

# Contingency and Potential: Reconsidering a Dialectical Philosophy of Technology

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**Abstract:** Unsatisfied with an intellectual history that divides the philosophy of technology into classical and empirical approaches, the following paper suggests a renewed attention to dialectical philosophies of technology. Drawing on the work of Andrew Feenberg, I argue that dialectical philosophies of technology are not essentialist holdovers from the past, but are empirically grounded approaches that direct researchers to ask why we have the technologies we do. From this, dialectical philosophies of technology open up ways to think about technology that prioritize the tension between the sociotechnical world as it is and concrete potentials of what it could be. Contrasting this against postphenomenology, I argue that avoiding these moments of potential can lead to a conservative and paternalistic philosophy of technology that fixes sociotechnical agency to a professional class of designers, engineers, and policy makers. I conclude by suggesting that Feenberg’s dialectical philosophy of technology presents a modest alternative to the design imperatives that now guide the trajectory of postphenomenology.

**Key words:** critical theory of technology, dialectical philosophy, postphenomenology, Andrew Feenberg

## 1. Introduction

Dialectical philosophy of technology is not what it used to be. What was one of the only traditions that took technology seriously has been rendered nearly obsolete through the intellectual history of the empirical turn (Achterhuis 2001; Brey 2010; Selinger 2009; Vallor 2016; Verbeek 2005). Neatly dividing the history of the philosophy of technology between classical and empirical approaches, proponents of the empirical turn have retroactively defined dialectical and critical approaches as

classical.<sup>1</sup> The consequence of this demarcation is that by virtue of ontology and method, dialectical philosophies of technology have been reduced to an unpleasant souvenir of an essentialist past that has been overcome by empirically rich case studies of discrete technical artifacts.

In the following paper, I want to challenge some of the assumptions that have been used to frame dialectical philosophies of technology as essentialist or determinist holdovers from the past. Specifically, I want to address the critique, familiar from postphenomenology and technical mediation theory, that dialectical approaches to technology cannot be properly sociotechnical<sup>2</sup> because they presuppose struggle and fixate on tropes of resistance and liberation that artificially separate the social from the technical:

[T]hey [dialectical philosophers] think in terms of struggle: oppression and resistance, enslavement and liberation, distraction and self-consciousness . . . a call to take up arms against the technologies of capitalism reinstates a separation of human beings and technologies that goes against the most central insights in philosophy of technology and Science and Technology Studies (STS) of the past decade. (Verbeek 2017, 303–04; see also Verbeek 2013)

This description of dialectical philosophy hardly qualifies as either acceptable or accurate. What it does accomplish, though, is the perpetuation of an intellectual history that artificially endows postphenomenology, STS, and technical mediation theory with a monopoly over the idea that the design, function, and meaning of technical artifacts is contingent and multiple. Against this claim, I argue that contingency is not restricted to postphenomenology and other post-empirical turn philosophies of technology. Against an intellectual history which argues that dialectical philosophies rely upon simplistic dichotomies and an essentialist ontology, I argue that a dialectical philosophy of technology is historically oriented towards the question of *why* we have the technologies we do, pointing to the distinctly sociotechnical contexts that precede and give meaning to our everyday experiences while opening up concrete potentials that can realize goals and ambitions that are different than those of the groups who design and administer technologies. Ignoring both history and potentiality, I argue, leads to a conservative and paternalistic philosophy of technology in which one unquestioningly accepts the technologies that are provided by a professional class of engineers, policy makers, and designers.

Against the intellectual history of the empirical turn, in the following paper I trace a history of dialectical philosophies of technology that are empirically grounded and committed to a sociotechnical perspective with the same rigour as postphenomenology and technical mediation theory. This intellectual history will be drawn from the work of Andrew Feenberg. Feenberg's philosophical project is well-known for providing the conceptual and methodological framework for the democratization of technology while also persuasively arguing for the necessity of this project. Within this project is a history of the philosophy of technology in which a dialectical tradition extends through Karl Marx, Georg Lukács, Herbert Marcuse, labor process theory, and STS before culminating in "a dialectical critique of technology that is neither irrationalist nor technophobic" (Feenberg 2014, 201). Drawing upon a number of examples, I want to use this paper to provide a counter to those philosophers and social theorists of technology who fear that dialectical philosophy encourages irrational resistance and a dualistic ontology. A dialectical philosophy of technology is not, *a priori*, aligned with some sort of spectacular revolt or concerted effort to resist domination. This is a philosophy that points to one of our most immediate, and philosophically overlooked, forms of engagement with technology—everyday experiences in which users imagine concrete potentials that contradict, or negate, prescribed designs and functions. There are no appeals to transcendent ideals or evidence of organized resistance to power independent of particular cases, just engaged use with technologies that reveal unimagined potentials.

In what follows I summarize Feenberg's history of the philosophy of technology as the history of an empirically grounded dialectical tradition that prioritizes the idea of sociotechnical potential. From this, I draw upon different examples to address in more detail the critiques of the dialectical, or critical, tradition and suggest that fear of an assumed essentialism inherent to this tradition can obscure a tendency towards conservatism and paternalism found in technical mediation theory, postphenomenology, and other approaches that fail to account for moments of unanticipated sociotechnical potential. I conclude by returning to the question of intellectual history and suggest that it is time to move beyond the artificial divide in which so-called classical philosophies of technology are deemed relics of an essentialist past and thus irrelevant for a contemporary philosophy of technology. Philosophers of technology should be sensitive to intellectual continuities and not reliant upon easy distinctions that allow decades of useful insights to be conveniently ignored. Freed from the imposition to continually rehearse the empirical turn narrative, philosophers can begin to draw out other differences between

dialectical philosophy and postphenomenology, which I suggest can be considered as a difference between asking *how* and *why* questions. The former, I argue, is closely aligned with a design imperative that prioritizes the sociotechnical agency of designers and engineers; the latter, which is aligned with Feenberg's critical theory and dialectical philosophy, avoids the hubris of prioritizing the agency of designers and engineers in favor of a more modest philosophy of technology that avoids the false promises that come from the illusion that one can have total control over the trajectory of technological design and development.

