephones, cable television. Also included are procedures for reproducing, e.g. photocopierners, laser devices, etc.

In other words, "information technology" is a versatile term with respect to its connotations and its usage. It will therefore be feasible to apply it to those economic, social, moral and political aspects that exert any effect on the meaning of the "information industry".

In the present study we are going to look into the application of new technologies in information as a process, within the field of information science which, in itself, comprises library sciences, archivology and documentation.

SOCIAL ASPECTS OF INFORMATION TECHNOLOGIES

Throughout history the innovation of any new technique has had repercussions on the society of its day.
Turning now specifically to information science, we shall give a quick historical revision, starting with the Egyptians. The introduction of papyrus as a writing support also brought about, amongst other things, the development of new techniques for the manufacture of writing materials, of inks, of filing systems etc. New professions arose ... Likewise, writing became more flexible and mobile. The pharaohs and ruling classes saw it as a tool for social and economic power, that would permit them to dominate culture and hence the people. It is logical to assume that these people viewed with considerable mistrust these techniques that did not improve their living conditions. (In the long run, however, this phenomenon did improve living conditions and served to spread the culture of the time).

A similar phenomenon arose with the introduction of the printing press. New techniques and profession were also created and this, in turn, required a certain adaptation. But in this case, it was the people who first accepted these new techniques when they realised their potential for the spreading of news (information). The majority still did not know how to read, but they put their trust in the bourgeoisie, who could use these techniques to the benefit of the people. The aristocracy, still very conservative, did not easily accept the printing press. Laredo Quesada recounts how the Duke of Urbino, in around 1460, declared that he did not have a single printed book in his library. It is not at all strange that the aristocracy should reject the printing press. With it they foresaw the loss of their social and cultural hegemony.

The capacity for adaptation and change that society demonstrated with the invention of the printing press was much more rapid than the same phenomenon in the papyrus age.

The discovery, in the present age, of semi-conductors and related devices that have contributed to the development of microelectronics and to present-day "information technology", has brought about various phenomena. All are notable in that they are rapid and variable.

First and foremost comes economic and political power which in turn is governed by industrial development and the consumer society.

Industry introduces certain products that have to be consumed. Production has to be increased in order to increase the public's purchasing power and hence increase consumption. It is an irreversible and theoretically infinite chain reaction. In practice, however, as the number of consumers does not increase at the same rate, there comes a time when a saturation point is reached and the speed of reaction is reduced. Consumption must be increased and this is achieved by manufacturing more products. We have now arrived at the application of the new technologies to information science. Here rests the "salvation of the human race" (with its economic and political power). There is no other solution but to promote and develop the information industry, be it by some degree of subterfuge or by correct or erroneous argument.

But, because of such forcing of the issue, we now find ourselves in a somewhat paradoxical situation. On the one hand, we should consume more (new items), on the other, countries have been
existing on false economic bases, attempting to appear prosperous when they were not, and they now find themselves having to freeze salaries and reduce expenditure. Such a situation logically leads us to a crisis situation that could become chaotic. Only a profound transmutation of society can save us. This transmutation has already commenced and will be brief in terms of time.

MAN CONFRONTED WITH NEW TECHNOLOGIES

Man, as the centre of the universe, where the macrocosmos converges and from the microcosmos is reached, forms a complete whole. He constitutes an open system, made up of an infinite number of impulses and sensations brought about by chain reactions in which the human organism plays a motor and regulatory role.

Stimulus → Organism → Response

The human organism naturally tends towards an equilibrium, to the "amorous state" as defined by A. Laforetac. It is really a metastable equilibrium between the positions of "love" and "dislike" that can swing, according to external influences, to one side or the other. It can easily and rapidly change from one state to another, though always tending towards an equilibrium.

In a normal person, for example, states of unbalance are normally brief, although they are immediately followed by another state of unbalance. If, however, these states of unbalance, where "loving" predominates over "disliking", or vice versa, become extended, the human being can become mentally and physically ill.

