

HOW THE LEGITIMACY OF MARX'S ECOLOGY IS POSSIBLE: DEMONSTRATING FROM THE PERSPECTIVE OF FACTUALITY AND EFFECTIVENESS?

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Abstract. This article will discuss the legitimacy of Marx's ecology. Generally speaking, the legitimacy of Marx's ecology is doubted in two aspects. Does Marx have ecology? Is Marx's ecology effective? In the former aspect, the opponents believe that Marx's theory lacks ecological content due to its inherent tendency of 'Prometheanism' and 'hyperindustrialism'. In the latter aspect, the opponents believe that although Marx has ecology, Marx's ecology has long lost its explanatory power for modern ecological problems due to changes of times and historical themes. Therefore, the demonstration of the legitimacy of Marx's ecology should also be carried out from the two dimensions of *factuality* (existence) and *effectiveness*.

Keywords: Marx's ecology, metabolism, ecosocialists, ecological critique, legitimacy, *Capital*

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1. Introduction

The 'second-stage ecosocialists' such as John Bellamy Foster, Paul Burkett, and Kohei Saito, etc., have revealed *the coupling relationship* between Marx and ecology by 'returning to Marx's materialist-ecological approach, and particularly to his concept of social metabolism' (Foster and Clark 2016: 1). Nevertheless, mainstream environmentalism, deep ecology, Neo-Malthusianism, a considerable number of ecologists, and ecological critics still doubt and oppose the legitimacy of

Marx's ecology and hold considerable doubts about Marx's contribution to ecology. They even believe that Marx, who inherited the spirit of the Enlightenment, was staunch Prometheanist with 'the Biblico-Christian ideology of the conquest of nature' (Lipietz 2000: 74), and then classify Marx as an 'anti-ecological' camp, emphasize the *rift* between Marx and ecology. The doubters and opponents either believe that 'Marx is neither the green angel nor the production devil, and that Marx is not an ecological theme' (Silva 2018: 1745). 'The founder of historical materialism was decisively unecological in his faith in the positive effects of unlimited technological and economic growth' (Saito 2017: 10). 'They prefer to abandon Marx's theories of value, reification, and class altogether, dismissing them as outdated and irrelevant, and see no point in reviving Marx's ideas as part of a radical critique of capitalism's environmental destruction' (Saito 2016: 60). In short, their final conclusion is that Marx should be forgotten (Immler and Schmied-Kowarzik 2011: 12). Marx's ecology has no legitimacy. Therefore, whether we can take a complete ecological narrative in Marx's theoretical heritage and use it to respond to the current ecological crisis is the key to confirming the legitimacy of Marx's ecology.

2. Two questions about the legitimacy of Marx's ecology

The issue of legitimacy is not limited to the traditional fields of sociology and politics, and almost all disciplines face the challenge of legitimacy. For example, questioning the significance of philosophy in modern society is actually questioning the legitimacy of philosophy, which is essentially a criticism of the *effectiveness* of philosophy. Of course, the history of philosophy undoubtedly confirms its existence or factuality. Marx's ecology also has a similar legitimacy problem, and it contains two sub-topics. On the one hand, is there ecological content in Marx's theory? The answer to this question is actually an interpretation of the relationship between Marx and ecology. If we can analyze enough ecological narratives from Marx's theory and confirm the coupling relationship between Marx and ecology, we can say that Marx's ecology has legitimacy at the level of factuality. However, factuality is only a necessary condition for the confirmation of legitimacy, not a sufficient and necessary condition. On the other hand, if Marx's ecology can effectively explain the essence and root of the current ecological crisis and provide academic resources for today's ecological movement and ecological governance, it can be said that Marx's ecology has obtained legitimacy in the sense of effectiveness. Only when we get a positive answer in the dual sense of factuality and effectiveness can Marx's ecology prove its legitimacy is necessary and sufficient, and the query of the legitimacy of Marx's ecology will become a *false problem*.

