Introduction

The world is on fire. We are experiencing 'the end of the end of history' (Hochuli, Hoare and Cunliffe 2021). With the rapid deepening of the global ecological crisis in various forms such as climate change, oxidation of the ocean, disruption of the nitrogen cycle, desertification, soil erosion and loss of biodiversity, Francis Fukuyama's declaration of 'the end of history' after the collapse of the USSR (Union of Soviet Socialist Republics) (Fukuyama 1992) is approaching a totally unexpected dead end today, namely *the end of human history*. In fact, the triumph of neoliberal globalization only accelerated the rapid increase in environmental impacts upon the earth by human activities since the end of the Second World War – the so called 'Great Acceleration', the age in which all major socio-economic and Earth system trends record a hockey stick pattern of increase (McNeil and Engelke 2016) – and ultimately destabilized the foundation of human civilization. Pandemic, war and climate breakdown are all symptomatic of 'the end of history', putting democracy, capitalism and ecological systems into chronic crisis.

Many people are well aware of the fact that the current mode of living is heading towards catastrophe, but the capitalist system does not offer an alternative to the juggernaut of overproduction and overconsumption. Nor is there any compelling reason to believe that it will soon do so because capitalism's systemic compulsion continues to employ fossil fuel consumption *despite* consistent warnings, knowledge and opposition. Considering the fact that rapid, deep decarbonization that could meet the 1.5-degree-Celsius target of the Paris Agreement requires thorough transformative changes in virtually every sphere of society, more radical social movements embracing direct action have emerged, demanding to uproot the capitalist system

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(Extinction Rebellion 2019). In this context, when Greta Thunberg denounced the 'fairy tales of eternal growth' in a speech, she made it explicit that the capitalist system that aims for infinite accumulation on a finite planet is the root cause of climate breakdown.

This represents a new historical situation, especially to Marxism that has been treated like 'a dead dog' after the collapse of actually existing socialism. As environmentalists learn to unequivocally problematize the irrationality of the current economic system, Marxism now has a chance of revival if it can contribute to enriching debates and social movements by providing not only a thorough critique of the capitalist mode of production but also a concrete vision of post-capitalist society. However, this revival has not taken place so far, and persistent doubts remain about the usefulness of having recourse to the Marxian legacy in the 21st century. Marx's political optimism most plainly expressed in *The Communist Manifesto* has been repeatedly cited as evidence of his notorious and unacceptable productivism and ethnocentrism.

It is surely too naïve to believe that the further development of productive forces in Western capitalism could function as an emancipatory driver of history in the face of the global ecological crisis. In fact, the situation today differs decisively compared with that of 1848: capitalism is no longer progressive. It rather destroys the general conditions of production and reproduction and even subjects human and non-human beings to serious existential threat. In short, Marx's view of historical progress appears hopelessly outdated. In this situation, if there is a slight hope of a revival of Marxism in this historical conjuncture, its essential precondition is the radical reformulation of its infamous grand scheme of 'historical materialism' that pivots around the contradiction between 'productive forces' and 'relations of production'. This constitutes the central topics of this book in order not to end (human) history but to envision another clear, bright future from a Marxian perspective without falling into pessimism and apocalypticism in the face of global ecological crisis.

Such a project cannot avoid the problem of 'nature'. This is all the more so because the end of the 'end of history' brought about the end of the 'end of nature'. Bill McKibben (1989) once warned that the idea of nature that the modern world presupposed for a long time is gone for good because global capitalism considerably modified the entire planet, leaving no pristine nature untouched.[1] This situation is now generally called *the Anthropocene,* in which humankind has become a 'major geological force' (Crutzen and Stroermer 2000: 18) with massive scientific and technological power capable of transforming the entire planet on an unprecedented scale.[2]

The reality of the Anthropocene is, however, far from realizing the modern dream of human emancipation through the domination of nature.

