

# MARX, CRITICAL THEORY, AND THE TREADMILL OF PRODUCTION OF VALUE: WHY ENVIRONMENTAL SOCIOLOGY NEEDS A CRITIQUE OF CAPITAL

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## ABSTRACT

*This chapter explores the domestication of Marx's critique of political economy within Marxist-oriented environmental sociology, and treadmill of production (ToP) theory, in particular. The aim is to explicate the theoretical resources for a rigorous critique of capital-induced planetary degradation. Shortcomings of ToP theory pertaining to the conceptualization of capital and value are identified. The reasons for these shortcomings, including how they might be addressed, are elaborated by reconsidering key aspects of Marx's critical theory of modern capitalist society. The chapter contributes to current discussions in both critical theory and environmental sociology by demonstrating the continued relevance of Marx's critical theory for understanding the political-economic, social, and ideational dimensions of planetary degradation. In contrast to ToP theory, which critically examines the production of wealth by counterposing finitude and limits against the expansionary tendencies of economic growth, the critical theory approach advanced in this chapter conceptualizes the acceleration of environmental degradation following World War II in terms of a ToP of value, whereby the necessity of the value form is continuously established in the present. The chapter discusses how Marxian critical theory facilitates a critical examination of the widespread growth of environmentalism as concomitant with the spread of neoliberal capitalism.*

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## INTRODUCTION

Marxist-oriented environmental sociology has developed as a contemporary movement since the late 1970s. This movement has gathered together a variety of perspectives and interests concerned to address the contemporary ecological crisis. A crisis because, although severe and in need of amelioration, capital-induced planetary degradation (e.g., global warming, land degradation, water pollution, biodiversity loss, natural resource depletion, and species extinction) has only increased (and even accelerated) throughout the past few decades. In contrast to affirmative approaches (e.g., ecological modernization theory), which assume that the possibility of nature–society reconciliation can be actualized through existing patterns of social change, Marxist-oriented environmental sociology assumes that existing social conditions prevent (i.e., are antithetical to) actualizing the possibility of nature–society reconciliation. This insight is implicitly rooted in Marx’s *critical theory* of modern capitalist society, which posits a free and rational form of social organization as a possibility that emerges within, yet remains constrained by, the capitalist mode of production (Postone, 1993).

At the same time, there remains a gap between Marx’s original critical theory and the 1960s New Left resuscitation of Marx’s work, which Marxist-oriented environmental sociologists combined with an environmentalist critique of affluence and growth. By accepting the New Left appropriation of Marx, environmental sociologists tend to either ignore or downplay the significance of the tradition of critical theory from the 1920s to 1960 (see, e.g., Foster & Clark, 2016) – as represented in the works of Georg Lukács (1923/1971), and the early Frankfurt School critical theorists, in particular – which sought to advance Marx’s project of critique and transformation during a later stage of the development of capitalist society. While these critical theorists were able to take Marx’s *critique* of political economy for granted, this insight was lost in the New Left appropriation of Marx, especially as the latter was codified through a red/green synthesis in the 1970s. While Marxist-oriented environmental sociologists were able to glean new ecological insights from Marx’s work, the Marx that has emerged in their hands is a domesticated political economist, not a critical theorist.

The central contention of this chapter is that understanding our current ecological predicament requires a rigorous critique of capital. My overarching objective is to explicate the theoretical resources for such a critique by reconsidering key aspects of Marx’s critical theory of modern capitalist society.<sup>1</sup> As such, the current chapter is part of a larger effort to bring critical theory into environmental sociology (see e.g., Cassegård, 2021; Gunderson, 2015, 2016, 2021; Leebrick, 2015; Stoner, 2014, 2020, 2021; Stuart, Gunderson, & Petersen, 2020; Stoner & Melathopoulos, 2015; Wehling, 2002).

In what follows, I explore the domestication of Marx's critical theory and some of the resulting confusion it has created for Marxist-oriented environmental sociology. Specifically, I focus on treadmill of production (ToP) theory, which represents one of the first systematic attempts to capture the nature and character of contemporary environment–society relations from a Marxist theoretical perspective. I will first provide a brief overview of ToP theory before directing focus on shortcomings of this approach pertaining to the conceptualization of capital and value. I will then elaborate the reasons for these shortcomings and how they might be addressed by reconsidering aspects of Marx's critical theory of modern capitalist society. Whereas ToP theory critically examines a ToP of *wealth* (i.e. increasing use-value output) by counterposing finitude and limits against the expansionary tendencies of economic growth, the critical theory approach advanced in this chapter conceptualizes accelerating environmental degradation following World War II (WWII) in terms of a ToP of *value*, whereby the necessity of the value form is continuously established in the present, giving rise to a fundamental tension between “capital time” and “ecological time.”

## TREADMILL OF PRODUCTION

Although ToP theory is based on propositions advanced over four decades ago, which have since been tested in numerous empirical studies (see, e.g., Cardenas, 2021; Carrillo & Pellow, 2021; Curran, 2017; Fu, 2015; Hayden, 2015; Houser & Stuart, 2019; Jorgenson & Clark, 2012; Shriver, Longo, & Adams, 2020), the theoretical tenets discussed below have changed little and remain central to the treadmill approach.

Within American environmental sociology, ToP theory represents one of the first systematic attempts to capture the nature and character of contemporary environment–society relations from a Marxist theoretical perspective. Allan Schnaiberg developed ToP theory to better understand the linkage between the spike in environmental degradation and the reconfiguration of business–labor–government relations following WWII (Schnaiberg, 1975, 1980). Schnaiberg later elaborated the ToP, both theoretically and empirically, in collaborative work with David Pellow, Kenneth Gould, and Adam Weinberg (see, e.g., Gould, Pellow, & Schnaiberg, 2004, 2008; Gould, Schnaiberg, & Weinberg, 1996). ToP theory has since become one of the most well-known approaches within environmental sociology.

