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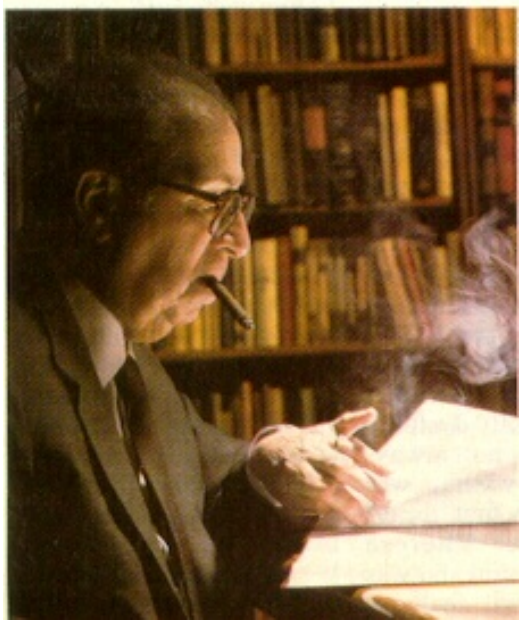

COMPUTERS AND ROBOTS:

The Promise and The Problem To Be Solved

Mortimer Adler

The Promise

Machines are labor-saving devices. In the centuries before the invention of power-driven machinery, the production of real wealth—consumable goods, useful services, and capital goods or instruments of production—was powered by human and animal muscle. As late as the middle of the last century, barely a hundred years since the beginning of the industrial revolution, more than eighty-five percent of our goods and services were produced by human and animal muscle and less than fifteen percent by power-driven machinery.

The reversal of this ratio has been achieved only in the very recent past, and only in the most technologically advanced countries. In the rest of the world human toil still bears the heavy burden of producing wealth, often to a minimal degree and without any surpluses to store

for barren days.

In the most technologically advanced countries, the twentieth century is the century of the computer. To call this the century of the computer (and, with it, of the robot) is to characterize what is most distinctive about it. It has been called the information age, the century of the knowledge explosion, and the epoch of atomic power, but without the contribution made by computers these other distinguishing aspects of our time would not have been as fully developed. And we are still only in the early generations of the computer. Generations that lie ahead hold out promises that are imaginable only by writers of science fiction.

However, we can foresee the direction in which these promises, when fulfilled, will take us. The amount of toil in the total of human work will be steadily decreased and be replaced by another kind of work, for which the only proper word is "leisure."

Toil is the kind of productive work that is repetitive drudgery. The worker engaged in it learns nothing from it, is in no way improved by doing it, and benefits from it only through the compensation earned. In contrast, leisure-work always involves some degree of creativity, some measure of learning and self-improvement. It is the kind of work that improves the worker in addition to earning a compensation for doing it.

In almost every case in which computers and robots have replaced human beings in the production of commodities or the performance of services, whether it be the making of shoes or the process of bookkeeping, the tasks involved are repetitive and mechanical. For that very reason, machines can perform these tasks more rapidly and more efficiently than can human beings. Whatever a machine can do, a machine should do.

In addition, there are many goods and services on which we have come to rely that would be totally unavailable to us without the intervention of machines, most of which now involve the input of computers. The high-speed transportation provided by jet airplanes is one example of this. Space exploration is another.

There are countless other things that have changed our lives in ways we have become so accustomed to that we do not realize we would be deprived of them if we had to depend on the productive powers of human beings, aided only by hand-tools and beasts of burden.

The promise held out by the computers and robots of the future is of

human life enriched by increasing amounts of free time that can be used for all self-improving forms of leisure-work as well as for the pleasures of play. If that is the promise, what is the threat?

The Problem To Be Solved

The threat comes from a by-product of computer technology. That by-product is called the artificial-intelligence machine, or AI for short. The AI machines that now exist are inventions motivated by the ultimate aim to produce a machine that will be able to do everything the human intellect can do and perhaps even more.

Put as concretely as possible, this means that computer technologists hope to produce a thinking-machine the performance of which will be indistinguishable from the human performance of thinking, and may even someday surpass it. We know that they have not done so yet, but there are many reputable scientists and philosophers who believe there is no reason to doubt that they will be able to do so in the not too distant future.

Why is this a threat to mankind? To answer this question it is necessary to remember that the human intellect (and with it the freedom of the will) has, in the long tradition of Western thought, been regarded as the distinguishing mark of human personality. In all the legal codes of the West, the line that divides persons from things involves a difference in kind, not just a difference in degree. Brute animals and machines are things, not persons, and do not possess the rights that human beings as persons have, because they do not have intellects and free will.