The criticism of the legitimacy of the factuality of Marx's ecology usually includes the following two aspects. On the one hand, sceptics believe that Marx's theory has nothing to do with ecology. This kind of criticism was first launched from *etymology*. They stressed that the word *ecology* has never been used in Marx's text, so Marx cannot make a fundamental contribution to the development of ecological

thought. Using ecological terms to express the arguments in Marx's works just puts ecological thoughts that emerged 120 years after Marx's death under Marx's domination (Kadt and Engel-Di 2001: 55). In addition, some scholars believe that the research theme of Marx is limited to 'grand narratives' such as class struggle, social revolution, and human liberation, his research field is limited to 'human societies' such as political economy and historical materialism, and Marx lacked attention to nature and ecology. For example, Donald Worster believed that we could not find much concern about preserving any ancient feeling for nature or even any concern for environmental preservation in Marx (Worster 1994: 427). Anthony Giddens accused Marx that his attention to changing the exploitative relationship of human society in the class system did not extend to the exploitation of nature (Giddens 1981: 59–60). These scholars' rejection of the factuality of Marx's ecology is actually accomplished by revealing the 'heterogeneity' between Marx's theory and ecology. They usually believe that Marx's theory is essentially a critical theory of capital, and therefore it does not contain the theme of ecology. In fact, Marx's ecological critique is usually embedded in capital critique. If we cannot understand the homogeneity of Marx's capital critique and ecological critique and the coupling of political economy and ecology, we will inevitably turn a blind eye to Marx's ecology.

On the other hand, skeptics believe that Marx has a natural anti-ecological tendency because of his excessive admiration for production. This view not only excludes the 'kinship' between Marx and ecology but also attributes the ecological crisis to Marx's tendencies of productivism, economic determinism, and technological optimism. John Passmore even wrote: 'Nothing could be more ecologically damaging than the Hegelian-Marxist doctrine' (Passmore 1974: 185). These critical opinions focused on portraying Marx's anti-ecological image and believed that Marx 'understands production from a committed point of view, that is, he sees a dominated object in nature. When using the concept of production or productivity, he does not take into account the possible damage to the environment caused by human actions' (Silva 2018: 1738). In addition, the misunderstanding of Marx's value theory is also an important reason for the formation of Marx's anti-ecological image. Skeptics believe that Marx's labor theory of value does not take into account the value of nature. Schmidt also claimed that Marx and Engels did not reserve any space for nature except for a one-sided and conqueror's attitude towards nature.

In short, the scholars who are obsessed with equating Marx's theory with anti-ecological theory mostly start with criticizing Marx's labor theory of value, portray Marx as a Prometheanist image with anthropocentric tendency, blind optimism about science and technology, one-sided respect for production, ignoring the inherent value of nature, and adhering to the spirit of *Enlightenment*.

The questioning of the legitimacy of Marx's ecology is also carried out by opposing its *effectiveness*. Skeptics believe that although Marx's theory contains the dimension of ecology, Marx's ecology has lost its explanatory power to the modern ecological problems due to the transformation of the times and the historical theme. This critical opinion mainly comes from the first-stage ecosocialists. Saito Kohei summed up this theoretical prejudice:

The 'first-stage ecosocialists', despite their avowed appreciation of Marx's larger legacy, tend to emphasize the theoretical shortcomings of Marx's ecology in the strongest terms, as 'a major ecological flaw', 'a serious error', 'a defect', and 'a failure' (Saito 2016: 60).

These so-called *theoretical shortcomings* are the critical reasons why the first-stage ecosocialists believe that Marx's ecology has lost its effectiveness. For the same reason, they think that it is meaningless to revive Marx's ideas as part of a radical critique of capitalism's environmental destruction (Saito 2016: 60). Specifically, they believe that the theoretical shortcomings of Marx's ecology mainly include three aspects. First, they accused Marx's ecology of lacking *system* and *completeness*. For example, Hubert Laitko firmly argues that Marx's ecology 'lacks a systematic character and rigor, and it can possibly give some stimulation for theoretical works, but not more than that' (Laitko 2006: 65). Second, they emphasize the limitations of Marx's ecology. Michael Löwy argued: "We can find in Marx writings a theory of the metabolic rift between human societies and nature" (Löwy 2017: 153). However, Marx and Engels's discussion on ecological issues is dated; the ecological issues they discussed belong to the 19th century and are almost meaningless to today. Third, they believe that Marx's ecology lacks *constructive* opinions. Marx's ecology itself can point out the stale fact at best that capitalism is harmful to the environment and cannot provide theoretical guidance for actual ecological movements and ecological governance. In short, critics deny its legitimacy of effectiveness by weaving the myth of the *empty field of the times* of Marx's ecology.

