

The "Metabolic Rift" of John Bellamy Foster: *What contributions for an ecomarxist theory?*

William Sacher

Abstract

This article sets out to analyse the relevance and identify the eventual limits and shortcomings of J. Bellamy Foster's concept of "metabolic fracture". A series of criticisms from various branches of ecomarxism are compiled. Some criticisms reject the idea altogether, while others recognise its interest and consider refining it. Despite an obvious lack of empirical foundations and its "catastrophic" character, I propose the concept has several merits. It explicitly refers to the Marxist concept of "metabolism" and allows a much-needed debate in ecomarxism about the limits of nature to be started.

For several decades now, faced with the magnitude and scope of the problems of environmental destruction and the highly political character of ecology, there has been a need within Marxist thought to fill the existing gaps in this field. Numerous authors initiated the construction of a new Marxist ecological - or ecomarxist - theory, i.e. an ecologically sensitive Marxism that allows for the integration of the Marxist critique of capitalism on the one hand and the need to take into account the ecological dimension on the other. Among the most important contributors are Gunnar Skirbekk, André Gorz, Enrique Leff, Jacques Bidet, James O'Connor, Alfred Schmidt, Ted



Rapid Ice Movement. One glacier on Russian islands in the Arctic Ocean surprised scientists with its rapid change. After decades of normal, slow movement, a glacier draining Vavilov Ice Cap sprang forward, accelerating rapidly after 2013. This fast movement is extremely rare for cold-based glaciers. In 5 years, the ice tongue doubled in size. In this inverted rendition, land is blue and fractured sea ice appears tan across the top of the image. Photo by [USGS](#) on [Unsplash](#)

Benton, Paul Burkett, Elmar Atvater¹ and the numerous publications of the journal *Capitalism, Nature and Socialism*, among others. These authors represent diverse perspectives and readings of Marxism, in some cases these are antagonistic and give rise to heated debates. Still, they have in common the aim of exploring in Marxist thought the possibility of constructing a theory of the exploitation of nature (which would complement that of the exploitation of labour) and crises, which integrates the environmental dimension.

In this paper, I focus on the work of one of the most prominent contributors in recent years, John Bellamy Foster, and in particular on his concept of metabolic rift,² which aims to "grapple with today's ecological problems", combining "the classical heritage of Marxism" with "the insights of contemporary radical ecology".³ I aim to provide a critical analysis of the concept by first reviewing the main critiques and assessments that have been published over the last 15 years. Then, by examining these debates, I hope to contribute to the extent to which this concept is relevant to the necessary task of constructing an ecological Marxism, identifying the premises underlying its elaboration and its eventual strengths and weaknesses.

The concept of the metabolic rift has found a certain interest in the Spanish-speaking linguistic area and particularly in Iberian America, to think about the environmental problems of this region on the basis of an ecological Marxist theory that associates sociology with environmental history. It presents a priori potential for those who wish to analyse large-scale mining and energy capitalism or other forms of industrial exploitation of natural resources. With this text, I hope to contribute to establishing theoretical criteria for its application to this type of productive activity and the environmental impacts they generate.

The structure of the article is as follows: the first section is devoted to the presentation of John Bellamy Foster's concept of metabolic fracture; in the second section, I present the concept of metabolism and elements of analysis of the society-nature relationship in Marx's work; in the third section I offer several critiques of Foster's concept compiled from various branches of ecological Marxist thought; and the fourth and final part is devoted to examining the validity of the critiques, the identification of implicit premises of Foster's concept, as well as elements of reflection on ecological Marxism in general.

Brief Presentation of John Bellamy Foster's 'Metabolic Rift'

The notion of the metabolic rift was first presented in 1999 by Foster in his article *Marx's Theory of Metabolic Rift*,⁴ and the following year in more detail in his book *Marx's Ecology*.⁵ In constructing his theory, Foster relies on the elements Marx provides about the problem of soil fertility loss observed in his time in England.

¹ ↪ Skirberk, G. "Marxisme et Écologie", *Esprit*, 1974; Gorz, A. y M. Bosquet *Ecologie et Politique* (Paris: Poche; 1978); Gorz, A. *Capitalisme, Socialisme, Ecologie, Désorientations, Orientations*, (Paris: Galilée; 1991); Gorz, A. "L'écologie politique entre expertocratie et autolimitation", *Actuel Marx*, "L'écologie, ce matérialisme historique", n° 12, 2° semestre de 1992, p. 15-29; Leff, E. *Ecología y Capital* (México: UNAM; 1986); Bidet, J. "Y a-t-il une écologie marxiste?", *Actuel Marx*, "L'écologie, ce matérialisme historique", n° 12, 2° semestre, Paris, PUF, p. 96-112; O'Connor, J. "Capitalism, nature, socialism: A theoretical introduction", *Capitalism, Nature, Socialism*, 1988, 1(1): 11-38; O'Connor, J. *Natural Causes: essays in ecological marxism* (New York: Guilford Press; 1998); Schmidt, A. "Vorwort zur Neuauflage 1993. Für einen ökologischen Materialismus", en: Schmidt, A. *Der Begriff der Natur in der Lehre von Marx*. 4a ed., revised and expanded, with a new preface by A. Schmidt (Hamburg: Europäische Verlagsanstalt, 1993), pp. I-XVII; Benton, T., "Marxism and Natural Limits: An Ecological Critique and Reconstruction", *New Left Review*, 1989, 1/178, pp. 1-86; Benton, T. *The Greening of Marxism* (New York: Guilford Press; 1996); Burkett, P. *Marx and Nature: A Red and Green Perspective* (New York: Saint Martin's Press; 1999); Atvater, Elmar, "¿Existe un marxismo ecológico hoy?", 2003, en línea.

