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Darryl Cressman *Editor*

The Necessity of Critique

Andrew Feenberg and the Philosophy of Technology

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Chapter 1
Introduction: The Necessity (and Spirit) of Critique in Andrew Feenberg's Philosophy of Technology

Darryl Cressman

Abstract In this introductory chapter I situate the following collection as one that takes as its starting point Andrew Feenberg's philosophical critique of technology. Feenberg's critique of technology is quite wide-ranging and so the chapters in this book fall within three themes that I outline in this introduction. First, Democratic Potentials, which explores how democracy can be used as a standard against which technologies can be critiqued. Trajectories of Contemporary Critique, which looks at how history and hermeneutics can inform the critique of contemporary technologies. And Critical Theories of Technology, which draws together intellectual histories of the critique of technology.

Keywords Andrew Feenberg · Critical theory · Technology · Critique · Democracy · Politics · History · Hermeneutics · Intellectual history · Philosophy of technology

1.1 Introduction

This collection commemorates Andrew Feenberg being awarded the Lifetime Achievement Award in 2019 by the Society for the Philosophy of Technology. It would not be an exaggeration to say that Feenberg is one of the best-known and most-read philosophers of technology of the past 35 years. He is a prolific writer who engages with a range of ideas and so, given the scope of his work, thematizing a volume like this can be a challenge. Other books and journals dedicated to

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Feenberg's work focus on the reform and democratization of technology (Veak, 2006), situating his work as part of the tradition of Frankfurt School critical theory (Arnold & Michel, 2017), and comparing his philosophical project against Don Ihde's project of postphenomenology (*Techné*, 24 [1/2], 2020). To distinguish this collection from these other projects, the following chapters focus on Feenberg's critique of technology.

Feenberg's critique of technology accounts for the sociotechnical world as it is while pointing to concrete potentials of what it could be, "a dialectical critique of technology that is neither irrationalist nor technophobic" (2014, p. 201). The object of his critique is not any one particular technology per se, but rather a type of rationality that normalizes a limited range of possible technical functions, designs, and meanings. Recognizing the inherent potential of sociotechnical rationality to respond to a plurality of experiences and initiatives allows for a shift in thinking about technology, away from neutrality, universal progress, and professional expertise to an idea of technology characterized by ambivalence, local progress, and situated use. This should not be confused with a technical fix. Rather, what Feenberg proposes is a radical re-configuration of social theory itself:

> …the 20th century, with its world wars, atom bombs, concentration camps, and environmental catastrophes, has made it more and more difficult to ignore the strange aimlessness of modernity. Because we are at such a loss to know where we are going and why, philosophy of technology has emerged in our time as a critique of modernity (Feenberg, 2005, p. 12).

This is a bold claim, but it points to the necessity of critiquing technology. Technology is both a contingent and permanent feature of the human experience such that any critical theory of society that is not also a critical theory of technology is woefully incomplete. Re-considering the concerns of social theory as distinctly sociotechnical concerns can open up trajectories of analysis and change that may prove to be more durable and effective than the law, education, or governance.

The critique of technology is not what it once was. Its apex occurred in the decades following World War II as a response to the carelessness and irresponsibility of the first half of the twentieth century.[1] The triumphant celebration of post-war technological progress, with its biases towards consumerism and militarism, inspired many in the humanities and social sciences to be critical of technology and suspicious of those who were not. The past 40 years has seen this tradition of critique fade.

For critical theorists working in the tradition of the Frankfurt School and Western Marxism, Habermas' influence neutralized the politicization of technology and

[1] Of course, the critique of technology did not begin in the twentieth century. In the West, a humanistic style of critique emerged in the wake of the Industrial Revolution. These early expressions took many forms: critiques of technological hubris in literature by writers like Mary Shelley (1797–1851), Henry David Thoreau (1817–1862), and Ralph Waldo Emerson (1803–1882), the humanist political economy of Karl Marx (1818–1883), representations of speed and technology in the paintings of J.M.W. Turner (1775–1851), and the hopeful utopianism of Edward Bellamy's novel *Looking Backwards* (1888). These reactions marked the beginning of a critique that challenged the ideologies of progress that shaped popular ideas about technology.

technological rationality by bounding it to a sphere of functional instrumentality that was independent of social influence and history. For those not convinced by Habermas, the influence of post-colonialism, aesthetics, feminism, and ecology has pushed critical theorists towards many fascinating insights, but without a corresponding critique of technology. Indeed, it is not surprising to find that a recent book on the intellectual history of contemporary critical theory makes only a passing reference to technology as a holdover from Horkheimer & Adorno's remarks on the culture industry (Keucheyan, 2014).[2]

Around the same time that Habermas became the leading voice amongst critical theorists, philosophers of technology began adopting the methodological insights of social scientists and Science and Technology Studies (STS) researchers in what has been termed the empirical turn. Turning to discrete case studies to demonstrate multiple instances of contingency, an explicit methodological a priori is evident in approaches such as actor-network theory, postphenomenology, value-sensitive design, virtue ethics, sociotechnical imaginaries, and many other recent additions to the philosophy of technology. Although these approaches have done much for the philosophical study of technology, they offer little to account for critical concepts like ideology, reason, alienation, and reification.

Despite these changing theories, methods, and objects of critical inquiry, the irresponsibility and carelessness that characterized the first half of the twentieth century persists across our shared technological condition. This demands, I argue, a theoretically coherent, historically conscious, and empirically sound critique of technology.

The following chapters do their best to adhere to this idea of critique. They are not intended to be an elaboration and application of specific concepts found in Feenberg's writings (although many do just that) nor a series of debates regarding the finer points of his philosophy (although this is also present). What connects the contributions to this volume is that they are indebted to Feenberg's insistence that critiquing technology is necessary for any sort of progressive social change. This, then, is the spirit (which can be considered a complement to the necessity) of critique that one can take from Feenberg's work. Whereas other writers can be quick to find fault with methods or theories that are different than their own, reading Feenberg it is clear that his political and philosophical ideals take precedence over any sort of academic tribal allegiances. Borrowing ideas, concepts, and methods that can assist in moving towards a more humane and democratic sociotechnical culture exceeds the value of any one particular approach.