## **2. Dialectical Philosophy and Sociotechnical Potential**

Dialectical, as I use the term, can best be described as a way of thinking that has its origins in Hegelian-Marxist theory. Dialectical thought is characterized by an awareness that seemingly contradictory concepts like value and fact or subject and object are intertwined, as is the relationship between singular objects, events, and facts and the historical and cultural contexts within which they are situated: "the objects of the empirical world are to be understood as aspects of a totality, i.e., as the aspects of a total social situation caught up in the process of historical change" (Lukács 1971, 162). Dialectical philosophy, in this regard, can be contrasted against the Cartesian tradition, which aims for fixed certainty by reducing the world to discrete facts and objects that are divorced from both history and culture.<sup>3</sup> Throughout the twentieth century, the task of developing a dialectical philosophy was taken up by writers associated with the Frankfurt School of Critical Theory who used dialectical thinking to counter what they believed was the naïve empiricism of positivism and behaviorism (Adorno et al. 1976; Jay 1973; Jeffries 2016). From this, dialectical thought was promoted as negative thinking in the sense that its task was the negation of empirical reality through the recognition of the history that stands behind this empirical reality and the unrealized potentials that are inherent to it (Marcuse 1964, 2007). That-which-is and that-which-could-be exist in dynamic tension and so one of the methodological tasks of dialectical philosophy is accounting for this two-dimensional ontology.

Applied to technology, a dialectical approach is directed towards those everyday experiences in which users imagine or develop concrete potentials that contradict, or negate, the prescribed designs and functions of existing technological artifacts and systems. The origins of a dialectical philosophy of technology can be found in the work of Karl Marx. Throughout most of the twentieth century, popular opinion held that Marx was a technological determinist. Lewis Mumford (1934) writes that Marx "erroneously assumed that technical forces (the system

of production) evolved automatically and determined the character of all other institutions” (i). Robert Heilbroner (1994) associates Marx with technological determinism by describing the famous hand-mill quote from *The Poverty of Philosophy* (“The hand-mill gives you society with the feudal lord; the steam-mill, society with the industrial capitalist”) as a Marxist paradigm which means that “the steam-mill follows the hand-mill not by chance but because it is the next “stage” in a technical conquest of nature that follows one and only one grand avenue of advance” (55; see also Misa 1988; Winner 1977).

Given that Marx wrote thousands of pages, using a few scattered aphorisms to implicate him as a technological determinist seems a bit hasty. Contrasting technologically deterministic readings of Marx, Feenberg parallels the ideas of many contemporary social theorists of technology in recognizing that Marx’s ideas about technology predate the empirical turn by at least a century; indeed, reading Marx’s work on the machinery of industrialisation in *Capital* and *Grundrisse* reveals that the discovery of the sociotechnical that was proclaimed by writers like Bruno Latour in the 1980s was, in fact, first inhabited by Marx in the nineteenth century (Bimber 1994; Harvey 2010; MacKenzie 1996). What Feenberg calls Marx’s design critique emphasizes that through careful empirical research, Marx recognized the inherent contingency of technical design to meet the socio-economic goals of different social groups (Feenberg 2002). This is demonstrated through reference to cases in which the interests of capital to increase surplus-value influenced the trajectory and design of so-called “neutral” or “objective” machines. In response to the legal restrictions on the length of the working day, for example, capital seeks to compensate itself, “by a systematic heightening of the intensity of labour, and to convert every improvement in machinery into a more perfect means of exhausting the workman” (Marx 1954, 393). This design critique is also evident in his claim that “it would be possible to write quite a history of machines, made since 1830, for the sole purpose of supplying capital with weapons against the revolts of the working class” (ibid., 411; see also Braverman 1974).

It is a testament to Marx’s prescience that his approach to technology follows the post-phenomenological maxim of focusing on the things themselves and letting technical artifacts challenge pre-given frameworks instead of simply reflecting these frameworks. In this regard, Peter-Paul Verbeek (2017), despite his aversion to Marxism, could be describing Marx’s approach to technology in explaining his own approach: “starting from actual technologies rather than pre-given philosophical frameworks, may reveal a more nuanced picture. . . . [I]nstead of applying a pre-given framework to a technology, we need to let technologies be a challenge

to those frameworks” (303). Applied to Marx, one could say that instead of enthusiastically championing the machinery of industrialization for creating wealth and contributing to a favorable notion of progress, as many nineteenth-century political economists were wont to do, he started from the artifacts themselves and from this developed insights that related to the actual experiences mediated by these machines instead of simply parroting pre-existing frameworks of triumphant progress.