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Climate change accompanied by sea-level rise, wildfires, heatwaves and change of precipitation patterns shows how the 'end of nature' dialectically turns into the 'return of nature' (Foster 2020); the earth and its limits are more and more tangible in such a way that humans can no longer control nature's power. It even subjugates them as an independent and alien force. In other words, the modern Baconian project is collapsing. Confronted with this increasing uncontrollability of nature, various critical theories of nature including eco-Marxism take up the urgent task of rethinking the relationship between humanity and nature (Rosa, Henning and Bueno 2021). However, the dominant narrative of the Anthropocene is a *monist* approach characterized by the hybridity of the social and the natural (Latour 2014; Moore 2015), which is *critical* of Marxism. In contrast, the current project aims to enrich the debate concerning the human–nature relationship by putting forward Marx's *dualist* methodology based on his theory of metabolism.

This theoretical task has important practical implications today. By comprehending Marx's method correctly, we can also recognize the unique contribution his work offers to recent debates on post-capitalism. And here is the third 'end' of post–Cold War values, that is, 'the end of capitalist realism'. Mark Fisher (2009) once lamented that 'capitalist realism' – the sense that 'it is easier … to imagine the end of the world than of capitalism' (Jameson 2016: 3) – severely constrains our political imagination, subjugating us to the regime of capital. The same tendency is discernible in environmentalism: 'It is easier to imagine a total catastrophe which ends all life on earth than it is to imagine a real change in capitalist relations' (Žižek 2008: 334). However, as the multi-stranded crises of economy, democracy, care and the environment deepen, the tendency of which was strengthened even more by the COVID-19 pandemic and the Russo-Ukrainian War, there are growing calls for radical 'system change'. Both Slavoj Žižek (2020a) and Andreas Malm (2020) argue for 'war communism', while John Bellamy Foster (2020) and Michael Löwy (2015) defend the idea of 'ecosocialism'.

In addition, there are intensive discussions on 'life after capitalism' (Jackson 2021) even among non-Marxist scholars. Thomas Piketty's (2021) dictum that it is 'time for socialism' is exemplary here, but a more ecological version of the same argument can be found in Naomi Klein's explicit endorsement of the idea of 'ecosocialism':

> Let's acknowledge this fact [that the Soviet Union and Venezuela are unecological], while also pointing out that countries with a strong democratic socialist tradition – like Denmark, Sweden, and Uruguay – have some of the most visionary environmental policies in the world. From this we can conclude that socialism isn't necessarily ecological, but

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> that a new form of *democratic eco-socialism*, with the humility to learn from Indigenous teachings about the duties to future generations and the interconnection of all of life, appears to be humanity's best shot at collective survival. (Klein 2019: 251; emphasis added)[3]

This is a remarkable shift, considering the fact that Klein is not a Marxist. Once Ellen Meiksins Wood (1995: 266) argued that 'the issues of peace and ecology are not very well suited to generating strong anti-capitalist forces. In a sense, the problem is their very universality. They do not constitute social forces because they simply have no specific social identity.' Today's situation concerning ecology looks quite different from Wood's time precisely because the planetary crisis provides a material basis for constituting a universal political subjectivity *against* capital. This is because capital is creating a globalized 'environmental proletariat' (Foster, York and Clark 2010: 47) whose living conditions are severely undermined by capital accumulation.

Inspired by these recent attempts to foster imagination and creativity for a more free, egalitarian and sustainable life, I draw upon Marx's theory in order to put forward a wholly new Marxian vision of post-scarcity society adequate to the Anthropocene. Such a revival of Marx's ecological vision of post-capitalism aims to enrich the discursive constellation around the Anthropocene, connecting this new geological concept to the contemporary issues of political economy, democracy and justice beyond the Earth sciences.