3. The overall logic of the legitimacy of Marx's ecology

In order to refute the questioning of the legitimacy of Marx's ecology, a standard for judging the legitimacy of Marx's ecology must be established. This standard can be divided into three aspects. 1. Does the core of Marx's theory involve ecology and nature? 2. Is there a rich ecological narrative in Marx's text? 3. Is Marx's ecology effective today? The first two standards are related to the *factual* basis of the legitimacy of Marx's ecology, while the latter standard is related to the *effective* basis of the legitimacy of Marx's ecology. In what sense does Marx's theory have homogeneity with ecology? It is not only a close inquiry into the overall logic of Marx's ecology but also a discussion on the relationship between Marx and ecology. In this sense, it is necessary to investigate the core content of modern ecology from the perspective of etymology and clarify their *kinship* by comparing it with the thrust of Marx's theory. This section will demonstrate the legitimacy of Marx's ecology through the first standard.

The word ecology has never appeared in Marx's works. Critics question the legitimacy of Marx's ecology through this point. However, the lack of word does not mean the missing of theory, just as Andronicus coined the term metaphysics after Aristotle, metaphysics, as the first philosophy, has been the main form of philosophy

since the birth of Greek philosophy. Therefore, if we want to confirm the unity of Marx and ecology, we only need to prove that the core of Marx's theory is highly *homogeneous* with ecology. First of all, we need to explain the exact meaning of the concept of ecology. In the modern sense, the German biologist Ernst Haeckel first completely defined the term ecology. According to the textual research, the term ecology first appeared in Haeckel's *Generelle Morphologie der Organismen* in 1866. Haeckel's classic definition of ecology is a comprehensive science to understand the relationship between organisms and their surrounding environment. In a broad sense, the external world around organisms can be understood as all conditions of existence. They are partly organic and partly inorganic. However, Haeckel's definition of ecology is always limited to the category of biology, and 'organism' does not mainly refer to human beings. Therefore, the ecology of Haeckel's era is *biological ecology* and *natural ecology*. Since the middle of the 20th century, with the prominence of environmental issues, especially the publication of the book *Silent Spring* by Rachel Carson, an American marine biologist, author, and conservationist in 1962, ecological issues and related topics have gradually entered the public eye. The original meaning of ecology has changed; that is, people begin to understand ecology apart from social ecology. Researchers also study ecology comprehensively by combining natural ecosystems and social ecosystems. The transformation of natural ecology into social and human ecology is the transformation of organisms in the broad sense to human society in the narrow sense. Therefore, social ecology or human ecology is an emerging discipline that studies the relationship and the law of interaction between human society and the environment.

By investigating the concept of ecology, we can see that the main contents and research objects of ecology revealed by natural ecology, social ecology, and human ecology are consistent; they all explore the relationship between organisms (humans) and their living environment. In what sense does Marx's theory maintain a coupling relationship with research objects of ecology? First of all, it is necessary to examine the core content of Marx's theory. In a sense, Marx's theory is essentially 'practical philosophy'. Its fundamental feature is that it reverses the relationship between theory and practice and holds that the practical relationship takes precedence over the theoretical one. Marx argues that the most fundamental practice of humanity is labor (survival) practice, which is 'a process between man and nature, a process by which man, through his own actions, mediates, regulates and controls the metabolism between himself and nature' (Marx 2004: 207-208). As a meta concept of Marx's theory, practice naturally shows the following two aspects: the relationship between humanity and nature (thing), and the other is the relationship between humanity and humanity. Therefore, Marx's concept of practice contains the core proposition of ecology: the relationship between man and nature, especially Marx's concept of metabolism mediated by labor practice, which clearly explains the interaction between humanity and nature, thus proving that his theory has an ecological theme. Foster, Saito, and other second-stage ecosocialists also revealed the *kinship* between Marx and ecology by interpreting the concept of metabolism. For example, Saito believes that 'the concept of metabolic interaction between humans and nature is the

vital link to understanding Marx's ecological exploration of capitalism' (Saito 2017: 64). Foster argues: 'In his definition of the labor process, Marx made the concept of metabolism central to his entire system of analysis by rooting in his understanding of the labor process upon it. Thus in his definition of the labor process in general (as opposed to its historically specific manifestations), Marx utilized the concept of metabolism to describe the human relation to nature through labor' (Foster 2000: 157).

