# The Computer Revolution and the Problem of Global Ethics

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ABSTRACT: *The author agrees with James Moor that computer technology, because it is 'logically malleable', is bringing about a genuine social revolution. Moor compares the computer revolution to the 'industrial revolution' of the late 18th and the 19th centuries; but it is argued here that a better comparison is with the 'printing press revolution' that occurred two centuries before that. Just as the major ethical theories of Bentham and Kant were developed in response to the printing press revolution, so a new ethical theory is likely to emerge from computer ethics in response to the computer revolution. The newly emerging field of information ethics, therefore, is much more important than even its founders and advocates believe.*

## INTRODUCTION

The inspiration for my paper comes basically from two sources. The first is the article by James Moor, "What is computer ethics?".[1] Published in 1985, it is already considered to be a classic in the field of computer ethics. This means that the validity and importance of its content are still highly regarded today. The other source of inspiration for the considerations presented here, is my work on the problem of a global ethic.

Unlike many scholars who are presently active in the field of computer ethics, my theoretical background is not in computer science, nor in technology in general. My philosophical background is not primarily in the analytic tradition. By saying this, I want to make it clear that my perspective on the Computer Revolution is not the perspective of someone who is participating in the making of this revolution. It is a perspective of someone who is defenselessly exposed to that revolution, who is overwhelmed by its current and who does not know whether she will ultimately be brought by this current to a sandy, sunny beach, or smashed against a rock or left out in

muddy standing water. And I want to make it clear as well that I do not look at the problems of computer ethics from the perspective of someone who can program or design a computer, although I welcome any information about what kind of problems there are. For this reason, computer ethics understood as professional ethics, i.e., ethics for those who have power over computers, is seen by me as just a fraction of computer ethics *per se.*

I am one of those individuals whose actions in cyberspace are dictated and defined by computer designers and programmers. Therefore, I am very much inclined to look at the Computer Revolution and computer ethics as "them," as the powers beyond me, whom I cannot influence, not to mention control. At the same time, however, these are the powers I cannot ignore, nor can I escape them. They are part of my life, they are my reality, almost in the same way Nature is.

Furthermore, neither nature nor computer technology can be fully controlled. I am not in the position of those who have the power to decide which computer program to choose for mass-production or whether to shut down the system. I represent the perspective of those who may or may not be granted the privilege to travel through cyberspace; individuals like me may also be coerced to enter this space. (One of the features of revolution, any revolution, is that it is merciless to its opponents, and at best it ignores the by-standers, providing that the by-standers get out of the way.) To quote Michael Heim,[2] the author of *Metaphysics of Virtual Reality*:

> The danger of technology lies in the transformation of the human being, by which human actions and aspirations are fundamentally distorted. Not that machines can run amok, or even that we might misunderstand ourselves through a faulty comparison with machines. Instead, technology enters the inmost recesses of human existence, transforming the way we know and think and will. Technology is, in essence, a mode of human existence, and we could not appreciate its mental infiltration until the computer became a major cultural phenomenon. (p. 61)

Each one of the old technological revolutions changed the way people functioned in Nature; with computer technology, however, there is the probability of the creation of a reality which is an alternative to Nature and equally complex. Humans are to be seen as inhabitants of both these worlds.

In this paper, I intend to concentrate on two issues. One of them is the definition of computer ethics proposed by James Moor, especially some of the implications this definition may have. The other issue is the way Moor addresses the question of the Computer Revolution.

My thesis is that both his definition of computer ethics and his presentation of the Computer Revolution are correct if applied locally and in respect to a relatively short period of time. By 'locally', I mean North America and Western Europe, but my suspicion is that Moor considers mostly the Anglo-American reality. His paper "Is Ethics Computable?",[3] known to me only in manuscript form reassures me somewhat in that supposition. By "a relatively short period of time," I mean the span of approximately two hundred years which Moor refers to in both his papers, although his

real focus is on no more than five decades.

This is not sufficient, because his article "What is computer ethics?", however minimalistic in approach, illustrates one of the most important philosophical problems of our times. The definition of computer ethics ought to be widened and the field of computer ethics should be regarded as a great deal more than yet another example of professional ethics.