ToP theory is rooted in the Marxist tradition, although, as Buttel (2004) points out, the treadmill approach is more aptly described as a unique variety of neo-Marxism. Buttel (2004, p. 326) characterizes the neo-Marxism of the ToP as “extra-Marxist political economy” – that is, “a style of critical or radical political-economic reasoning that borrows eclectically from Marx's concepts and insights while eschewing other aspects of Marx's work or those of contemporary Marxists.” For example, ToP theory eschews the traditional Marxist labor theory of value, including the idea that the proletariat is the historical agent of progressive change, and combines neo-Marxist research on state capitalism (O'Connor, 1973/

2001) with the analysis of monopoly capitalism (Baran & Sweezy, 1968). Within this framework, Schnaiberg (1980, p. 208) identifies three constituencies of the economic “growth coalition”: business, labor, and government. Although these constituencies differ across time and place in terms of how economic surplus is mobilized and allocated, all share “in the desire to mobilize it *for* production expansion” (Schnaiberg, 1980, p. 208). Citing Sweezy and Magdoff’s work on overproduction, Schnaiberg (1980, p. 209) contends that the contemporary environmentalist critique of growth illustrates “the utility of the broad institutional perspective of structural analysis such as Marx’s.”

ToP theory operates with a model of environment–society interaction within which notions of finitude, ecological limits, and ecological “overshoot” play a central role (Schnaiberg, 1980; Schnaiberg & Gould, 2001). Within this framework, environmental degradation of all kinds is attributed to the *additions* and *withdrawals* of matter and energy. The “industrial logic” of advanced capitalist societies increases damage to ecosystems because such forms of social organization “exceed ecological limits in more pernicious ways” (Schnaiberg & Gould, 2001, p. 25), mass producing environmental “bads” such as synthetics and toxic chemicals and accelerating the extraction of natural resources. In addition, production became more capital intensive after WWII, requiring more energy and material throughputs and less labor per unit of output (Gould et al., 2004). Because these new technologies were expensive and a form of “sunk costs,” firms needed to increase output levels to maintain or raise profit rates. The cycle of production geared toward profit accumulation reduces the need for labor inputs, thereby weakening the position of labor, while increasing environmental degradation. The deteriorating conditions of workers resulting from the treadmill dynamics that displace them have been translated into demands for an acceleration of this process; economic growth is seen by many as a solution to the conditions that economic growth itself causes. Thus, throughout the latter half of the twentieth century, the expansion of production systems also meant that the livelihood of wage workers was increasingly dependent on continued economic growth, thus pitting “labor” against “environmentalists” (Schnaiberg, 1980).

ToP theory conceptualizes the “industrial logic” of the treadmill as a reference frame that reflects economistic models of progress and legitimizes the superiority of the market and associated forms of social practice. As a concept, the ToP is built around two processes: expansion of technological capacity and the desideratum of economic growth (Schnaiberg & Gould, 2001, p. 69). Maximizing profit is boundless, and individual firms are compelled to maximize their profits in order to compete in the market (Schnaiberg & Gould, 2001, p. 74). Firms can either go bankrupt, have a low rate of profit, or have a high rate of profit. Having a low rate of profit, however, can only be temporary, leading to either bankruptcy or higher profits. Profits are then reinvested in production, generating even more production *ad infinitum*, until the system eventually collapses. This explanation rests upon the existence of intracountry competition, that is, interfirm competition.

*The Domestication of Marx's Critique: Capital and Value in ToP Theory*

This section discusses some theoretical shortcomings pertaining to the conceptualization of capital and value within ToP theory. In the latter half of this chapter, I shall return to elaborate these shortcomings and how they might be addressed by reconsidering key aspects of Marx's critical theory. It should be emphasized that my discussion is an initial attempt to confront ToP's extra-Marxist political economy with Marx's critical theory of modern capitalist society and, as such, has no pretense of being an in-depth analysis of related debates or their validity.

First, as Gunderson (2015, 2017) points out, ToP theory tends to downplay the role of ideology, giving inadequate attention to the ideational context of environment–society relations. Although Schnaiberg et al. discuss the cultural dimension of the treadmill logic, ToP theory places analytic primacy on the objective political-economic dimension of environment–society relations. The “objectivist, materialist, realist” (Buttel, 2004, p. 327) orientation of ToP theory is consistent with Marxist-oriented approaches to environmental sociology, particularly in the United States, which maintain a firm commitment to realist epistemological and ontological positions. Commitment to the realist position was reinforced throughout the 1990s with the onset of postmodern theories, which many Marxist-oriented environmental sociologists perceived as a subjectivist and/or idealist threat (Stoner, 2014). Yet, framing the problem as primarily one of political economy *or* culture has inhibited theoretical development within environmental sociology. Absent is a robust critical theoretical approach oriented toward recognizing critically the dynamic interrelationship between both objective and subjective dimensions of the environment–society problematic (Ollinaho, 2016; cf.; Stoner, 2014). Marx's theory of social practice and social mediation, which I return to elaborate below, offers a way of moving beyond such static conceptualizations by providing conceptual tools uniquely well-suited to grasp the linkages between consciousness and social structure.

The difference between the Marx's *critique* of political economy, as elaborated in this chapter, and the extra-Marxist political economy of ToP theory is more than semantical. ToP scholars adopt a *categorical* approach, which treats the categories of political economy (e.g., commodity, labor, value) as essentially “external,” market-mediated economic categories. This approach stands in contrast to the *categorical* framework that informed Marx's critical theory and his *critique* political economy (Postone, 1993, pp. 17–18). Marx understood the commodity, for example, not only in economic terms but also as a mode of cognition specific to the historically determinate form of existence under capitalism. Indeed, the categories of Marx's mature critique, such as commodity and value, denote alienated modes of being comprehended by thought (Marcuse, 1941/1960, p. 25), which is why Marx was able to unfold the category of commodity to indicate a historically specific form of social life characterized by internal contradictions, such as the opposition between abstract and concrete, and general and particular. Such an approach explodes the constructivist/realist

dichotomy, which despite numerous efforts (see, e.g., Foster & Burkett, 2016; Malm, 2018; Moore, 2015) continues to haunt environmental sociology.

Within ToP theory, failure to adopt a categorial approach has resulted in the inadequate conceptualization of Marx's categories, particularly his categories of capital and value, which remain vastly theoretically underdeveloped within environmental sociology. Indeed, ToP theory reduces the specific logic of capital, which fuels the expansionary dynamic of "runaway" economic growth, to the profit motive driven by vested "interests" (i.e., owners and managers of big business). While Schnaiberg et al. are certainly correct to emphasize how elite decision-making under capitalism tends to be channeled in ways that accelerate the treadmill, as the basis for social action, this process is operative at the "surface level" of capital's forms of appearance. What is missing in such an account is an analysis of the underlying process at work – namely, the production of value – and the ways in which elites (among other social groups), acting on the basis of capital's forms of appearance (i.e., the profit motive), simultaneously disguise and reconstitute the underlying structures of capitalism (see Postone, 1993, p. 196). I shall return to elaborate this elusive dynamic below in my discussion of the dialectic of transformation and reconstitution.