² ↪ *American Journal of Sociology*, 1999, 105: 366-405; Foster, J. B. *Marx's ecology: Materialism and nature* (New York: Monthly Review Press; 2000).

³ ↪ Foster, J. B. "The Scale of our Ecology Crisis", *Monthly Review*, 1998, volume 49, issue 3, p. 7.

⁴ ↪ Foster, J. B. "Marx's theory of metabolic rift: Classical foundation for environmental sociology", 1999, op. cit.

⁵ ↪ Foster, J. B. *Marx's ecology: Materialism and nature*, 2000, op. cit. En castellano: Foster, J. B. *La Ecología de Marx* (España: Edición de Intervención Cultural/El viejo Topo; 2000b).

An "Irreparable Rift" in "Social Metabolism"

It can be said schematically that Foster's starting point for his theory of metabolic rift is a phrase found in book 3 of Capital, where Marx evokes an "irremediable tear"⁶ in "the continuity of social metabolism" (unheilbaren Riß in German, which is translated into English by irreparable rift):

...the large landed property reduces the agricultural population to an ever-decreasing minimum, opposing it to an ever-increasing industrial population, crowded into the cities; it thus engenders conditions which bring about an irremediable rift in the continuity of the social metabolism, prescribed by the natural laws of life, as a consequence of which the strength of the soil is squandered, a squandering which, by virtue of trade, is carried far beyond the borders of the country (Liebig).⁷

In this paragraph, Marx argues that the advent of industrial capitalism in England in the nineteenth century, and the continuous migration of populations from the countryside to the cities,⁸ implied an irreversible modification of the previously established patterns of material exchange between society and nature. Marx argues that this modification was the cause of the marked loss of soil fertility observed in the first half of the 19th century.⁹

The connection Marx suggests between rural-urban population flows, and soil fertility is perhaps most evident in another paragraph of Capital, this time at the end of chapter 15 of book 1:

With the incessantly growing preponderance of the urban population, accumulated in great centres by capitalist production, this, on the one hand, collects the historical motive power of society, and on the other disturbs the metabolism between man and earth, that is, the return to the soil of those constituent elements of the soil which have been consumed by man in the form of food and clothing. This return is the eternal natural condition of the permanent fertility of the soil.¹⁰

Perhaps less radically than in the preceding paragraph, Marx points out here that rural-urban migratory flows "disrupt"

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the metabolism and affect the "natural conditions" which - following Marx - would ensure the fertility of the soil.

⁶ ↪ There is a translation problem. In English of the "irreparable rift" in "social metabolism", Foster coins the term "metabolic rift". In Marx's Ecology, op. cit., the Spanish version of Marx's Ecology, we find the translation "metabolic rift". For the translation of the paragraphs from Capital quoted by Foster, the translators made their own translation from the English version (the quoted paragraphs from Marx came from Vintage). They translated "irreparable rift" as "irreparable fracture". However, the official translation of Capital by the Siglo XXI publishing house does not speak of "irreparable fracture" but of "insanable rifting", see Marx, K., El Capital, Libro 3 (México: Siglo XXI; 1976 [1894]), p. 1034. In this text we will use the formulation "metabolic rift", as this is the formulation of its translators. However, there is a relative disconnect between this formulation and the official translation.

⁷ ↪ Marx, K. El Capital, Libro 3 (México: Siglo XXI; 1976 [1894]), p.1034, las cursivas son mías.

⁸ ↪ The main identified determinant of the metabolic rift is the massive migration of peasant populations to the city; an adequate historicisation of the concept requires considering the link that binds it to the process of original accumulation (as Foster explains it well in his book Marx's Ecology), and more precisely in its broad political economy sense as interpreted by Rivero and Cooney (2010:53), i.e. the separation of rural producers from their means of production. This separation led to waves of dispossession of rural populations from their land as part of a progressive process of conversion of the countryside to the capitalist logic of land exploitation. The dispossessed rural populations made up a large part of the migrants to the cities.

⁹ ↪ Implicitly, Marx posits that the previous pre-capitalist society-nature relationship was more "sustainable".

¹⁰ ↪ Marx, K. El Capital, Libro 1 (México: Siglo XXI; 1975 [1867]), p. 611.

For Foster, the "irremediable tear" - or, in literal translation, the "metabolic rift" - of which Marx speaks, was a "disruption" in the "nutrient cycle"¹¹ and the previously existing human-nature relationship. Taking up Marx's reasoning, Foster argues that this cycle was broken when organic human waste (and the nutrients it contains), which previously returned permanently to local soils, began to be transported and accumulated in the sewers of cities.

For Foster, the loss of soil productivity following the advent of capitalist agriculture was the major ecological crisis of Marx's time.¹² According to him, building a theory of the ecological crises of capitalism around the concept of metabolic rift can be very relevant for analysing the current ecological crises. With this concept, Foster also aims - as conveyed in his book Marx's Ecology - to extend historical materialism (based on the primacy of human existence) to nature's domain. In this sense, this "extended materialism" is an attempt to synthesise historical materialism and ecology and can be seen as a new contribution to the effort to construct an ecomarxist theory. Such a theory could even be, according to Foster, "a guide to ecological struggles, just as Marxist theory has been a guide to workers' struggles".¹³

Foster also aims to extend historical materialism (based on the primacy of human existence) to the domain of nature... this "extended materialism" can be seen as a new contribution to the effort to construct an ecomarxist theory... [and] could even be "a guide to ecological struggles".