The  purpose of this paper is to show that:

1.  The Computer Revolution causes profound changes in peoples' lives world-wide. In cyberspace, there are no borders in the traditional sense. The borders as well as the links between individuals world-wide will be increasingly defined in terms of the individual's ability to penetrate cyberspace.

2.  Because of the global character of cyberspace, problems connected with or caused by computer technology have actually or potentially a global character. This includes ethical problems. Hence, computer ethics has to be regarded as a global ethic.

3.  Up to the present stage of evolution of humankind there has not been a successful attempt to create a universal ethic of a global character. The traditional ethical systems based on religious beliefs were always no more powerful than the power of the religion with which they were associated. No religion dominated the globe, no matter how universalizing its character. The ethical systems that were not supported by religion had even more restricted influence.

4.  The very nature of the Computer Revolution indicates that the ethic of the future will have a global character. It will be global in a spatial sense, since it will encompass the entire Globe. It will also be global in the sense that it will address the totality of human actions and relations.

5.  The future global ethic will be a computer ethic because it will be caused by the Computer Revolution and will serve the humanity of a Computer Era. Therefore, the definition of computer ethics ought to be wider than that proposed by James Moor. If this is the case, computer ethics should be regarded as one of the most important fields of philosophical investigation.


## COMPUTER REVOLUTION

In his presentation of the anatomy of the Computer Revolution, James Moor uses as the point of reference the Industrial Revolution in England.  I wonder whether he would reach different conclusions had he chosen the revolution caused by the invention of the printing press instead. (I mean in Europe, since books were printed in China from around the year 600 C.E.)[4]

Moor writes about the Industrial Revolution indicating that its first stage took place during the second half of the Eighteenth Century, and the second stage during the

Nineteenth Century. This is a span of about 150 years. Let me compare this with what happened after the printing press was invented in Europe.

Gutenberg printed the "Constance Mass Book" in 1450, and in 1474 William Caxton printed the first book in the English language.[5] By 1492 "the profession of book publishers emerges, consisting of the three pursuits of type founder, printer and bookseller."[6] This was, roughly speaking, forty years after the invention of the printing press, the same amount of time Moor claims the Computer Revolution needed for its introduction stage.  In 1563, the first printing presses were used in Russia. (This was the same year in which the term "Puritan" was first used in England, one year before the horse-drawn coach was introduced in England from Holland, and two years before pencils started to be manufactured in England.) And in 1639, the same year in which the English settle at Madras, two years after English traders were established in Canton and the Dutch expelled the Portuguese from the Gold Coast, the first printing press was installed in North America, at Cambridge, Massachusetts.[7] This is about 140 years from the first publication of the printed text by Johann Gutenberg, almost the same amount of time Moor considers for both stages of the Industrial Revolution.[8]

Another problem pointed out by Moor in "What is computer ethics?" is the question of how revolutionary a machine the computer is. He claims that it is the *logical malleability* that makes the computer a truly revolutionary machine. Moor challenges the "popular conception of computers in which computers are understood as number crunchers, i.e., essentially as numerical devices." (p. 269) He further writes:

> The arithmetic interpretation is certainly a correct one, but it is only one among many interpretations. Logical malleability has both a syntactic and a semantic dimension. ... Computers manipulate symbols but they don't care what the symbols represent. Thus, there is no ontological basis for giving preference to numerical applications over non-numerical applications. (p. 270)

Here, too, the similarity between a computer and a printing press seem to be evident. Like the printing press, computers serve to transmit thoughts. The phenomenon of the printing press is that it meant both the technological revolution, i.e. the profound change in the kind of physical objects used to substitute for human muscles, as well as a revolution in the transport of ideas, the communication between human minds. The same can be said about a computer.

I have written elsewhere about the impact of the printing press on the western hemisphere.[9] Here, I would like to mention only two of the many changes caused by the invention of movable printing type. The mass-production of texts and hence their growing accessibility made reading and writing skills useful and caused a profound change in the very idea of education. Gradually, the ability to read and write became an indispensable condition of human beings' effectiveness in functioning in the world.