While the ToP approach may account for "the value consciousness that aims for an increase in capital, i.e., the profit motive" (Uchida, 1988, pp. 92–93), this process is not explicitly theorized as such. More important, ToP theory fails to account for the abstract, substantive dimension of capital's value form which underlies production, and, therefore, is unable to adequately grasp the form economic growth must take in fully developed capitalism. Instead, ToP theory follows the lead of Meadows, Meadows, Randers, and Behrens (1972) by counterposing finitude and limits against the expansionary tendencies of economic growth. This has resulted in a one-sided affirmation of the use-value dimension of the commodity form in contradistinction to its antiecological exchange-value dimension. ToP theory captures the content, but not the form of the treadmill's growth dynamic. This omission is important because, in Marx's analysis, form determines content (see Uchida, 1988). Whereas Schnaiberg et al. focus solely on the ToP of *wealth* (specified in relation to the environmental impact of use-value output), I contend that the temporal dimension of this process (i.e., the tendency for productivity increases to accelerate over time) can only be adequately grasped and rigorously theorized as a ToP of *value*.

## MARX'S CRITICAL THEORY RECONSIDERED

Drawing insight from the work of Moishe Postone (1993), this section reconsiders key aspects of Marx's *critical theory* of modern capitalist society. I begin by discussing Marx's theory of social practice and social mediation, which I contextualize in relation to his early writings on alienation. I then turn to Marx's later work, and his *Grundrisse*, in particular, to explicate the double character of commodity-determined labor. Against this background, I discuss the

contradiction between wealth and value, which lies at the heart of capital-induced planetary degradation.

*Social Practice and Social Mediation: Alienation as Self-generated Domination*

One of the most important insights of Marx's critical theory is his theory of social mediation, which is also a theory of social practice. Marx's theory of practice breaks with the subject–object dualism of traditional epistemology to conceptualize objectivity and subjectivity as mutually constituted through social practice (Postone, 1993, pp. 218–219). Marx's critical theory aims to specify exactly how, through productive activity, or “labor” [*Arbeit*], both subject and object are produced. Praxis, as such, can then be analyzed and understood in terms of structures of social mediation (Postone, 1993, pp. 218–220). Marx's mature theory is rooted in a critique of the mediating function of labor, which in capitalism structures a historically specific form of abstract socioecological domination.

The methodological function of mediation in Marx's mature critical theory must be contextualized in relation to his category of alienation. Alienation, according to Marx, is the foundation of the entire complex of social relations under capitalism, and as such it comprises a set of *mediating* processes between subject (human[s]) and object (nature).

In the *Economic and Philosophic Manuscripts of 1844*, Marx considers labor in the general sense as well as its *particular* form in modern capitalist society. When Marx discusses labor in the general sense, he is referring to the mediation between humans and the natural environment, and the ways in which, through such laboring activity, both humans and environment are transformed in meeting a given end (Stoner & Melathopoulos, 2015, p. 22). Labor, in general, as productive activity (which is always social), is “the fundamental ontological determination of ‘humanness’ (*menschliches Dasein*, i.e. really *human* mode of existence)” (Mészáros, 1970/2005, p. 78), that is, the universal mediation between subject and object (human[s] and nature). Through productive activity, both subject and object are transformed *simultaneously* as labor is realized in its objectification (*Versachlichung*) (Marx, 1844/1988, p. 71). In the process, humans produce nature and themselves, and they thereby become conscious as a *species being*.

However, in capitalism, labor takes a particular form, which Marx calls alienation: “In the conditions dealt with by political economy the realization of labor appears as *loss of reality* for the workers; objectification as *loss of the object* [*Entleerung*]; appropriation as *estrangement*, as *alienation* [*Entfremdung*] (Marx, 1844/1988, p. 71 [translation amended]). The opposition between objectification and alienation, indicated by Marx's statement quoted above, implies that in capitalist production, instead of creating mastery through laboring activity (objectification), humans create structures that in turn dominate them. Marx (1844/1988, p. 87) indicates that such structures (of self-generated domination) refer specifically to “the production of the object of human activity as *capital*.” Although the category of capital remains theoretically underdeveloped in the

*1844 Manuscripts*, it is clear that Marx's critique of alienation is directed toward an emergent form of sociality based on exchange, where individuals do not consume what they produce but instead must use their labor to receive a wage in order to buy objects to consume.<sup>2</sup>

For Marx (1844/1988, p. 75–79), alienation is a process of mediation constituted by the capitalist mode of production, which, in addition to estranging humans from self, nature, others, and consciousness, simultaneously rewrites reality to inhibit these very same humans from consciously recognizing that this is indeed the case (Stoner, 2014, p. 632). Within this framework, social relations, as well as environment–society relations, are socially constituted in alienated form. To reiterate, the mediating function of alienation (understood as a dynamic form of social practice) is at once both objective and subjective. In capitalism, both the subjective dimension (i.e., the social conception and understanding of the natural environment) and the objective dimension (i.e., human–ecological transformation via labor) of the environment–society problematic are continually constituted in alienated form (Stoner, 2014). However, following Marx, we must recognize critically the nonidentity of these subjective–objective moments because, although contradictory and even opposed to one another, the subject and the object of labor appear unified in social practice (cf. Stoner, 2014, p. 633).<sup>3</sup> Moreover, in capitalism, cause and effect (of alienation) are inverted. Although capital appears to be the result of alienated labor, Marx (1844/1988, p. 81) contends that alienated labor is the real cause of capital and private property. Hence, in his polemic against Proudhon, Marx (1844/1988, pp. 81–82) argues, “A forcing-up of wages (...) would therefore be nothing but better payment for the slave.” If, logically speaking, alienation is more fundamental than private property, then it is conceivably possible to abolish private property but not alienation, so that society, therefore, becomes “an abstract capitalist” (Marx, 1844/1988, p. 82).