On the other hand, if the external stimuli are such that the organism finds itself incapable of finding the suitable response that would take it to an amorous or homostatic state, a series of internal tensions would be created, with ensuing behavioural effects and modifications.

In the past, new discoveries and inventions, affecting the stimulus → response chain, took place with sufficient time lapeses that enabled the human being to recuperate his balance. Nor were they perhaps as radical and innovative as the inventions and discoveries that have taken place, almost vertiginously, over approximately the last hundred years. Man barely has time to adapt to the innovations. He is unable to achieve his "homostatic state", his internal equilibrium, or to modify his behavioural pattern with regard to the current "new technologies".

Furthermore, one should also consider the nature of these new technologies with respect to the human individual.

If we consider the definition that Eloy Terrón gives and we consider tools as "a piece of nature that man suitably transforms to achieve his purpose" and, moreover, that they serve to correct human faults and increase the exploitation of natural resources, we have to agree in that the new technologies are sophisticated tools. They are much more sophisticated than those primitive stone axes that Homo, who was still at the beginning of his "sapiens" status, extracted from nature, or parts of it, to
achieve his aims. The human brain has continued developing and today one can perhaps refer to the "Homo informaticus" as a superior link within the development of the human race on Earth.

Man both knew and trusted his tools. These gave him confidence in the task of attempting to exploit and dominate nature, with his principal aim being that of survival. By means of these, man achieved that internal "amorous", emotional equilibrium which is so necessary.

Amongst those activities designed to making nature more useful and submissive, is that of work. Work requires the adaptation of a physical or mental effort in the adaptation of the human being to his surroundings. By means of work, the essential scope of the sphere has been transformed: the noosphere and the biosphere. Work evokes connotations of punishment, due to the effort involved in its fulfilment. "Work takes a lot of work". But working conditions are being alleviated and improved with tools, and hence new technologies.

In contrast with previous times, man currently does not know the tools he is managing, he does not understand the new technologies. Of course he knows how to use them, but he has no idea of how they are made nor how they work. That knowledge belongs to a privileged few who can dominate the rest. A new class of illiteracy has emerged. Such people feel insecure, they cannot control their stimuli and do not achieve an interior state of equilibrium. That contradictory sentiment of "loving" or "disliking" the new technologies, causes man to break with his own convictions and his own self, provoking that lack of adaptability to his own environment.

The argument, to this point, has been based purely on the human or natural dimension of man, as a further part in nature's machinery. But there is another side to man, his spiritual component. There is a current movement to make man forget the idea of religion, of a relationship with a Supreme Being. In an attempt to satisfy this need, obscurantist ideas are gaining ground: astrology, magic, palmistry ... In the same way that the human being needs to compensate his internal mental-physical tensions, so he must do with his spiritual tensions. Moreover, both types of tension must remain in a mutual equilibrium and in a state of interaction. It is difficult to understand how a stimulus → organism → response reaction can exist without the mental-physical and spiritual attributes of that organism also taking part. Moreover, the "psyche" is much closer to a man's spiritual component than to his physical one.

If we also consider the spiritual value of the human being, we can readily comprehend that the "new technologies" do not provide him with a complete internal satisfaction and for this same reason he distrusts them. In spite of this, he fully realises the advantages they can provide, which will only be in relative terms, never in absolute terms.

Turning now specifically to the application of new technologies in information science, one will have to make a distinction between the members of the profession and the users. The professionals in information science accept the new technologies with less distrust. They have got to know them better, they know
the tools and they get to recognise their use in making work more productive. Work is better accepted when one reaps its benefits, be they economic, spiritual, or both (we can perhaps be accused of being utopian).