While the number of individuals who were able to read and write expanded rapidly, the time needed for the popularization of texts grew shorter.  Dante's "Divine Comedy" needed 400 years to become known throughout Europe, Cervantes' "Don Quixote" needed twenty years for the same, and "The Sorrows of Werther" by Goethe only five years (see Escarpit, p. 21).[10] The printed texts made it also possible to acquire knowledge *individually* (i.e. not through oral public presentation) and *freely*

(i.e., without control of either the individual tutor or the owner of the collection of manuscripts). One of the results of this situation was the loss of belief that knowledge means possession of a mystery, a *secret* wisdom, inaccessible to outsiders. Knowledge became an instrument which everyone could and should use. Faith in the power and universal character of the individual human mind was born and with it a new concept of the human being. The masses of believers who used to obey the possessors of knowledge, discovered that they were rational individuals capable of making their own judgments and decisions. This paved the way for the two new ethical concepts that were ultimately created by Immanuel Kant and Jeremy Bentham.

The function of the most important machines invented at the end of the Eighteenth Century, the steam engine and the spinning machine, was the replacement of manual labor. This is, of course, true of the printing press and computer as well. But their primary function, their real importance, lies in the fact that both increase so incredibly the efficiency of the labor of the human mind — and not only the individual mind. Computers, like the printing press, allow human minds to work faster and more efficiently, because of their ground-breaking impact on communication and the exchange of ideas. Like the printing press, they are creating a new type of network between human individuals, a community existing despite the spatial separation of its members.

One could argue that the invention of the telegraph, telephone, radio and television are all serving faster and better communication between human beings as well. Why not compare them with computers? Scholars point out the versatility or, as James Moor calls it, *malleability,* of both computer and movable printing type. James Moor claims that *logical malleability* is what makes the computer a truly revolutionary machine. If we accept this criterion, then the power and complexity of the Computer Revolution cannot be compared to anything less than the power and complexity of the revolution caused by the printing press.

## PRINTING PRESS AND ETHICS

The changes and problems caused by the Industrial Revolution of the eighteenth and nineteenth centuries did not bring with them any truly new ethics. There was no need to create one. The world could be explained and brought into order with the help of the already existing theories. Marxism, the only truly powerful theory that was consciously created in response to the changes the Industrial Revolution caused in peoples' lives, is often accused of not having a coherent vision of new ethics. The point is that it does not need to and, as a matter of fact, could not really have one. Part of the popularity Marxism enjoyed for some time was due to the fact that it is an ideology promising the fulfillment of old dreams.

Marx, as a matter of fact, did accept ethical theories already elaborated on by others: by Bentham and Kant, by Plato and the Ten Commandments. Even his social theory relied on ethical premises elaborated on earlier; among others, on Locke's statement that it is one's labor that changes an object of nature into one's property. Marx never questioned this statement. He spent years trying to show that in the world

of his times those individuals who put their labor into objects of Nature are unjustly deprived of the ownership of those objects of Nature transformed by them into something new. According to Marx, one of the most important results of the Industrial Revolution was that the process of manufacturing goods became a collective process. This meant for him that the ownership of these goods should also have a collective character. He pointed out that the ownership of capital had already an international, global character; therefore the just owners of the products of their labor should abolish national boundaries as well. From an ethical point of view, there was nothing substantially new in the theory created by Karl Marx. And there was no other, new theory after Marx that would challenge the already existing ethical systems.

In Marx's times, there were new ethical theories, though. These theories were created in the eighteenth and nineteenth centuries. The authors of the two especially interesting and challenging theories were Immanuel Kant and Jeremy Bentham. Their theories, however, were not responses to the Industrial Revolution. They were responses to the questions caused by religious wars and the social revolutions of the seventeenth and eighteenth centuries, events that historians linked with the invention of the printing press. (Of course, the printing press was not the only cause of such profound changes, but neither was the steam engine or, for that matter, computer technology.

Since many authors who write on the subject of computer ethics, including such prominent scholars as James Moor, Terrell Bynum and, above all, the author of a major textbook in the field of computer ethics, Deborah Johnson, use the ethics of Bentham and Kant as the point of reference for their investigations, it is important to make clear that both these ethical systems arrived *at the end* of a certain phase of profound and diverse changes initiated by the invention of movable printing type. The question is: were these ethical systems merely solving the problems of the past or were they vehicles driving humankind into the future?