Marx's time.¹² According to him, building a theory of the ecological crises of capitalism around the concept of metabolic rift can be very relevant for analysing the current ecological crises. With this concept, Foster also aims - as conveyed in his book Marx's Ecology - to extend historical materialism (based on the primacy of human existence) to nature's domain. In this sense, this "extended materialism" is an attempt to synthesise historical materialism and ecology and can be seen as a new contribution

Influence on Marx of Agrochemistry and German Natural Materialism in the 19th Century

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Foster,¹⁴ and other authors such as Alfred Schmidt,¹⁵ show how these approaches of Marx were strongly influenced by German biologists and agrochemists of his time, such as Jacob Moleschott and Justus Von Liebig. The latter was one of the first to identify the chemical elements essential for fertility: nitrogen, phosphorus and potassium (the famous N, K and P). Liebig had concluded that the massive export of foodstuffs and fibres from the countryside to the

cities, associated with the new industrial capitalist social organisation, had led to a substantial drop in the concentration of N, P and K in the soils of the countryside and thus to an impairment of their fertility. Empirical evidence of fertility loss in the 19th century accelerated interest in this theory.

Foster's Followers

Numerous authors recognised the relevance of the concept of metabolic rift and considered it appropriate to address various environmental problems of our time. It is possible to identify a group of close followers of Foster, for example, Brett Clark, Richard York, Rebecca Clausen and Philip Mancus, among others. Jason Moore refers to these as the "Oregon School"¹⁶ because they work (or were working) at the University of Oregon, as did Foster. Paul Burkett, for his part, describes Foster's work as "the first serious intellectual-historical analysis of the role of ecological concerns in the

¹¹ ↪ Foster, J. B., 1999, *op. cit.*, p. 377; y Foster, J. B., 2000, *op. cit.*, p. 152.

¹² ↪ Foster, J. B., 1999, *op. cit.*, p. 373.

¹³ ↪ Kovel, J. "A Materialism Worthy of Nature", *Capitalism Nature Socialism*, 2001, 12:2, 73-83, p. 73.

¹⁴ ↪ Foster, J. B., 1998, *op. cit.*, p. 378; y Foster, J. B., 2000, *op. cit.*, p. 150 y siguientes.

¹⁵ ↪ Schmidt, A. *The Concept of Nature in Marx* (Londres: Verso [1962] 2014), p. 86 y siguientes.

¹⁶ ↪ Moore, J. W. "Transcending the metabolic rift: A theory of crises in the capitalist world-ecology", *Journal of Peasant Studies*, 2011, 38(1): 1-46, p. 2.

development of a materialist theory of human societies";¹⁷ and identifies it as the development of "an ecological critique of historical Marxism" and at the same time as "an immanent materialist-historical critique of contemporary ecology".¹⁸

Among the research that attempted to examine or establish the relevance of the concept of the metabolic rift in the context of different environmental issues, we find Clausen and Clark¹⁹ for industrial fisheries; Austin and Clark²⁰ for open-pit coal mining; Gunderson²¹ for agribusiness; Clark and York²² for anthropogenic disturbances of the carbon cycle; Böhm et al.²³ for carbon markets; Clement²⁴ for urban pollution; Clark and York²⁵ for ecosystem destruction in general, etc. These authors often highlight "natural cycle breaks" as the main phenomena constituting metabolic rifts. And we could cite many more: Clark and Foster,²⁶ Longo and Clausen,²⁷ McClintock,²⁸ Mancus,²⁹ Magdoff,³⁰ etc.

Current Relevance of the Metabolic Rift

According to Foster, "the problem of nutrient cycle breakdown is only one example of the many metabolic rifts that are

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occurring today".³¹ Today there is even "a major fracture emerging in the planetary system and a transformation of the [capitalist] nature-society metabolism" is needed³² to avoid catastrophe. For example, the "breakdown" of the "carbon metabolism" could affect "the metabolism of the planet in such a way that - if it is not stopped - we will have catastrophic

effects on life".³³

¹⁷ ↪ Burkett, P. "Marx's Ecology and the Limits of Contemporary Ecosocialism", *Capitalism, Nature and Socialism*, 2001, 12:3, 126-133, p. 126.

¹⁸ ↪ *Ibid.*, p. 127.

¹⁹ ↪ Clausen, R. y B. Clark "The metabolic rift and marine ecology: An analysis of the oceanic crisis within capitalist production", *Organization & Environment*, 2005, 18, 422-444.

²⁰ ↪ Austin, K. y Clark, B. "Tearing Down Mountains: Using Spatial and Metabolic Analysis to Investigate the Socio-Ecological Contradictions of Coal Extraction in Appalachia", *Critical Sociology*, 2012, 38: 437-457.

²¹ ↪ Gunderson, R. "The Metabolic Rifts of Livestock Agribusiness", *Organization & Environment*, 2011, 24: 404-422.

²² ↪ Clark, B. y R. York "Carbon metabolism: Global capitalism, climate change, and the biospheric rift", *Theory & Society*, 2005, 34, 391-428.