Similarly, Marx does not root his critique of alienation in the opposition between “first nature” (i.e. the original identity of humanity and nature) and “second nature” (the social metabolic order of capital).<sup>4</sup> Although the conceptualization of an original identity of humanity and nature only applies to pre-bourgeois forms, such conceptualization only emerges under bourgeois relations of production, where the original identity of humanity and nature turns into its equally abstract opposite: “the radical divorce of labor from its objective natural conditions” (Schmidt, 1962/2014, p. 82). Contra Foster (2001), Marx's position neither confirms the social metabolic order of capital as transhistorical nor denies the existence of a material substratum independent of labor. Rather, Marx treats both conceptualizations of nature as the expression of alienated social relations, which is why the opposition of “first nature” and “second nature” is not an opposition of noncapitalist and capitalist moments (see also Cassegård, 2021; Cook, 2011). The fact that the original identity of humanity and nature can be and has been projected backward onto all of human history is itself reflective capital's specific historical logic – namely, its abstract generality (Postone, 1993, pp. 17–18).



*The Double Character of Commodity-determined Labor*

Although Marx abandons the term “alienation,” his mature theory of capital is rooted in a critique of the mediating function of commodity-determined (i.e., alienated) labor. The mediating function of commodity-determined labor, as I elaborate below, structures a form of abstract socioecological domination which first appears historically in the opposition of wage labor and capital.

Marx’s *Grundrisse* provides a relatively succinct account of the historical specificity and unique socially mediating function of alienated labor in capitalism. Labor under capitalism is no longer directly social but rather abstract and universal (Marx, 1857/1858/1973, pp. 158–164). In precapitalist social formations, labor is directly social insofar as “various labors are imbued with meaning by the social relations that are their context” – that is, laboring activities are “determined as overtly social and qualitatively particular” (Postone, 1993, p. 151). However, in the capitalist social formation, where the commodity is the dominant form, labor itself constitutes a social mediation. To say that in capitalism labor itself constitutes a social mediation means that in capitalism one’s labor has a dual function: “On the one hand, it is a specific sort of labor that produces particular goods for others, yet, on the other hand, labor, independent of its specific context, serves the producer as the means by which the products of others are acquired” (Postone, 1993, p. 149).

What distinguishes capital in history – as something new – is a form of abstract, impersonal social domination: “*Personal independence* in the framework of a systematic *objective [sachlicher] dependence*” (Marx, quoted in Postone, 1993, p. 125). Citing Marx’s *Grundrisse* (see Marx, 1857/1858/1973, p. 164), Postone (1993, p. 125) stresses that the “‘objective’ dependence is social; it is ‘nothing more than social relations which have become independent and now enter into opposition to the seemingly independent individuals; i.e., the reciprocal relations of production separated from and autonomous of individuals.’”<sup>5</sup> As Postone (1993, pp. 125–126) explains: “The nonpersonal, abstract ‘objective’ form of domination characteristic of capitalism (...) refers to the domination of people by abstract, quasi-independent structures of social relations, mediated by commodity-determined labor.” If labor is bonded in traditional society and then becomes a social bond in bourgeois society, it becomes *the* form of social domination with the advance of capitalism (Stoetzler, 2004, p. 263).

The historical specificity of such labor, as reflected in the commodity form, is characterized by a peculiar double character as abstract value-creating labor and concrete useful labor (Marx, 1867/1976, pp. 131–137). Commodity-producing labor is both particular (as concrete labor, a determinate activity that creates specific use-values) and socially general (as abstract labor, a means of acquiring the goods of others). As a particular use-value, the commodity is the product of a particular concrete labor; as a *value* it is the *objectification* of *abstract* human labor (cf. Marx, 1867/1976, pp. 125–131; Postone, 1993, p. 154). The emergence of abstract labor, as a dominant form of social mediation, is a historically specific process in which the labor of modern proletarians is disciplined and synchronized through the power of the state (Thompson, 1967; Tomba, 2013). The double

character of commodity-determined labor mediates a unique form of sociality, which structures the form of abstract socioecological domination specific to capital. The index of such domination is value.

*Nature of the Contradiction: Wealth versus Value*

The category of “value” is a historically specific form of wealth distinct from and opposed to that of “material wealth” (Marx, 1867/1976, p. 137). These two forms of wealth correspond to the dual character of the commodity (value and use-value) and the two forms of labor (abstract and concrete) it embodies (Postone, 1993, p. 154). “Material wealth” corresponds to the use-value dimension of the commodity. Wealth, as such, “expresses the objectification of various sorts of labor, the active relation of humanity with nature” (Postone, 1993, p. 154), and is measured in terms of the quantity and quality of products produced. Material wealth, as the dominant measure of wealth in prebourgeois forms of social organization, requires a social mode of mediation that is *overtly* social, meaning “it is ‘evaluated’ and distributed by overt social relations – traditional social ties, relations of power, conscious decisions, considerations of needs, and so forth” (Postone, 1993, p. 188). In capitalism, where value is the dominant form of wealth, the measure of value is not overtly social; rather, value *is itself a mediation* (Postone, 1993, p. 188). As such, value acts as “the self-mediating dimension of commodities”; its measure “is *not* a direct function of the amount of goods produced” (Postone, 1993, p. 188). Departing from the traditional Marxist interpretation of the labor theory of value, Postone (1993, pp. 188–189) indicates that abstract labor “constitutes a general, ‘objective’ social mediation” that is “neither expressed in terms of the objectifications of particular concrete labors nor measured by their quantity. *Its objectification is value* – a form *separable* [emphases added] from that of objectified concrete labor, that is, particular products.”

In pinpointing value as *the* social mediation in capitalism, Marx was quick to recognize the so-called “double character” of commodity-determined labor as that which structures a new form of social domination in capital.<sup>6</sup> In doing so, Marx also specified the form of wealth – subsumed under value – such labor produces. The historical specificity of value in capitalism is its abstract generality expressed in exchange. With use-values (concrete) labor differs qualitatively, yet “with reference to value it counts only quantitatively” (Marx, 1867/1976), p. 136). As the expression of value, the exchange value of a commodity “is indifferent to its natural qualities because it is the embodiment of human labor in general measured by the time outlaid, and all the determinations of nature are extinguished in it” (Schmidt, 1962/2014, p. 66).

*The Treadmill of Production of Value*

The two dimensions of the social forms in capitalism discussed above (use-value/value, concrete labor/abstract labor, wealth/value) are related through the commodity form of labor as a function of time. The exchange value of a commodity,

including labor, is determined by the time socially necessary for its reproduction (Marx, 1867/1976, p. 129). The structure of modern capitalist society, according to Marx, is determined by the drive to produce surplus value and capitalize on labor (measured in socially necessary labor time). Hence, the constant need to produce value above the exchange value of the labor employed (i.e., surplus value). Following Marx (1867/1976, p. 318), it is important to bear in mind that the reference point for socially necessary labor time, as the determination of a commodity’s magnitude of value, is society as a whole. Hence, the contradiction between concrete individual laboring activity and abstract value-creating labor as reflected in the opposition between individual and society, where the former is subsumed by the latter, and the contradiction between value and material wealth, where both human and nonhuman natures emerge as dead, thing-like material bearers of objectified time.