Marx's concepts of productive forces and relations of production also contain the dimension of ecology. As Joel Kovel said, Marx's 'basic category of production is inherently ecological, as it deals with the relationship between one part of nature – the human being – and the remainder of nature as this is transformed by the peculiarly human faculty of labor in the production process' (Kovel 2011: 5). On the one hand, productive forces are the objectification force for humans to transform the external world. The realization of this force must depend on the labor practice of humans, and the practical force of humans can objectify only by relying on nature. On the other hand, people's objectified labor can only be carried out in certain production relations, that is, 'people must form certain connections and relations with each other in order to produce things; Only within the scope of these social connections and social relations can they have their impact on nature and production' (Marx and Engels 2009: 724). Therefore, productive forces represent the relationship between humans and nature, and production relations represent humans and humans. Productive forces solve the contradiction between humans and nature, while production relations solve the contradiction between humans and humans. In this sense, the ecological dimension of Marx's concepts of productive forces and relations of production can also confirm the fit between Marx's theory and ecology. In a word, the core of Marx's theory is highly coupled with ecology, which strongly refutes those remarks that attempt to deny the legitimacy of factuality of Marx's ecology through the lack of the word ecology in Marx's text.

4. The textual evidence of the legitimacy of Marx's ecology

Marx's main works have discussed the issues related to nature and ecology and contain rich ecological narratives such as *The Economic and Philosophical Manuscripts of 1844*, *The German Ideology*, *Capital*, and *natural science notebooks*. These ecological narratives refute the following viewpoints. 1. Marx's labor theory of value ignores the internal value of nature. 2. Marx ignores its negative ecological consequences because of his optimistic attitude towards science, technology, and modern industry. 3. There is no ecology in Marx's Communist theory. 4. Marx's ecological interest is a *digression* deviating from the theme of political economy. The rich ecological narratives in Marx's text disenchant the images of Prometheanism, anthropocentrism, and productivism imposed on Marx.

The rich exposition of the concept of humanized nature in *The Economic and Philosophical Manuscripts of 1844* (from now on referred to as *The Manuscript*),

the practical definition of the relationship between humanity and nature, the criticism of the anti-ecological alienated labor, and the explanation of the homogeneity of Communist society and ecological society are necessary textual basis for the confirmation of the legitimacy of factuality of Marx's ecology. It can be said that *The Manuscript* is the *outline* and *manifesto* of Marx's ecology.

First of all, the explanation of the concept of humanized nature and the demonstration of the triple relationship of practice, cognition, and aesthetics between humanity and nature in *The Manuscript* refutes those who believe that Marx's theory lacks an *ecological dimension*. Old materialism often breaks away from the subject's perspective, statically understands nature, and then emphasizes the abstract view of nature, such as *the pre-existence nature* and *primitive nature*. On the contrary, Marx said, 'but nature too, taken abstractly, for itself – nature fixed in isolation from a man – is nothing for man' (Marx 2014: 114). In other words, nature separated from human practice is an abstract nature, and only 'the natural world produced in human history, that is, produced during the formation of human society, is the actual natural world of human' (Marx 2014: 86). However, the concept of humanized nature in *The Manuscript* still has some limitations because Marx did not implement the principles of historical materialism in his understanding of nature.

Second, the anti-ecological criticism of alienated labor in *The Manuscript* refutes the remarks that believe that Marx only pays attention to the alienation of humans and ignores the *alienation of nature* and the alienation of the relationship between humans and nature. Marx, in the first notebook of *The Manuscript*, compared the capitalist form of land property with that of feudalism, revealing the historical changes in the relationship between humanity and land: "In feudal landholding system, there was still the appearance of a closer relationship between the possessor and the land than that of mere physical wealth." "The land seemed like the inorganic body of its lord." "People who belong to the property would rather treat the property like their home country" (Marx 2014: 41). Nevertheless, due to the commodification of the land, producers living in modern society lost any direct connection with the earth and separated from their original means of production, the human 'marriage with the honor of the land must be necessarily replaced by the marriage of interests' (Marx 2014: 42). In the historical transformation of feudal society to capitalist society, the relationship between man and land changed from unity to separation. The alienation resulting from this separation of humanity and nature is the subject of *The Manuscript*. The investigation of the *unity and separation* between humanity and nature is an important clue that runs through Marx's ecological research.

