

Jean-Pierre Dupuy^{*}

DO WE SHAPE TECHNOLOGIES, OR DO THEY SHAPE US?

To the question that the title of my talk raises, a short answer might be the one put forward by Ralph Waldo Emerson in the middle of the 19th century, "machines, once made, make men". A slightly longer reply would be, we can shape technologies only to the extent that we acknowledge that they shape us. However I will be led to question the pertinence of the question itself.

Two major attitudes towards technology stress our capacity to shape technology, although they differ strongly from each other in all other respects.

The *technocratic attitude*, first, is rationalistic and decisionist. It characterizes the technological elites of our countries, and is the kind of philosophy implicit in the way scientists and engineers themselves think about technology. According to this view, technology is neutral as regards values; it is *wert-frei*, value-free. It is a means to an end. It can enhance or destroy our capacities for enjoyment, well-being, achievement and the like, depending on the intentions of those who devise or use it. This is the utilitarian, instrumental conception of technology as the embodiment of the kind of rationality that Max Weber dubbed *Zweckrationalität* – i.e. means-ends rationality. As is well known, this view was radically deconstructed by Heidegger. "As long as we think of technology as an instrument," Heidegger declared in his famous paper on the essence of technique, first presented in 1949, "we remain caught up in the will to mastery." And this will to mastery can only lead us to our destruction.

The second attitude that emphasizes the idea that technology is being shaped by us is the *sociology of technology*, one of its variants being known as "SCOT", i.e. "Social Construction of Technology". One of its founding papers states that "social setting shapes technologies as much as vice versa."¹ It is obvious that the phrase "we shape technologies" has a very different meaning here than the one it has for the technocratic attitude. It is now a matter of understanding how the *social world*, and not a few decision-makers, shapes artefacts. Whatever it consists of, this social shaping has very little to do with the rational decisions made by a technocrat or a bureaucrat.

This second line of thinking stresses our capacity to shape technologies in reaction to the once fashionable thesis that *technological determinism* trumps, overrides all other forms of causation – a thesis known as the "autonomy of technology". The view that technology is autonomous has been put forward by various schools of thought or individual thinkers, whatever their differences otherwise. One can think of Heidegger, Jacques Ellul, Ivan Illich, the Frankfurt school, from Marcuse to Adorno to Horkheimer to Habermas, "deep ecology", diverse environmentalist schools, etc. For example, for Jacques Ellul, Technique is the milieu in which humans exist - it

^{*} Professor of Philosophy, Ecole Polytechnique, Paris, and Stanford University; member of the HLEG "The New Technological Wave", European Commission. Email: jdupuy@stanford.edu

¹ Robin Williams and David Edge, "The social shaping of technology", *Research Policy*, 25, 1996, 865-99, p. 875.

has replaced nature. It is artificial, autonomous, self-determining, characterized by growth, but not goal directed. Means have come to have precedence over ends. Its parts are intrinsically interrelated and inseparable. Modern human values, choice, and ideas are dominated by Technique. Our choices are always already incorporated within the technological process. We believe that we can decide whereas in effect Technique decides for us.

From the start, our group has been very concerned about the necessity to avoid joining the crowds that believe that technology must be analyzed only or mainly in relation to itself. The group has been mostly attentive to the ways social structures shape opportunities and constraints. In this respect, the NSF report, "Converging Technologies for Human Performance", has played for us the role of an anti-model. The US report is an interesting combination of technological determinism and technocratic decisionism. Technology is viewed as a means to an end; i.e. the approach is purely utilitarian and instrumental. As a means technology is the major driver. It is seen as inevitable, almost as fate, but a fate that it is up to us to choose or to refuse. Science and technology follow an autonomous development, a progression that we can slow down or accelerate depending on our decisions and efforts. The ends are glorious, like to "achieve an age of innovation and prosperity that would be a turning point in the evolution of human society." Thanks to the NBIC convergence, "the 21st century could end in world peace, universal prosperity, and evolution to a higher level of compassion and accomplishment." What adds to the utilitarian frame is the resolute individualistic bias: "The right of each individual to use new knowledge and technologies in order to achieve personal goals, as well as the right to privacy and choice, are at the core of the envisioned developments."

The socio-economic analysis is of an incredible poverty. There are no social dynamics or forces, only individual behaviour that can be predicted and corrected if need be – for instance, disruptive behaviour, terrorist acts, etc. The inflow of dollars is the only driver. The role of the government is to set the conditions for private initiatives to flourish while ensuring public acceptance.