This new ecosocialist project for the Anthropocene is also supported by recent philological findings, thanks to materials published for the first time in the *Marx-Engels-Gesamtausgabe* (*MEGA*). The *MEGA* publishes in its fourth section Marx's notebooks on the natural sciences, and the scope of Marx's ecological interests proves to be much more extensive than previously assumed (Saito 2017). Although these notebooks were neglected even by researchers for quite a long time, recent studies demonstrate that through his research in geology, botany and agricultural chemistry, Marx intended to analyse various practices of robbery closely tied to climate change, the exhaustion of natural resources (soil nutrients, fossil fuel and woods) as well as the extinction of species due to the capitalist system of industrial production.

Consequently, ecological aspects of Marx's critique of political economy have become one of the central fields for revitalising the Marxian legacy in the Anthropocene. His concept of 'metabolic rift', in particular, has come to function as an indispensable conceptual tool for the ecological critique of contemporary capitalism (Foster, York and Clark 2010; Foster and Burkett 2016). This concept substantiates Marx's critique of the destructive side of capitalist production by demonstrating that it can be applied to contemporary ecological issues such as global warming, soil erosion, aquaculture, the livestock business and the disruption of the nitrogen cycle (B. Clark 2002; Clark and

York 2005; Longo, Clausen and Clark 2015; Holleman 2018).[4] Part I of the current book develops the metabolic rift approach further as the theoretical and methodological foundation of Marxian political ecology. In addition to Marx, Part I enriches Marxian ecology by dealing with Friedrich Engels, Rosa Luxemburg, Lukács György and István Mészáros, because their texts help comprehend the theoretical scope of the marginalized concept of 'metabolism' in Marxism.

However, this project is not simply about how to understand Marx's concept of metabolism more *correctly*. The task of developing Marxian ecology based on the concept of metabolic rift is worth carrying out as it has a practical relevance: different approaches to the ecological crisis will provide different solutions to it. In this context, it is noteworthy that 'post-Marxist' attempts to conceptualize the human–nature relationship in the Anthropocene *against* the concept of 'metabolic rift' have emerged. They are committed to philosophical monism. The proponents of the monist view problematize an 'ontological dualism' of Marxism (Castree 2013: 177) that they claim fails to adequately understand the ontological status of nature in the Anthropocene. Since capitalism thoroughly reconstructs the entire environment, nature as such does not exist, but is 'produced' through capitalist development. Monists, transcending ontological binarism, insist on replacing it with relational thinking: everything is a 'hybrid' of nature and society. Jason W. Moore (2015) in particular directs this critique against the concept of 'metabolic rift', claiming that it falls into the Cartesian dualism of 'Society' and 'Nature'. He instead puts forward a relational understanding of human–nature metabolism.

Yet monism once again revives a failed Prometheanism for the Anthropocene, justifying the ever-increasing intervention in nature. Such a 'geo-constructivist' approach maintains that there is already too much human intervention in nature in the Anthropocene (Neyrat 2019). Therefore, any attempt to stop the intervention in fear of environmental destruction is irresponsible and disastrous because the process is irreversible. According to the geo-constructivist approach, the only way forward is 'stewardship' of the earth by remaking the whole planet in order to secure human existence in the future, if not human emancipation. This revival of the Promethean project is sneaking into Marxist efforts to renew their vision of a post-capitalist future (Mason 2015; Srnicek and Williams 2016; Bastani 2019). In this context, Part II of this book offers a reply to various monist and Promethean currents in the Anthropocene through the lens of Marx's methodological dualism.

After critically examining the theoretical limitations of both monist and Promethean views, Part III elaborates on Marx's ecological vision of a post-capitalist society in a non-productivist manner. Using the new insights offered by the *MEGA*, it demonstrates that through interdisciplinary research in the

natural sciences, humanities and social sciences, the late Marx experienced a theoretical breakthrough – *coupure épistémologique* in an Althusserian sense (Althusser 2005) – after 1868. His last vision of post-capitalism in the 1880s went *beyond* ecosocialism, and it can be more adequately characterized as *degrowth communism*. This previously unknown idea of degrowth communism begets useful insights to transcend persistent 'capitalist realism'. While there is growing interest in radical approaches today, it is not sufficient simply to develop an ecosocialist critique of contemporary capitalism. Only by going back to Marx's own texts is it possible to offer a positive vision of a future society for the Anthropocene. Such a radical transformation must be the new beginning of history as the age of degrowth communism.