One feature of this collection is that all of the contributors are located in Europe. In one way, this geographical feature distinguishes this collection from others dedicated to Feenberg's work, which tend to draw primarily from the United States and other English-speaking countries. But, it also points to a disparity in the range of perspectives that have come to shape the philosophical critique of technology. The

[2] Similarly, as Hans Radder points out in his contribution to this book, "technology" is completely absent from the recent German edited collection *Warum Kritik? Begründungsformen kritischer Theorien*, which takes as its starting point the justification for a critical theory.

object of Feenberg's critique, as noted above, is a form of technological rationality that normalizes a limited range of technical functions while restricting the scope of whose ideas count in relation to design and meaning. Key to this limited notion of technological rationality is the assumption that technology, and technological rationality, is universal. Attached to grand narratives about the inevitability of progress and the inherent benefits of innovation, is the widely assumed belief that technologies provide the same promises to everyone, regardless of who they are, where they come from, or what they desire; a great levelling of expectations determined by functional attributes designed by a small cadre of experts representing a small geographical region. Drawing attention to the voices and perspectives that are not accounted for in the idea of a neutral and universal technological rationality is the basis of a philosophical critique that fits nicely with Feenberg's overall project, "replacing the grand narratives of the past with the many local narratives will free the imagination to explore alternatives to both the existing society and the failed revolutions of the past" (Feenberg, 2017a, p. 204). It is hoped that this book can emphasize the necessity of locality, both geographic and cultural, in order to open up a philosophical critique of technology that recognizes as many experiences and potentials as possible.

Because Feenberg's critique of technology covers a range of ideas, the following chapters are organized around three themes that expand upon his philosophical project. The first theme, **democratic potentials**, is concerned with his work as a political philosopher of technology. The second, **trajectories of contemporary critique**, explores the historical and hermeneutic dimensions of his critique through studies of contemporary digital technologies. And the last theme, **critical theories of technology**, takes as its inspiration the intellectual history of the philosophy of technology. Prior to these themes and chapters, this collection begins with a recent essay by Feenberg that summarizes his approach to technology. Titled "Critical Constructivism: An Exposition and Defense," this is a concise summary of the ways in which his theory draws together insights from Frankfurt School Critical Theory, Heideggerian phenomenology, labour process theory, and Science and Technology Studies (STS) to politicize the rationality manifested in both technology and the ideologies that surround it, arguing that "uncovering the bias of that rationality is the critical task of the study of technology today."

1.2 Democratic Potentials

> What human beings are and will become is decided in the shape of our tools no less than in the action of statesmen and political movements. The design of technology is thus an ontological decision fraught with political consequences. The exclusion of the vast majority from participation in this decision is profoundly undemocratic (Feenberg, 2002, p. 3).

The above quote is used by a few contributors to this collection because it succinctly points to a fundamental problem of modernity: technology remains largely outside of the scope of our democratic expectations. For many, the failure to democratize

technology is due to variations of technocracy. At its most imaginative, technocracy has parallels with the totally administered society of Huxley's *Brave New World* while contemporary critics identify it with the top-down decision making associated with nudging or design thinking. Technocracy is problematic because the trajectory of technology should respond to, and not direct, the interests of the people whose lives are mediated through particular designs and functions. Omitting plurality, compromise, and uncertainty from the scope of technical decision-making contributes to a sense of collective disenfranchisement in the face of seemingly autonomous sociotechnical changes, reinforcing the legitimacy of technocratic ideals.

The democratization of technology is a political philosophy that aims to delegitimize technocratic rationality, albeit without predictable dualisms or binary oppositions. For Feenberg, democratization is not a matter of holding an election between different technologies, but accounting for democratic interventions, which he defines as those unexpected and unimagined potentials that emerge from everyday engagements, that, by virtue of their existence and not their intention, destabilize technocratic rationality by demonstrating its limits. Think, for example, of the moment when different social groups transformed turntables, mixers, and LPs into musical instruments (Fikentscher, 2000; Hebdige, 1987) or the processes through which farmers reshaped the design and meaning of the car to better meet goals that were their own, distinct from manufacturers and dealers (Kline & Pinch, 1996). These moments of informal and improvised interjections into formally rational systems make it possible to recognize alternative functions and meanings that reflect values that were not part of the formal design process. There are no appeals to transcendent ideals or evidence of organized resistance to power, just engaged use that leads to unimagined potentials. This is a modest philosophical critique that reminds us that the hubris of planning out technological solutions needs to be balanced alongside the recognition that one cannot know, or plan, the trajectory of technological change.

> …the new politics is neither revolutionary nor reformist…we do not know where these changes lead, but we cannot doubt that they represent a universal advance…critical constructivism gives an account of the process of transcendence without positing a final endpoint the nature of which we do not know (Feenberg, 2017a, p. 119).