The ethical systems of Kant and Bentham were created during the time of the Industrial Revolution, but they were not a reaction to, nor a result of, the Industrial Revolution of the eighteenth and nineteenth centuries. Likewise, there was no immediate reaction in the form of an ethical theory to the invention of the printing press. Problems resulting from the economic, social and political changes that were caused by the circulation of printed texts were at first approached with the ethical apparatus elaborated on during the high Middle Ages and at the time of the Reformation. Later, there was a period of growing awareness that a new set of ethical rules was necessary. The entire concept of human nature and society had to be revised. Hobbes, Locke, Rousseau and others did that work. Finally, new ethical systems like those of Kant and Bentham were founded. These ethical theories were based on the concept of the human being as an independent individual capable of making rational judgments and decisions, freely entering the social contract. Such a concept of the human being was able to emerge in great part because of the wide accessibility of the printed text.[11]

The ethics of Bentham and Kant are both manifestations and a summary of the European Enlightenment. They were created at the time when Europeans were experimenting with the idea of society being a result of a free agreement (social

contract) between human individuals rather than submission to divine power or to the power of Nature. Moreover, such a new, contractual society could have been created only in *separation* from traditional social groups. The conquest of the world by Europeans, called by them geographic discoveries, and the colonization of the 'new' territories, made it possible. Both Locke's definition of property as appropriation of nature by one's own labor, and the lack of the concept of private property in most of the invaded societies, helped that task.

Despite their claims to universalism, Kant's as well as Bentham's concept of human being refers to European man, free and educated enough to make rational decisions. 'Rational' means here the type of rationality that grew out of Aristotelian and scholastic logic. This tradition was strengthened by Pascal, Leibniz and others. It, of course, permitted exclusion from the ranks of partners in discourse all individuals who did not follow the iron rules of that kind of rationality. The term 'mankind' did not really apply to such individuals. Finally, this tradition turned into Bentham's computational ethics and Kant's imperialism of duty as seen by calculating reason.

The nature of both these ethical systems must be very attractive and tempting for computer wizards, especially for those who grew up within the influence of the 'western' set of values. It is quite easy to give the answer 'yes' to the question asked by James Moor: "Is Ethics Computable?", if one has Bentham's or even Kant's ethical systems in mind.[12]

It is very likely that now the situation will repeat itself, although probably less time will be needed for all phases of the process to occur. The Computer Revolution is a revolution. Computers have changed the world already in a profound way, but it is obvious that presently we all can see only the tip of the iceberg. Computer technology causes many new situations and many new problems. Some of these new situations and problems are of an ethical nature. There are attempts to solve these problems by applying to them the now existing ethical rules and solutions. This procedure is not always successful, and my claim is that the problems will grow. Already, there is a rising tide of discussions on the ethical crisis in the United States. It is starting to be noticeable that the traditional solutions do not work anymore. The first reaction is, as is usual in such situations: let's go back to the old, good values. However, the more computers change the world as we know it, the more irrelevant the existing ethical rules will be and the more evident the need of a new ethic. This new ethic will be the computer ethic.

## THE PROBLEM WITH THE DEFINITION OF COMPUTER ETHICS

In 1985, at the 10th International Wittgenstein Symposium held in Kirchberg am Wechsel, Austria, Heinz Zemanek, professor at the Technical University Vienna and one of the founders of computer technology in Europe, was given an award for his impact on the development of this field. In his paper presented on that occasion and entitled "Will the computer rehumanize natural sciences?",[13] Zemanek claimed that computer technology at its then present level of development needed new thinking and a new philosophy. The world could not and should not be seen any longer as a

particular order of individual objects. It should be seen as a *whole* or a system. Another significant point made by Zemanek was his statement about reciprocity in the relationship between humans and the world of technology that was created by them.

In the same year, 1985, James Moor proposed the following definition of computer ethics: "On my view, *computer ethics* is the analysis of the nature and social impact of computer technology and the corresponding formulation and justification of policies for the ethical use of such technology." (What is Comp. Ethics?, p. 266) Next, Moor concentrated on the term "computer technology". Since he did not focus on the meaning of the phrase "ethical use of such technology", I assume that he did not consider it to be problematic. I assume further that under "ethical", he means: "what is in our (i.e., American) society regarded to be ethical." My assumption is supported by the fact that Moor uses the term "our society" and the examples he gives present situations that took place in the United States.