However, if Marx really did propose degrowth communism, why has no one pointed it out in the past, and why did Marxism endorse productivist socialism? One simple reason is that Marx's ecology was ignored for a long time. It is thus first necessary to trace back the moment of its suppression. This genealogy of (suppressed) Marxian ecology starts with Marx himself. Referring to Marx's notebooks on the natural sciences that are published in the *MEGA*, Chapter 1 establishes Marx's concept of 'metabolic rift' by highlighting the three dimensions of the ecological rifts and their spatiotemporal 'shifts' mediated by technologies on a global scale. This original insight into capital's constant expropriation of nature as the root cause of the metabolic rift was deepened by Rosa Luxemburg in *The Accumulation of Capital*, which problematized the main 'contradiction' of capitalism due to its destructive impacts upon the people and environment in non-capitalist peripheries.

Although she employed the concept of 'metabolism', Luxemburg formulated it as a *critique* of Marx's narrow view of capital accumulation. Her critique implies that Marx's concept of metabolism was not properly understood even at that time. This misunderstanding was inevitable because many of Marx's writings were unpublished and unavailable to Luxemburg. Yet this problem also originates in Engels's attempt to establish 'Marxism' as a systematic worldview for the proletariat. In order to trace the original deformation of Marx's concept of metabolism, Chapter 2 reconstructs Engels's reception of Marx's theory of metabolism by carefully comparing Engels's editorial work on *Capital* with Marx's original economic manuscripts as well as their notebooks published in the *MEGA*. This investigation reveals subtle but decisive theoretical differences between Marx and Engels, especially in terms of their treatment of metabolism. These differences prevented Engels from adequately appreciating Marx's theory of metabolic rift, so the concept of metabolism came to be marginalized in Marxism.

This marginalization is clearly documented in the historical formation and development of Western Marxism in the 1920s, which further diverged

from Marx's original insight into metabolism and his methodology. Here the problem of the intellectual relationship between Marx and Engels came to have a significant influence because it determined the entire paradigm of Western Marxism. Famously enough, Western Marxism highlighted the rigorous differentiation of Marx and Engels, accusing the latter's illegitimate extension of dialectics to the sphere of nature as a cause of Soviet Marxism's mechanistic social analysis. However, despite their harsh critique of Engels, Western Marxists shared the fundamental assumption with Soviet orthodox Marxism that Marx had little to say about nature, thereby neglecting the importance of his concept of metabolism and his ecological critique of capitalism.

As discussed in Chapter 3, the founder of Western Marxism, Lukács György, is an exceptional figure in that he clearly paid attention to this concept of metabolism. Although his critique of Engels's treatment of nature in *History and Class Consciousness* had an immense impact on Western Marxism, he actually had a different approach to the problem of nature that was formulated as part of his theory of metabolism in his unpublished manuscript of 1925–6 titled *Tailism and the Dialectic*. This manuscript was unknown for a long time, so Lukács's intention in *History and Class Consciousness* was not properly understood, and he was repeatedly criticized for various theoretical inconsistencies and ambivalences. However, looking at *Tailism and the Dialectic*, it becomes clear that his treatment of the relationship between humans and nature shows a continuity with Marx's own dualist methodology that analytically distinguished between the social and the natural. With this methodology, Lukács's theory of metabolism provides a way of developing Marx's 'non-Cartesian' dualism of *Form* and *Matter* as a critique of modern capitalist production. Nevertheless, his unique insight was suppressed by both orthodox Marxism and Western Marxism, leading to the marginalization of Marxian ecology throughout the 20th century.

Since Marx's dualist method is not correctly understood, the concept of metabolic rift continues to be exposed to various criticisms. Chapter 4 deals with Marxist versions of the monist view represented by Jason W. Moore's 'world ecology' as well as by Neil Smith's and Noel Castree's 'production of nature'. Despite their obvious theoretical differences, their monist understanding of capitalism shows how misunderstanding Marx's method generates problematic consequences that have practical relevancy.