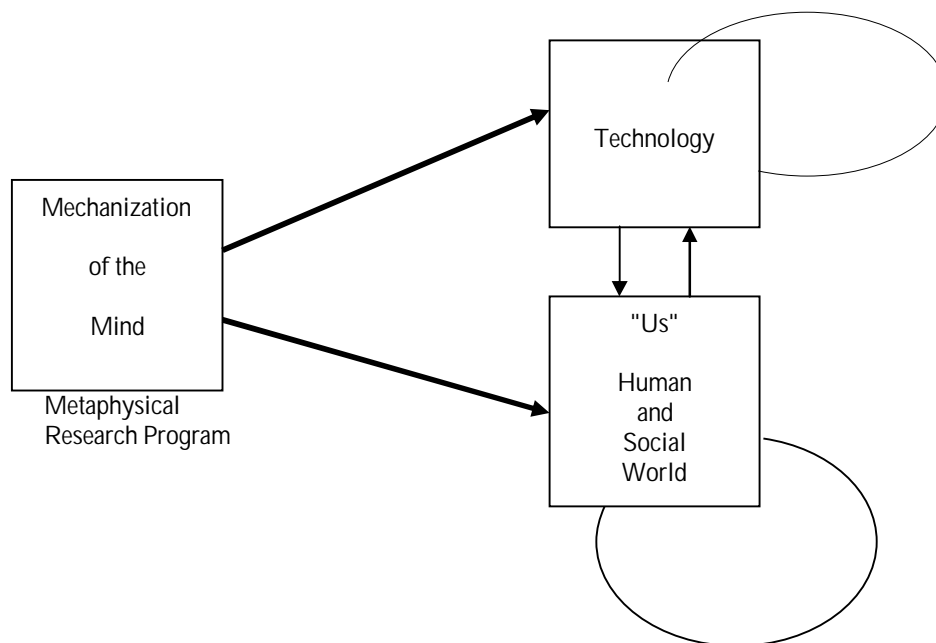
The major impediment is ethics, that is, our current ethics, conservative and overcautious. The report looks forward to a possible radical change in ethics, akin to a transformation of civilization, thanks to which "the acceptance of brain implants, the role of robots in human society, and the ambiguity of death" will conform to new principles.

By contrast, one of the major aims of *our* report has been to propose a "European approach to converging technologies" – the so-called CTKES: Converging Technologies for the European Knowledge Society. Such a phrase clearly manifests that our work has been shaped in part by the sociology of technology. However, there are other influences that show in the final report, more philosophical than sociological, and as a philosopher I'd like to stress these.

The question "do we shape technologies or do they shape us?" presupposes that there are two distinct entities, possibly connected by causal relations: technology, on the one hand, us on the other – us meaning either us as individual human beings or us as a society. But this presupposition must be questioned and challenged determinedly. I should like to argue that technology, on the one hand, and the human and social world, on the other, are both shaped by a common set of factors in such a way that it becomes increasingly meaningless to ask which of technology or us is the more active causal force. *The most powerful factor is a third party.* What

is it? Here I will go against the grain of the kind of materialism that is driving the convergence of technologies. Precisely, what I see as the major driving force is a set of ideas, worldviews, corresponding to what Karl Popper used to dub a "metaphysical research program". The positivist philosophy that drives most of modern science (and much of contemporary philosophy) takes "metaphysics" to be a meaningless quest for answers to unanswerable questions, but Popper, following the lead of Emile Meyerson², showed that there is no scientific (or, for that matter, technological) research programme that does not rest on a set of general presuppositions about the structure of the world. To be sure, those metaphysical views are not empirically testable and they are not amenable to "falsification". However, that does not imply that they are not interesting, substantial, and that they do not play a fundamental role in the advancement of science. Those who deny metaphysics simply render it invisible, and it is very likely that their hidden metaphysics is bad or inconsistent. To the amazement of those who mistook him for a positivist, Karl Popper claimed that the philosopher or historian of science's task was twofold: first, unearth and make visible the metaphysical ideas that lie underneath scientific programmes in order to make them amenable to criticism; secondly, proceed to a critical examination of those metaphysical theories, in a way that is different from the criticism of scientific theories, since no empirical testing is here possible, but nevertheless rational.

The question I have asked, then, is, what is the metaphysical research programme that drives the so-called converging technologies? I have given this program a name, "the Mechanization of the Mind"³. I'd like now to present some thoughts about it.