Third, *The Manuscript* embodies the *ecological color* of communist society and refutes those who believe that Marx's theory of communist lacks *ecological dimensions*. In the context of Marx, the absolute unity of humanity and nature is the central task of communism:

This communism, as fully developed naturalism, equals humanism, and as fully developed humanism equals naturalism; it is the genuine resolution of the conflict between man and nature and between man and man – the actual resolution of the strife between existence and essence, between

objectification and self-confirmation, between freedom and necessity, between the individual and the species (Marx 2014: 78).

Communism realizes the reconciliation between humanity and nature as naturalism and realizes the reconciliation between man and man as humanism. Therefore, communism is embedded with ecological color and ecological dimensions, and communist society and ecological society have a high degree of homogeneity and compatibility. In the future communist society, which will realize two central reconciliations, people's 'needs and enjoyment have lost their egoistic nature, while nature has lost its pure usefulness' (Marx 2014: 82). Humanity and nature have realized the return of their respective essence. Nature has restored the *warm relationship* with man, no longer become the *object of profit*, and become humanity's real personal property again through free labor and free enjoyment (Marx 2014: 43). In short, a communist society is an *ecological* communist society; an ecological society is a *communist* ecological society.

Marx pointed out the *primacy* of the relationship between humanity and nature with the method of historical materialism in *The German Ideology*:

The first premise of all human history is, of course, the existence of living human individuals. Thus the first fact to be established is the physical organization of these individuals and their consequent relation to nature (Marx and Engels 2009: 519).

It should be noted that the relationship between individuals and other nature discussed by Marx here is primarily practical. Only continuous material practice can ensure the existence of living individuals. In addition, Marx's discussion on the relationship between theory and reality in *The German Ideology* reveals the falsity of ideology such as anthropocentrism:

A hero suddenly thought that people drowned because they were fascinated by the idea of gravity. If they throw this idea out of their minds, for example, claiming that it is superstitious and religious, they will avoid any risk of drowning (Marx and Engels 2009: 510).

People's ideas are reflections of the actual situation, not the opposite. Abandoning the concept of gravity in one's mind will not change the *risk of drowning* in reality. Marx emphasized that 'the ideas generated by these individuals, or about their relationship with nature ... these ideas are the conscious expression of their realistic relations and activities, their production, their communication, their social and political organizations, regardless of whether this expression is realistic or illusory' (Marx and Engels 2009: 524). Therefore, whether or not the relationship of 'the Unity of Heaven and Man' in pre-capitalism or the tendency of anthropocentrism caused by the change of mode of production in capitalism is the product of 'realistic relations and activities'. It is crucial not only to criticize the concept of anthropocentrism but also to investigate the social reality that produced this ideology. As long as we leave the starting point of social reality, the modern ecological critique can only be subjective,

abstract, and romantic. In a word, in *The German Ideology*, Marx researched the relationship between humanity and nature with the method of historical materialism, understood the opposition of humanity and nature as the specific product of capitalist industrialization, and realized the methodological change of studying the relationship between humanity and nature.

The integration of ecological critique and critique of capital is a remarkable feature of Marx's ecology. In *Capital*, Marx introduced ecological critique into the critique of capital and investigated the relationship between humanity and nature in capitalist production. In particular, the ecological narrative in *Capital* dispels the anti-ecological image of Marx in the following aspects.

First, Marx's labor theory of value does not deny the intrinsic value of nature. On the one hand, Marx never ignored the significance of nature to humanity. When Marx criticized the capitalist system, he wrote: "Capitalist production develops the technology and combination of social production process, just because it destroys all the sources of wealth – land and workers at the same time" (Marx 2004: 580). Therefore, in Marx's text, the land representing nature and the workers representing labor together constitute the source of wealth. In this sense, Marx agreed with William Petty's explanation of wealth: "Labor is the father of wealth and land is the mother of wealth" (Marx 2004: 56-57).

On the other hand, Marx explained the *carrier role* of nature in the formation of value with the help of the concept of use value: 'Regardless of the social form of wealth, use value always constitutes the material content of wealth' (Marx 2004: 49) and 'the natural form of commodity itself, such as iron, wheat, diamond, etc.' (Marx 2004: 48), is use value, which is the material carrier of commodity value and the material content of social wealth. However, value has human factors and social attributes. Only objectified human labor can create value, and nature can only be the material carrier of value formation. In short, skeptics criticize Marx's labor theory of value because they confuse the difference between value and wealth and *material carrier* and the *actual source* of value.

