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COMPUTER SOCIETY, PRESENT AND FUTURE

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1. Introduction: a light approach

A basic theme of this paper is, of course, that further increases in computer technology will tend - in spite of some obvious gains - to reduce the quality of human society in general, and human relations in particular. That theme is certainly not old and has probably accompanied the introduction of any technology, pointing not only to deep rooted fears, but also to a certain tendency towards sterec typed thinking about technology - which certainly does not mean that this stereotype, like most other stereotypes, is without a considerable grain of truth. And yet the costs may appear small relative to the benefits for many people. In spite of traffic accidents, in spite of the dying-away of forests, even in spite of interminable jams with cars bumper to bumper making considerable less progress than pedestrians in cities like Napoli, Sao Paulo, Djakarta, Tokyo people - including the present author - stick to their cars. A major reason is the gain in freedom the car offers, the choice of departure and arrival in time, the choice of trajectory in space, not to mention with whom - in social space - one wants to travel. At the same time there is also a growing awareness of the costs, and there are some imaginative efforts to restore the balance, for instance through the introduction of car-free-zones in time (car-free-days, legitimized through gasoline saving) and car-free-areas (such as the "inner city", or at least walking streets - legitimized by reference to increased shopping when cars do not disturb all other kinds of human activity). But the cars are here, more than ever.

As mentioned, the theme is not new. I am reminded of a Soviet joke from the 1930s of the three stages of love: first stage, under capitalism, between man and women; second stage, under socialism, between man and tractor and women and tractor; and then the final, the ultimate third stage under communism: between tractor and tractor. And the corresponding joke for computer society: the woman who married three times but still was a virgin, because the first time she happened to marry a homosexual, the second time the man got a heart attack and died, and the third time she married a computer specialist with a terminal on his night table.

Just as repressive, authoritarian, dictatorial society produces a very high number of political jokes the exponential increase in computer technology is likely to produce a high number of computer jokes - some of them possibly made by the computers themselves according to some joke software. This is the normal human reaction particularly in front of powerlessness: to hit back with a collectively shared joke, defining a language of discourse, capturing the situation in a nut-shell. But there are, of course, certainly very serious aspects to the computer revolution. Thus, one story from the Federal Republic of Germany (Der Tagesspiegel, 19 March 1983) is about a mother in Düsseldorf who tried to commit suicide and to kill her 15 years old daughter and 13 years old son (she managed only to kill the daughter) when she was informed from the insurance company that according to the computer she was suffering from a venereal disease. She thought it was syphilis and that it had been transmitted to her children. The verdict of the court was that she had not been responsible because of the shock she had suffered; nothing is told about court proceedings against the insurance company.

Another example of a computer "error" (Der Spiegel No. 3, 1984) comes from Wiesbaden where the address book for 1984 contained the names and addresses and telephone numbers of 972 citizens who should have been protected by the strictest secrecy (many of them where working for the police, specialists on terrorists and drug dealers, and so on). Of course, their names and addresses were in the computer like for everybody else, but protected by a code; the wrong code had somehow been used (totally unintended?) and everything went into print. It goes without saying that in this case immediate action was taken, forty functionaries of the city of Wiesbaden were all over the city collecting the 500 copies that had already been delivered of the total stock of 4,000.

Another set of stories comes from the United States, of course. In Massachusetts the computer was used to check income and buying records of people on public welfare. If names came up where the comparison suggested that too much had been bought relative to the income they were simply dropped from the welfare, without being given the reason,

or having a chance to protest. Of course, it showed up that in a number of cases the data were wrong and that in other cases there had been no fraud at all.

In Los Angeles the police was using for some time, as a basis for arresting people, a percentage of matched characteristics between a profile generated by a computer and a given suspected person. The minimum percentage should be 61 - if that requirement were met the person might be arrested, even if - as once happened - he was black rather than white as the criminal was supposed to be.

And then, there are all those individuals who have been placed under extended government surveillance because of wrong computer information, as there have been individuals who have been denied loans and rentals of apartments because of erroneous credit profiles (The Daily Yomiuri, 19 March, 1984). But there is, of course, also the story from Sweden (always handy as the general case of over-technologised society) in Der Spiegel, reporting that in Sweden there are 60,000 electronic files on persons, in a little town like Hamstad, 3000 that can be used to check whether there is a discrepancy between income information and spending information. The person who buys a furcoat for 35,000 Swedish Kroner might get into difficulties if his income tax return puts his income as only twice that amount, 70,000 Swedish Kroner. Of course, it does not help him to use a credit card since that will already have been included in the information base. And it might also show up, to quote Der Spiegel, that the furcoat was of size 36 when the wife, according to some other file, uses the size 42 - - - .