Hans Radder's chapter deals with one of the methodological problems that has perplexed critical theorists of technology for the past few decades – how does one balance individual sociotechnical experiences with larger scale concepts, like democracy, that critique demands?[3] On one hand, phenomenological-empirical descriptions of the "thing itself" often reveal fascinating details of small-scale individual experiences and, in doing so, draw out the material and interpretative flexibility of technology. But this attention to micro-level contingencies occurs at the expense of history and an awareness of larger cultural patterns, negating critique by

[3] This debate has occurred between empirical researchers of technology and philosophers of technology since the 1990s. See, for example the essays collected in Misa et al. (2003) and Hans Radder's (1992) critique of the methodological and theoretical presuppositions of STS.

affirming the world as it is. On the other hand, reducing the richness of our sociotechnical lifeworld to variations of capitalist political economy or technocracy can diminish the range of potential by offering little beyond variations on the persistence of one-dimensionality. Radder overcomes this methodological paradox through a comprehensive critical theory of the common good in which democracy is used to assess the feasibility and normative desirability of a particular technology. In his assessment of the Dutch government's attempts to develop a COVID-19 tracking app, Radder demonstrates how a universal concept of the common good can be used to develop different assessments of particular sociotechnical initiatives. This particular critique refers back to Marcuse's critical interpretation of theoretical concepts and Radder reminds readers that, "our concepts contain the seeds of their own transformation: their nonlocal meaning reflects our potential of seeing the world in novel ways." The unification of the local and the universal proposed by Radder fits nicely alongside Feenberg's ideas about local progress. Democratic critique is itself universal, but the character of this resistance is wholly local.

The chapters by Tina Sikka and Roy Bendor complement Feenberg's democratic proposals by scrutinizing aspects of theory, refining and expanding the processes by which the democratization of technology can occur. Working from the insights developed through Feenberg's study of AIDS patients in the United States in the late 1980s and early 1990s, **Tina Sikka** subjects the case of COVID-19 to a similar type of analysis. Whereas for AIDS activists and patients, increased communication transformed the hierarchical and paternalistic technical codes that governed experimental drug trials, Sikka highlights how increased communication in a highly politicized and polarized media environment distorts attempts to democratize sociotechnical rationality, suggesting that Feenberg's democratization thesis falls short, "not because it is philosophically or empirically suspect, but because of a number of mitigating factors that have interfered with and distorted the productive role pro-social democratic values and norms usually play." Sikka overcomes this problem by drawing on feminist science scholars to imagine discourses around health care that prioritize an ethic of care that emphasizes the interdependence and mutual responsibility of all humans alongside (or perhaps even ahead of) their communicative liberty.

Roy Bendor's chapter examines the question of whose sociotechnical agency counts. One of the more provocative moves that Feenberg makes is that he argues that it is no longer sufficient to assume that the trajectory of technological change can be bracketed off as something that only a select class of experts – designers, engineers, and policy makers – can effectively have agency over. This is not intended to be antagonistic towards these professions, rather it is a re-consideration of sociotechnical agency based on empirical demonstrations that technical expertise is not wholly restricted to an idea of technological rationality that only a select few have mastery over. Bendor, working from a perspective informed by design theory, suggests that professional designers have much to contribute to a democratic politics of technology while still maintaining practical resonances with Feenberg's politics. Summarizing different approaches to design that share affinities with Feenberg's strategies for democratization, Bendor suggests that "a different kind of design

altogether," what he calls (un)design, can open up democratic potentials that go beyond hacking, re-appropriation, or reinvention. Unlike other forms of democratic rationalization, (un)designs are intentionally unfinished, what he calls "ontologically incomplete" designs that invite users to exercise their own agency in directing the function and meaning of design. In Bendor's hands, (un)design recognizes how designers can exercise their professional expertise while maintaining and enhancing the democratic potentials of those who live with design.

Ryan Wittingslow's chapter concludes this section by pointing out the inherently undemocratic processes by which the design and implementation of "smart cities" has been championed by city planners, designers, and philosophers eager to implement a neatly uniform "the good," which he subjects against the standard of democracy. From this perspective, the well-intentioned ambitions of smart city visionaries are deeply problematic. Democracy is pluralistic, containing multiple iterations of "the good" that are excluded by design in the plans of smart cities. Democracy is also slow and sensitive to interests that may delay the goals of competitive efficiency, profit-making, and other positive externalities found in the sociotechnical imaginaries championed by smart city enthusiasts. As Wittingslow demonstrates, democracy is an effective way to think about what smart cities can provide for citizens, concluding that, "democracy plays a foundational role in that it provides the means by which a given polis can collectively conceptualise the smart city…democracy's pluralism makes possible the development of hitherto unimagined potentials for smart urban technologies." Democracy, in this sense, is not about providing another version of a smart city, it is about providing frameworks through which we can evaluate these ambitions, a mode of critique to judge the legitimacy and desirability of technical initiatives and provide a vocabulary to discuss the limitations of top-down and expert-led initiatives.

1.3 Trajectories of Contemporary Critique

> In sum, values are the facts of the future…our world was shaped by the values that presided over its creation. Technologies are the crystallized expression of those values (Feenberg, 2017a, p. 8).

The complex richness of our sociotechnical world is diminished when the meaning of technology is reduced to an ahistorical and decontextualized functionality. Although reducing technology to its functions is a common-sense approach that corresponds with other widely accepted ideas, such as the idea that technology is neutral and that improved functionality is synonymous with progress, this is a misguided effort to discern the essence of technology from a limited idea of how it works. Think of a car: one can understand how a car works by reading the user's manual, but this is an impoverished understanding of what it means for a technology to work. A car also works symbolically as a marker of success (or lack thereof), it works as part of a complex network of roads, traffic laws, manufacturing facilities, gas stations, insurance companies, and a myriad of occupations and institutional

arrangements, and it works to mediate debates concerning environmental issues, the expansion of public transportation, and more recently, ethical debates about self-driving cars. Technologies work, in other words, both functionally and hermeneutically.