If human beings can do to a greater extent what brute animals can do to a lesser extent, the difference between them is a difference in degree. It is a difference in kind only if human beings can do what brute animals cannot do at all. If animal thinking is never more than perceptual thought and if human beings can rise above that to the level of conceptual thought, dealing with objects that are unperceived and even imperceptible, then the difference is one in kind, not degree.

Which it is—kind or degree—has serious practical consequences. Our Western legal codes do not acknowledge animal rights, as they do human rights. Animals can be killed, but they cannot be murdered, because they do not have the right to life possessed by persons. Animals are not legally wronged by being imprisoned in zoos (as human beings would be if they were so treated), because they do not have the right to liberty possessed by persons.

What has all this to do with the AI or thinking machines projected for the future? The fact that human beings can reach a level of thinking not attained by animals is sometimes explained by a difference in degree between the size and complexity of the human brain as compared with the size and complexity of the brains of such higher mammals as chimpanzees and dolphins.

No animal brain in the further course of evolution on Earth may ever come near to the size and complexity of the human brain, but AI machines, which are supposed to be analogous to the human brain, may someday be built that will have electrical and chemical components equal to the human brain in number and in the complexity of their connections. They may even surpass human brains in these respects.

When that happens, will not their thinking performances either perfectly match the thinking performances of human beings, or perhaps even surpass them? If so, what grounds would we have for drawing the sharp line made by a difference in kind between persons and things—between men and machines, or men and brute animals? What would then become of our claim to have certain rights that are exclusively human because we are persons distinguished from things by virtue of our having intellects—the ability to think conceptually and to choose freely—not possessed at all by animals and machines?

Not only our exclusive claim to having certain unalienable rights that constitute the dignity of the human person would be severely challenged. In addition, certain beliefs common to the three great religions of the West—Judaism, Christianity, and Islam—would be highly questionable.

In these religions, unlike some of the religions of the East, man alone is regarded as a sacred animal, made in the image of God as nothing else is, because man alone has a certain measure of spirituality, that is, immateriality. It is in this respect that man and man alone resembles God, who is a purely spiritual being.

How is man's possession of a measure of spirituality, or immateriality, to be understood? That is the problem to be solved.

The Answer To That Question

The answer lies in the relation of the human intellect to the human brain.

Consider for a moment our power of sight. We know two things about it. We know that we cannot see without using our eyes. We also know

that in seeing we make use of our eyes. We not only cannot see without them; we also see with them. Seeing, in short, is completely the function of bodily organs—the eye and the whole optical apparatus including the optic nerve and the visual center of the brain. It is entirely a bodily operation.

Now let us consider our intellectual power, our power of conceptual thought. If we cannot think without the action of our brains and if thinking is also reducible to the action of our brains, then, like seeing, our thinking is nothing but the action of bodily organs. There is nothing immaterial about it. But if in conceptual thought we do not think with our brains even though we cannot think without them, then conceptual thought is not a wholly material operation, because it is not completely reducible to the action of a bodily organ such as the brain.

There is, in ancient and mediaeval philosophy, a very strong but also a very subtle argument to the effect that matter cannot think intellectually—that conceptual thought cannot be reduced to the action of the brain. If that argument is sound, then the computer technologists will never be able to produce an artificial intelligence machine the thinking performance of which will be indistinguishable from human thought or surpass it. Even though they may be able to produce machines the componentry and connections of which are greater than that of the human brain, they will not succeed, because human thinking is not reducible to the action of the brain.

However, it would be folly to suppose that modern materialistic scientists and computer technologists can be persuaded by the subtle philosophical argument mentioned above.

How Can The Problem Be Solved?

In only one way, so far as I can see. Let the computer technologists, with generation after generation of AI machines, keep on trying to produce one that succeeds in passing the single critical test of telling whether machines can perform in a manner that is indistinguishable from human performance. The critical test, which the machine must pass, consists in its being able to succeed in engaging in conversation with a human being in the very same way that one human being engages in conversation with another. The human being involved should be deceived by the machine, hidden behind a screen, into thinking that he is talking with another human being.

My reason for thinking that AI machines will never pass this test is that the many turns in an extended human conversation are unpredictable and what is unpredictable cannot be programmed. Even when

computers are programmed to act in certain random ways, the degree and character of that randomness is programmed. But an extended human conversation has a randomness and unpredictability that is unprogrammable. Hence no AI machine will ever be built that can be programmed to pass the conversation test.

This may not stop the computer technologists from trying. Let them try, again and again and again. Each time they try and fail, it becomes more and more probable that they cannot succeed.

Though the probability becomes greater and greater, it can never reach certitude, because there is always the possibility of another try. Nevertheless, while it is never finally removed, the threat of the computer to the personality—the dignity and the spirituality—of the human being will gradually diminish toward the vanishing point. 🕮

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