²³ ↪ Böhm, S., Misoczky, M. C. y S. Moog "Greening Capitalism? A marxist Critique of Carbon Markets", *Organization Studies*, 2012, vol. 33, no.11, 1617-1638.

²⁴ ↪ Clement, M.T. "A basic accounting of variation in municipal solid-waste generation at the county level in Texas, 2006: Groundwork for applying metabolic-rift theory to waste generation", 2009, *Rural Sociology* 74(3): 412-429.

²⁵ ↪ Clark, B. y R. York "Rifts and shifts: Getting to the root of environmental crises", *Monthly Review*, 2008, 60(6):13-24.

²⁶ ↪ Clark, B. y J. B. Foster "Ecological imperialism and the global metabolic rift: Unequal exchange and the guano/nitrates trade", *International Journal of Comparative Sociology*, 2009, 50, 311-334.

²⁷ ↪ Longo, S. B., y R. Clausen "The Tragedy of the Commodity: The Overexploitation of the Mediterranean Bluefin Tuna Fishery", *Organization & Environment*, 2011, 24: 312-328.

²⁸ ↪ McClintock, N. "Why farm the city? Theorizing urban agriculture through a lens of metabolic rift", *Cambridge Journal of Regions, Economy and Society*, 2010, (3): 191-207.

²⁹ ↪ Mancus, P. "Nitrogen fertilizer dependency and its contradictions: a theoretical exploration of social-ecological metabolism", *Rural Sociology*, 2007, 72(2): 269-288.

³⁰ ↪ Magdoff, F. "Ecological civilization", *Monthly Review*, 2011, 62(8): 1-25.

³¹ Foster, J. B. "Marx and the Rift in the Universal Metabolism of Nature", *Monthly Review*, 2013, 65 (7), p. 8.

³² ↪ *Ibid.*, p. 1.

³³ ↪ *Ibid.*, p. 10.

Foster invariably presents his concept as "Marx's metabolic rift theory".³⁴ However, it should be noted that Marx never used the formulation "metabolic rift" in his work and "did not intend to construct a theory based on this terminology".³⁵ Foster argues that his work—Foster's work—was a "systematic reconstruction of Marx's theory of the metabolic rift",³⁶ and that elements of an ecological critique of capitalism are already present in Marx's thought.³⁷ He even claims that "Marx's worldview [is] profoundly and in fact systematically ecological".³⁸

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The above notwithstanding, in contrast to the concept of metabolic rift, the concept of metabolism is widely present throughout Marx's work, and an ecomarxist theory cannot fail to consider its relevance. In the following section I briefly present how this complex but essential notion of ecological Marxist thought can be understood.

"Metabolism" in Marx: A Concept Equally Material, Social and Historical

Marx was one of the first to use the analogy between the metabolism of living beings and the material exchanges between human beings and their environment to characterise the complex relationship between society and nature.³⁹

For Marx, metabolism refers, in the first place, to the physical exchange of materials, mediated and controlled through human labour, "the universal condition for the metabolic interaction between man and nature, the everlasting nature-imposed condition of human existence".⁴⁰ In book 1 of *Capital*, he writes:

*Above all, labour is a process between man and nature, a process in which man mediates, regulates, and controls his metabolism with nature. Man confronts natural matter itself as a natural power. He sets in motion the natural forces belonging to his corporeality, arms and legs, heads and hands, to seize the materials of nature in a form useful for his own life. By operating employing this movement on nature outside him and transforming it, he transforms at the same time his nature.*⁴¹

In this paragraph, one can appreciate Marx's dialectical view of the human-nature relation. As the German philosopher Alfred Schmidt, a great promoter of this aspect of Marx's work, sums it up, "the consequence of this metabolic interaction is that nature is humanised and humanity naturalised. These forms are, in both cases, historically determined".⁴² The relationship between human beings and nature is based on the mutual determination within the

³⁴ ↪ Foster, J. B., 1999, *op. cit.*, las cursivas son mías.

³⁵ ↪ Stoner, A. M. "Sociobiophysicality and the Necessity of Critical Theory: Moving beyond Pre-vailing Conceptions of Environmental Sociology in the US", *Critical Sociology*, 2014, Vol. 40(4): 621-642, p. 626.

³⁶ ↪ Foster, J. B., 1999, *op. cit.*, p. 373.

³⁷ ↪ *Ibid.*

³⁸ ↪ Foster, J. B., 2000, *op. cit.*, p. viii.

³⁹ ↪ We point out that the recently developed anthropology of nature, in particular by Philippe Descola (Descola, 2002), shows how the ontology that rests on a society-nature duality is not universal in scope and is rather a product of capitalist modernity.

⁴⁰ ↪ Marx, K. *Capital*, Vol.1 (London: Penguin Books; 1976 [1867]), p. 290.

⁴¹ ↪ Marx, K. *El Capital*, Libro 1 (México: Siglo XXI; 1975 [1867]), p. 215.

⁴² ↪ Schmidt, A., 2014 [1962], *op. cit.*, p. 78.

framework of a complex subject-object relationship. In this conception, reality is not viewed exclusively "in the form of the object" or "in the form of the subject", but rather in a form that involves both moments indivisibly.⁴³

The metabolism between human beings and nature changes according to the mode of production: "the different economic arrangements of society that have succeeded one another in history have been as many as there are forms of determination of nature";⁴⁴ that is, the metabolism is both natural and socially determined.