Fig. 1 depicts the production of relative surplus value and its expansion required by capital. This process – initially theorized by Marx – has been elaborated most fully by Moishe Postone (1993). According to Postone, and in contrast to ToP theory, the two dimensions of capital’s social forms do not form a static opposition but rather a dynamic interaction. Specifically, Postone (1993, pp. 286–306) explicates a dialectic of labor and time, whereby the social labor hour and base level of productivity are moved forward in time, giving rise to a particular “treadmill” dynamic – what I refer to here as *the treadmill of production of value*. The metaphor of the ToP of value emphasizes the temporal dimension of Marx’s concept of capital as self-expanding value (more on this below), which, in turn, redirects focus on the growing contradiction between *wealth* (measured in terms of the quantity and quality of products produced) and *value* (whose magnitude is a function of the expenditure of abstract labor time).

In fully developed capitalism, once the working day has been limited, relative surplus value is effected by increasing productivity (so as to yield a larger output per hour worked) (Marx, 1867/1976, p. 438). But this is only effective indirectly, for once a given level of productivity becomes general at the level of society, this becomes the basis against which a new socially necessary labor hour is measured.

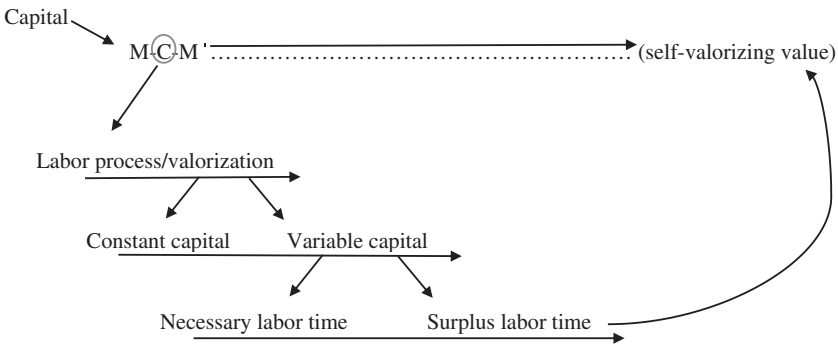


Fig. 1. Treadmill of Production of Value.

Although increases in productivity turn out greater quantities of material wealth and reduce socially necessary labor time, these developments do not change the total value produced per abstract time unit because the “constant” time unit itself is determined by productivity as a function of the use-value dimension of commodity-determined labor (Postone, 1993, p. 292). In this sense, the social labor hour, although constant, undergoes what Postone (1993, p. 292) refers to as a “substantive redetermination” – that is to say, “with increased productivity, the time unit becomes ‘denser’ in terms of the production of goods.” Value remains the same but is distributed across a growing number of products, thereby proportionately decreasing the value of each.<sup>7</sup> The production of surplus value (and its expansion required by capital) is, therefore, marked by increasing (and even accelerating) productivity growth, which in turn necessitates accelerating bio-physical throughput.<sup>8</sup>

To reiterate, once a given level of productivity becomes general at the level of society, this then becomes the base (or referent) against which a “new” social labor hour is measured. This, in turn, necessitates increasing productivity further, which, once generalized, establishes another social labor hour, which then necessitates increasing productivity even further. The connotation of the treadmill is more accurately employed as a metaphor for the production of value (as opposed to wealth), which under current conditions must continue *ad infinitum*. Each “new” hour (and, by extension each increase in productivity) produces and is produced by our actions. Although Marx’s early critique of alienation is an initial attempt to grasp such self-generated domination, it is only later, in *Capital*, that he is able to fully ground and elaborate his category of capital as “the accumulation of alien surplus-labor time” (Uchida, 1988, p. 98; cf.; Postone, 1993). It is in this sense that the social necessity of socially necessary labor time is quasi-objective – work in capitalist society confronts individuals as an “external” social necessity, which they must engage as “functioning” members of society. Whereas Schnaiberg et al. focus solely on the ToP of *wealth* (specified in relation to the environmental impact of use-value output), the metaphor of a ToP of *value* emphasizes the temporal dimension of Marx’s concept of capital as self-expanding value. Schnaiberg et al.’s understanding of the ToP is static and one-sided. Understanding capital-induced planetary degradation in terms of the ToP of value, by contrast, means directing critical focus on the interaction between wealth and value.<sup>9</sup>

### *Capital: On the Dual Crisis of Labor and Environment*

Within the framework of Marx’s critique, form and content are intrinsically related. The commodity both has a form and is a form. The content of commodity’s value dimension is a social relation – the product (commodity) is brought into being through objectifying activity (labor). Yet, as a social form, the commodity has another content – namely, abstract labor – and it is this latter, substantive dimension that underlies the formalism of the capitalist system (cf. Sohn-Rethel, 1978). According to Postone (1993, p. 268), this abstract, formalistic dimension allows Marx to put forward his formalistic account of the logic of

capital. Yet,  $M-C-M'$  is not the formula for a process whereby “wealth in general is increased”; rather, it is the formula for a process whereby “value is increased,” which is why the difference between  $M$  and  $M'$  – what Marx calls *surplus value* – is “necessarily only quantitative” (Postone, 1993, p. 267). As Postone (1993) elaborates:

With capital, the transformation of (the commodity) form becomes an end and (...) the transformation of matter becomes the means to this end. Production, as a social process of the transformation of matter which mediates humans and nature, becomes subsumed under the social form constituted by labor’s socially mediating function in capitalism. (p. 267)

The logic of capital, according to Marx, is characterized by an endless dynamic: capital is “self-expanding value” which “*preserves itself only by constantly multiplying itself*” (Marx, 1973/1857/1858, p. 270). The ToP of value is propelled forward by capital and as such dictates the form economic growth must take. Hence, the form economic growth takes in capitalist society is marked not only by increasing productivity but a tendency for the rate at which productivity increases to accelerate. The consequences of the contradiction between wealth and value can be observed in the growing antagonism between “ecological time” and “capital time.” The ToP of value highlights the specific temporality and directional dynamic of capital (i.e., the tendency of the system toward accelerating productivity growth). The temporality of capital can, in this sense, be defined as the necessity to produce as many commodities as rapidly as possible. Such “capital time” is antithetical to “ecological time” because it necessarily accelerates more rapidly than the Earth’s biocapacity (to reproduce resources and to absorb our waste) (cf. Rosa & Trejo-Mathys, 2013).

