

Excerpt from Alfred Nordmann “A forensics of wishing: technology assessment in the age of technoscience,” *Poeisis & Praxis* forthcoming 2010 (special issue guest edited by Karen Kastenhofer).

## The age of technoscience

To make sense of ours as an age of technoscience, one must assume that it supersedes a previous age, call it the age of science, the age of big science, or the age of mode-1 laboratory research. Either way, the age of technoscience is just as mythical as was the one that preceded it (Bensaude-Vincent 2009). The claim that we live in an age of technoscience, then, does not imply that the technosciences themselves are new or that research practices are fundamentally different now from how they have been before. The age of technoscience is characterised, instead, as a way of valorising the technosciences. The organising myth of technoscientific innovation orients the expectations and priorities of scientists and other social actors just as much or as little as did the powerful myth of scientific Enlightenment (Nordmann forthcoming).

Here is a concise, though admittedly somewhat abstract definition of “technoscience”: As opposed to the “sciences” (as conceived, especially, by scientists and philosophers of the 19th and 20th centuries), the “technosciences” do not even attempt to distinguish between theoretical representation of the world and technical intervention into the world. It is nowadays a commonplace that representing and intervening are part of every attempt to arrive at knowledge of empirical matters (Hacking 1983). However, the “pure” sciences are pure precisely because they invest a lot of analytical effort into the conceptual and technical separation of these two activities: The Large Hadron Collider is necessary to detect the Higgs boson, and a great amount of effort will go into showing that what is detected is no artefact. The sole purpose of the gigantic experimental intervention is to allow the representation of something that is part of the furniture of the world. In contrast, the technosciences have been considered impure precisely because they are not concerned about maintaining this distinction: A pharmacological laboratory is necessary to produce a chemical substance that will dilate arteries and increase the flow of blood. Though this chemical represents some general features of the world, it does so like any chair, table or other artefact. It would appear to be a moot exercise to take this pharmacological agent or to take the effected dilation of the arteries and carefully tease apart what is due to human intervention and what to features of nature. It is in this rather obvious sense that the technosciences do not distinguish between theoretical representation of the world and technical intervention into the world – because it is neither necessary nor possible to

achieve this kind of purity.<sup>1</sup> This is true not only for today's paradigmatic technosciences such as nano and biotechnological research, but has been true for alchemy, pharmacy, the agricultural sciences, forestry, nursing science, materials research, information and communication technologies, synthetic chemistry and the like.

In the age of science, all the sciences, but also these technosciences are beholden to the ideal of separating representation and intervention and its associated ideals of distinguishing between science and technology, nature and culture, between what is given and what is made, between organic growth and thinglike construction. For the technosciences, orientation to this ideal meant that they were considered less pure than theoretical physics and evolutionary biology, but that they nevertheless made a contribution to the overarching aim of the scientific enterprise, namely to advance what Max Weber has called the disenchantment of the world through increasing rationalisation and intellectualisation (Weber 1946).

In the age of technoscience, the ideal of pure science appears to be obsolete.<sup>2</sup> Basic technoscientific research is dedicated to the acquisition of basic capabilities of visualisation, manipulation, modelling and control and is not dedicated to the advance of Enlightenment by way of truth-seeking or the criticism of prejudice and superstition. Even basic research is now application-oriented – where the applications are research techniques, proofs of concept, stepping-stones and tool-kits.

The notion of an all-out epochal break may be too grandiose even to those who appreciate the different characterisations of the ages of science and of technoscience. It would appear, after all, that representing and intervening have always been inextricably interwoven throughout the history of science and that the dream of teasing them apart was the hopeless conceit of only a negligibly small group of empiricists, logical positivists, and other scientists and philosophers of science in a mostly Kantian tradition – how can one even envision seeking an understanding of the world without changing it, too?

Though it downplays the powerful influence of the scientific dream of reason, this is a perfectly plausible view of the history of science, and it is the only plausible view from the vantage point of the age of technoscience. From its point of view, there has never been anything but technoscience without an epochal break anywhere in sight. Looking back into history from our current

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<sup>1</sup> Some theorists of technoscience, most notably Bruno Latour, argue that there is no difference between science and technoscience because upon close analysis all sciences turn out to be technosciences – their work of purification never succeeds (Latour 1987, 1993). In the age of science, at any rate, it is a hallmark of science to engage in this work of purification, whereas in the age of technoscience even much of physics and biology is abandoning it.

<sup>2</sup> Many drivers conspired to render the ideal obsolete and they all belong to the age of technoscience. They include science policy-makers and many scientists themselves – preferring the likes of a Louis Pasteur to a Nils Bohr on the one hand, and a Thomas Edison on the other (Stokes 1997). They also include Science and Technology Studies – against the vigorous resistance by many philosophers and some historians of science.

age it would appear that there has been nothing but tinkering all along: fitting data to theory, constructing models as mediators between theory and reality, specifying explanatory mechanisms, establishing the resilience or robustness of accounts and the like.

However, this characterisation of the history of science as a history of multiple activities, all of them involving representations and interventions, misses out on “science” as a cipher for human intellectual progress and the Enlightenment. The fact that the association of science, modernity and the Enlightenment is mythical does not make it less relevant for questions of self-image, cultural prestige and epistemic orientation of the many sciences and technosciences. Even if the myth of science casts only a handful of Galileos, Darwins and Einsteins as great thinkers who upset prejudice and advanced theoretical knowledge, and even if it therefore makes for a highly selective and deeply flawed history of scientific practice, the abandonment of this myth is culturally significant for societies at large and for scientific self-understanding – especially when it comes to defending pure science and basic research, and especially when it comes to assessing the limits of knowledge or the relation between the regimes of truth and power. From the point of view of the age of science, accordingly, hardly anything could be more significant than the demotion of this mythical idea of “science” as a principle that orients the scientific enterprise as a whole (Forman 2007). Looking from the age of science, nothing less than an epochal break is required to settle into the age of technoscience.

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