# From 'Technology' to 'Technologies': Artifacts, Practices and Knowledge

> The way he lives his life and looks at objects, his intercourse with the world and with his peers, his powers and modes of action, kinds of goals, states and changes of society, objectives and forms of politics (including warfare no less than welfare), the sense and quality of life, even man's fate and that of his environment: all these are involved in the technological enterprise as it extends in magnitude and depth. (Jonas 2010: 12)

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This comprehensive exam aims to trace the central themes and contemporary debates in the philosophy of technology. Technology, following Martin Heidegger's (1977) analysis of its etymological origins in the Greek word *tekhnê*, includes material objects (tools or equipment), the cultural practices involved in their production and use, and the forms of knowledge that they enable. Correspondingly, for the purpose of this exam, I will define technology as *that field comprised of objects, practices and knowledge designed to extend human capacities and capabilities*. I will approach the technological field through two complementary (and at times overlapping) prisms or themes that provide the structure for this comprehensive exam. The first views technology as an abstract field of human activity, while the second as a collection or system of particular technologies (Jonas 2010). These two categories – 'technology as whole', and 'technology in practice' – also roughly correspond to macro- and micro-level styles of analysis. Together they provide the foundation for a critique of the normative, ethical and moral dimensions of technology, which comprises the third theme of the philosophy of technology according to Jonas.

## Technology as Whole

Generally speaking, the readings gathered under this section approach technology as the total sum of all technologically mediated human activities. Technology is thus understood as an "enterprise and not a possession, a process and not a state, a dynamic thrust and not a set of implements and skills" (Jonas 2010: 14). Within this frawe, the discussion of particular technological artifacts is merely a means to prove larger, more encompassing theories of the technological worldview and its consequences. While the first group of readings share an interest in the ontological dimension of technology, that is, inquire as to the nature and essence of technological

technology is an autonomous force operating outside of social control, whether it is neutral or biased, and whether it "drives history" or merely reflects it.

I will consider Ellul's (1967) substantive and deterministic critique of "la technique" as the autonomous, self-augmenting and pervasive recontextualization of human affairs, and Heidegger's (1977) equally deterministic understanding of the technological as a privative mode of revealing the world as "standing reserve". I will evaluate Mumford's (1962) counterview of technology's premise in existing social relations, and Marx's (1906; 1973) identification of the roots of modern industrial technology in the labour process of capitalist society (see also Lukacs (1966) and MacKenzie (1984)). Finally, I will consider Heilbroner's (1994) use of "soft determinism" and Hughes's (1994) notion of "technological momentum" as more nuanced ways for understanding the social effects of technological development.

**Technology in Use**

The readings that belong to this section can be seen as correctives to the tendency exhibited by the works discussed in the first section to abstract and reify a variety of particular technologies in a singular, substantive or essentialist notion of 'technology' (Feenberg 1999). In contrast, the approaches discussed here seek to develop theoretical and normative frameworks for the analysis of technology based on concrete examinations of processes of technological design, production and use. Thus, they arrive at a detailed, robust understanding of the inherent and essential relationships between social actors and technological artifacts, which is then used to illustrate a more realistic picture of the limits and potentials of power and agency as they pertain to modern technologies.

The first group of readings represents a phenomenological approach to technology, exploring the ways in which the use of technological artifacts mediates human experience. Here, Ihde's (1990) illustration of the dialectic of amplification and reduction that marks human-technology-world relations, and Verbeek's (2004) emphasis on the technical mediation of action, provide a valuable framework with which human-technology micro-interactions can be unpacked. This is supplemented by Feenberg's (2009) analysis of the relations between social rationalization and technically mediated experience, that is, the (social) conditions of possibility for validating experientially derived norms.

the other hand, Eglash (2004) finds that contemporary users actually retrieve new forms of agency by their capacity to appropriate even 'mature' technologies in a variety of counter-hegemonic ways, essentially opening the technological 'black box' long after the process of design is completed.

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