The ToP of value also drives technological change, which should give pause to the optimistic predictions of ecological modernization theory. As Tony Smith (2010, p. 211) explains, “The technologies of production and distribution will tend to be used in a manner that depletes resources and generates wastes at a faster rate than ecosystems can sustain.”

The tension between capital time and ecological time became increasingly clear throughout the latter half of the twentieth century as capital’s demand on the biosphere accelerated, further exceeding the available biological capacity of the planet. While Schnaiberg’s ToP (of wealth) exemplifies the importance of political economy for examining the post-WWII spike in environmental degradation, our current *inability* to subject these threats to a conscious and free overcoming by society must be understood in relation to the dynamics of alienation and the ToP of *value*, which as discussed above, remain hidden at the “surface level” of immediate experience. When value is the dominant form of social wealth, productivity (understood as the expression of humanity’s productive abilities) is socially constituted in alienated form (Postone, 1993, p. 195; see also Marx, 1867/1976, p. 137). Instead of being appropriated and controlled by people, the acquired productive abilities of humanity become attributes of capital and, therefore, dominate and control people as an alienating force, which is why the growing importance of science and technology in the production process do *not* correspond to growing amounts of value per unit time. Rather, in capitalism,

products function simply as material bearers of objectified time (Postone, 1993). Such heteronomy is endemic to capitalist production, and as such, cannot be explained in distributional terms but only in terms of the form of wealth (i.e., value) itself.

Contrary to Schnaiberg et al., the logic of capital cannot be reduced to the “interests” of those at the top of the social pyramid who stand to benefit from its operations, though this is not to deny that certain individuals do, in fact, benefit in extreme disproportion to the vast majority. The contradiction between the accumulated historical potential of humanity (“dead labor”) and the capitalist production of value structured by alienation is at the heart of the Marx’s critique of capital. The nature of this contradiction is between a world where people are controlled by production (i.e., the historical necessity of capital) and the possibility of a world in which people consciously determine and, therefore, control what they produce.

Although constituted by labor, the ToP of value is a quasi-objective, heteronomous dynamic that structures social action accordingly. Hence, the domination of human and nonhuman natures is wrapped up in an alien, runaway developmental logic, which, despite our increasing efforts, no one controls, and to which all are subject. While the socioecological effects of the ToP of value have become increasingly visible, the production of value remains concealed at the level of the immediate present, insofar as the present is determined by a dynamic and contradictory totality (i.e., capital).<sup>10</sup> The insidiousness of the ToP of value, as I elaborate below, emerges from the interaction between capital’s dual social forms.

*Dialectic of Transformation and Reconstitution: Value as  
the Continual Necessity of the Present*

Following Postone, the process whereby the necessity of value is continuously established anew involves a dialectic of transformation and reconstitution of the two dimensions of the commodity form. I alluded to this previously when, in discussing the ToP of value and capital time, I indicated a dialectic of labor and time, whereby the social labor hour and base level of productivity are moved forward in time. Postone (1993) explains that at the level of totality (i.e., capital), Marx’s analysis of the valorization process, including what I call the ToP of value:

...is concerned not only with the source of the surplus but also with the form of the surplus wealth produced (...) This dynamic involves a dialectic of transformation and reconstitution that results from the dual nature of the commodity form and from the two structural imperatives of the value form of wealth – the drive toward increasing levels of productivity and the necessary retention of direct human labor in production. (p. 308)

Following Postone (1993, p. 308), Fig. 2 depicts the dialectic of transformation and reconstitution between two forms of social necessity: ongoing transformations at the surface level of immediate appearance (the concrete, material wealth dimension) and the continual reconstitution of the underlying conditions necessary for the production of value (the abstract, value dimension). In Fig. 2,

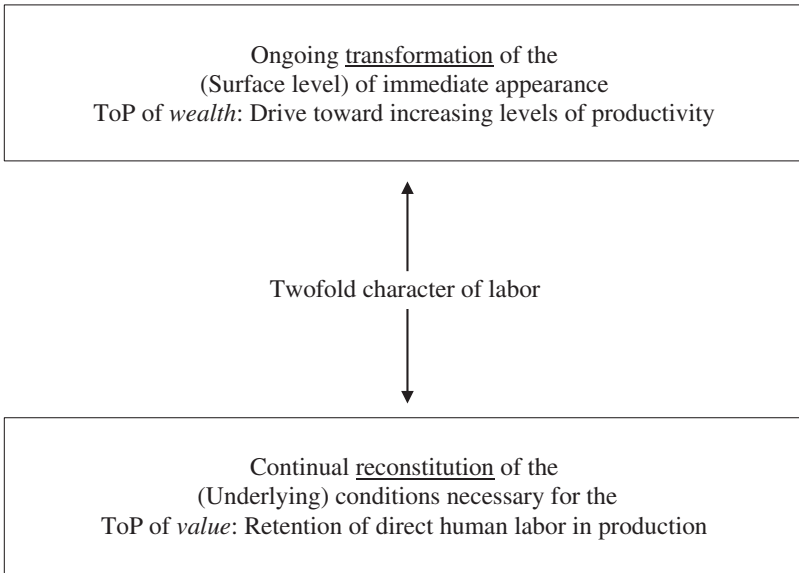


Fig. 2. Dialectic of Transformation and Reconstitution.

the twofold character of labor is depicted as the active mediation between the material wealth and value dimensions, whereas the two structural imperatives of the value form of wealth (the drive toward increasing levels of productivity, on the one hand, and the necessary retention of direct human labor in production, on the other) are depicted as occurring at the surface level and underlying structure of society, respectively.