The original German word used by Marx is Stoffwechsel, which literally means "exchange of materials", but also "metabolism" in the biological sense of the term. Not all translations of Das Kapital use the word metabolism. For example, in the International Publisher's translation,⁴⁵ Stoffwechsel is only translated by interchange;⁴⁶ that is, "exchange". In French, it becomes "material circulation",⁴⁷ which possibly explains why the term *metabolisme* is almost non-existent in French-speaking Marxist thought.

Moleschott's reflections inspired Marx⁴⁸ to coin the concept of metabolism, but he did not fail to alter them by giving

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them a dimension beyond the material aspect. For example, he also resorts to the concept of "social metabolism" to characterise the process of commodity exchange.⁴⁹ Similarly, Foster points out that the material dimension of metabolism is not the only relevant one but rather a set of physical and social processes that characterise the relationship between human beings and nature. For him, "it makes sense, then, to speak of the socio-ecological nature of this concept".⁵⁰ In any case, with the concept of metabolism considered from a

dialectical perspective, we can conclude that there is at least an embryonic - but powerful - form of ecological theory in Marx.

Eco-Marxist Controversies

One sign of the importance of the concept of the metabolic rift in ecological Marxist thought is the richness of the debates it has generated. In this area, I have identified two major kinds of criticisms of the concept:

- ➔ The "radical" critiques. While these critiques tend to recognise the relevance of Foster's work in general, because of his attempt to develop Marxist ecological thought, they deplore the existence of serious flaws in his ecomarxist theoretical scaffolding;

⁴³ ↪ *Ibid.*, p. 79.

⁴⁴ ↪ *Ibid.*

⁴⁵ ↪ The International Publisher's translation of the original German edition.

⁴⁶ ↪ Schneider, M. y P. McMichael. "Deepening, and repairing, the metabolic rift", *The Journal of Peasant Studies*, 2010, Vol. 37, No. 3: 461-484, p. 463, nota a pie 2.

⁴⁷ ↪ "Circulation matérielle", ver Marx, K., *Le Capital*, Livre 1 (Paris: Champs Flammarion; 1985 [1867]), p. 46.

⁴⁸ ↪ Schmidt, A., 2014 [1962], op. cit., p. 87.

⁴⁹ ↪ Marx, K. *Capital*, Vol.1 (London: Penguin Books; 1976 [1867]), p. 198.

⁵⁰ ↪ Foster, J. B., 1998, op. cit., p. 381; y Foster, J. B., 2000, op. cit., p. 158-9.

- ➔ The "reformist" critiques. While identifying shortcomings, these critiques conclude that Foster's theory has interesting potentialities and propose modifications to overcome its limitations and/or extend its scope.

❖ "Radical" Criticisms and Their Responses

A lively debate about Foster's book, *Marx's Ecology*, took place in several issues of the journal *Capitalism, Nature, Socialism (CNS)* during 2001. The following are some of the highlights of this debate.

Maarten De Kadt and Salvatore Engel-Di Mauro: Foster's scientific foundations are outdated:

De Kadt and Engel-Di Mauro⁵¹ argue that Foster uses scientific theories from the 19th century and does not consider the

They criticise Foster's conception of ecosystems based on the notion of "equilibrium" and his reliance on the concepts of "saturation" and "carrying capacity" [and] accuse Foster of "greening" Marx by attributing to him an ecological dimension that is not present in his work.

criticisms that have been made of them. In doing so, they claim, Foster ignores a vast body of scientific knowledge and ecological theories developed since that time, particularly the qualitative leap made by science in understanding the "scales and types of interaction between humans and the rest of nature".⁵² The authors argue that several questionable and possibly outdated assumptions

underlie the approach to the concept of metabolic rift. For example, they criticise Foster's conception of ecosystems based on the notion of "equilibrium" and his reliance on the concepts of "saturation" and "carrying capacity".⁵³ Furthermore, De Kadt and Engel-Di Mauro accuse Foster of "greening" Marx by attributing to him an ecological dimension that is not present in his work.

Alan Rudy: the shortcomings of the scientific foundations of the metabolic rift:

For Rudy, Foster neglects a number of key phenomena in his argument. Taking them into account could completely disqualify the scientific reasoning underlying his theory. Rudy argues, for example, that the English enclosures, while leading to a significant migration of the rural population to the cities, also led to a "massive increase in the numbers of

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livestock in the countryside".⁵⁴ Consequently, it may not be entirely valid to speak of a break in the "nutrient cycle". For its part, the observed loss of soil fertility may have been the consequence of "a maldistribution of rural waste", rather than population dynamics involving massive transports of material to the cities. According to Rudy, Foster's argument about the metabolic rift tends to attribute an - arguably -

"implicit sustainable coherence" to pre-capitalist agriculture, which, Foster assumes, did not carry within it the contradictions to which the capitalist mode of agricultural production led.⁵⁵ More generally, Rudy accuses Foster of missing the potential of Marx's analyses of the environmental and ecological conditions of his time by improperly reducing them to a "break" in a "natural" nutrient cycle. Rudy shares De Kadt and Engel-Di Mauro's conclusion that Foster "overstates the importance" of the ecologically tinged analyses in Marx's work.⁵⁶

⁵¹ ↪ De Kadt, M. y S. Engel-Di Mauro, "Failed Promise", *Capitalism Nature Socialism*, 2001, 12:2, 50-55.