And so on, and so forth. Everybody will have his own story to contribute, particularly of how computers are used to dilute responsibility ("it is in the computer"; "the computer is being reprogrammed"; "the computer stands/is dead today"), and of the gnawing sensation that somewhere in the country/world a "profile" of exactly me can be/is being/has been put together. There is a feeling of computers on top of people, with very few, and not necessarily the best, people on top of the computers. Are these just prejudices - or symptoms of realism, and resignation?

2. Towards an analysis

The reader will have noticed that many of the examples used above have one thing in common: at one place or another there was a mistake, an error. The type of analysis that will be made here will not be based on that kind of criticism, which will be considered cheap and itself erroneous. Obviously any new technology at an early stage will be replete with errors, and the information about such errors will serve as a major stimulus to make the technology more perfect. It is the perfect, not the imperfect technology that merits analysis from the points of view of human and social development, not the imperfections however important they may be in practice, unless it can be convincingly shown that these imperfections are inevitable aspects of the system. Its a little bit like basing the argumentation against arms races on the possibility of technical mistakes, of computers going wrong, launching missiles on their own, etc. That analysis does not hit the arms race as such.

Much more important would be an analysis of how the various laws, regulations and rules against combining datafiles are circumvented. Thus, in Norway (Aftenposten, 17 January 1984) the military will get information about criminal records of applicants for Norwegian United Nations Forces, even without the consent of the person concerned (because it would be too time-consuming). One may pay some attention to the structure of the situation: a relatively uncontroversial goal, participation in United Nations Forces, is used to legitimize a highly controversial act - linking together computer-data so as to get a more complete profile of the person. It can probably be assumed that once the routine has been established it will apply to other parts of the Norwegian forces, and without the consent of the person concerned even if there is no time pressure, because of the precedent.

However, let us try to be more systematic about this. The first step would be a definition of a computer. It will be seen as any hardware/software combination that includes memory, processor and communication. In short, a computer should be able to store even very high amounts of information, to process that information (to "compute"),

and to communicate the result, even quickly and over large distances. A devise that can only store information is known as a file, an archive; a devise that can only process or compute is known as a calculator; and a devise that can only communicate is known as a devise for (tele-) communication, such as a telephone, telex and so on.

It is clear from the very beginning that computers easily compete with human beings in terms of memory and communication. It may well be that if all the things memorized by human being are somehow put on the table, or rather on the chip, it would still offer substantial competition, but in any one given field the computer is superior. Also, the human being is not very good at communicating much information during short spans of time and over large distances in space.

However, does this mean that computers are also more "advanced" than human beings when it comes to processing? This is the difficult question to answer: will artificial intelligence (AI) turn out to be superior to ordinary human intelligence? Will the gap between computers and human beings be closed, even with a negative window, in the sense that computers will be superior? Will that threaten human beings? Will it simply mean that we may have to abdicate, to give in to the computers as superior?

There are similarities between the two. A computer is equipped with a potential as a computer, built into the "hardware"; a human being has a similar potential built into the anatomy/physiology of the human body. They can both be supplied with "software"; the computer receives it as a program, whereas the programming of humans is referred to as "socialization" into a certain culture, partly territorial cultures (civilizations or macro-cultures, national sub-civilizations or cultures, sub-national sub-cultures) or professional cultures (such as the ways in which mathematicians, economicst, philologians, military people, actors, computer people are programmed). So far the similarity is convincing, and that also refers to the next step: no doubt computers can be programmed to change their own program, just like human beings seem to be - although

more or less, the capacity being limited. But, and this is the essential point in any search for the crucial difference between computers and human beings: are computers able to reflect on their own program and transcend it in an non-programmed, meaning completely unpredictable way or, will the self-reflection have to be programmed, in other words made predictable in advance? I would tend to think that the answer is no. But I would then immediately have to add: are human beings able to do this? Or is this only an illusion, one more expression of our arrogance, claiming that we can achieve states of conciousness where we look at ourselves and our own patterns of behavior with full and complete freedom, disturbed by nothing so that our self-transcendence will lead to results totally unpredictable, not only by ourselves but also by anybody else?