Second, Marx is not a productivist, nor does he promise that production can solve all human development problems. Saito argued: "Marx actually did not dream up a utopian vision of the socialist future based on the infinite increase of productive forces and the free manipulation of nature. On the contrary, he seriously recognized natural limits, treating the complex, intense relationship between capital and nature as a central contradiction of capitalism" (Saito 2017: 18-19). Marx emphasized in *Capital*, "Under conditions of capitalist production, the purpose of saving labor by developing labor productivity is not to shorten working days, but only to shorten the labor time necessary to produce a certain amount of goods" (Marx 2004: 372-373). Capitalist production is subject to the logic of capital of increasing surplus labor time. Just to pursue surplus value, capital 'recklessly forces mankind to produce for production, so as to develop social productivity and create material conditions for production' (Marx and Engels 2009: 683). In addition, 'the capitalist mode of production takes man's domination of nature as the premise' (Marx 2004: 587) and realizes unlimited productivity improvement by destroying nature. There is no

doubt that Marx did not always have absolute trust and commitment to production but investigated the nature of *chasing profit* and the nature of *anti-ecology* of the capitalist mode of production in a critical context.

Third, Marx is not for *technological optimism* or *technological utopianism*. Marx believed that machines and large-scale industry symbolized productivity progress, but its capitalist application brought disastrous consequences to the working class. The so-called economic paradox arises once the machine enters the production department in capitalist production. Machines should have been produced to shorten labor time; in fact, they are the most reliable means to convert all the lifetime of workers and their families into labor time dominated by capital to increase the value of capital (Marx 2004: 469). As a result, machines and large-scale industry forced workers to work longer than barbarians (Marx and Engels 2009: 200). It should be said that Marx generally explained the role of machines in capitalist production from the perspective of negation and criticism and believed that ‘machines are the means of producing surplus value’ (Marx 2004: 427). However, Marx’s negative exposition of machines does not show that he has a negative attitude towards whole science and technology. If the scene used by machines and science and technology changes, that is, ‘once machines become the property of joint workers, they will become powerful conditions of social production’ (Marx and Engels 2009: 209). They will become the starting point of a new production foundation.

Fourth, the assertion that *Capital* does not contain a theory of nature and ecology is a false proposition. Marx confirmed the ecological theme of his theory by expounding the theory of metabolism in *Capital*. On the one hand, Marx defined labor for the first time in the ecological category as the metabolic process between humanity and nature, that is, the eternal and necessary condition for realizing human life, emphasizing the importance of metabolism to human life. On the other hand, Marx explained how capitalist agricultural production ‘destroyed the metabolic process between people and land, that is, prevented the components of the land consumed by people in the form of food and clothing from returning to the land, thus destroying the eternal fertility of the land’ (Marx and Engels 2009: 579). Marx reveals the phenomenon of the *metabolic rift* in the *robbery system* of agriculture. In this sense, he provides a scientific perspective to understand the ecological crisis.

There is a view that Marx’s *ecological interest* in *Capital* is only a digression that deviates from the theme of political economy. In fact, this is a misunderstanding of Marx. Since the 1860s, Marx was engaged in natural science research closely related to ecology. German socialist Wilhelm Liebknecht once described Marx’s interest during this period: “Especially on the field of natural science, including physics and chemistry, and of history, Marx closely followed every new appearance, verified every progress” (Liebknecht 1965: 81). Furthermore, in 1876 and 1882, Marx was still paying attention to Maurer. Under the influence of Maurer’s work, Marx wanted to study the metabolic interaction between humans and nature in pre-capitalist and non-Western societies. He was, therefore, interested in the Russian rural communes. After the publication of *Capital* in 1868, Marx still tirelessly studied natural science and made many notes and excerpts. One-third of Marx’s notebooks were produced

in the last 15 years of his life, and nearly half of these notebooks were related to agricultural chemistry, geology, animal husbandry, forestry, and other ecology (Saito 2017: 17).

By examining these notes, we found that the ecological interest in Marx's *Capital* is related to his natural science notes, and Marx's ecological narrative is not occasional but an important part or even the core content of his political economy. Moreover, Marx did not stop his ecological research after *Capital*, and his ecological interest is increasing rapidly. Marx *broadened* his theoretical vision, and his research on natural science was not limited to the problems of agricultural chemistry and soil exhaustion involved in *Capital* but extended to the fields of climate, forest, animal husbandry, and so on.