On the other hand, the introduction of new technologies imposes a transmutation in the practice of the profession which should be met with rigour and optimism, with complete acceptance. A librarian or documentalist, for example, will cease being an intermediary between the harshness of culture or science and their exploitation. He will continue being the guardian of science and culture because someone will have to feed the data bases and control the documents produced by bibliographic references, catalogues, summaries, ... But he will no longer have to search for and track down documentation and information in order to hand it over to the user.

According to Ch. Oppenheim, the documentalist, librarian, or archivist will become a consultant, with a new knowledge of microelectronic and computing techniques.

With respect to the user, we shall have to consider two distinct types: the user who employs the new technologies in his everyday work, and the average man.

For the latter, these technologies constitute a game and a diversion and, without taking them very seriously, he accepts them.

The former is much more distrustful, because these technologies must prove their usefulness. It is true that both fashion and publicity constitute a powerful form of penetration, and modern tools get to be used which are not really profitable ... but none the less they are used.

SOCIAL IMPLICATIONS

The human being is naturally sociable. J. Castillo Castillo refers to the "Homo sociologicus" as a "fictitious being made up of supposed norms of conduct taken from diverse social possibilities, who has connections with other similar beings". He is fictitious in that he is conditioned by his internal impulses (perhaps his genes) and his surroundings. J. Ortega y Gasset writes about "man and his circumstances" and P. Calderón de la Barca reminds us that life is a dream, it is fiction and "everyone dreams of what he is, although no one understands".

Within this fiction, these circumstances, these dreams ... each person is given the role he should play. Perhaps, to the best of his capabilities? If this were so, there would be no strife in the world. But not always is the role played to the utmost. So many are the factors that intervene!

The "Homo sociologicus" develops his role on three different planes, in which he performs his allotted duties within his surroundings, as a part of nature.

- individual
- family
- social
As an individual, a person must be in agreement with himself. He should attain that degree of homostatic, "amorous equilibrium" that we mentioned in previous pages. He should control and compensate his internal tensions and, if capable, dominate them. Of what may serve the new technologies to reach his homostatic state? The answer he gives to this question will be an indication of his degree of acceptance.

Today, there is still a certain degree of distrust with regard to the new technologies. It is better, on the other hand, that they be assimilated gradually. The rapidness with which inventions and discoveries are made, causes an internal confusion and consequently an internal lack of satisfaction, a sense of unease ... and completely irrational, outlandish modes of behaviour. This can happen not only on an individual level but also on a professional level.

This individual situation also has its repercussions on the family and there is a tendency to break with all preestablished structures. The family no longer has meaning as a social institution. That feeling of union, of penetration, of belonging, has disappeared. Individual selfishness predominates over an integrated devotion to the group.

The younger members of the family, who are most affected by the new technologies, and in particular those applied to information, display such shallow and variable sentiments, with no roots, that they obviously do not understand what their role can be in a social institution they no longer need. The influence of the new information technologies and their rapid development prevent one from reflecting upon the past. Their goal is the present ... the future is senseless.

The older components of the family are those who most feel and suffer from this situation. Their very ideas, prejudices and convictions are being destroyed. They are completely bewildered. Who can be wrong, they ask. And they are unconvinced by the answer, which, to a certain extent, is an acceptance of the new situation. These technologies do not help in solving the dilemma. The most the older members can hope for, is to become more confused ... The family is therefore on the point of disappearing, although solutions still exist.

These situations and factors become even more pronounced when we refer to the social level as such i.e. relationships between people. Individuals look to themselves and not to others, for compensation for their internal unbalanced state. They become increasingly more selfish and materialistic. Economic and political structures also contribute, as they are ruled by governments that are also characterised by selfishness and materialism. There is considerable talk of the rights of man, but in fact what are really looked after are the economic rights of the powers, which are looked after by human beings.