I am not sure of the answer to either of these important questions although my hunch would be, as mentioned, "no" in the first case, "yes" in the second. However, these may still not be the most important questions to be raised. If one is worried about the gap between computers and human beings being closed then the question may simply have been put the wrong way: it may be not so much a question of computers catching up with human beings as human beings "catching down", in other words humans becoming more like computers rather than computers becoming more like humans. Intuitively this may sound like a better way of raising the problem. It seems difficult to imagine computers so erratic as human beings, meaning erratic in so many erratic ways - so filled with the unexpected as more complex human beings seem to be, some of it being creative and praised as science and art, some of it being plainly destructive and feared as crime and violence. In other words, it is not only a question of to what extent human beings and the capacity known as "intelligence" is being well imitated by computers but also of the extent to which computers have been increasingly imitated by human beings as one would expect in any process of close interaction. A car-owner may be not only obsessed by a car demanding to be parked, washed, greased - but will probably not behave like a car. A computer-owner is sufficiently similar to a computer to become even more similar; both may get "under the skin" of the other, so to speak.

Before an effort will be made to delve into this let me try to raise another question: why do we have the computer revolution right now? I think there are three answers, and all of them are important.

On the rational level there is no doubt that increasingly complex societies, with ever-rising numbers of peoples, of goods and services and of transactions with them will lead to an increasing demand for information. Or, to be more precise, at least to a marketable supply of computers. In a relatively small habitat, such as a limited village, human brains will have sufficient memory to store necessary information, to process it, and human ways of communicating information (oral, written, non-verbal) will be sufficient for communication. In increasingly national and global societies one might agree that this is no longer the case. Hence, information storage is needed (memory); processing of that information may be needed, and communication of the information from storage to users is a rational way of coping with the problem. Of course, we have had this for a long time, the encyclopedia being the typical storage of enormous amounts of information, but very low or zero in processing capacity, using only the alphabet as ordering principle, and very low in communication capacity. We have had train tables, air-line guides and telephone books, and so on. None of this was very important in a tradition-oriented local community; they are indispensable today.

But then there is also a more irrational reason. It has been alluded to above and it has to do with precisely the relationship between computers and human beings: the search for something absolute, something above us, something indisputable, something more like god, particularly in a period where the traditional judaeo-christian god seems to be very ill, even dying. A typical example would be the use of the computer program Modis II by the Norwegian government, the computer that is supposed to store all relevant information about the Norwegian economy, process it and communicate its findings about the best course of action. Thus, Modis II may communicate that surplus oil money can best be invested abroad. The answer from a computer attains in the eyes of the uninformed the aura of something absolute, something undisputable: thus spake the computer - - - . One Norwegian

parlamentarian did not accept this and asked some time ago whether he could have a look at the program (the software). The answer from the minister was no, for security reasons. Whose security? - Of course, above all the security of the programmers who in the program have built in their assumptions about global, national and local economies, with all their prejudices, déformation professionelle, and so on.

Then there is a third reason which is linked to structures and processes in the world economy, right now. One theory about the world economy is the theory of the four Kondratiev cycles, lasting something like 45 years. The first cycle, after the industrial revolution was dominated by the textile industry, the second cycle by the railway and steel industry (and chemicals), the third cycle by the car industry and the fourth, supposed to be coming up in the early 1990s, may probably be the computer cycle, particularly then the 5th generation computer that such major countries as Japan, United States and Britain are fighting to dominate (in all probability with Japan as the winner). Of course these cycles are not only tied to the production of one particular type of product; with the product comes a style of life, a way of reconstructing society. The first cycle led to urbanization/industrialization; the second cycle expanded this through national networks and even international ones based on railroads and everything that grew up along the rails; the third cycle created a whole car industry with all its side-lines, eventually leading to super-highways, supermarkets, super-suburbia and the fourth cycle, based on the computer, will probably change the life styles even more, leading to new ways of furnishing ones's homes, of inter-human communication, and so on - to be explored below. The basic point made here is only this: a cycle runs out of steam, the job to be done implicit in its logic is more or less accomplished, an economic crisis threatens to destroy the system, there is a need for a new upturn, in other words, not only for a new product, but for a product that may re-shape society in equally profound ways as the preceding three.

Taken together these three reasons are good reasons, more than sufficient to explain the tremendous increase in computerization of human society and human relations in particular. The question, of course, is what the consequences will be.

3. An outline of computer society.

Above a distinction has been made, sometimes, between social development and human development, between human society in general and human relations in particular. We shall stick to the same distinction although it is not a very sharp one, and put the analysis of computers and power structure in the bag "human society in general", and the analysis of computers and human interaction in the second "bag".