5. The effective evidence of the legitimacy of Marx's ecology

Whether we confirm the homogeneity between Marx's theory and modern ecology by researching the meaning of ecology or confirm the rich *ecological narration* in Marx's text by interpreting Marx's main works, we only demonstrate the self-consistency logic of Marx's ecology from the perspective of the legitimacy of factuality, that is, we only complete the work of *factual judgments* of Marx's ecology. Therefore, we also need to seek *effective evidence* of Marx's ecological legitimacy from the perspective of *value judgments* to prove the *significance* of Marx's ecology today.

The effectiveness of Marx's ecology is mainly reflected in its scientific interpretation of the current global ecological crisis; that is, the interpretation of Marx's ecology to the essence of ecological crisis have more explanatory power, persuasive power, and scientific features than the green trend of thought such as environmentalism, deep ecology, and ecological romanticism. Marx's ecology provides rich theoretical resources for the construction of ecological civilization.

First, the ecological crisis is essentially caused by the metabolic imbalance between humanity and nature. According to Marx's theory of metabolism, capitalist production destroys the constant metabolic interaction between humanity and land and then creates a metabolic imbalance or metabolic rift. Because the metabolic process between humanity and nature must be completed through the intermediary of labor, this *rift* or *imbalance* is rooted in the alienation of human practice. In other words, the ecological crisis is essentially the result of the practice of alienation between humans and nature and the result of human's unreasonable mode of production and lifestyle.

Second, the ecological crisis is rooted in the production logic of capital. "Ecocentric approaches blame the ecological crisis on the anthropocentrism and thirst for power" (Gimenez 2000: 294). In fact, anthropocentrism as the extreme expression of the relationship between humanity and nature since *Enlightenment*, its emergence has its specific social and historical background, especially rooted in the mode of production of capitalist private ownership and the production logic

of pursuing exchange value. Capitalist commodity production obtains *transactional goods* rather than *physical wealth*, so use value is a means, and value is an end. This will inevitably lead to an anti-ecological result: human beings will do anything to obtain use value. People ignore the natural capacity, natural growth cycle, and natural sustainability, which eventually leads to ruthless plundering and destruction to nature by production and the indifference to the natural ecological function by humanity. Therefore, the production and exchange of commodity and its production logic intrinsically in capitalism initiate the current global ecological crisis.

Third, the ecological crisis is also a crisis between people. Some environmentalists often confine the ecological crisis to the horizon of humanity and nature but ignore the important role of *interpersonal contradiction* in shaping the ecological crisis. Modern ecology believes that the research on the relationship between subject and environment must be extended to the level of the relationship between subjects. Marx's ecology just solves the problem of the relationship between humanity and nature from the perspective of the relationship between man and man and expounds on the ecological crisis from the unique perspective of *interpersonal contradiction*. On the one hand, the contradiction between humanity and nature and man's contradiction has an identity. On the other hand, in a sense, the contradiction between man and man determines the contradiction between humanity and nature. The ecological crisis is formed by *contradictions and conflicts* produced in occupying, dominating, and utilizing natural resources in different countries, regions, and classes, so the ecological crisis is also an interpersonal communication crisis. In other words, the relationship between humanity and nature is essentially the ruling relationship between man and man, and the contradiction between humanity and nature is essentially the contradiction between man and man. On this point, Marx has already explained: "Any self-alienation between man and himself and with nature is reflected in the relationship he makes himself and between nature and other people different from him" (Marx 2014: 56). In this sense, Marx regards 'the real solution of the contradiction between man and nature and between man and man' (Marx 2014: 78) as the necessary feature of the future communist society.

Fourth, ecological imperialism will exacerbate the ecological crisis. Although Alfred W. Crosby first put forward the concept of ecological imperialism in *Ecological Imperialism: The Biological Expansion of Europe, 900–1900* published in 1986. Marx discussed ecological imperialism as early as the 19th century. For example, in *Capital*, Marx mentioned the problem of soil exhaustion in Ireland due to British colonialism. Marx said that England has indirectly exported Ireland's land for a century and a half, but even the simple compensation for various land components has not been given to Irish farmers. This makes Ireland's land fertility cannot be compensated and restored, 'many lands are abandoned, and agricultural products are greatly reduced. As a result, the soil of Ireland that was originally suitable for wheat was useless except for green fodder' (Marx and Engels 2009: 819). Therefore, ecological imperialism will inevitably aggravate the *metabolic rift* between humanity and nature.