Importantly, Marx was not techno-phobic and it would be disingenuous to claim that he proposed either escaping or destroying technology. Marx, like all dialectical philosophers of technology, does not assume that there are two spheres in opposition to one another, one technical, and thus necessarily capitalist, and one social and thus a source of resistance and liberation. Rather, Marx contrasts capitalism as a sociotechnical system with both feudalism and socialism as sociotechnical systems. This is not an idealized social world versus an essentialized Technology-with-a-capital-T, but rather different articulations of competing sociotechnical systems. For Marx, both capitalism and the potential to transition beyond it are to be found in the machinery of industrialization. The potential exists, Marx argues, for this machinery to be directed towards providing socially necessary goods while simultaneously decreasing the labor necessary to achieve this, “Capital, quite unintentionally, reduces human labour, expenditure or energy, to a minimum. This will redound to the benefit of emancipated labour, and is the condition of its emancipation” (Marx 1973, 701). Following Marx, then, industrialization is not a mistake or a historical wrong turn; rather, it is a necessary step towards freeing people from the necessity of labor and opening up potentials that go beyond the sociotechnical opportunities and experiences on offer.

A dialectical philosophy of technology oriented towards the design of machinery lay dormant for decades as many Marxist scholars moved away from examining the relationship between technology and capitalist labor processes towards a critique of the mode of distribution and production (Braverman 1974, 12). The question concerning sociotechnical contingency and potential had to wait until writers affiliated with the Frankfurt School of Critical Theory, and in particular Herbert Marcuse, pushed dialectical philosophers of technology to respond to the wealth and prosperity of post-war American (and increasingly Western) industrial society. Key to Marcuse’s diagnosis of advanced industrial society was the assertion that modern technological society had subverted dialectical thought such that alternatives to the technological infrastructure of mass production and consumption cannot be imagined (Marcuse 1964). Again, following Marx, the response to

this infrastructure is not escape, but rather a re-thinking of the assumptions and expectations that direct industrial society towards mass production and consumption. Critical energies should be directed towards this infrastructure if alternatives are to be imagined that go beyond mimicking capitalist labor processes and related modes of production and consumption. For Marcuse, then, progressive social change is necessarily sociotechnical, a “redefinition of values in *technical terms*, as elements in the technical process. The new ends, as technical ends” (ibid., 232).

For Feenberg, Marcuse’s work provides the foundation from which to argue that sociotechnical potential is not a dreamy respite from reality, but a historically plausible and philosophically sound response to the world as it is. His starting point is Marcuse’s claim that “dialectical thought understands the critical tension between “is” and “ought” first as an ontological condition” (ibid., 133). As Feenberg explains it, Marcuse’s two-dimensional ontology consists of both an empirically given reality and the unrealized potentials that are inherent to this reality. The tension between empirical reality and unrealized potential permeates lived experience, but has been truncated in an attempt to reduce the totality of experience to the logic of a scientific rationality premised on de-contextualization and methodological atomism. Through this logic, technologies come to be understood as discrete and measurable, divorced from both history and culture and reduced to a precise, yet myopic, functionality (Feenberg 2002, 2005, 2013, 2014). From this perspective, questions concerning why design takes the form that it does or why technologies have different consequences for different people become largely unanswerable. The reduction of technology to pure function—as if one could fully understand the significance and meaning of a computer or a car simply by reading a user manual—is an example of the one-dimensionality that Marcuse sought to critique in his philosophical project.

Feenberg advanced Marcuse’s theory of potentiality by transposing his dialectical ontology of “is” and “ought” into sociotechnical terms through historical examples of individuals and social groups who transform technical design, function, and meaning to better reflect their own experiences and expectations. Potentiality resides in the technical intentions of lay users who, through engaged use, propose and enact unimagined interpretations of the function and meaning of technical objects. This methodological attention to users follows from Feenberg’s desire “to better understand what we *do* when we envisage the world with a technical intention” (Feenberg 2017, 137; italics in original). The interesting point here is not the hermeneutic question being asked about the nature of technical intentionality, but rather the question of *whose* technical intention should one attempt

to understand. It is only through these moments of informal and improvised interjections into formally rational systems that it is possible to recognize alternative forms of sociotechnical rationality that reflect values, expectations, and initiatives that were not part of the formal design process. Think, for example, of the moment when turntables, mixers, and LPs were turned into musical instruments by marginalized social groups who were able to transform technology to realize potentials that responded to their own situations, but were unimagined by the engineers who designed these technologies (Fikentscher 2000; Fricke and Ahearn 2002; Hebdige 1987). We can also see this potential in the processes through which farm people reshaped the design and meaning of the car to better meet goals that were distinct from manufacturers and dealers (Kline and Pinch 1996). In these and countless other cases, users transformed the function and meaning of technology to better realize concrete potentials that were not considered in the original design. Potential, in this case, “is a dynamic future-oriented principle rather than an essence. . . . [I]t is not constructed speculatively as a fact independent of humanity but comes into view in the course of actual struggles and reflects the essential involvement of human beings with lived nature. Those struggles are based on the imaginative capacity to project a better future” (Feenberg 2014, 183). Making sense of these engagements requires a dialectical philosophy that can explain the tension between what is and what could be by recognizing the potential of technical design, function and meaning to realize a variety of worldviews and experiences.