As the epigraph above hints at, history is one way that the hermeneutic dimension of technology can be revealed as a means of critique. Feenberg draws insights from histories of the competing values and ideas that were present at the origin of technologies, and his work contains numerous references to historians who are sympathetic to these functional and hermeneutic contingencies, such as Carolyn Marvin, Wolfgang Schivelbusch, and Jean-Baptiste Fressoz. The allure of these histories is that they demonstrate that the success or failure of a technology is never wholly technological. The corollary to this insight is that what has come to be assumed as rational and inevitable is dependent on particular historical and social contexts that, if different, would result in a different technology. The assembly line, for example, is often considered to be a model of universal rational efficiency that can be unproblematically used in any context. But this design is dependent upon capitalist notions of labour and power. The functional deskilling, surveillance of labour, and autonomy of management that seems to be an inevitable consequence of productivity and progress are contingent elements that could be otherwise. Forgetting this history, paradoxically, transforms the assembly line into a neutral tool that is also ideologically useful, "The assembly line only appears as technical progress because it extends the kind of administrative rationality on which capitalism already depends" (Feenberg, 2002, p. 78). This is an example of what Feenberg calls the technical code, or the design code, of capitalism, which explains the reification of political and economic biases that influence the design and meaning of technology.

> …the legitimating effectiveness of technology depends on unconsciousness of the cultural-political horizon under which it was designed. A critical theory of technology can uncover that horizon, demystifying the illusion of technical necessity, and expose the relativity of the prevailing technical choices (Feenberg, 1999, pp. 86–87).

Following Feenberg, an attention to history can open up trajectories for critiquing contemporary technologies that go beyond the somewhat restrictive bounds of "new and emerging" technologies. Writing and researching at a pace that attempts to keep up with incessant technological change comes at the cost of an inability to comprehend technological society in its totality, which frustrates attempts at dialectical critique by overlooking the endurance of social and economic relations that are neither new nor emerging. Indeed, the labour processes that characterize technology as imagined by Henry Ford and Fredrick Winslow Taylor in the early twentieth century persist today in both the manufacture and operation of seeming cutting-edge technologies like AI and other innovations (Crawford, 2021; Irani, 2019). Identifying the technical codes that govern the production and consumption of technologies, like the codes that provide the horizon through which AI is imagined, points to historical continuities that tie aspects of technological society together, enabling a critique that transcends any one particular technical object.

The chapters in this section undertake this type of critique through studies of big data, recommender systems, and algorithmic things. **Sally Wyatt's** chapter is a

wide-ranging analysis of the many claims that have come to endow big data with particular meanings, such as the idea that data are given, that data are a natural resource, that numbers speak for themselves, and that everything is already data. She easily critiques the assumption that data are neutral and self-evident by pointing out that "data are never simply given, nor are they enough by themselves to make any kind of knowledge claim. Theoretical concepts are always built into the classifications and algorithms used to make sense of large volumes of data." These concepts, rendered invisible, reproduce existing power structures. This is compounded by a myopic reliance on big data as all that truly counts as both knowledge and a way of knowing. Wyatt points to the popular claim that, reliant upon big data, researchers no longer need to know why people do what they do, they only need to know what they do. As she makes clear, this attitude persists in an unthinking reliance on data that "represent the past and not the future, and thus cannot be used to support equal opportunities for groups that have been historically discriminated against in labour markets." She concludes by arguing that it is not enough to critique these moments of reification. If big data are to be harnessed towards socially desirable ends, it is necessary for human intervention to make the biases of big data explicit.

Marit de Jong and **Robert Prey** draw out in fascinating detail the long history of contemporary recommender systems (like the ones used by Spotify, Amazon, and Netflix) in the ideas of behavioral psychologists like B.F. Skinner. What de Jong and Prey call the "behavioral code" of recommender systems, "promotes an impoverished view of what it means to be human." Impoverishment derives from an inherent conservativism, familiar from Wyatt's analysis of big data, that comes from limiting the scope of potential behavior to a simplistic idea of past behavior that avoids questions of intentionality or historical and cultural circumstances – only *what* people do counts, not *why* they do it. For de Jong and Prey, tracing the history of recommender systems to behaviorist psychology opens up a space for critique that looks beyond the software to the ideas upon which it is designed. Considering recommender systems through a critical framework, they trace how a formal bias emerges: a contested intellectual field characterized by multiple debates about human behavior becomes reduced and translated into recommender systems, resulting in a sociotechnical system that effectively aligns both an idea of what counts as behaviour and how behaviour can be measured. This analysis resonates with what Marcuse wrote in his critique of empirical social research, "…the criteria for judging a state of affairs are those offered by…the given state of affairs. The range of judgment is confined within a context of facts which excludes judging the context in which the facts are made" (Marcuse, 1964, pp. 115–116).

Whereas these two chapters open up trajectories for de-reifying the design of contemporary technological systems and processes, **Yoni Van Den Eede** looks to Feenberg to develop an idea of critique appropriate to algorithmic things, those elusive networks of data, algorithms, automated processing, and artifacts that everyone recognizes as both "tech" and "more-than-objects." Algorithmic things have become part of the fabric of our lives, unobtrusive and unquestioned. And so, how does one critique an algorithmic thing? Where are the spaces for resisting and critiquing algorithmic things when there is no thing to resist or critique? As Van Den

Eede writes (with a nod to Heidegger), "Critical constructivism needs breakdowns…as a gateway into democratic rationalization…but what if breakdown doesn't take place?" This is not to say that there are not injustices and inequalities mediated through technology, it is just that these biases appear as business as usual and not as issues of concern. Violations of privacy, the extension of surveillance, and the increased commodification of communication processes cannot be addressed via that traditional means of resistance (strikes, protests, and boycotts). Van Den Eede's solution is a re-consideration of the way in which objects should be interpreted: a new hermeneutic of technology. He proposes this through Object-Oriented Ontology, a theory, he suggests, that allows for a re-conceptualization of technology that in combination with Feenberg's critical constructivism is better suited to making sense of algorithmic things, and hence, better prepared to critique algorithmic things.

1.4 Critical Theories of Technology

> Capitalism is more than an economic system; it projects a world in the phenomenological sense of the term. The congruence of science, technology, and the form of experience is ultimately rooted in the logic of capitalism. 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…because they are intrinsically adjusted to serving a social order that ignores potentialities and views being as the stuff of domination (Feenberg, 2014, p. 180).