Mainstream environmentalist believes that ecological problems are 'simply the

unanticipated consequences of economic and social activities, which can eventually be solved to the extent people and corporations are induced to change their behavior through mixtures of economic rewards and punishments' (Gimenez 2000: 294). Deep ecology emphasizes that to overcome the ecological crisis, we should demote humans from their privileged position with the natural environment and other life forms and advocate 'biospheric egalitarianism' (Naess 1973: 95), giving equal survival and fulfillment claims to all forms of life. They attempt to resolve the ecological crisis by emphasizing the shared values of the human and non-human worlds and maintaining the diversity of all life forms and all natural ecosystems. Ecological romanticism attributes the ecological crisis to *overproduction* and technocentrism, holding a negative attitude towards modern society, advocating *returning to the jungle*. Mainstream environmentalists, deep ecology, and ecological romanticism all try to carry out ecological improvement within the framework of capitalism. However, if we lack the perspective of disintegrating capital logic as profoundly explained by Marx, overcoming the ecological crisis can only be an idiotic dream. In short, green capitalism and ecological capitalism can only be illusions that cannot be realized at all.

Based on correctly revealing the essence of ecological crisis, Marx's ecology has found a viable path for today's ecological movement:

Just as the savage must wrestle with nature to satisfy his needs, to maintain and reproduce his life, so must civilized man, and he must do so in all forms of society and under all possible modes of production. This realm of natural necessity expands with his development, because his needs do too; but the productive forces to satisfy these expand simultaneously. Freedom, in this sphere, can consist only in this, that socialized man, the associated producers, govern their metabolic interaction with nature rationally, bringing it under their collective control instead of being dominated by it as a blind power; accomplishing this metabolism with the smallest expenditure of energy and in conditions most worthy and appropriate for their human nature (Marx and Engels 1974: 926-927).

Only when the process of social life, that is, the process of material production, as the product of free and united people, is under the conscious and planned control of people (Marx 2004: 97) will the relationship between human beings and nature be apparent and reasonable. Therefore, a reasonable metabolic process is key to resolving the ecological crisis. The metabolic process between humanity and nature is a material activity operating in a particular social relationship. In order to change the mode of humanity practice to nature and bridge the metabolic rift between humanity and nature, we must change the production mode and superstructure of the whole capitalist society. In this sense, we must awaken the *ecological consciousness* of the working class and realize the unity of social revolution and ecological revolution through the *integration of red and green*.

To sum up, Marx's ecology that contain a socialist standpoint and revolution strategy, is the unity of ecological critique and capital critique, and is also the unity

of ecological revolution and social revolution. Someone might believe that ecology without Marx is ecology for the privileged (Gimenez 2000: 292). The distinctive feature of class and revolution of Marx's ecology distinguishes it from other green trends of thought. In short, only by integrating the ecological movement into the socialist movement to realize the integration of red and green, and by changing the capitalist mode of production to realize the *rationalization* of the metabolism between humans and nature and the *equality* of the relationship between man and man, can we complete the two central reconciliation of human history. This is the strategy to solve the ecological crisis provided by Marx.

6. Conclusion

Through the above demonstration, we can draw a clear conclusion that the legitimacy of Marx's ecology is beyond doubt. Its legitimacy mainly comes from three aspects. First, the core of Marx's theory is highly consistent with the theme of modern ecology. Both of them are committed to revealing the relations between humans and nature. As Saito said, the investigation of the unity and separation between humanity and nature is an important clue that runs through Marx's ecological research. Second, Marx's main works are closely related to ecology. In *The Economic and Philosophic Manuscripts of 1844*, Marx revealed the alienation between humans and nature. In *The German Ideology*, Marx revealed the practical relations of humans and nature by historical materialism. In *Capital* and its manuscripts, Marx put forward the theory of metabolism, which is the core content of Marx's ecology. After the publication of *Capital*, Marx *broadened* his theoretical vision. His research on natural science was not limited to the problems of agricultural chemistry and soil exhaustion involved in *Capital* but extended to the fields of climate, forest, animal husbandry, etc. These research results of Marx's later years, known as natural science notebooks, have been published in MEGA2.¹ Third, Marx's ecology is still effective today. In particular, his theory of metabolism provides a unique perspective for us to understand the current global ecological crisis. In summary, Marx's ecology has both *factual* legitimacy and *effective* legitimacy.

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¹ Marx-Engels-Gesamtausgabe <<https://mega.bbaw.de/de>>.

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