What kind of ethic is it? Moor's other text "Is Ethics Computable?" shows his interest in Bentham. Deborah Johnson, who frequently cites Moor to support her statements and seems to be in general agreement with his views, presents in her book ethical relativism (which she dismisses), utilitarianism and deontological theories, but it is really only Kant in whom she is interested. Terrell Bynum, whose classes on computer ethics I had the pleasure to audit, recently added Aristotelian ethics to the theories of Bentham and Kant.

These are all ethical systems of the Western hemisphere and utilitarianism can hardly be regarded as a universally accepted ethical system even within western culture alone. Indeed, there is *no* agreement about what kind of ethic is the ethic of western societies or even the ethic of American society today. As Johnson writes, the basic principle of utilitarianism is that "everyone ought to act so as to bring about the greatest amount of happiness for the greatest number of people. Utilitarians conclude that *happiness* is the ultimate intrinsic good, because it is not desired for the sake of anything else."(p. 24)[14] But *what* actually is happiness? And even if it is not desired for the sake of anything else, is it not so that we can do many nasty things in the pursuit of happiness? The literature of the seventeenth and eighteenth centuries, from Hobbes through Marquise de Sade to Goethe is a parade of examples illustrating this thesis.

Since the problem of happiness remains unsolved, we have the "no harm" principle. But this principle, combined with happiness understood as the ultimate intrinsic good is an unrealistic postulate in societies that are fueled by competition. Then there is fairness. At least, we can have a just, that is, fair society, says the neo-Kantian John Rawls. There should be an equilibrium of rights and duties. Let's sign that contract, and let's be rational. The *pursuit* of happiness is everybody's right.

But then again, Kant did not think that happiness should be the basic principle of ethics. Moreover, he claimed (in "Foundations of the Metaphysics of Morals") that if you acted with the intention to be happy, it was *not* a moral action, because you were expecting gratification in the form of your good feelings. On the other hand, Kant said that a human being should never be seen as a means, but only as an end. Does this mean that a human being is the highest value? Many understand him that way. However, individuals who read a page or two in Kant know that he really did not care

that much for those whom he did not consider enlightened enough to use reason and intellect as their only guides in action. This, of course, opens anew the whole discussion of the question, what is a human being.

Or maybe not. Maybe no discussion on that subject is necessary. The same eighteenth century that brought us Kant, and in which Bentham was born, gave us a concept of human being that can be very useful if we would like to delete the line between humans and computers.[15] I have in mind the concept of human being as a machine. The French philosopher and physician Julien Offray de La Mettrie published his book *Man a Machine* (L'Homme machine) in 1747. This idea, which initially caused very strong angry protests, is today so common that in one of the early sequels of the very popular TV series "Northern Exposure" a physician repairs a broken airplane, because he thinks of the airplane's engine as a heart. In Philadelphia, Pennsylvania, in the Franklin Institute, every day hundreds of visitors watch a technologically sophisticated educational film about the human body in which the human body is routinely talked about as a machine.

In their book *Naturally Intelligent Systems,*[16] Maureen Caudill and Charles Butler present the work on neural networks done by scientists so far. On the cover jacket it says:

> Neural networks ... are information processing systems that are physically modeled after the structure of the brain and are trained to perform a task, rather than being programmed like a computer. Neural networks, in fact, provide a tool with problem-solving capabilities — and limitations — strikingly similar to those of animals and people.

If a human being is just a machine then we surely can expect man-made machines to be human-like. We can even repeat the Story of Creation. It is also obvious that the story of Frankenstein has its continuation in both scientific laboratories and in the world of artistic fiction. From this area, I would like to mention one of the most interesting attempts, namely, the film "Blade Runner". There, the problem with humanoids was caused by their pursuit of happiness. (La Mettrie, by the way, published a book entitled *Discourse on Happiness* (Discours sur le bonheur, 1750) as well.)