In the quote above, Feenberg argues that existing technology is conservative because it is designed to reproduce the world as it is. Extending this point, philosophical thought about technology can also be conservative by an unquestioned reliance on existing theories or methods that affirm capitalist political economy. Although the object of inquiry may change, conservativism endures when the processes of inquiry remain the same. A key aspect of critique, in this regard, is the development of philosophical critique through theoretical and methodological interrogations of exiting theories and methods, comparative summaries that illuminate resonances and dissonances across different critical approaches to technology, and intellectual histories that draw out different traditions of critique. But, like critique itself, this is a fading dimension of the philosophy of technology. The demands of meritocratic and achievement-oriented inquiry and the lucrative nature of fulfilling the needs of State and Industry favours the safe predictability of theoretically and methodologically similar studies. This is another reason why critique is necessary: if we expect it to effectively challenge the design, function, and meaning of technology and not just reiterate the ambitions of neoliberal capitalism, it is imperative to chart a path that encourages research and writing that is an alternative to these ambitions.

Throughout Feenberg's work is an intellectual history that encourages a theoretical adventurousness familiar from the New Left and journals like *Telos*, *Radical America*, and *New German Critique*. Reading Feenberg is a reminder that the critique of technology has a history. As R.G. Collingwood put it, "the philosophizing

mind never simply thinks about an object, it always, while thinking about any object, thinks also about its own thought about that object" (Collingwood, 1946, p. 1). The thought about technology that interests Feenberg begins with Marx's ideas about alienation and machinery and then moves to include the concept of world (or lifeworld) as developed by Heidegger and Husserl; Lukács' theory of reification as a more complete realization of Marx's theory of commodity fetishism; an idea of rationality that begins with Max Weber and extends through Horkheimer, Marcuse, and Habermas; and the recognition of sociotechnical contingency that corresponds with the empirical observations found in Science and Technology Studies (STS) and the labour process theory of Harry Braverman. Along the way, he engages with the ideas of Gilbert Simondon, Michel Foucault, Japanese philosophy, and contemporary critical theorists like Amy Allen, Jodi Dean, Christian Fuchs, and Bernard Stiegler. All of this culminates in a "radical social theory of modernity around the theme of technology" (2018, p. 31), which, given the diminishing place of technology within critical social theory, is a significant contribution.

The chapters in this section re-imagine the intellectual history of critical social theory to emphasize technology and debate the merits of contemporary critical theories of technology. In the first chapter of this section, **Federica Buongiorno** compares Feenberg's critique of technology against Byung-Chul Han's critique of technological modernity. Han is a popular and prominent critical theorist of digital culture whose work is insightful and uncompromising. Buongiorno is a leading scholar of Han's work (she has translated many of his books into Italian) and her analysis of these two philosophers of technology is wide-ranging, exploring how both draw different conclusions from Foucault and Heidegger that correspond with their different attitudes towards essentialism and concluding with a comparison of their critique of digital culture (she also proposes an interesting phenomenological reading of Feenberg that is inspired by Husserl). Buongiorno argues that although both Feenberg and Han can both be considered humanist critics of technology, Feenberg presents a more convincing critique by virtue of his attention to the concrete materiality of design, a reminder that critique needs more than the intellectual gymnastics of Han's poignant and totalizing ideas. Certainly, drawing out the problematic nature of neoliberal society demands uncovering the newly complex biases and consequences of digitally mediated processes and experiences, but this is only one side of critique. The other, as Buongiorno writes, can be found in Feenberg's philosophy, an anti-essentialist corrective to Han's reduction of technology to efficiency and the performance of positivity. Careful consideration of technology as both function and meaning, design and use, allows for critical insights and transformative potentials.

Ivan Landa and Jiří Růžička focus their chapter on the development of Marxist Critical Theory in East-Central Europe, and in particular Marxist humanists writing in 1960s Czechoslovakia, like Karel Kosik and Ivan Sviták. These writers proposed a theory of praxis that differentiated itself from trends in both Western Marxism and existential phenomenology by means of what was termed "onto-creativity," which was neither revolutionary, in the Lukácsian sense, contemplative, in the Heideggerian sense, or fixated on productive labour, as in the Soviet-Marxist sense. Czechoslovak Marxist humanists, instead, proposed a theory of praxis that emphasized how creation, or productive spontaneity, mediates the subject-object relationship through a

process of negation and critique. The objective world of things is created by acting subjects whose scope of action is defined by this world, against which the creative desire to re-create this world as something new emerges. This is a theory of praxis that is indebted to a reading of Marx and Hegel and developed as a counter to Stalinist orthodoxy and Western Marxism. Onto-creativity as praxis emphasizes the immediacy of concrete potentials to create something entirely new and distinct from that which is given in social reality. This sits nicely alongside Feenberg's philosophical critique, which begins with our most immediate, and philosophically overlooked, forms of engagement with technology; everyday experiences in which users, through engaged use, imagine concrete potentials that exceed prescribed designs and functions. Interestingly, for philosophers of technology, the critique of existentialists like Heidegger and Sartre by Czech Marxist humanists, that they "were satisfied with a mere description of the given state of affairs, but did not provide any explanation of the possibility of such phenomena," corresponds with contemporary debates in the philosophy of technology between critical theory and phenomenologically-oriented approaches to technology. Beyond this, Landa & Růžička's work points out that the post-war experiences of Marxist theorists in Western Europe and North America were not shared by Marxists working in East-Central Europe, whose experiences demonstrate the importance of locality, and situated knowledge and experience in the critique of technology.