There is also talk of the aid given to weaker countries, as if it were an altruistic action. What really lies behind this, however, is a desire for economic and cultural domination. It is mentioned, for example, that the inhabitants of certain areas of Africa must be taught how to read and write. Considerable action and resources are employed, but in what language do they
teach them to read and what is the cultural vehicle? It is true that this is an inbred characteristic of mankind. Each race wants to spread its own culture, as an expression of an elaborated and assimilated humanistic and scientific knowledge that is in the process of being used. This "blemish" on the face of mankind is not just attributable to the application of new technologies to information science, where information becomes more relevant. It does, however, exert a considerable influence.

Despite this economic and materialistic selfishness, it has been observed that sentiments of friendship and companionship have remained unscathed and in fact have grown stronger. This perhaps cannot be appreciated in the isolated behaviour of unknown individuals in immense urban communities. It becomes evident between fellow students, colleagues at work, or travelling companions. Such a reaction is only natural, as the human being is naturally affective. Within him he has a collection of affective impulses that require a reciprocal relationship. He looks for communication with similar persons. It has always been said that when a friendship springs up between two people, it is because they have "something" in common that creates a spiritual and reciprocal bond. Mankind, in spite of all its advances, has not been able to discover the nature and essence of that "something", but it effectively exists.

We cannot foresee whether the new technologies will be of help in the study and penetration of that "something". The future does not belong to us. Nevertheless, we cannot help hoping that if this were to happen ... we would attain a better knowledge of people and we could perhaps seriously attempt to improve life in all its aspects. We believe that this could be feasible, despite psychological tendencies that speak of a connection between pleasure and pain, which are compensated within ourselves in quality and quantity. The greater the pain, the greater the pleasure. He who lives intensely, will experience great pleasures and much suffering. Not so is the case of the more apathetic person, or he who is more insensitive, or he who has ataraxia, who lead indifferent life styles and neither experience pleasure nor suffering.

There are several sayings that warn us of this human condition. For example: "There's no pleasure without pain" or "After a storm comes a calm". Literature also gives obvious examples of what we have been saying. For this reason, we will quote Cervantes in "La Comedia Entrenenida": "Nature created - the luck of the mortals - between goodness and evil - as custom shows us. This truth I know well - without trusting to demonstrate; - yesterday wept he who laughs today - and he who cries today, laughed yesterday.

THE GENERATION GAP

We have reach a point in our line of reasoning where we feel we ought to mention the differences that have arisen between the different generations of today.

There have always existed discrepancies between the mentalities of the younger and older generations, simply because, ever since
ancient times, mankind has been evolving. Young people are born in a more advanced stage of evolution, they grow up in this age, with the imprint of the new mentality of their time. To date, however, periods of evolution have been extremely slow and the adult generations have been able to maintain their hegemony and establish norms of conduct. The advice of the old was followed and their authority was preserved. These were the people with experience and they transmitted their knowledge. Retrospection was the norm.

At the present time, evolution has taken place at a vertiginous rate. Inventions and discoveries are rapidly succeeded by others. P. Armer states that four years after leaving university, one's knowledge is then obsolete and one should have to start studying all over again. These technical advances, including of course the new technologies, also imply a change of mentality and adaptability with respect to the medium. Human beings don't react as rapidly. It is only the younger generations, who are born among the new technologies, who can consider them as something innate. A rift is consequently formed between the generations of the over 40's and the younger people. The limit is probably still too high. It is now possible that people in their 30's do not easily understand the attitudes and behaviour of 18 year olds, who are of age and hence own the world.

Young generations, born into the new information applied technologies, are already familiar with these and get to know them when at school. They know the tools they are using, they will trust them and they show no distrust. They will be better prepared to accept a job than those who are still distrustful. This brings us to yet a further cause for rift; the fight for a job at a time when these are extremely scarce.

Work is now, instead of being something disagreeable and unpleasant, becoming something that is good and desirable because, among other reasons, it provides an economic independence to young people and allows them to break their ties with that "retrograde" and "stagnant" family. Further reason for the rift between the two generations.