In his own critical theory of technology, Feenberg demonstrates how users were able to realize sociotechnical potential through his study of the Minitel, a networked telecom device used in France in the 1980s that has similarities with the early Internet. For Feenberg, the design and function of the Minitel translated the social and cultural assumptions of engineers, policy makers, and managers, materializing “a world in which “freedom” is the more or less informed choice among pre-selected options defined by a universal instance such as technocratic authority” (Feenberg 1995, 157; see also Feenberg 2010; Bendor 2013). Users of the Minitel, though, felt that the retrieval of pre-determined information did not fully exploit its communicative potential. They hacked the network, and what was envisioned as one-way, top-down form of information dissemination was transformed into an interactive communication technology. This communicative potentiality was then translated into the design of new software applications and programs that contributed to the re-definition, both semantically and functionally, of the Minitel. Thus, this interpretation of the Minitel can be located within a



historical continuum of an empirically informed dialectical philosophy of technology in which the necessary corollary to sociotechnical contingency is potentiality.

### **3. Minitels, Ultrasounds, and the Imperative of History**

As noted earlier, for some philosophers of technology, dialectical and critical theories of technology can have uncomfortable affiliations with the essentializing tendencies of the so-called “classical” philosophies of technology. Peter-Paul Verbeek, for example, uses the case of the Minitel to point to a fundamental flaw that contradicts the methodological and ontological orthodoxy that followed the empirical turn: critical theories of technology employ a Marxist dialectic of liberation and resistance that reproduces the mistaken belief that technology and society are two separate spheres. Following Verbeek, the case of the Minitel, as presented by Feenberg, presupposes struggle and conflict between everyday users and the imperatives of an elite class of designers, policy makers, and engineers, thus setting up an inevitable conflict between ideologies that are independent of the artifact itself. In Feenberg’s analysis of the Minitel, then, the actual technology is unimportant because, following a dialectical approach, the analysis is always the same. Alternatively, if one adheres to the postphenomenology commandment (adopted from Husserl) to study “the thing in itself,” a very different relationship is revealed in which abstract frameworks of liberation and resistance are ineffective for theorizing the actual communicative engagements mediated by the Minitel and experienced by its users:

[T]he most relevant thing to study here is how communication media like Minitel have an impact on the quality of our daily lives. . . . [T]he impact of computer-mediated communication should not be reduced to the ideology from which it comes, but should be studied in terms of the material mediation of people’s experiences and practices. (Verbeek 2013, 85)

To further demonstrate the limitations of a dialectical philosophy of technology, Verbeek points to a technology that is difficult to reconcile with a model of resistance and liberation, prenatal ultrasounds, which he reads phenomenologically as a sociotechnical script that mediates moral quandaries about the unborn fetus. Hermeneutically, the ultrasound mediates a relationship between mother and fetus by isolating the two, creating a new ontological status for the fetus as an individual that exists independently from its mother as opposed to mediating the fundamental unity of mother and child (Verbeek 2011, 24–26). Prenatal ultrasounds also allow for diagnostic tests that can reveal a heightened chance of Down Syndrome or

spina bifida, which may force expectant mothers to consider abortion as an alternative to raising a child with a congenital disorder (ibid., 32). A political dimension of this mediated morality is that obstetric ultrasounds produce socially acceptable demarcations between a normal and abnormal fetus (Verbeek 2013, 86).

Against a framework that would interpret the ultrasound as a form of technocratic or ideological power that requires resistance,

The real decisions, though, concern the ways in which human beings deal with the screening system, how they shape themselves as expecting parents in interaction with the mediating power of this technology. What is needed here is not a tactics to fight against the strategies of the powerful, but a repertoire of “technologies of the self,” to deal responsibly with the new ways in which antenatal diagnostic technologies help to shape pregnancy and the moral decisions that come with it. (Ibid., 87)

Following this, the task for the philosophy of technology is to develop a phenomenological realist position from which to better grasp the complexities and consequences of living with technologies. In this case, the artifact itself and the sociotechnical relations that it mediates reveals a healthcare system that can better prepare expectant parents of the potential choices that are mediated via an ultrasound. What is needed is not liberation from imposed sociotechnical relations, but an infrastructure of responsibility that attends to sociotechnical mediations, including education, discussion, and informed deliberation intended to help people live with the realities of technically mediated pregnancies.

This is certainly a worthwhile trajectory for the philosophy of technology, but it is not the only one. While postphenomenology provides a philosophical framework that encourages careful consideration of the consequences and affordances of living with technology, an important aspect of living with technology is to ask *why* we have the technical artifacts and sociotechnical relations that we do. This question, too, follows from one of the central insights of STS:

*They might have been otherwise:* this is the key to our interest and concern with technologies. . . . [T]he question then becomes: why did they *actually* take the form that they did? This is a question that can be broken down into a range of further questions. Why did the designers think in this way rather than that? What assumptions did the engineers, or business people, or the politicians, make about the kinds of roles that people—or indeed machines—might play in the brave new worlds they sought to design and assemble? (Bijker and Law 1992, 3; emphasis in original)

The case of the prenatal ultrasound, for example, can also be examined as part of the sociotechnical transformation of health care in the Netherlands that began in 2006 in which a system that was formerly based on “solidarity and basic public insurance” was transformed into “a market-driven system with managed competition between private insurance companies” (ten Have and Gordijn 2013, 123). If a sociotechnical process like an ultrasound is defined as a scarce commodity within a market economy, then the meaning of this health care process as a sociotechnical phenomenon is inseparable from an ideology of cost-effectiveness and managed scarcity. A recognition of this history can be the starting point from which patients, as citizens, can ask different questions about the organization of healthcare in the Netherlands. This does not diminish the philosophical importance of developing an infrastructure of responsibility, but rather suggests an interpretation of this technology in which it is inseparable from the larger context of the health care system in the Netherlands and historically contingent ideas about access, scarcity, and the value (both economic and social) of healthcare.