Central to the ToP of value, as indicated above, is a dialectic of labor and time in which socially general productivity increases redefine the basis against which further increases in productivity must be effected. Because productivity is rooted in the use-value dimension of labor, it is possible to conceive of the “forward” movement of the abstract temporal frame of reference “as a mode of concrete time” (Postone, 1993, p. 293). That the interaction between capital’s use-value and value dimensions can be conceived in this way is itself indicative of capitalism. As Postone (1993, p. 293) explicates, the interplay of abstract labor and concrete labor sheds light on the foundation of Marx’s analysis of capital, especially the fact that *a feature of capitalism is a mode of (concrete) time that expresses the motion of (abstract) time*. Historical time within capitalist society, then, is socially constituted (via praxis) insofar as it is mediated by value.<sup>11</sup>

Yet, because the “entire abstract temporal axis, or frame of reference, is moved with each socially general increase in productivity” (Postone, 1993, p. 293), the *historical movement* of the ToP of value (i.e., its parameters as dictated by the directional dynamic of capital) cannot be adequately grasped in two-dimensional (x-y axis) terms. As Postone (1993) elaborates:

Although the measure of value is time, the totalizing mediation expressed by “socially necessary labor time” is not a movement *of time* but a metamorphosis of substantial time into abstract time *in space*, as it were, from the particular to the general and back. (p. 292)

According to Postone (1993), although one can measure the *consequences* of the production of value within the framework of abstract Newtonian time:

...the historical developments *themselves* (...) cannot be quantified as dependent variables of abstract temporality (that is, in value terms), even though the requirements of the social form of value mold the concrete form of production in which the accumulation of knowledge, experience, and labor is objectified. The movement of history, then, can be expressed indirectly by time as a dependent variable; as a movement of time, though, it cannot be grasped by static, abstract time. (p. 297)

While both abstract and historical forms of time are intrinsically related, the abstract temporal unit is distinct in that “it does not manifest its historical redetermination – it retains its constant form as *present time*” (Postone, 1993, p. 295). Like the commodity form, the “social ‘content’ of the abstract temporal unit remains hidden” (Postone, 1993, p. 295). Moreover, value, as an expression of time as the present, represents an external social norm to which actors comply (Postone, 1993, p. 295). Postone (1993) applies this insight into Marx’s example of the power loom as follows:

The social labor hour in which the production of 20 yards of cloth yields a total value of  $x$  is the abstract temporal equivalent of the social labor hour in which the production of 40 yards of cloth yields a total value of  $x$ : they are equal units of abstract time and, as normative, determine a constant magnitude of value. Assuredly, there is a concrete difference between the two, which results from the historical development of productivity; such a historical development, however, redetermines the criteria of what constitutes a social labor hour and is not reflected in the hour itself. In this sense, then, *value is an expression of time as the present*. It is a measure of, and compelling norm for, the expenditure of immediate labor time regardless of the historical level of productivity. (p. 296)

The dynamic of capital gives rise to a growing disparity between the accumulated historical potential of humanity and the production of value. For Marx, the retention of direct human labor in the production process, as that which underlies the value form, becomes increasingly anachronistic in the face of the immense wealth-producing potential of industry. As he notes, “The theft of alien labor time, on which the present wealth is based, appears a miserable foundation in the face of this new one, created by large-scale industry” (Marx, 1973/1857/1858, p. 704). This growing disparity, however, does not automatically undermine the necessity of the present, represented by value, but rather changes the “concrete presuppositions of that present, thereby constituting its necessity anew” (Postone, 1993, p. 299). *Value*, as an expression of time, is what indicates the historical movement of capital as simultaneously dynamic and static: “It entails ever-rising levels of productivity, yet the value frame of reference is perpetually reconstituted anew” (Postone, 1993, p. 299). As constituted by capital, historical time is invariably naturalized “into the framework of the present, thereby reinforcing that present” (Postone, 1993, p. 300).



The use-value and value dimensions of capital's social forms, as discussed above, do not simply form a static opposition. Rather, both dimensions interact through an ongoing "process of reciprocal determination," effecting "a directional dynamic in which (...) concrete labor and abstract labor, productivity and the abstract temporal measure of wealth, constantly redetermine one another" (Postone, 1993, p. 290). This "ongoing pattern of social transformation and reconstitution," according to Postone, is perhaps the best estimate of a so-called Marxian "law of value."

## **NEOLIBERALISM AND CONTEMPORARY ENVIRONMENTALISM**

The Marxian critical theory framework outlined above allows one to gain a better understanding of the widespread growth of environmentalism as concomitant with the spread of neoliberal capitalism. The onset of neoliberalism in the 1970s marks a transition from state-centric capitalism, in which the decline in industrial output that plagued the 1930s was overcome through state planning and coordination of the economy. This shift resulted in tremendous advancements in productivity and related forms of accumulated knowledge that fueled the post-WWII spike in environmental degradation, which environmental critics characterize as productivism. These developments also entailed massive transformations in social life. The technologies associated with the productivist dimensions of state-centric capitalism, for example, allowed the mass production of commodities, which in turn allowed a decline in prices and facilitated a mass consumer market. The discontents articulated by the environmental movement during the late 1960s and early 1970s expressed the fact that a productivist industrial society is not adequate to the well-being of the natural environment.

But precisely when it became possible to question the ecological impacts of the capitalist work regime during the 1970s, the necessity of this regime reasserted itself; as unemployment rates skyrocketed, "work" became a matter of increasing social necessity (Postone, 1978). Although the early environmentalist criticism was articulated at a time when the material expansion of the post-WWII regime had developed to such an extent that it became possible to question its necessity, the development of contemporary environmentalism did not correspond to a related shift in how society was organized. In fact, the exact opposite happened as the growth of environmentalism during the 1970s and 1980s was synchronous with the expansion of neoliberal global capitalism.

The restructuring of capital in neoliberal form is an attempt to reconstitute the underlying structural preconditions for the capitalist production of value discussed above. The crisis of state-centric capitalism during the mid-1970s incited a sweeping restructuring of capital that continues to this day. I have already mentioned the spike in unemployment and the resurgence of the necessity of work that accompanied this economic downturn. Other important developments include trends commonly associated with "neoliberal" capitalism: financialization, the shift toward monetary, supply side economics bolstered by the nation

state, the transformation of business and labor, and the creation of an infrastructure conducive to the formation of a global economy.

The issue of productivism and its connection to the problem of redistribution has been a source of confusion for environmentalism since the 1960s (Stoner & Melathopoulos, 2016). The climate justice movement, for example, foregrounds the issue of redistribution (e.g., “carbon debt,” “ecologically unequal exchange,” etc.) but opposes redistribution predicated on productivism. While such an approach correctly identifies the great acceleration of ecologically destructive patterns of development that took form in the 1930s, the notion that socialism would reconcile the capitalism-nature antithesis by decoupling productivism from redistribution remains suspect.