⁵² ↪ *Ibid.*, p. 50.

⁵³ ↪ *Ibid.*, p. 54.

⁵⁴ ↪ Rudy, A. "Marx's Ecology and Rift Analysis", *Capitalism Nature Socialism*, 2001, 12:2, 56-63, p. 58.

⁵⁵ ↪ *Ibid.*

⁵⁶ *Ibid.*, p. 61.

Paul Burkett defends metabolic rift: beyond positivism

In a later issue of CNS, Burkett responds to the criticisms outlined above. He argues that the approaches of De Kadt and Engel Di-Mauro are biased by "a non-dialectical conception of scientific progress as a unilinear accumulation of

[For Burkett] the countryside-city opposition was an exemplification "of the fundamentally materialist conception that introduces the concept of metabolic rift" ... he emphasises the relevance and usefulness of the concept of the metabolic rift as a method... the great contribution of this notion lies not in its applicability in a single context but in its historical materialist ontology, so that critics who start from a quantitative and "positivist" stance miss the point.... Victor Wallis argued that one of Foster's merits is to rescue critical elements of Marx's work to construct ecological Marxist thought.

knowledge".⁵⁷ Burkett supports the idea that a relevant critical ecological analysis of capitalism can already be found in Marx's work because "although capitalism was still young in Marx's time, it was capitalism. Consequently, it is not clear why Marx could not have had serious ecological concerns".⁵⁸ Further on, Burkett recalls that, according to Foster, the concept of fracture has to be understood as a means to "express the material estrangement of human beings from the natural conditions that shape their existence in a capitalist society".⁵⁹ For him, the countryside-city opposition was an exemplification "of the fundamentally materialist conception that introduces the concept of metabolic rift",⁶⁰ and it is arbitrary to

reduce the concept to the only example Marx provides. Burkett further emphasises the relevance and usefulness of the concept of the metabolic rift as a method. For Burkett, the great contribution of this notion lies not in its applicability in a single context but in its historical materialist ontology,⁶¹ so that critics who start from a quantitative and "positivist" stance miss the point. Moreover, Burkett accuses Rudy of being a functionalist and not a dialectical thinker. He does not accept Rudy's conclusion that the metabolic rift lacks centrality in analysing the tendency of crises in Marx. For him, instead, the use of the word "rift" shows how much Marx had measured the importance of the contradiction between "the quantitative aim of unlimited accumulation of capital and the limited natural organic conditions of commodity production".⁶²

In a later issue of CNS, Victor Wallis deplored the "fictitious antagonisms"⁶³ between Foster's opponents and defenders and that the criticisms are "tangential".⁶⁴ He argued that one of Foster's merits is to rescue critical elements of Marx's work to construct ecological Marxist thought. Above all, he challenges stereotypical views, such as that of a Promethean and productivist Marx.⁶⁵

❖ The "Reformist" Critics

The critiques of the second group I have identified show a more positive attitude towards the concept of metabolic rift. Here we cite two studies in the field of environmental sociology which, while identifying limits to Foster's vision, propose to continue building an ecomarxist theory based on it, refining it and increasing its scope.

⁵⁷ ↪ Burkett, P., 2001, *op. cit.*, p. 127.

⁵⁸ ↪ *Ibíd.*

⁵⁹ ↪ *Ibíd.*, p. 128.

⁶⁰ ↪ *Ibíd.*

⁶¹ ↪ *Ibíd.*

⁶² ↪ *Ibíd.*, p. 129.

⁶³ ↪ Wallis, V. "Letters", *Capitalism, Nature and Socialism*, 2001, 12 (4), p. 133.

⁶⁴ ↪ *Ibíd.*, p. 134.

⁶⁵ ↪ *Ibíd.*

Jason Moore: "transcending" the metabolic rift:

For Jason Moore, the more profound implications of the metabolic rift as a theory of ecological crisis have to do with the understanding of capitalism as an unsustainable system of social organisation and the need for this system to "seek new

For Moore, metabolic rift theory offers a "powerful point of view" to historically analyse the "unsustainability of capitalism". Moore concludes that Foster's concept is useful because it helps to "explain not only transitions within capitalism, but also transitions from one historical system to another.

frontiers" by expanding geographically.⁶⁶ This trend entails successive waves of capitalist development, new city-countryside relations, and "new means of exploiting the land and the worker".⁶⁷ For Moore, metabolic rift theory offers a "powerful point of view" to historically analyse the "unsustainability of capitalism".⁶⁸ Moore concludes that Foster's concept is useful because it helps

to "explain not only transitions within capitalism, but also transitions from one historical system to another. Not only is there a metabolic rift in general, there is also a succession of rifts that correspond to - and make possible - the different successive stages of global capitalism".⁶⁹

In a later work,⁷⁰ Moore rejects considering the metabolic rift as "a falsifiable postulate"⁷¹ that requires quantitative evidence of its concreteness. On the contrary, Moore tends to favour the methodological dimension of the concept and

Marx - and Foster after him - seems to have "idealised" pre-capitalist agricultural practices by uncritically assuming that, before capitalist agriculture, "soils were healthy, productive and well managed".

proposes to "transcend" the metabolic rift conceived only as a moment of rupture of natural cycles and to highlight its capacity to describe moments of crisis within the framework of a materialist historical-ecological theory. Metabolic rifts are the culmination

point of crises linked to socio-ecological contradictions in any phase of capital accumulation (or mode of production).