When the younger generations sense that everything is subject to rapid change, they should look for that homostatic internal state which balances and regulates their stimuli. These stimuli, however, are governed by increasing progress and are extremely varied and disconcerting, in contrast to those of previous, but recent times. They must hence provoke extremely varied and disconcerting reactions. Examples of this can be seen in art, music and the theatre, as mentioned by our much admired friend and prestigious scientist, Manuel Alia. Yet another reason for the generation gap.

We could continue analysing further, situations, but we feel that these are sufficient in demonstrating that this important and irreconcilable gap between the generations of today is basically due to the application of new technologies to information science and hence to the diffusion of information.

MORAL IMPLICATIONS

If we consider ethics and moral behaviour in terms of norms
of conduct, dictated by cultural developments depending on the
 corresponding moment in each historical age, it is now necessary
to analyse what could be, or are, the moral implications of
the new technologies when applied to information science.

When studying the subject of ethics, one should take into account
the spiritual or animistic aspect of man and his relationship
with the Omnocosmos (1), in which he is immersed with a unilaterally,
and at the same time complex, dependence. This is a question
that, amongst many others, human beings are still not in a position
to understand. Man's mental and cultural evolution has not
reached that stage of development that permits him to delve
into these matters. Perhaps he will reach this in the future.

Let us return to our moral implications ... that are logically
involved with the already mentioned changes in social conduct.

Morals, ethics and deontology have gone to pieces. What sense
has the sentence "Do well and dread no shame" in a world of
such selfishness and extravagance?

In situations of work, however, where there are more serene
generations, deontological and ethical rules are maintained.
This is particularly evident between colleagues and between
suppliers and customers. In a documentation centre, for example,
a correct and honourable professional conduct is observed with
respect to the user.

There is a further factor that should be mentioned, which is
found in the middle aged generation, as opposed to the senior
citizen generation.

The middle aged generation bears most of the brunt of the advances
in science and techniques, above all in the application of new
technologies.

We have emphasised the implications of the application of these
new technologies: mistrust, insecurity at work, fear of reduction
of purchasing power, fear of not being up to date in modern
techniques, being out of touch with the younger generations, ... a
lack of understanding of the new forms of culture, ... Such
people have to make a considerable mental and spiritual effort,
at least to keep up with the times in which we are living. They
should try to find that internal balance; but external tensions
are such that not everyone is capable of achieving this balance
and one frequently comes across cases of depression, gloom,
despondency, bad temper, ... All this not only affects the
individual but also his environment, his family and society.
That previously mentioned crisis situation is aggravated.

The euphoria in the use and current diffusion of new technologies
is a result of trends to attempt to escape from these crisis
situations and perhaps to trust the technologies or to try to
be bewildered by them.

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(1) With this term, we do not pretend to give God a materialistic
dimension, but that of omnipotence, enveloping the macrocosmos,
the mesocosmos and the microcosmos. In all three, the essence
of God is to be found.
One further point that should be mentioned, is everything related to the legal aspects of information, i.e. the indiscriminate reproduction of documents, both written and recorded, piracy in publishing, trickery in computerised information, authors' copyrights, ... These are all extremely delicate situations and are difficult to solve. The key to the question rests basically in one's own conscience, for what is the use of norms or rules, if one doesn't feel the need to obey.

WHERE IS MANKIND HEADING?

Throughout this exposition there seems to be a prevailing pessimistic and fatalistic slant that leads us to a world in crisis, without any possibility of salvation. Nothing is certainly further from what we have in mind and in fact we customarily adopt optimistic approaches.

It is true that the problematic situations we have posed here, which merely reflect the present-day situation, fill us with mistrust. We long for the past, have little faith in the present and are sceptical regarding the future. But we are in fact in a period of crisis, of fundamental and rapid change. From the application of telematics and studying infodynamics, who can tell what life and society will be like within a few years, say, for example, in the year 2000?