From East-Central Europe to France, **Adeline Barbin's** chapter is a history of French philosophy of technology that emphasizes how technology (or technics) always already is human. Technology, in other words, should be considered a natural and a biological process. Anticipating the seemingly radical ideas of actor-network theorists by decades, Barbin traces this idea across French writers who theorize the relationship between the technical and the natural and how this relationship can inform ideas about technological change. She looks to the work of André Leroi-Gourhan, Gilbert Simondon, and Georges Canguilhem to consider how technological change can open up ways of critically assessing technology by pointing to those aspects of technology that are flexible and contingent and those that are fixed and unchanging. It is not enough, she suggests, to emphasize contingency, as this gives the mistaken impression that the range of technical change is limitless. The challenge is recognizing the limits of what is possible, what she terms "possiblism," to better assess why technologies take the form and function they do. The French tradition, Barbin suggests, provides a more thorough conceptual vocabulary to assess the nature of invention and technological change, opening up modes of critique that can complement Feenberg's philosophical project. This history of the philosophy of technology gives greater insight into Feenberg's reading of Simondon's idea of concretization by providing more conceptual tools to better grasp the continuities and discontinuities of sociotechnical change and potential.

Alberto Romele's chapter takes as its starting point contemporary debates in the philosophy of technology regarding both the "empirical" and "ethical" turns that have shaped the discipline for most of the twenty-first century. Romele, taking up the argument of many political and critical theorists of technology, points out that both of these turns have led to little more than therapeutic philosophies of "living

with technology" and consensus building at the expense of real critique. Feenberg's approach, by accounting for both power and resistance, is an alternative to these turns. However, for Romele, his philosophy is not critical enough. Drawing out what he detects to be the consensus-oriented influence of Habermas in Feenberg's work, Romele argues that the way out of this dilemma is by integrating the work of political philosopher Chantal Mouffe (alongside Jacques Rancière and Pierre Bourdieau) whose theories of agonistic politics sees little value in consensus. Although his indictment of Feenberg's theory of democracy as Habermasian in nature can be subjected to debate, Romele's chapter is a valuable contribution to a "critical" turn in the philosophy of technology that offers a real alternative to the emptiness of the ethical and empirical turns by encouraging the subversion of the status quo, not its affirmation.

Taila Picchi focuses her attention on two of the more prominent influences on Feenberg's philosophy, Herbert Marcuse and Martin Heidegger. She traces a genealogy of a dialectical philosophy of technology to Marcuse's early work with Heidegger. Heidegger's concepts of *dasein* and *world* were translated by Marcuse through the lens of Marxism, interjecting a needed dose of political economy to concretize Heidegger's somewhat obscure concepts. In doing so, Marcuse was able to overcome Heidegger's dystopian essentialism regarding technology by arguing that capitalism is a "world" that, although historically contingent, endures through a value-neutral functionalism that is perfectly suited to capitalism. Modern technology may be characterized through an "enframing" that is environmentally and socially disastrous, but this is not the only possible technology. Picchi's intellectual history of Marcuse's dialectics of technology spans decades and culminates in an emphasis of the role that Simondon plays in this history: "We can notice in Marcuse's production the shift from an ontology of Life based on historicity to a critical theory of technology based on the notion of technicity that is influenced by the work of Gilbert Simondon." Picci's chapter is an important contribution to understanding Marcuse's philosophy of technology and an important contribution to the history of a dialectical philosophy of technology.

1.5 Conclusion

Following Feenberg's suggestion that "we are confronted with multiple rationalities instead of a single technocratic rationality" (2017b, p. 5), the chapters in this book demonstrate that critique can take many forms: political philosophies of technology, historical and hermeneutic inquiries, and intellectual histories; critique can be oriented towards specific technical artifacts like smart cities, COVID apps, and big data, or concepts such as reason or ideology; and critique can be developed through any number of disciplines, including STS, media studies, industrial design, urban planning, and philosophy. This range corresponds with a remark from Foucault that Feenberg points out concerning styles of governance. According to Foucault, socialism lacks an art of government that is comparable to liberalism because socialism

merely imitates the attempt at universal regulation or attempts to draw limits on the domain of free exchange. From this, Feenberg suggests that a "technological politics" may offer a starting point from which to build a uniquely socialist politics that does not simply reiterate the politics of liberal capitalism. To this, I would like to suggest that a theoretically coherent, historically conscious, and empirically sound critique of technology offers a philosophical approach to technological society that does not merely imitate the ambitions of capitalism. Critique encourages a philosophy in which it is necessary to situate the present moment of technological society with both the past and the wider social contexts that tie together the "thing itself" with its manufacture, use, and meaning, allowing for the development of critical insights that overcome ways of knowing generated and privileged by capitalist technological society. The necessity for this type of critique is wide-ranging and defies headline grabbing technical fixes by focusing on the technical object and the rationality, or to put it differently, the ideas and ways of thinking, that shape our engagements with these technologies.

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Chapter 2
Critical Constructivism: An Exposition and Defense

Andrew Feenberg

Abstract In this paper, I explain in detail *Critical Constructivism*, which I situate as a political philosophy of technology that draws from the Frankfurt School, Heideggerian phenomenology, Marxist labour process theory, and Science and Technology Studies (STS). Critical constructivism thus addresses the study of specific designs and the public controversies they provoke, while at the same time reconstructing aspects of the Heideggerian and Frankfurt School critiques of instrumental reason. Critical constructivism "de-ontologizes" these philosophies of technology, capturing their critique of rationality while affirming nevertheless the value of modern science and technology. To clarify my approach to technology and to address a number of misunderstandings regarding my approach to technology, this paper is organized around different aspects of my theory, including Marxism, technology and political theory, operational autonomy, the democratization of technology, formal bias, and instrumentalization theory.

Keywords Critical constructivism · Marx · Democracy · Technology · Labour · Operational autonomy · Technosystem · Technical code · Formal bias · Rationality · Instrumentalization theory

2.1 Introduction

Since publishing *Critical Theory of Technology* (Feenberg, 1991), I have gone on to develop a specifically *political* philosophy of technology which I now call "critical constructivism." That approach is based on a number of intellectual traditions,

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including the Frankfurt School, Heideggerian phenomenology, Marxist labour process theory, and Science and Technology Studies (STS).