The arrows represent causal links. Note that the diagram does some justice to the partial self-determination of technology (as well as to the partial closure of the human and social world). It also does justice to the Emerson quote, "machines, once made, make men", i.e. the circular

² "L'homme fait de la métaphysique comme il respire, sans le vouloir et surtout sans s'en douter la plupart du temps." E. Meyerson, *De l'explication dans les sciences* (Paris, 1927).

³ See Jean -Pierre Dupuy, *The Mechanization of the Mind*, Princeton University Press, 2000.

causality between technology and society. However, the most important links are those that come out from the Metaphysics box.

Let there be no misunderstanding. What I call "the Mechanization of the Mind" is a set of ideas, representations and worldviews; it is very different from what our report calls the engineering of the mind, which is a technique. The claim is that *ideas precede technique*. You may have noticed in our report the apparently innocent phrase, "the powerful heuristic of CTs will prove productive even if it is or should be realized to a small extent only.[Section 5.]" The effects we have been interested in exploring are not only the effects of technology per se, but also the effects of the ideas that drive technology, whether technological realizations see the light of day or not.

In my own work, I have been able to show that the mechanization of the mind preceded and was the condition for the invention of the computer, which itself prompted questions like "can a machine think?", which pertain to the anthropomorphisation of the machine, To this question the proponents of the mechanization of the mind could only respond in the affirmative, since they had already defined the activity of thinking as the property of a certain class of machines.

What are the components of the metaphysical program borne by CTs? Converging technologies purport to take over Nature's and Life's job and become the engineer of evolution. Evolution so far has basically consisted in mere "tinkering". It can lock itself in undesirable paths or end states. It is therefore desirable for Man to take over the role played by Evolution and become the designer of biological and natural processes. *Man can participate in the fabrication of life.*

If this technological and philosophical agenda is at all conceivable, it is of course because Nature and Life have been previously redefined in terms that belong to the realm of artefacts. See how one of the most vocal champions of NBIC, Damien Broderick, rewrites the history of life, or, as he puts it, of "living replicators":

Genetic algorithms in planetary numbers lurched about on the surface of the earth and under the sea, and indeed as we now know deep within it, for billions of years, replicating and mutating and being winnowed via the success of their expressions – that is, the bodies they *manufactured*, competing for survival in the macro world. At last, the entire living ecology of the planet has *accumulated, and represents a colossal quantity of compressed, schematic information*.⁴

Once life has thus been transmogrified into an artefact, the next step is to ask oneself whether the human mind couldn't do better. The same author asks rhetorically, "Is it likely that nano -systems, designed by human minds, will bypass all this "Darwinian wandering, and leap straight to design success?"⁵

From its inception in cybernetics up to today, cognitive science's philosophical agenda has been, in its own terms, to "naturalize the mind". That this naturalization of the mind coincides with the artificialisation or mechanization of the mind, although a huge paradox, should come as no surprise. An enterprise that sets itself the task of naturalizing the mind has as its spearhead a

⁴ Damien Broderick, *The Spike*, Forge, New York, 2001, p. 116. My emphasis.

⁵ Ibid., p. 118.

discipline that calls itself artificial intelligence. To be sure, the desired naturalization proceeds via mechanization. Nothing about this is inconsistent with a conception of the world that treats nature as an immense computational machine. Within this world man is just another machine —no surprise there. But in the name of what, or of whom, will man, thus artificialized, exercise his increased power over himself? In the name of this very blind mechanism with which he is identified? In the name of a meaning that he claims is mere appearance or phenomenon? His will and capacity for choice are now left dangling over the abyss. The attempt to restore mind to the natural world that gave birth to it ends up exiling the mind from the world and from nature. This paradox is typical of what the sociologist Louis Dumont, in his magisterial study of the genesis of modern individualism, called "the model of modern artificialism in general, the systematic application of an extrinsic, imposed value to the things of the world. Not a value drawn from our belonging to the world, from its harmony and our harmony with it, but a value rooted in our heterogeneity in relation to it: the identification of our will with the will of God (Descartes: man makes himself master and possessor of nature). The will thus applied to the world, the end sought, the motive and the profound impulse of the will are [all] foreign. In other words, they are extra-worldly. Extra-worldliness is now concentrated in the individual will."⁶

In mechanizing the mind, in treating it as an artefact, the mind presumes to exercise power over this artefact to a degree that no psychology claiming to be scientific has ever dreamed of attaining. The mind can now hope not only to manipulate this mechanized version of itself at will, but even to reproduce and manufacture it in accordance with its own wishes and intentions. Accordingly, the technologies of the mind, present and future, open up a vast continent upon which man now has to impose norms if he wishes to give them meaning and purpose. The human subject will therefore need to have recourse to a supplementary endowment of will and conscience in order to determine, not what he can do, but what he ought to do —or, rather, what he ought not to do. Converging technologies will require a whole ethics to be elaborated. But to speak of ethics, conscience, the will —is this not to speak of the triumph of the subject?