The imperative of history in this scenario, like dialectical philosophy, may seem at odds with the methodological and ontological foundations of a postphenomenology and other post-empirical turn philosophy of technology. Again, following Verbeek (2005), “Classical philosophy of technology tried to understand technology from its conditions of possibility, from what must be presupposed in order for it to be possible. It thought “backwards,” so to speak; from the actual presence of concrete technological objects in our society to what made them possible” (7; see also Misa 1988). Locating technology historically, in other words, can lead to situations in which the conditions of possibility, like political economy or culture, are mistaken for the technologies themselves. The solution to this is to look forward, “starting from the technologies themselves and asking what role they play in our culture and daily lives, instead of reducing them to the conditions of their possibility and speaking about these conditions as if we were speaking about technology itself” (Verbeek 2005, 8–9).<sup>4</sup> History, though, should not be mistaken as an immaterial condition of possibility. Are questions about the history of the ultrasound and its place within the Dutch health care system necessarily committed to an essentialist reading of this technology? The ultrasound can also be a starting point to look backwards and ask questions such as how has this technical object, historically, been defined and enrolled as part of the sociotechnical organization of health care? How did this definition both reflect and influence attitudes towards the role of both a national health care system and the place of technology in it? In this scenario, looking backwards does not mean reducing

technology to its conditions of possibility, but rather understanding the complex intertwining of technology, culture, subjectivity, and political economy through which sociotechnical meanings are constructed and produced. These questions, in turn, demonstrate moments of historical contingency, revealing potentials that can be overlooked through a methodological focus on the artifact itself and the atomistic relations that it mediates.

The idea that history is an immaterial condition of possibility rests upon a very selective understanding of the role that history can play within the philosophy of technology.<sup>5</sup> Certainly, philosophers like Heidegger are guilty of reducing innumerable technologies to the same transcendental condition of possibility, but not all philosophers understand the history of technology as Heidegger did. The history of the Minitel, for example, highlights that users did not appeal to a transcendent or emancipatory ideal of communication. Rather, through engaged use, French citizens imagined concrete potentials premised on historically conditioned sociotechnical experiences of communication that were not realized in the original design of the Minitel:

The hacking of the Minitel network responded to users' perception of unexplored potentialities of the technology. These potentialities were suggested by the connection of the Minitel to the telephone network. The hackers must have been puzzled by the obstacles to communication on a familiar network dedicated precisely to that purpose. (Feenberg 2009, 13)

Even if one were to interpret this as resistance, this is a distinctly sociotechnical form of resistance that is unique to the case at hand and rooted historically in a variety of engagements that span a number of different technologies. Following the insights of STS researchers, it is important to be sensitive to the ways in which "the sociotechnical influences the sociotechnical" (Law 1987, 418). Dialectical philosophies of technology demonstrate that the history of technology can be as richly sociotechnical as the technical artifact itself. Only in the realm of metaphysical speculation are historical conditions of possibility immaterial.

Phenomenologically-oriented studies of technical mediation largely fail to account for history for fear of mistaking the conditions of possibility for the artifact itself, leading philosophers to methodologically fixate on the ways in which discrete technologies mediate action and perception. The cost of artifactual and temporal specificity, though, is a diminished sense of historical contingency, eliminating questions such as whose interests and worldviews are materialized through the design and function of technology, as in the case of Marx's critique of

the machinery of industrialization. Without this historical contingency, potential disappears; the study of technological objects, disconnected from both history and culture, denies an awareness that technology, and the relations that it mediates, could be otherwise. This lack of historical awareness leads to a conservative philosophy of technology that normalizes the sociotechnical world as it is:

Existing science and technology cannot transcend the capitalist world. Rather, they are destined to reproduce it by their very structure. They are inherently conservative, not because they are ideological in the usual sense of the term, not because their understanding of nature is false, but because they are intrinsically adjusted to serving a social order that ignores potentialities and views being as the stuff of domination. (Feenberg 2014, 180)<sup>6</sup>

This conservatism is accentuated by a paternalistic methodology that tends to restrict sociotechnical agency to a professional class of engineers, designers, and policy makers while fetishizing these professions with a kind-of vocational neutrality (see Oldenziel 1999 for a feminist critique of engineering culture). The result of this is the unquestioned acceptance of a worldview in which every person has a fixed and unchanging role in sociotechnical modernity: Engineers engineer technical solutions, designers design technical artifacts, and users accept the artifacts provided to them—a pillarization model for sociotechnical society. Living with technology, in this case, is tantamount to knowing one's place in a sociotechnical hierarchy.

Ignoring history and adhering to a methodology that diminishes moments of potential from the scope of the philosophy of technology is detrimental to those approaches that seek alternatives to existing technologies and the relations that they mediate. This includes, for example, the work of feminist philosophers of technology, labor process theorists, and critical race theorists, each of whom who work to identify and critique how histories of unfair and unjust sociotechnical relations have been, and continue to be, materialized in different ways through technical artifacts and sociotechnical systems. This is the basis not only of condemnation and critique, but also the basis from which concrete sociotechnical potentials can be realized.