This eclectic combination of sources recognizes both the empirical specificity of technology and the general crisis of our technological civilization exemplified by such issues as climate change. Critical constructivism thus addresses the study of specific designs and the public controversies they provoke, while at the same time reconstructing aspects of the Heideggerian and Frankfurt School critiques of instrumental reason. The early Frankfurt School is the major influence. It contrasts a "one-dimensional" scientism with the potentialities revealed in everyday experience on the basis of which resistances arise. Critical constructivism "de-ontologizes" these philosophies of technology, capturing their critique of rationality while affirming nevertheless the value of modern science and technology. The task is to conserve their valid insights, made evident by the crisis, without losing modernity itself. Social constructivism plays an essential role in my appropriation of this tradition, but I endeavor to overcome its underestimation of structural features of modern society.

I have presented my approach in many books and articles (see bibliography). Several books and special sections of journals have been devoted to the analysis and critique of my work.[1] Various misunderstandings recur in these commentaries. I will respond here to some of these criticisms in a new way in the hope that a more fruitful discussion can result. In order to achieve maximum clarity, I have refrained from directly addressing criticisms, kept references to a minimum, and reduced my principal positions to schematic arguments. Since I am often accused of favoring one side of a dilemma I attempt to transcend, I have formulated some of the supposedly contradictory propositions explicitly to show how I reconcile them. My goal in this paper is not so much to convince as to clarify my positions on the key issues I have discussed in my work.[2]

2.2 Why Marx?

A Marxist scholar once told me that "Everyone believes 90% of Marxism; the Marxists are those who also believe the other 10%." Who can doubt Marx's most important discovery, the central role of the economy in history and social life? But the other 10%, socialism as democratic control of the economy, is still highly controversial. Two principal arguments challenge it: the inefficiency of planning, and the "imperatives" of modern technology. The latter argument holds that the management of technology is fundamentally incompatible with democracy.

[1] For example, see the criticisms and my replies in Veak (2006), Arnold and Michel (2017), *Techné: Research in Philosophy and Technology* 17:1 (Winter, 2013); Thesis Eleven (2017), Vol. 138(1). See also Kirkpatrick (2020).

[2] For a recent summary of the theory, see my contribution to the fourth edition of the *Handbook of Science and Technology Studies* (Feenberg, 2017b), republished as chapter 2 in Feenberg (2017a).

This claim has itself been challenged in recent years. The constructivist notion of "actors" has liberated the study of technology from technological determinism and its vaunted imperatives. (Pinch & Bijker, 1987). No longer is it acceptable to deduce social consequences from a reified notion of technology, presumed to follow a unique track based on strict scientific principles. We now believe that there exist alternative technological choices and designs, and that they may have different social impacts. And we also believe that many different social actors pursue an interest or ideology by attempting to influence those choices and designs. No technological imperatives exclude a more democratic organization of the economy bringing additional actors into the design process.

This is an important methodological advance, but differences in power between actors are not easily explained within the constructivist framework. Foucault challenged the role of power as an explanandum by reducing it to the play of disciplinary techniques. Actor-Network Theory attempts to reduce power to an ever receding list of networked actors. Power would explain nothing but instead would be explained by the number of effective associations actors are able to mobilize in the networks they organize (Latour, 1986).

These strategies aim to avoid positing a substance of power separate from its manifestations. That is convincing as far as it goes but it fails to solve the problem in the most important case. That case is the influence of capitalism on the design and development of technology. Capitalism is a social structure that conditions actors' access to power. As such it is not reducible to techniques or associations. While I cannot argue the case for a structural account of capitalism here, that is the conclusion of most social science since Adam Smith, David Ricardo, and Marx, down to Thomas Piketty. Can structure be incorporated into social theory without reifying power once again?

The reaction against Marxism lies in the background of the constructivist rejection of power as an explanatory factor. This has less to do with Marx's own work than with the dominant interpretation of Marxism which emphasizes political economy and class struggle. Given the extent of government intervention in the market and the disinterest in revolution among workers, that version of Marxism has lost much of the support it once enjoyed.

The "post-Marxists," Ernesto Laclau and Chantal Mouffe, rejected the centrality of class domination (Laclau & Mouffe, 1985). They retained the idea of antagonism but in the context of symbolic differences rather than economic interests. That new approach was congruent with an increasingly diverse radical politics.

But it is becoming increasingly clear that an account of capitalist power is still necessary to address its role in three of the great crises of our time: the climate crisis, the issues surrounding the threats to liberty of current applications of information technology, and the declining faith in science which disarms society in the face of the other two crises. Each of these crises is rooted in the exorbitant exercise of capitalist power over the evolution of the technical system.

- The fossil fuel industry exercises such overwhelming power that so far no amount of scientific evidence of climate change is able to overrule its continuing domination of the energy system.

- The Internet, which once enhanced public debate, has come under the control of a few large corporations and is increasingly incorporated into the propaganda apparatus of corporations and governments.
- Neoliberal deregulation and tax policies, and the extension of simulacra of market rationality into every corner of social life have generated inequalities of wealth and power that have provoked a dangerous reaction against rationality as such. The post-modern decline of the "Grand narratives" of freedom and progress in the face of total rationalization has given way to a return of narrative in the form of dystopian conspiracy theories (Feenberg, 1995, chap. 6).

Despite changes in the economy and much criticism, Marx's *Capital* is still relevant to the understanding of these crises, but it takes some work to extract the useful insight without falling back into class essentialism. Although Marxists often denounce the personal power of capitalists, Marx himself viewed the capitalist as a mere agent of anonymous structures. He situated the capitalist as a dominant technological actor in relation to two determining structures: the irresistible pressures of the market and the resistance of the labour force. Given the relatively untrammeled power of the capitalists of Marx's day, this theory was sufficient to explain the rapid progress of technology accompanied by such negative phenomena as the deskilling of labour and the exhaustion of the soil.