Caudill and Butler try to reassure the reader of their book that the international scientific community which is working on recombinant DNA technology and other biological techniques that will "allow us eventually to grow whatever neural configurations we need for a given application" (p. 266) is still far away from reaching its goal. How far away? Caudill and Butler think about 100 years. However, when after the release and phenomenal success of "Jurassic Park," the Public Broadcasting System prepared a program about the likelihood of actually re-creating extinct organisms from the preserved DNA, some of the scientists on that program thought 50 years would be needed for this task to be successfully completed.[17] In October, 1993, the (already second) International Conference on Ancient DNA took place for three days at the Smithsonian Institution in Washington, D.C. According to George and Roberta Poinar,[18] pioneers on work in this field, there were almost three times as many participants at the second conference, as there were at the first one. "Subscriptions to

the *Ancient DNA Newsletters*, a means of communication for the members between meetings, have swelled to 600—not immense, but not bad for a field still in its infancy", the Poinars wrote enthusiastically (p. 192). This shows the great dynamism in the growth of that new discipline. The research on ancient DNA will not only help to understand and solve many of the mysteries of life on our Planet, but will also provide scientists with powerful new tools of creation of new forms of life.

Should all of the above happen according to the projected scenario then, of course, another question will have to be answered, namely the question of the differences between "natural" and "artificial" life. This question will be added to the question about the differences between "natural" and "artificial" intelligence. If the two forms of life and the two forms of intelligence come together close enough, the question "Is ethics computable?" asked by Moor will probably be replaced by the question with which he opened his article (i.e., the article entitled "Is Ethics Computable?"): "Can computers be ethical?" This would significantly change the meaning of the term "computer ethics." On the other hand, after the close proximity between humans and humanoidal computers is achieved, the question "Can computers be ethical?" would have to mean also "Can humans be ethical?" So, we will probably go back to the old question: "What is ethical?" or "Is this action ethical?" Therefore, whether computers will increasingly become human-like or not, the basic ethical problems and questions will remain the same; that is, as long as there will be an interaction between different subjects, i.e., as long as the action of one subject will affect at least one other subject.

In the closing part of this paper, I will use the term "humans" or "people", but I would like to make clear that the term "human-like" may be added at will.


## GLOBAL CHARACTER OF ETHICS IN THE COMPUTER ERA

Revolution, more than any other kind of change, means that two processes take place simultaneously: the process of creation and the process of destruction. The problem is that in a human society this usually causes conflict because both creation and destruction can be regarded as a positive or negative (good or bad/evil) process. The assessment depends on the values accepted by an individual or group of people who are exposed to the revolutionary changes.

James Moor writes: "On my view, computer ethics is a dynamic and complex field of study which considers the relationships among facts, conceptualizations, policies and values with regard to constantly changing computer technology." (What is Comp. Ethics, p. 267) This is a broad enough definition to be accepted by almost everybody. The problem starts once we realize how many people may be affected by and interested in those facts, conceptualizations, policies and values, and how diverse this group is. We are talking about the whole population of our Globe.

Computers do not know borders. Computer networks, unlike other mass-media, have a truly global character. Hence, when we are talking about computer ethics, we are talking about the emerging global ethic. And we are talking about all areas of human life. What does this mean for the understanding of what computer ethics is?

Computer ethics is not just another professional ethic. Deborah Johnson devotes

one chapter of her book to the justification of the thesis that computer ethics is professional ethics. From the perspective from which she presents the issue, she is definitely right and I support wholeheartedly the possibly strict ethical rules for computer professionals.

However, there are still at least two problems remaining.

**1**. Unlike physicians or lawyers, computer professionals cannot protect themselves from activities that are similar to their own but performed by non-professionals. Therefore, although many of the rules of conduct for physicians or lawyers do not apply to those outside of the profession, the rules of computer ethics, no matter how well thought through, will be ineffective unless respected by the vast majority or maybe even all computer users. This means that in the future, the rules of computer ethics should be respected by the majority (or all) of the human inhabitants of the Earth if the Computer Revolution is to be democratic in its nature. In other words, computer ethics will become universal, it will be a global ethic. If the Computer Revolution becomes elitist however, computer ethics could easily turn into a secret code of an ivory tower elite. Such a possibility is real if social analyses by authors like the late Christopher Lasch[19] are correct.