#### **4. Conclusion**

I want to conclude by returning to an argument that I made in the introduction of this paper concerning the intellectual history of the empirical turn and the tendency to divide the philosophy of technology between classical and empirical approach-

es. Distinctions such as these, as writers ranging from Nietzsche to Foucault to Mary Douglas have argued, are convenient illusions. They are not discovered, but produced and maintained through the development of categories, like classical and empirical. One of the consequences of maintaining these distinctions is the ease with which philosophers can either avoid or dismiss ideas without seriously engaging with them; classical, after all, is a designation that by its very name means that it has been surpassed. The preceding paper has demonstrated that empirical approaches to technology are not bound to those philosophers working in the wake of STS and postphenomenology and so a history that splits the discipline between classical and empirical philosophies of technology should be replaced with one that considers the history of the philosophy of technology as one that extends from the nineteenth century to today. In this way, critical theories that focus on economic inequality or unjust social relations can co-exist with historical accounts of technology and phenomenological descriptions of technical mediations. All of these approaches, despite their conceptual and methodological variations, contribute to a greater philosophical understanding of the complex engagements that exist between humans and technology.

This does not mean that there are no differences between dialectical philosophy and postphenomenology. If we accept that both traditions begin with the fact of sociotechnical contingency, the difference between the two concerns the objectives that sociotechnical contingency opens up for both traditions. For postphenomenologists and technical mediation theorists, contingency is the starting point for examining *how* technology mediates our experiences and actions, “the central question then is how technologies help to shape knowledge, politics, aesthetic judgements, normative ideas, religious experiences, et cetera” (Rosenberger and Verbeek 2015, 31). From this, postphenomenologists and technical mediation theorists have developed rich descriptions of how technical artifacts mediate various dimensions of action and experience. In recent years, this approach has borne a wealth of fascinating studies, including Rosenberger’s (2017) study of “callous designs” and essays attuned to the art of living with technology (Dorrestijn 2012; Van Den Eede, Goeminne, and Van den Bossche 2017). From this, a design imperative can be developed through which philosophers provide insights to designers and engineers to come up with design-based solutions to contemporary problems.

For Feenberg and other writers working in the dialectical tradition, the question of *why* we have the technologies that we do does not lend itself to the practice of designers and engineers so easily—indeed, asking why designs correspond with the interests of the organizations that pay the salaries of designers may raise

uncomfortable questions for postphenomenologists. Against the philosophical objectives of postphenomenology, Feenberg’s philosophy avoids the hubris of a design imperative and points philosophers towards a more modest, yet realistic, trajectory. He writes,

Dialectical social theory must preserve the Hegelian-Marxist notion of actualization by relating it to a historically plausible *Aufhebung* or transcendence of the given state of society. . . . [T]he new politics of the technosystem is neither revolutionary in the Marxian sense nor merely reformist, confined to minor tinkering with the established system. We do not know where these changes lead but we cannot doubt that they represent a universal advance, an *Aufhebung* of important aspects of the technosystem. . . . [C]ritical constructivism gives an account of the process of transcendence without positing a final endpoint the nature of which we do not know. (Feenberg 2017, 116–17)

This is wonderful! A philosophy of technology that takes into consideration decades of research that conclusively demonstrates that the trajectory of sociotechnical change is, in fact, unimaginable and without any sort of final endpoint. So where does this leave the philosophers of technology? Faced with the unpleasant consequences of the hubristic desire to design our way out of our problems (which at one point were also proposed as progressive design solutions), the task, I believe, is to pay closer attention to the local situations where everyday users engage with the world as it is and imagine a multiplicity of potentials of what it could be. Sociotechnical contingency may be universal, but potential is local, contextual, and multiple.

## Notes

1. See also Dominic Smith (2018) who critiques the empirical turn for essentializing an idea of “transcendence” that has been retroactively applied to classical approaches in order to render them obsolete.

2. The term sociotechnical is taken from work in Science and Technology Studies (STS). STS refined methods from anthropology, history, and the sociology of science to better understand the process of “technology in the making” (Latour 1987). Through finely detailed case studies, researchers were able to empirically refute assumptions of either social or technological essentialism by recognizing that the social and the technical are so deeply intertwined that it no longer makes sense to speak as if these were distinct from one another. As such, many in STS began using the term “so-

ciotechnical” in the 1980s to clarify their position against unproblematic distinctions between humans and the human-built world (Bijker, Hughes, and Pinch 1987; Hughes 1983; Latour 1988). Responding to the insights of STS, the challenge for many contemporary philosophers of technology has been to conceptualize active engagements between humans and technologies without drawing a neat distinction between the two.

3. In his reading of Marx’s *Capital*, David Harvey (2010) suggests that dialectical thinking is more intuitive and natural than scientific thought: “One of the curious things about our educational system, I would note, is that the better trained you are in a discipline, the less used to dialectical method you’re likely to be. In fact, young children are very dialectical; they see everything in motion, in contradictions and transformations. We have to put immense effort into training kids out of being good dialecticians” (12).

4. There is a connection here with Actor-Network Theory (ANT), specifically regarding what Callon (1986) called generalized agnosticism and Bruno Latour’s (1991) claim, on behalf of actor-network theorists, that “we refuse to accept judgments that transcend the situation” (130). This is mirrored in the belief that the conditions of possibility that precede the design and manufacture of artifacts—be they cultural assumptions and traditions, ideologies, or the organization of production and consumption—should be kept distinct from the study of the ways in which action and perception are technically mediated.

5. This inability to grasp history is a continuation of Don Ihde’s ahistorical hermeneutic phenomenology of technology that relies on spectacular examples of how technologies are interpreted differently by different cultures. Although essential for revealing technology’s inherent ambiguity, Ihde’s hermeneutics of technology does not explicate meaning in relation to the historical contexts that precede our involvement with technologies. He emphasizes the social contexts that shape our interpretation of technologies, but not the sociotechnical contexts.