Mindi Schneider and Philip McMichael: "repairing" the metabolic rift:

First, Mindi Schneider and Philip McMichael argue that Marx's understanding of soil fertility and biochemistry, in general, was "extremely simplistic", and his reasoning - taken with Foster's identical one - linking fertility loss to a massive rural-urban migration could be severely flawed. On organic waste movements in particular, they claim that "Marx's original conception of metabolic rift is actually limited"⁷² and conclude that his argument "is empirically indefensible".⁷³ They argue that modern science has shown that soil productivity parameters are numerous: air pollution,

There is a need "to rethink the materials and mechanisms involved in metabolic rifting". The authors argue for an extension of the concept, integrating historical and epistemological dimensions beyond a purely material conception.

extensive soil cultivation, overgrazing, forest clearance, salinisation, desertification, erosion, etc. All these factors can influence soil productivity and can influence soil fertility in a way comparable to nutrient concentration.⁷⁴ In line with Rudy, Schneider and McMichael conclude that Marx - and Foster after him - seems to have "idealised" pre-capitalist

⁶⁶ ↪ Moore, J. W. "Marx's Ecology and the Environmental History of World Capitalism", *Capitalism, Nature and Socialism*, 2001, 12:3, 134-139, p. 138.

⁶⁷ ↪ *Ibíd.*

⁶⁸ ↪ *Ibíd.*

⁶⁹ ↪ *Ibíd.*

⁷⁰ ↪ Moore, J. W., 2011, *op.cit.*

⁷¹ ↪ *Ibíd.*, p. 6.

⁷² ↪ Schneider, M. y P. McMichael, 2010, *op. cit.*, p. 466.

⁷³ ↪ *Ibíd.*, p. 471.

⁷⁴ ↪ *Ibíd.*, p. 469.

agricultural practices by uncritically assuming that, before capitalist agriculture, "soils were healthy, productive and well managed".⁷⁵ Moreover, Schneider and McMichael tell us, Marx failed to properly analyse agricultural practices despite being "an essential determinant of the metabolic rift mechanism" and failed to "understand soil formation as a historical process".⁷⁶

Following these analyses, Schneider and McMichael conclude that there is a need "to rethink the materials and mechanisms involved in metabolic rifting".⁷⁷ The authors argue for an extension of the concept, integrating historical and epistemological dimensions beyond a purely material conception. For example, they suggest that a metabolic rift can be associated with a "rift in the production and reproduction of knowledge", a loss of knowledge in the sphere of agricultural practices and local ecosystems, i.e. a knowledge rift, and even an epistemic rift due to changes in conceptions of value.

Synthesis

Admittedly, several of the criticisms compiled in the previous section are valid. They have the merit of revealing a set of shortcomings that would have to be honestly addressed by proponents of the metabolic rift to gain analytical power and theoretical force. Both hostile critics and those who recognise the value of the concept point to the stark need to clarify the scientific validity of the phenomena and the mechanisms operating at the basis of the concept and find supporting empirical evidence.

To refute these criticisms, Moore and Burkett highlight the methodological interest of Foster's proposal and advocate avoiding considering it as "falsifiable". However, we should not lose sight that the metabolic rift is initially based on an

Foster and his followers could legitimately be asked to acknowledge that his theory's empirical and logical foundations are fragile, without this being a reason to reject the concept. Indeed, its application to the analysis of current phenomena - or its use as an abstract category - may be of interest, regardless of the reasoning that gave rise to it.

empirical argument that rests on quantitative elements (material flows) and draws on theories and concepts from the natural sciences (cycles, nutrients, chemical elements, etc.). In other words, it could be argued that Foster's concept is based on positivist reasoning. Consequently, Foster and his followers could legitimately be asked to acknowledge that his theory's empirical and logical foundations are fragile, without this being a reason to reject

the concept. Indeed, its application to the analysis of current phenomena - or its use as an abstract category - may be of interest, regardless of the reasoning that gave rise to it.

Unfortunately, it seems to me that Foster has not explicitly responded to these criticisms. In his subsequent writings on the subject,⁷⁸ he is content to repeat the reasoning linking food displacement to fertility loss. All this weakens Foster's proposal. On a methodological level, he arguably took a major risk in building a theory from a marginal and largely undeveloped argument in Marx's work. Additionally, Foster's emphasis on attributing his theory to Marx lends credence to De Kadt and Engel-Di Mauro and Rudy's conclusion that Foster puts too much effort into "greening" Marx.

⁷⁵ ↪ *Ibíd.*

⁷⁶ ↪ *Ibíd.*

⁷⁷ ↪ *Ibíd.*, p. 474.

⁷⁸ For example, Foster, J. B., B. Clark y R. York. *The Ecological Rift. Capitalism's war on earth* (New York: Monthly Review Press; 2010); y Foster, 2013, op. cit.