As discussed in Chapter 5, the failure to understand Marx's method also results in the recent revival of the Promethean idea among Marxists. These utopian Marxists draw upon Marx's *Grundrisse* and argue that a third industrial revolution based on information technology (for example, artificial intelligence [AI], sharing economy and Internet of things [IoT]) combined with full automation could liberate humans from the drudgery of work and

make the capitalist system of value obsolete. Despite their celebration of dream technologies of the future, the old Prometheanism remains. In order to decisively abandon Prometheanism, it is necessary to focus on Marx's concept of 'real subsumption' in the 1860s – that is, not in the *Grundrisse* written in the 1850s. Doing so reveals that Marx's critique of 'productive forces of capital' in *Capital* represents a major shift in his view of technological progress under capitalism. Marx came to realize that the capitalist development of technologies does *not* necessarily prepare a material foundation for post-capitalism.

However, his rejection of his earlier naïve endorsement of technological development posed a series of new difficulties for Marx. Once he started to question the progressive role of increasing productive forces under capitalism, he was inevitably compelled to challenge his own earlier progressive view of history. Chapter 6 reconstructs this process of self-critique in the late Marx. Only by paying attention to Marx's theoretical crisis does it become clear why he had to simultaneously study the natural sciences *and* pre-capitalist societies while attempting to complete the subsequent volume of *Capital*. By intensively studying these theoretical fields, Marx ultimately went through another paradigm shift after 1868. It is from this perspective that Marx's letter to Vera Zasulich sent in 1881 needs to be reinterpreted as the crystallization of his non-productivist and non-Eurocentric view of the future society, which should be characterized as degrowth communism.

This conclusion must be surprising to many. No one has previously proposed such a vision of Marx's post-capitalism. Furthermore, degrowth economics and Marxism have had an antagonistic relationship for a long time. However, if the late Marx accepted the idea of a steady-state economy for the sake of a radically equal and sustainable society, there will be a new space of dialogue between them. In order to start such a new dialogue in a fruitful manner, the final chapter will revisit *Capital* and other writings and reread various passages from the perspective of degrowth communism. In a word, Chapter 7 aims at the reinterpretation of *Capital* as an attempt to go beyond *Capital*. It will offer a fresh reading of some key passages which would otherwise turn into a naïve endorsement of productivism. Most notably, the radical abundance of 'communal/common wealth' (*genossenschaftlicher Reichtum*) in the *Critique of the Gotha Programme* signifies a non-consumerist way of life in a post-scarcity economy which realizes a safe and just society in the face of global ecological crisis in the Anthropocene.

Notes

1 Bill McKibben does not necessarily deny that pristine nature did not exist even before the 1990s. He instead highlights that the 'idea' of nature as independent from human intervention can no longer be accepted as a valid conceptual tool due to the increasing human impacts upon nature. This situation has to do with the recent popularity of monist approaches, as discussed in Chapter 4, although McKibben does not participate in these debates.

2 Eugene F. Stoermer already used the term 'Anthropocene' in the 1980s, although he employed it in a different sense. A Russian geochemist, Vladimir I. Vernadsky developed the concept of 'biosphere' in the 1920s in order to highlight human impacts upon the biological life on a planetary scale, which has relevance to today's discussion of the Anthropocene (Vernadsky [1926] 1997; Steffen et al. 2011: 844).

3 Naomi Klein (2020) continues to argue for 'democratic socialism' in her more recent book too. Thomas Piketty (2020) also advocates for 'participatory socialism' not only for the sake of social equality but also for sustainability in the face of climate change. Their endorsement of 'socialism' represents a major shift in the general political tone towards the left.

4 Other recent literature on the metabolic rift approach includes Moore (2000, 2002), Mancus (2007), McMichael (2008), Gunderson (2011) and Weston (2014).