6. This follows Rao et al. (2015), who argue that Verbeek’s project of technical mediation theory corresponds with a “conservative political agenda” in which, “we should not negate our current capitalist society and its concurrent technologies, but seek for manners to develop a good life amidst these relations of power” (459).



**References**

- Achterhuis, Hans, ed. 2001. *American Philosophy of Technology: The Empirical Turn*, trans. Robert P. Crease. Bloomington: University of Indiana Press.
- Adorno, Theodor W., Hans Albert, Ralf Dahrendorf, Jürgen Habermas, Harald Pilot, and Karl R. Popper. 1976. *The Positivist Dispute in German Sociology*, trans. Glyn Adey, and David Frisby. New York: Harper.
- Bendor, Roy. 2013. "The Role of Experience in the Critical Theory of Technology." *Techné: Research in Philosophy and Technology* 17(1): 47–71. <https://doi.org/10.5840/techne20131714>
- Bijker, Wiebe, Thomas P. Hughes, and Trevor Pinch, eds. 1987. *The Social Construction of Technological Systems*. Cambridge, MA: MIT Press.
- Bijker, Wiebe, and John Law. 1992. *Shaping Technology/Building Society: Studies in Sociotechnical Change*. Cambridge, MA: MIT Press.
- Bimber, Bruce. 1994. "Three Faces of Technological Determinism." In *Does Technology Drive History: The Dilemma of Technological Determinism*, ed. Merrit Roe Smith and Leo Marx, 79–101. Cambridge, MA: MIT Press.
- Braverman, Harry. 1974. *Labor and Monopoly Capital: The Degradation of Work in the 20th Century*. New York: Monthly Review Press. [https://doi.org/10.14452/MR-026-03-1974-07\\_1](https://doi.org/10.14452/MR-026-03-1974-07_1)
- Brey, Philip. 2010. "Philosophy of Technology after the Empirical Turn." *Techné: Research in Philosophy and Technology* 14(1): 36–48. <https://doi.org/10.5840/techne20101416>
- Callon, Michel. 1986 "Some Elements of a Sociology of Translation: The Domestication of the Scallops and the Fishermen of St. Brieuc Bay." In *Power, Action and Belief: A New Sociology of Knowledge?*, ed. John Law, 196–223 London: Routledge and Kegan Paul.
- Dorrestijn, Steven. 2012. "Technical Mediation and Subjectivation: Tracing and Extending Foucault's Philosophy of Technology." *Philosophy & Technology* 25(2): 221–41. <https://doi.org/10.1007/s13347-011-0057-0>
- Feenberg, Andrew. 1995. *Alternative Modernity*. Berkeley: University of California Press.
- Feenberg, Andrew. 2002. *Transforming Technology: A Critical Theory Revisited*. Oxford: Oxford University Press.
- Feenberg, Andrew. 2005. *Heidegger and Marcuse: The Catastrophe and Redemption of History*. New York: Routledge. <https://doi.org/10.4324/9780203489000>
- Feenberg, Andrew. 2009. *Function and Meaning: The Double Aspects of Technology*. Unpublished Draft.

- Feenberg, Andrew. 2010. *Between Reason and Experience: Essays in Technology and Modernity*. Cambridge, MA: MIT Press.  
<https://doi.org/10.7551/mitpress/8221.001.0001>
- Feenberg, Andrew. 2013. "Marcuse's Phenomenology: Reading Chapter Six of *One-Dimensional Man*." *Constellations* 20(4): 604–14.  
<https://doi.org/10.1111/1467-8675.12060>
- Feenberg, Andrew. 2014. *The Philosophy of Praxis: Marx, Lukacs and the Frankfurt School*. London: Verso.
- Feenberg, Andrew. 2017. *Technosystem: The Social Life of Reason*. Cambridge, MA: Harvard University Press. <https://doi.org/10.4159/9780674982109>
- Fikentscher, Kai. 2000. *You Better Work: Underground Dance Music in New York City*. Hanover, NH: University Press of New England.
- Fricke, Jim, and Charlie Ahearn. 2002. *Yes Yes Y'All: The Experience Music Project Oral History of Hip Hop*. Cambridge: De Capo Press.
- Harvey, David. 2010. *A Companion to Marx's Capital*. London: Verso.
- ten Have, Henk, and Bert Gordijn. 2013. "The Business of Care." *Medicine, Health Care, and Philosophy* 16(1): 123–24. <https://doi.org/10.1007/s11019-013-9477-1>
- Hebdige, Dick. 1987. *Cut 'n' Mix: Culture, Identity and Caribbean Music*. London: Methuen and Co. <https://doi.org/10.4324/9780203359280>
- Heilbroner, Robert L. 1994. "Do Machines Make History." In *Does Technology Drive History: The Dilemma of Technological Determinism*, ed. Merrit Roe Smith and Leo Marx, 53–66. Cambridge, MA: MIT Press.
- Hughes, Thomas P. 1983. *Networks of Power: Electrification in Western Society 1880–1930*. Baltimore: Johns Hopkins University Press.
- Jay, Martin. 1973. *The Dialectical Imagination: A History of the Frankfurt School and the Institute for Social Research, 1923–1950*. Boston: Little, Brown and Co.
- Jeffries, Stuart. 2016. *Grand Hotel Abyss: The Lives of the Frankfurt School*. London: Verso.
- Kline, Ronald, and Trevor Pinch. 1996. "Users as Agents of Technological Change: The Social Construction of the Automobile in the Rural United States." *Technology and Culture* 37(4): 763–96. <https://doi.org/10.2307/3107097>
- Latour, Bruno. 1987. *Science in Action: How to Follow Scientists and Engineers Through Society*. Cambridge, MA: Harvard University Press.
- Latour, Bruno. 1988. "Mixing Humans and Nonhumans Together: The Sociology of a Door-Closer." *Social Problems* 35(3): 298–310. <https://doi.org/10.2307/800624>
- Latour, Bruno. 1990. "Drawing Things Together." In *Representation in Scientific Practice*, ed. Michael Lynch, and Steve Woolgar, 19–68. Cambridge, MA: MIT Press.