**2**. Even assuming that computer ethics applies only to professionals, professionals as a group are not totally isolated from the society in which they function. The function of their profession is significantly determined by the general structure of the society of which they are a part. At present, there exist various societies and cultures on Earth. Many of them function within different ethical systems than those predominantly accepted in the United States or even in the industrialized west. Hence, professional ethics, including the ethical codes for computer professionals, may differ between cultures to the point of conflict. And even if it does not differ, the conflict may still be unavoidable. For example, computer professionals in two countries who happen to be at war, may obey the same rule that computers should be used to strengthen national security. In such a situation, computers may become a weapon more deadly than the atomic bomb. What was and still is the discussion about scientists' responsibility for the use of nuclear energy may now apply to computer professionals. Computerized weapons may affect all of humankind, and the potential destruction may be greater than in the case of an atomic bomb.

Another aspect of the same problem: on February 25, 1995, the NBC Nightly News aired the information that the CIA monitors the Internet. If that is true, the CIA does it obviously for security reasons. However, the question is whether this means that certain ethical rules such as respecting privacy do not apply to certain subjects? If the CIA does not need to respect an ethical code, who else is entitled to be unethical and on what grounds? If one country can do it, what *moral* imperatives could prevent other countries from doing the same? Let's assume that such moral rules could be found and applied. Does this mean that the ethic of that other country is better than the one which allows a state agency to violate the principle of privacy? If it is better, why shouldn't it be applied on a global scale? If it is better in an ethical sense, but does not help to survive in the case of conflict, does it mean that it should be abandoned? But

then would not that be giving permission to abandon all other uncomfortable ethical rules? Of course, the simple answer to these questions would be that the problem exists because of the existence of different cultures competing and sometimes being hostile to each other. Such an answer, however, still does not solve the problem of how to abolish the hostility between cultures while maintaining freedom of self-realization or, in other words, avoiding totalitarianism.

Problems like the above mentioned will become more obvious and more serious in the future when the global character of cyberspace makes it possible to influence the life of people in places very distant in space from the particular acting subject. This happens already today, but in the future it will have a much more profound character. Actions in cyberspace won't be local. Therefore, the ethical rules for these actions cannot be rooted in a particular local culture, unless, of course, the creators of computer ethics accept the view that the function of computers is to serve as a tool in gaining and maintaining dominion over the world by one particular group of humans. I would like very much to believe that this is not the case. I would like to believe what Dr. Smarr of the University of Illinois said (quoted from William J. Broad's article in *The New York Times*[20]):

> It's the one unifying technology that can help us rise above the epidemic of tribal animosities we're seeing worldwide. One wants a unifying fabric for the human race. The Internet is pointing in that direction. It promotes a very egalitarian culture at a time the world is fragmenting at a dizzying pace.

It may be an example of yet more wishful thinking however. I am afraid that the creators of computer ethics may contribute to the problem, if they do not fully see the importance of their undertaking. It seems to me that, unfortunately, they sometimes are not strong enough in their demands. For example, the experience of Tom Forester and Perry Morrison with their Australian students (which could be the same in many parts of the world) caused them to limit the goals of their program in teaching computer ethics. They write:

> Computer Ethics has evolved from our previous writings and in particular our experiences teaching two courses on the human and social context of computing to computer science students at Griffith University. One lesson we quickly learned was that computer science students cannot be assumed to possess a social conscience or indeed have much awareness of social trends and global issues. Accordingly, these courses have been reshaped in order to relate more closely to students' career goals, by focusing on the ethical dilemmas they will face in their everyday lives as computer professionals. (Preface)[21]

Reading this, I would like to ask: If not we, then who? If not now, then when?

I am afraid that this paper may appear critical of what has been done in the field of computer ethics. In fact, my only criticism, if it is a criticism at all, is that the scholars who have chosen to explore the problem of computer ethics were too modest in defining the area of investigation as well as the importance of the subject.