Within the framework of Marx’s critical theory, overcoming capitalism involves a transformation not merely of distribution but more fundamentally of the mode of production itself. Overcoming capitalism would involve the transformation of capitalist social relations, and the abolition of production resting on value measured in socially necessary labor time, in particular. Yet, insofar as the current historical juncture is determined by the logic of capital, moments of historical possibility are skewed at the level of the immediate present. By specifying the social mediations at work in the dialectic of transformation and reconstitution of capital, Marx’s critical theory is uniquely suited to provide conceptual tools capable of grasping the ways in which the horizon of possibility looks different at the level of historical immediacy.

## CONCLUSION

Although Schnaiberg et al.’s treadmill metaphor alludes to a phenomenon that is simultaneously static and dynamic, ToP theory has been restricted to analyzing the concrete wealth dimension, namely, the socioecological consequences of increasing use-value output. What is missing in the traditional ToP account is analysis and critique of the dialectic of wealth and value as driven by capital. The possibility of such critique is rooted in the double-sided nature of capital’s social forms, rather than between these social forms and “nature” or “labor” (understood transhistorically) (Postone, 1993). Grasping the interaction between these two (wealth/value) dimensions is important because, insofar as substantive changes effected by the use-value dimension remain nonmanifest within the abstract temporal frame of value, these changes cannot be recognized critically within the framework of the present.

The nature of the contradiction between material wealth and value directs focus on the ways in which the socioecological tensions endemic to capitalist society are structured by a historically specific form of human activity (commodity-determined labor), which shapes action and consciousness, including social conceptions and understandings of the natural environment. Although the environmental impact of the ToP of *wealth* is becoming increasingly evident, the process continues in large part because the ToP of *value* remains hidden at the “surface level” of immediate appearance. Indeed, the emergence of

“contemporary ecological subjectivity” (see Stoner & Melathopoulos, 2015, pp. 62–65), evidenced by the globalization of environmentalism, is not separate from, or necessarily opposed to, the domination of capital and may, in fact, serve to obscure the underlying sociostructural dynamics at work (see Stoner & Melathopoulos, 2015, pp. 57–62; Stoner, 2021).

Current research examining the potential of work time reduction (WTR) as a strategy for constructive ecological practice (see, e.g., Gunderson, 2019; Hayden & Shandra, 2009; Knight, Rosa, & Schor, 2013; Pullinger, 2014) could be conceptually enhanced by incorporating insights from the ToP of value, as discussed here. Such an approach would allow one to scrutinize critically windows of opportunity opened by the increasing superfluity labor while recognizing the ways in which these very same structural circumstances simultaneously constrain the possibility of qualitative social change. At the same time, understanding our current ecological predicament in terms of compounding levels of alienation (Dahms, 2011) severely complicates the urgent political tasks involved. For most individuals in advanced capitalist societies, an alternative nonalienated set of socioecological mediations is seemingly beyond imagination, as our identity, who we are and how we function is so completely tied to the capitalist production of value (Stoner, 2020, 2021). The challenge is that we have no reason to assume that we can contribute to altering the destructive dynamics of capital, environment, and society if we, as individuals, refuse to make real changes in our lives, in our standard of living, and especially in our social relations and modes of interaction.

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## NOTES

1. My approach is deeply indebted to the work of Moishe Postone (1993), who has arguably provided the most sophisticated reinterpretation of Marx’s critical theory to date.

2. The category of “object,” as well as “labor” (as a general category), is historically constituted. Both exclusively emerge in capitalism. Likewise, money, as a universal equivalent, presupposes a “world” in which everything is up for exchange.

3. As Postone (1993, p. 222) explains, “In capitalism, both moments of people’s relation to nature are a function of labor: the transformation of nature by concrete social labor can, therefore, seem to condition the notions people have of reality, as though the source of meaning is the labor-mediated interaction with nature alone. Consequently, the undifferentiated notion of ‘labor’ can be taken to be the principle of constitution, and knowledge of natural reality can be presumed to develop as a direct function of the degree to which humans dominate nature.”

4. Here, Marx’s insights stand in opposition to John Bellamy Foster’s (2001) well-known theory of metabolic rift. Foster’s theory is rooted in an uncritical and ahistorical affirmation of “labor” (as the universal metabolic relation between society and nature), which then becomes disrupted in the social metabolic order of capital, giving rise to an irreparable rift (for a critique of Foster, see Cassegård, 2021; Stoner, 2014; Stoner & Melathopoulos, 2018).

5. As Marx (1973/1857/1858, p. 164) explains, “individuals are now ruled by *abstractions*, whereas earlier they depended on one another.”

6. In *Capital, Vol. I*, Marx (1976/1867, p. 132) indicates the significance of the double character of commodity-determined labor, commenting that he was “the first to point out and critically examine” the twofold nature of commodity-determined labor, and that an adequate understanding political economy requires its elucidation.

7. According to Postone (2009, pp. 98–107), Marx’s falling rate of profit thesis is an attempt to capture this dynamic in a radically critical and immanent manner.

8. Although ToP scholars are correct that technological innovation is not determined by social or environmental needs but by the need to expand and absorb profit (see, e.g., York & Julius, 2016), ToP theory has not yet recognized the ways in which efficiency increases are patterned by the ToP value. Marx’s theory of value, as discussed here, is an important, though underutilized, theoretical resource for understanding the so-called “Jevon’s paradox,” in which the efficiency with which a resource is used corresponds to an increasing rate of consumption of that resource.

9. Cassegård (2021) also examines the tendency within green critical thought to focus on capital’s material outside, metabolism per se, and usevalue at the expense of second nature and the valueform. The argument about the interaction of capital’s dual social forms and the natural environment is congruent with the theoretical approach outlined in this chapter. As Cassegård (2021, p. 98) explains: “[t]he point is not to choose between focusing on second and first nature or value and use-value, but having the tools needed for an analysis that illuminates the contradictory relation between them.”

10. In this sense, Foster’s (2016) reading of the post-WWII period as an “age of ecological enlightenment,” in which the growth of ecology and radical environmentalism lead to a future socialist revolution, is not necessarily “wrong” but rather reflective of how our theoretical understandings of history mirror the current inability to bring about qualitative social change.

11. In contrast to the concept of “agency” in structuralism, poststructuralism, and many of the recent developments in contemporary sociological theory, “agency” within a critical Marxian framework is always constrained, which is to say that “structure” is not the opposite of agency but is rather constitutive of agency.

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