Modern technocratic society is based on three major pillars: bureaucracy, corporation and intelligentsia, meaning by the latter the non-manual professions of various kinds. In addition to that there is a more or less clear power structure, here referred to as partocracy, based on the party, military and police. Societies differ in the relative weight they give to technocratic BCI-structure and the partocratic PMP-structure, and also in the relative weight given to the three components within these two structures.

But they do not differ very much in one particular regard: all six of them tend to be vertical, and tend to be on top of a society which for that reason becomes even more vertical. More particularly, there is a division of labor between top and bottom, there is the conditioning of the bottom by the top which defines how to think and act about what, there is usually some kind of tight cooperation at the top and fragmentation at the bottom, and even some kind of integrated, more total views on the top and highly segmented thinking and action at the bottom.

Of course, a computer system fits beautifully into this. The very structure of the technology with the central main computer-with tremendous memory, processing and communication capacity-and terminals placed lower down or further out is not isomorphic to modern hierarchies by chance. They are designed exactly to become similar in structure. At the very center the organs of central bureaucracy can draw their conclusions about individual citizens, corporations

about their customers, professions about their clients, police about their criminals, military about their conscripts, and the party about everybody. Whereas the computer terminals may be relatively inexpensive this is certainly not the case for the major computers in the center of the system; they can only be acquired by organizations sufficiently strong, rich and powerful to acquire them. Bureaucracy will be able to carry out a census more complete than ever before, corporations will be able to map production and consumption patterns, the professions to predict client behavior, the police to control by matching information, the military to play war games, and the party - in principal - to supervise the other five.

Of course, it is not quite so simple as that. There is the important example of Big Brother possessing techniques that can also be turned against him, from the last days in the (largely) non-violent battle against the highly repressive regime run by the late Shah of Iran. He is reported to have had 27 TV screens in his office, with the corresponding cameras giving a relatively adequate picture of what is happening in squares and major streets of Tehran. In other words, a latter-day version of the old king sneaking out in the market place, poorly dressed, to hear how people were talking about him. The population, however, knew where the cameras were located and one day was able to burn fotos of the Shah in front of 25 of them. It is reported that this was a less than edifying sight for the Shah, himself a relatively hardened person, as he watched his 27 screens - - - .

And there is the movie War Games; the little boy breaking into the computers, followed by real life cases! People are imaginative.

Similarly, there is of course the possibility that the periphery may react against any center by feeding it with wrong information, or the type of information the center would prefer not to know. In short, the system only works to the extent that the periphery of anyone of these six hierarchies, not to mentioned those who are in the periphery of all six at the same time (and they are very numerous!) cooperate. No doubt, through the dialectic of these events people will learn to react, to defend themselves against computerism. But the potentials

available to the top for having rather complete images of people at the bottom without any reciprocation, without the people having any chance of knowing exactly who are the people on the top (see the example from Wiesbaden mentioned above!) are rather scary. A topheavy speciety becoming even more topheavy, regardless of how much people play games with their home computers!

If we now turn to human interaction in general the perspective does not necessarily become brighter. It can be seen in quantitative and in qualitative terms, and human interaction can be divided into primary interaction (within families, among friends), secondary interaction (within organizations and associations) and tertiary interaction (in the market and the public domain, in search for goods and services). To take the quantitative aspect first: computers will probably make tertiary and secondary interaction much less necessary. Goods and services can be purchased in a more direct manner, using the computer and various electronic devices, such as electronic transfer of funds (of money) and the computer to obtain information one otherwise would have gotten talking with the person in a service institution, for instance a travel bureau. No doubt there are advantages to getting that information by the flip of a switch, or whatever one does. But in practice it may mean that cities will tend to be empty since cities are grandiose service institutions. Streets will be naked, people will be sitting at home, reading desk terminals and receiving their goods pre-packaged through vastly improved service systems tied up with computer ordering systems. Sub-urbanization will become super-suburbanization.

This may also apply to secondary interaction. Organizations may tend to do their job in a more decentralized manner since information can be communicated over longer distances by means of computers. Factories and offices may gradually wither away, people may sit at home doing their jobs which may be good for family life, but may also mean a further deadly blow to the city as the biggest and possibly greatest working place human kind has invented. Again, vastly improved transportation systems may rotate parts and bits for productive assembly, and the final products around, according to computer instructions, eliminating the necessity of humans to meet humans. Structures will be more hidden than ever before.