Our situation is both paradoxical and contradictory. Paradoxical, because the artificialization of nature leads to the triumph of subjectivity, as mankind accepts the responsibility for all that is. Contradictory, because the naturalization of man replaces the autonomous subject with a blind algorithm.

What is involved in these symmetrical processes of the naturalization of humankind and of the artificialisation of nature is not a mere transformation of our image of the world⁷. It is true that, not so very long ago both science and philosophy represented humans as beings that were not entirely part of the natural order. The human mind, it was thought, either because it contains a divine spark or because it is essentially historical, escaped at least in part the jurisdiction of natural sciences. It was also thought that what is artificial is clearly distinct from what is natural. Even if technology was seen as resting on the laws of nature that hold the world together, everyone agreed that human products were no match for nature's inventions. Our image of the

⁶ Louis Dumont, *Essais sur l'individualisme*, Seuil, Paris, 1983.

⁷ In what follows, I borrow freely from a paper written in collaboration with Paul Dumouchel, "Nature and Mimetic Theory" - a paper presented at the COV&R Symposium, "Nature, Human Nature, and the Mimetic Theory", Ghost Ranch, Abiquiu, New Mexico, USA, 2-5 June 2004.

world has changed; no one talks that way anymore. However, it is not only the way in which we represent what is that has changed. The world itself that we represent has been transformed.

If the world has changed it is not only because our representation of the world is part of the world and therefore if it has changed so must have the world itself. More importantly it is because modern science is not so much a representation of the world as it is an action, an act of creation. Vico, Hobbes and Locke all believed that politics, and mathematics, had more certainty and were more rigorous sciences than physics or natural history. The reason why this is so, they thought, is because we have made ourselves the world of politics and of mathematics, while nature was created by God. In consequence we can know politics and mathematics inside out, in the same completely transparent way that an artisan knows the secrets of his inventions. Nature on the other hand will always remain opaque to us. We can describe its behaviour and propose hypotheses to explain what we see, but we will never share the knowledge of the Great Artificer who made the world that surrounds us.

Experimental science changed all that. Through experiments at first and through technology later we became the makers of the world we studied. Nature entered our science through the narrow door of elaborate preparations and through the production of phenomena that never existed naturally, at least if to exist naturally is to exist without the help of human intervention. In the end, there is little sense in asking whether our creations are natural or not. Nature conceived this time as the object that our sciences describe is not in any way different from those things that we create and produce. It is not something that is out there and exists by itself. The ultimate reason why nature has become an artifice is not because of what our science tells us about the world, but because *we understand natural phenomena through making them*. Converging technologies represent the horizon of this *scienza nuova*, this new science, this new way of approaching nature whose advent Giambattista Vico prophesied at the beginning of the 18th century.

A similar argument applies to *us*. The naturalization of mankind is not simply that we now view culture or history as natural processes rather than as what sets us apart from nature. It is not only that we have new sciences like cognitive science that promise to bring the understanding of mind, of human actions, or of religion within the fold of natural sciences. These new disciplines endeavour to replace the old image of ourselves inherited from the humanities, by a new one that defines us as natural and as natural only. Yet the naturalization of humans is not so much the transformation of the image of humankind and of its place in nature. Above everything else the naturalization of humankind is the mechanization, the “artificialisation” of ourselves. Just like our environment, our bodies and our mind are more and more the products of our scientific interventions. From Prozac to pace makers, from skin grafts to genetic testing, from industrially produced insulin to artificial insemination, from brain implants for the stimulation of an improbable happiness centre to the augmentation of our cognitive capacities, we are inseparably nature and artifice. We are natural in the exact measure that we can become artifices, scientific products, that we can be transformed, bettered, saved, exploited using the laws of nature.

To conclude, I should like to quote from an ancient wisdom, that proves, it seems to me, more pertinent than ever: “*What should it profit a man if he would gain the whole world yet lose his soul?*”(The Holy Bible, Mark 8:36).