There has been such a growth in the new information applied technologies, that the importance of the "information industry" within the world's economy, is being studied. The information market will be the one that gives the power to the country that possesses it. If there was a gold standard that dominated economic fluctuations, later substituted by oil (black gold), today J.M.Berenguer speaks of a "grey gold" with respect to the intellectual evolution, in which there is an increase of knowledge and a development of the new technologies, permitting its diffusion and storage.

We have now gone beyond the Contemporary Era, and even the Atomic Age, which was so brief yet so important, and have now entered the Information Era - still frequently referred to as post-industrial or service era. We are overwhelmed by information, though at the same time it is necessary for our very existence. Without information of either type, as a phenomenon and as a process, life cannot develop. A clear example of this can be seen in how a newly born baby becomes aware of his existence. On the other hand, information should be considered as a source of work, a resource, raw material, an economic value and a tool for work, as well as perhaps other qualities such as its value in politics, in the diffusion of culture, ...

We have mentioned elsewhere that mankind as such, placed on the planet Earth, as it is, constitutes a closed system with no other mankind with which to relate. It is well known that closed systems bring about a degradation of matter into energy and this into information. When this information reaches massive proportions, the system either has to transmute, in order to assimilate this information, or it dies. Mankind has, at least for the moment, chosen the alternative to transmute and assimilate information. Evidence of this is to be seen in the great social changes taking place today.
It is precisely these new technologies applied to information that help us in this assimilation. These technologies that seemed so harmful will eventually be mankind's salvation.

Let us now think of other attributes, factors and, what might even be, qualities. At present, these technologies are costly. They are not within the possibilities of every budget and their use is necessarily limited. Let us hope that this will be a beneficial measure. These technologies also belong to the group of "soft technologies" which do not pollute and which conserve and help to maintain an ecological balance. The so-called "hard technologies" cannot of course disappear because, for example, we still need steel, aluminium and plastics. Perhaps though the production of such things as paper, copper, sulphur, ... could be reduced.

The application of new technologies to telematics will bring about a radical change in associated ways of life. By working, or studying, at home, the family will be thrown together and it will perhaps become more united.

With the reduction in working hours arising from automatisation, people will have more free time. They will no longer be slaves to their own work and they will be able to devote more time to cultivating their spirit. They will become more human, more social and less selfish. Obviously, under these conditions, salaries will have to be sufficient so as to cover everyone's needs. If not ...

What we are trying to say is that, although the great increase in information and the development of new techniques have brought about this state of crisis in which man is immersed, paradoxically, a correct and rational use of these techniques will enable man to overcome the situation and tend towards the possession of the truth which is the path towards wisdom.

Likewise, we feel it is necessary to emphasise the importance of information within information science and, in particular, with respect to documentation itself. With documentation, we refer here to documents, data, ... constituting, as a whole, a gross knowledge. At the onset of mankind there would be no more than documentation. Throughout the ages, man has been elaborating documentation and obtaining information which, in turn, has shaped his culture. There has been a gradual decrease in documentation, accompanied by an increase in information. Can we possibly predict that in the end, there will only be information? Will this then mean that we are in possession of the truth?

REFERENCES


SUMMARY

The 20th century has seen the development of new technologies, which are of utmost importance to the implementation of information science. The implications in man's social life can be readily understood. His way of life, way of thinking and behaviour have all changed.

Our aim in this paper is to underline the social implications of these new technologies, considering particularly the most recent ones, such as those that come under teledocumentation: videotex, videophone, etc., in people's way of life, their relationships...

We also consider the moral implications and their influence on copyrights, the integrity of employers, the keeping of professional secrets...

Also to be considered are the implications to the internal mental process of the human being, which ultimately lead to the acquiring of knowledge, to the possession of the truth and the attainment of the ideal yet always remote happiness.

At the onset of mankind only documentation existed. Man transformed this into information. The end of humanity is predicted when only information exists. Will happiness then be attained?