Marx did not need to attribute a particular ideological bias to the capitalist, or personality defects such as greed, nor even a personal economic interest to explain the outcome because these structural factors compelled capitalists to perform in a specific manner or disappear from the scene. In sum, the structures determine *the conditions of possibility of effective action* under capitalism regardless of the motives of an actor situated in the dominant economic position. Hence Marx called capitalism a system of "impersonal" domination. Only other structures would make possible different and more humane forms of effective action associated with what Marx called "socialism."

Today capitalist control of technology faces a far more complex situation than in the nineteenth century. Other actors compete with it. Governments act on behalf of citizens to regulate business, and courts, labour unions, and other organizations within civil society frequently influence business decisions. Furthermore, many of the characteristics of capitalist management have been imported into public institutions, which make technological choices on the basis of quasi-economic criteria that imitate market prices in various ways. The result of all this intermingling and complexity is a situation ripe for the study of the role of a variety of actors and this no doubt explains why the field of technology studies has developed so successfully around this notion.

Nevertheless, Marx's idea that technology is shaped by the distribution of power can still form the basis of a structural approach to current crises. The role of leadership, the split between conception and execution, the control and incentive systems, the forms of psychological manipulation designed to keep subordinates on task, and other similar features of the division of labour have substantive impacts on technological choices and designs. These considerations can be generalized to take account

of the harms caused by technologies affecting any social group that, like workers, has no direct access to decisions that affect them.

Marx's contribution for us today is thus his discovery of the political *in* the technology rather than opposing politics and technology as value and fact, ideology and rationality, or any of the other binary oppositions that flow from a discredited technological determinism. In what follows I will show how the Marxian politics of technology plays out in the various aspects of critical constructivism.

2.3 Technology and Political Theory

In the nineteenth and early twentieth centuries bodies of experts were constituted, serving within the administrative structures of modern institutions. Close association with management insured the congruence of technical systems and disciplines and the priorities of capitalist enterprise. Business had the freedom to dismiss hazards suffered by workers and communities, and this dismissive attitude was echoed all too often in science and technical disciplines. Technical disciplines evolved in which the hazards were ignored or minimized. Many scientifically undecidable matters were routinely biased in favor of business (Fressoz, 2012; Bensaude-Vincent, 2013). Government agencies that relied on the science and deployed the technology were little better.

Thus in addition to the unequal access to the wealth of enterprise, subordinates under capitalism suffered an excessive exposure to the discommodities of the technology that produced that wealth. This situation persisted so long as the mass of the population was silenced and in any case too uneducated to engage in a democratic dialogue with experts. That is no longer the case. The heritage of industrialism is now challenged in the public sphere. In this situation political conflict over technology is inevitable.

Political theory has not shown much interest in technology even as the world around us is ever more technified. Exceptionally, for a brief period after World War II, modernization theory and Marxism focused on technology. Technological development was supposed to bring with it democracy or communism, but those predictions have been refuted by history. Since these deterministic theories were discredited, mainstream academic thinking has gone back to its previous indifference to technology.

Surely it is past time to end this state of affairs and to integrate technology into political theory. But the task is not easy. It is necessary to navigate between three apparently contradictory propositions:

- *First*, *Non-Determinism.* Technological development is not deterministic, characterized by essentialist "imperatives" that inevitably prevail everywhere at every stage, but is socially constructed.

- *Second*, *System Convergence.* The actual development of technology under both capitalism and (really existing) communism reproduces the power of capitalists and managers.
- *Third*, *Rationality.* Technical choices are generally, if not always, made on "rational" grounds, that is to say, in response to criteria of efficiency and knowledge held in technical disciplines.

The first and second propositions appear to be incompatible. The convergence between capitalism and communism seems to imply that technological development imperatively requires authoritarian control, otherwise why would such control characterize most development in different social systems over long periods? A whole literature in social science has been based on the notion that technology is responsible for system convergence. In that case, the first anti-deterministic proposition must be false. If, on the contrary, the first proposition is true, if technological development is not deterministic, why do successive waves of technological innovation in different societies yield similar structures of control?

The third proposition holds that most technological decision-making has a rational basis in one or another technical discipline. These disciplines are properly called "rational" because they are evidence based and logically elaborated, in contradistinction to tradition, prejudice, and personal or literal authority. Rationality on these common sense terms has nothing to do with "pure reason." This needs emphasizing since the notion of rationality is confounded in some academic circles with an idealized form that is an easy straw man for relativistic arguments. Critical constructivism is not embroiled in that contentious debate which concerns the truth of natural science rather than the design of technical systems and artifacts. The relativity of rational designs to a social context is self-evident. For example, no one is puzzled that a rational automobile design, rational in the sense of well engineered, is also contingent on a social choice favoring private transportation and must meet aesthetic criteria that enter into the technical design itself.

The third proposition appears to contradict the first since rational technical disciplines are everywhere similar. Perhaps the rationality of technical decisions explains why convergence is observed, as the second proposition claims. To resist this conclusion, Marxists usually condemn the irrationality of capitalism and promises freedom in a future rational society. Not rationality but irrationality–the intrusion of particular capitalist interests–would be responsible for domination. Other Marxists, critical of Soviet communism, attribute convergence to different forms of irrationality, capitalist and bureaucratic, leading to the same result.

Critical constructivism proposes an explanation that preserves the non-deterministic thesis of the first proposition despite system convergence and the rationality of management choices. The similarity between capitalist and communist management methods can be explained by the fact that the Soviets did not elaborate an independent technology and corresponding management methods but simply adopted technologies and methods developed under capitalism in the West. The technology then functioned as a vector of cultural diffusion (Fleron, 1977). The fact that the disciplines and artifacts travel so successfully from one social