CMNS 895 - Comprehensive Examinations
Field Definition #1 - **A History of the Philosophy of Science and Technology**
Jean Hébert
24 September 2009

Western philosophical perspectives about technology have been constructed in various ways representing a number of historically contingent ontological orientations: utopianism and its opposite, instrumentalism and its heirs, Marxism, critical theory, social constructivism, poststructural approaches and actor network theory. The prevalence of one or another approach or orientation toward science and technology as a sociological or philosophical subject of inquiry is dialectically related to its historical and social context – that is, it is both produced by it and works to reproduce it. Further, our very demarcation of the distinctive territories of science and technology is an historical artefact warranting a thorough exploration, too. In this comprehensive examination I will explore the contours of this history of thinking about science and technology.

Philosophical thinking about science outgrew its origins in philosophy around several problems, which have heavily influenced its development, largely by preventing it from developing (Ihde 1993): the conventional bias toward "pure" thought in philosophy as against materialistic concerns, the view of modernity (and its technology) as superior to its predecessors, and the wide supposition that technology is a subset of or is a consequence of science.

Subsequent philosophical developments distorted and perturbed this original Enlightenment-era position of technology as related to science. While Marxism and its discontents provided much of the groundwork for 19th and 20th century technological utopianism, a Philosophy of Technology *per se* doesn't emerge until later phenomenological studies approached the subject (from Husserl through Heidegger). In tandem with the development of technology with massive destructive potential (the Nazi regime, nuclear technology, biological engineering and so forth), the historical character of much early 20th century thinking about technology is fearful and dystopic (Ellul, Heidegger, Adorno). Alternative readings that come up later in the century are utopian and instrumental (Habermas), while yet other readings of this era bear both the hallmark of an activist tradition and the seeds of later constructivist approaches (Marcuse).

Science and Technology Studies grew into its own with the development of the sociology of scientific knowledge school (SSK, as exemplified in the works of Bloor and Kuhn) in the 1960s and 70s. This school emphasized philosophical attention to the historical contingency of science and knowledge. A few of this school's leading thinkers (notably Bloor) worked at expanding the contingencies recognized by the SSK school into a broader critique – what is now referred to as the "Strong Programme" in the sociology of science. The primary contribution of the Strong Programme was perhaps the notion of symmetry, the use of which demonstrated a longstanding bias in historical studies of science that distinguished between proven and failed scientific knowledge. This critical turn legitimized the study of scientific practice as contingent on social organization and culture, paving the way for the wider critique provided by social constructivism.

The SCOT approach (Social Construction of Technology) was advanced by writers such as Bijker, Hughes and Pinch. Here the principles developed by the SSK school were systematically applied

to studies of technological innovation, with analyses of the social relations constituted in designs for bicycles (Pinch & Bijker 1984), electric cars (Callon 1987), and door grooms (Latour 1992). An important argument raised by this school of thought is that values and ideology are designed/ embedded into technology, such as how bridges can be designed to racially discriminate and segregate (Winner). SCOT theorists expose how the design of objects and techniques that affect our lives – everything from viruses to airplanes to ship's masts – is ideological.

Actor-Network theory emerges as a counterargument to SCOT. Advanced by Bruno Latour, John Law and others, ANT antagonizes the strong constructivist argument by constructing one in which artifacts and networks are equally constitutive of social relations as are humans. In this view, being in the world (and being technology in the world, specifically) is an emergent property of networked agents of all kinds. As a matter of course, facts and artifacts, according to Actor Network theorists, are indistinguishable. Moreover, networks and actors are perceived only relatively (via the technique of punctualisation). ANT is a richly-conceived methodological alternative to social constructivism in technology studies, which helps to de-center SCOT's earlier decentering further.

More recent approaches to the question of technology have attempted to balance social constructivism with an emphasis on agency, such as Feenberg's (1999, 2002) critical constructivism and works by philosophers such as Radder (1996) that point out some of ANT's unhelpful normative assumptions and other problems. Critical constructivism, in particular, draws from earlier sociological critiques to help re-center and politicize the analysis of technology into more of an actionable theory.

The major philosophical debates within this field of inquiry (as I have described it) center around definitions of technology, the relative weight of agency and structure in technical ongoings, transcendence and immanence of artifacts and actors, the historical and ontological priority of science as against that of technology, the degree to which politics can be designed into technology, and, most importantly, divergent overall definitions of the role of technology in society, which bring with them radically incompatible assumptions about human social behaviour. This comprehensive exam aims to address each of these debates in turn, following an historical account of Western thought about technology.

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