## REFERENCES AND NOTES

1    Moor, James H. (1985) What is computer ethics? *Metaphilosophy* **16** (4): 226-275.
2    Heim, Michael (1993) *The Metaphysics of Virtual Reality*, Oxford University Press, New York, Oxford.
3    Moor, James H. (1991) *Is Ethics Computable?* Manuscript, written after 1991.
4    The fact that print did not revolutionize life in China the way it did in Europe is itself a subject of interesting analyses.
5    In 1481, Caxton translated from French into English *The Miracle of the World*, a popular account of astronomy and other science.
6    Grun, Bernard (1982) *The Timetables of History. A Horizontal Linkage of People and Events*. Based on Werner Stein's *Kulturfahrplan*, Simon and Schuster – A Touchstone Book, New York, p. 217.
7    In 1637, "Geometrie" by René Descartes was published. In 1638, Galileo's "Discorsi e Dimonstrazioni Matematiche." In 1639, Gerard Desargues published his book on modern geometry.
8    The timetable for the Industrial Revolution varies greatly depending on sources and criteria. The one chosen by Moor is popular, but the view that the Industrial Revolution started with the invention of the printing press is popular as well.
9    Dialogue – A New Utopia? (in German). In *Conceptus. Zeitschrift für Philosophie*, Jhg XX, Nr. 51/1986, p. 99-110. English translations published in *Occasional Papers on Religion in Eastern Europe*; Princeton, Vol. VI, No. 5, October 1986, p. 13-29 and in *Dialectics and Humanism*; Warsaw, Vol. XVI, No. 3-4/1989, p. 133-147.
10   Escarpit, Robert (1969) *Rewolucja ksiazki*, translated from French by Jerzy Panski; Warsaw. French original: *La revolution du livre*; Paris, UNESCO 1965. English: *The Book Revolution*, 1966.
11   As you can see, from my point of view things happened very much the way Thomas Kuhn speaks about the paradigm shift.
12   Neil Postman (p. 13) comments as follows on the first known instance of grading students papers (at Cambridge University, in 1792): "...The idea that a quantitative value should be assigned to human thoughts was a major step toward constructing a mathematical concept of reality. If a number can be given to the quality of a thought, **then a number can be given to the qualities of mercy, love, hate, beauty, creativity, intelligence, even sanity itself.**" (my bold - K.G.K) Postman, Neil (1993) *Technopoly. The Surrender of Culture to Technology*, New York, Vintage Books A Division of Random House.
13   Zemanek, Heinz (1986) Wird der Computer die Naturwissenschaft rehumanisieren? In: Leinfellner, Werner & Wuketits, Franz M: *Die Aufgaben der Philosophie in der Gegenwart*. Proceedings of the 10th International Wittgenstein Symposium, August 18 - 25, 1985 Kirchberg am Wechsel, Austria; Wien, Holder-Pichler-Tempsky, p. 33-38. The paper was presented in German.
14   Johnson, Deborah G. (1994) *Computer Ethics*, second edition; Prentice Hall, Englewood Cliffs, NJ.
15   There are opponents of such an idea, e.g. Hubert Dreyfus, as well as enthusiasts, e.g., scientists whose interests are neurocomputers. Dreyfus, Hubert L. (1992) *What Computers Still Can't Do. A Critique of Artificial Reason*, The MIT Press, Cambridge, MA, London.
16   Caudill, Maureen & Butler, Charles (1990) *Naturally Intelligent Systems*, The MIT Press, Cambridge, MA.
17   On the other hand, the USA network TV news broadcasted (on March 19, 1995) the information that the scientists from Beijing, China, deny the possibility of re-creation of extinct species from DNA any time soon.

18    Poinar, George & Poinar, Roberta (1994) *The Quest for Life in Amber*, Addison-Wesley Publishing Company, Reading, MA.

19    Lasch, Christopher (1995) *The Revolt of the Elites and the Betrayal of Democracy*, W.W. Norton & Company, New York, London.

20    Broad, William J. (1993) Doing Science on the Network: A Long Way From Gutenberg. *The New York Times*; Tuesday, May 18.

21    Forester, Tom & Morrison, Perry (1990) *Computer Ethics. Cautionary Tales and Ethical Dilemmas in Computing*, The MIT Press, Cambridge, MA.

22    Grun, Bernard (1982) *The Timetables of History. A Horizontal Linkage of People and Events*.  New, updated edition. Based on Werner Stein's *Kulturfahrplan*, Simon and Schuster Touchstone Edition,  New York.