The end result of this tendency will be a tremendous fragmentation of people into primary units, not necessarily families in the conventional sense, there could also be "communes", collectivities of various kinds. The pressure will be on these forms of human organization; they will have to absorb the energies and the positive and negative emotions that otherwise were also given to secondary and tertiary interaction. My suspicion will be that that pressure will ultimately be loaded onto the shoulders of the women in these forms of interaction, already overloaded, in advance, and that primary units will break down more than ever, meaning the virtual end of the nuclear family.

This opens an interesting perspective if we combine what has been said about power and verticality with the quantitative distribution of human interaction. My guess would be that in future society it will be almost a privilege to be permitted to work without computer. In the typical organization those at the very top will probably still interact with each other directly in what is known as human-human interaction. Those lower down will be assigned to human-computer interaction, sitting in front of the screen, in front of the computer all day long, although their working day will be shorter and shorter. Those at the top will occasionally test how the computer works among other reasons to see to it that nobody lower down will have a monopoly of knowledge and insight. And then, at the very bottom, will be computer-computer interaction, between the branches of the same hierarchy, between hierarchies, between nations. Maybe, one day, spy satellites will tie up with another?

In other words, it will be a society with elite interaction face to face at the top, de-humanized interaction lower down, and then human interaction among people in general on the side line, in the primary groups, isolated, fragmented away in families and communes. The latter may not be so dangerous in itself, but when combined with the former we are heading for a very top heavy society, steered by a small elite (that in case of war may even live in bunkers, under-ground), divided into units too small to provide that elite with real countervailing balance.

What, then, about the qualitative aspect of interaction? By and large I will imagine that increasing computerization leads to a tremendous command over information of a certain kind, both memory, processing and communication functions. But at the same time computerization will probably also lead to decreasing competence in inter-human relations, decreasing linguistic competence, and decreasing intellectual competence, for the following reasons.

We human beings are limited in our competence. We cannot possibly hope to become very good at computers and devote very much of our time to them without costs in terms of human competence. A child asking for comfort, asking for support, for instruction, for playfulness is much more demanding than a computer asking to be used; one reason being that intellectual problems can often be decided in the sense that a solution is found, or the problem is defined as being incapable of solution, whereas emotional needs are not of that kind. They are endless, there may be no solution, and it does not help any to define them as unsolvable. Any marital relation is the story of the difference of intellectual problems and emotional needs. How much more easy then for homo computerensis to escape from children and/or spouse to the computer, just as generations of professionals or whatever have done before him (or her): escaping into professionalism.

As to linguistic competence: the computer puts certain demands on human language. The language may be BASIC, and it stands to reason that months and years using this computer language (or similar ones) will not pass unnoticed but express itself already in BASIC English, BASIC Norwegian, and so on. Communication will be very clear, to the point, nothing superfluous - and for all these reasons extremely poor, no allusions, no double ententre, low experiments with forms and contents and relations between forms and contents.

And this may be even more so for the thought structure implied. The basic unit of information remains the dichotomous choice, the "bit". Programs are written as sequels, in a linear fashion. The fact that they are performed extremely quickly does not make them less linear.

And this will probably be a major point in the future of computerized society: will it affect human beings in such a way that they will tend to think in an even more dichotomous and linear fashions, in other words in occidental thought patterns? Is the computer, still in other words, the ultimate tool in the occidentalization of the world, eliminating ambiguities, eliminating holistic perceptions and intuitions, eliminating dialectic thinking? And, is this possibly their major function - not necessarily an intended one, in the conquest of the world? We do not know today. We know that tele-conferences and tele-dialogues are not necessarily bad, at the same time as we know that when people start watching television four hours per day, seven hours, eight hours then it must have some impact and not all of it can be good even if they do not really watch, but only have the screen on as a flicker, even relatively pleasant to the unwatching eye.

We also know that there will be guerrillas against computerization, some of them criminal, some of them political, some of them more random. And we know that any major social force has a tendency to create a counter force, and that these counter forces are not yet very strong because the computer system is not yet that strong. Probably we shall relatively soon have time zones and space zones where computers are banned, and not only the tiny efforts in social space to keep the computers out of certain areas. We are simply at the beginning of all of this, and it is difficult to see much further. But what we do see is undoubtedly of such a kind that it should be watched closely, and every effort should be made to make those professionally concerned with computers as socially conscious and ethically committed as possible - even with some kind of hippocratic oath as a condition for operating their powerful devices.