- Latour, Bruno. 1991. "Technology is Society Made Durable." In *A Sociology of Monsters: Essays on Power, Technology and Domination*, ed. John Law, 103–31. London: Routledge. <https://doi.org/10.1111/j.1467-954X.1990.tb03350.x>
- Law, John. 1987. "The Structure of Sociotechnical Engineering: A Review of the New Sociology of Technology." *The Sociological Review* 35(2): 405–25. <https://doi.org/10.1111/j.1467-954X.1987.tb00015.x>
- Lukács, Georg. 1971 (1923). *History and Class Consciousness: Studies in Marxist Dialectics*. Cambridge, MA: MIT Press.
- Mackenzie, Donald. 1996. *Knowing Machines: Essays on Technological Change*. Cambridge, MA: MIT Press.
- Marcuse, Herbert. 1964. *One-Dimensional Man: Studies in the Ideology of Advanced Industrial Society*. Boston: Beacon Press.
- Marcuse, Herbert. 2007 (1960). "A Note on the Dialectic." In *The Essential Marcuse: Selected Writings of Philosopher and Social Critic Herbert Marcuse*, ed. Andrew Feenberg, and William Leiss, 63–72. Boston: Beacon Press.
- Marx, Karl. 1954 (1887). *Capital: A Critique of Political Economy Volume One*, trans. Samuel Moore, and Edward Aveling. Moscow: Progress Publishers.
- Marx, Karl. 1973 (1939). *Grundrisse: Foundations of the Critique of Political Economy*, trans. Martin Nicolaus. Middlesex: Penguin Books Ltd.
- Misa, Thomas J. 1988. "How Machines Make History, and How Historians (and Others) Help Them to Do So." *Science, Technology and Human Values* 13(3/4): 308–11. <https://doi.org/10.1177/016224398801303-410>
- Mumford, Lewis. 1963. *Technics and Civilization*. New York: Harcourt, Brace and World, Inc.
- Oldenziel, Ruth. 1999. *Making Technology Masculine: Men, Women and Modern Machines in America, 1870–1945*. Amsterdam: University of Amsterdam Press. <https://doi.org/10.5117/9789053563816>
- Rao, Mithun Bantwal, Joost Jongerden, Pieter Lemmens, and Guido Ruivenkamp. 2015. "Technological Mediation and Power: Postphenomenology, Critical Theory, and Autonomist Marxism." *Philosophy & Technology* 28(3): 449–74. <https://doi.org/10.1007/s13347-015-0190-2>
- Rosenberger, Robert. 2017. *Callous Objects: Designs Against the Homeless*. Minneapolis: University of Minnesota Press. <https://doi.org/10.5749/9781452958538>
- Rosenberger, Robert, and Peter-Paul Verbeek. 2015. *Postphenomenological Investigations: Essays on Human-Technology Relations*. Lanham, MD: Lexington Books.
- Selinger, Evan. 2009. "Towards a Reflexive Framework for Development: Technology Transfer after the Empirical Turn." *Synthese* 168(3): 377–403. <https://doi.org/10.1007/s11229-008-9450-3>

- Smith, Dominic. 2018. *Exceptional Technologies: A Continental Philosophy of Technology*. London: Bloomsbury.
- Vallor, Shannon. 2016. *Technology and the Virtues: A Philosophical Guide to a Future Worth Wanting*. Oxford: Oxford University Press.  
<https://doi.org/10.1093/acprof:oso/9780190498511.001.0001>
- Van Den Eede, Yoni, Gert Goeminne, Marc Van Den Bossche. 2017. "The Art of Living with Technology: Turning Over Philosophy of Technology's Empirical Turn." *Foundations of Science* 22(2): 235–46.  
<https://doi.org/10.1007/s10699-015-9472-5>
- Verbeek, Peter-Paul. 2005. *What Things Do: Philosophical Reflections on Technology, Agency, and Design*. University Park: Pennsylvania State University Press.
- Verbeek, Peter-Paul. 2011. *Moralizing Technology: Understanding and Designing the Morality of Things*. Chicago: University of Chicago Press.  
<https://doi.org/10.7208/chicago/9780226852904.001.0001>
- Verbeek, Peter-Paul. 2013. "Resistance Is Futile: Toward a Non-Modern Democratization of Technology." *Techne: Research in Philosophy and Technology* 17(1): 72–92. <https://doi.org/10.5840/techne20131715>
- Verbeek, Peter-Paul. 2017. "The Struggle for Technology: Towards a Realistic Philosophy of Technology." *Foundations of Science* 22(2): 301–04.  
<https://doi.org/10.1007/s10699-015-9470-7>
- Winner, Langdon. 1977. *Autonomous Technology: Technics out of Control as a Theme in Political Thought*. Cambridge, MA: MIT Press.