However, contrary to CNS's critics, I believe that, however profound they may be, the shortcomings of Foster's concept do not detract from its interest. First, it has the merit of rescuing the concept of metabolism, which is mentioned many

Contrary to CNS's critics, the shortcomings of Foster's concept do not detract from its interest. It has the merit of rescuing the concept of metabolism. The current signs of environmental destruction, with its increasing scope in terms of complexity and material implications, make Foster's concept striking, both from a theoretical and political point of view.

times in Marx's work and is undoubtedly an essential basis of ecological Marxist thought. Second, it must be acknowledged that the current signs of environmental destruction, with its increasing scope in terms of complexity and material implications, make Foster's concept striking, both from a theoretical and political point of view. Consequently, although the initial reasoning of Foster's theory (about nutrient flows in

England in the 19th century) may be flawed, it is likely to find more direct relevance and application with today's capitalist metabolism and the environmental affectations it entails. Let us remember that the *raison d'être* of capitalism is accumulation, whatever the levels of exploitation and destruction. All this points to the possibility of bifurcations in the behaviour of ecosystems - which would be the result of unanticipated responses linked to the complexity of "natural" phenomena - which could lead to another "valley" in the relief of possible futures.

With this theme, it becomes clear that Foster's concept has the merit of considering a theoretical knot to be faced honestly to construct an ecological Marxist theory of the exploitation of the earth (if we want it to be on a par with Marx's theory of the exploitation of the worker): the problem of the limits of nature.

The Metabolic Rift and the Question of Nature's Limits

Foster starts from the premise that "capital, by its very nature, tends to exceed its own absolute limits".⁷⁹ Foster's

Foster can also be criticised - rightly, in my opinion - from a dialectical perspective of the human-nature relationship.... The situation is more complicated if we think dialectically. In this case, Harvey tells us, there is no "this sort of clear-cut separation" .

approach to the metabolic rift (like Marx's "irremediable tear" and his allusion to "natural conditions") leads logically to the problem of the limits of nature, to evoke a "rift" that involves reaching a breaking point, i.e. something like a saturation point. Underlying Foster's theory is the conception that "natural cycles" can

"withstand" metabolic changes until a tipping point, a rupture, is reached. For De Kadt and Engel-Di Mauro,⁸⁰ this view does not take into account current findings of the natural sciences, such as the non-linear and complex character of ecosystems.

However, Foster can also be criticised - rightly, in my opinion - from a dialectical perspective of the human-nature relationship, as David Harvey does. It is easy to conceive of limits when one adopts a "bourgeois conception of nature", which, as Harvey puts it, "presupposes a clear separation between 'humans and nature'; culture and nature"; human beings and nature'; culture and nature; the natural and the artificial; the mental and the physical; and according to which history is seen as a titanic struggle between two independent forces: humanity and nature".⁸¹ The situation is more complicated if we think dialectically. In this case, Harvey tells us, there is no "this sort of clear-cut separation" and

⁷⁹ Foster, J. B. "The Scale of our Ecology Crisis", *Monthly Review*, 1998, volume 49, issue 3, p. 9.

⁸⁰ De Kadt, M. y S. Engel-Di Mauro, 2001, op. cit., p. 54.

⁸¹ Harvey, D. *A Companion to Marx's Capital* (New York: Verso; 2010), p. 111.

the unitary character of this dialectical relation, even though it entails an "externalisation" of nature and an "internalisation" of the social, can never be displaced. This dialectic, of perpetually transforming oneself by transforming the world and vice versa, is fundamental to understanding the evolution of human societies as well as the evolution of nature itself.⁸²

Consequently, if the limits of nature are historically and socially situated, they are to be found as much in forms of social organisation and mental conceptions as in nature itself.

With the "irreparable rift", one could argue that Marx himself seems to admit the existence of absolute limits and does not respect his own proposed dialectical view of the society-nature relation, which runs through the whole of Capital.

The current global environmental transformations lend credence to the hypothesis of the existence of absolute limits to the current capitalist metabolism.

From this ambiguity in Marx's work and the diversity of his intellectual sources of inspiration, the possibility of constructing Marxist ecological theories that follow different trajectories and that lead, for example, Foster

and Harvey to antagonistic positions are indeed born.⁸³

Foster's proposal is that we are currently facing a "major fracture in the planetary system", which could lead to ecological catastrophes. Harvey, for his part, while acknowledging that "there are obvious unintended consequences everywhere [...] of massive environmental change (which are, however, also contested)", does not necessarily imply "that we are reaching limits, that environmental catastrophe is just around the corner and that we are about to destroy the planet".⁸⁴

However, the current global environmental transformations lend credence to the hypothesis of the existence of absolute limits to the current capitalist metabolism. Undoubtedly, this metabolism is associated with a capacity for transformation and material intervention in the environment unprecedented in human history. Although, from a dialectical point of

The concept of the metabolic rift has been remarkably successful since its formulation by John Bellamy Foster. It is an important, necessary and urgent task for Marxism to integrate the environmental dimension into the analysis, understanding, critique and attempt to overcome capitalism.

view, the limits are both socially and naturally defined and can be displaced "in time and space according to the socio-technical organisation of society",⁸⁵ it is valid to ask whether this displacement can be unlimited. Definitely, within ecomarxist studies, a debate is still pending that would allow a way out of the dichotomy between catastrophism and optimism that comes close

to Promethean positions.

Conclusions

Among the proposals to build a theory that synthesises the critique of Marxist political economy and radical ecological thinking, the concept of the metabolic rift has been remarkably successful since its formulation by John Bellamy Foster at

⁸² *Ibíd.*, p. 112.

⁸³ This antagonism is evident in their discussions of the book *The Vulnerable Planet* (Foster, 1999), published by *Monthly Review* in the late 1990s.

⁸⁴ Harvey, D. "Marxism, Metaphors and Ecological Politics", *Monthly Review*, 1998, Volume 49, issue 11, p. 3.

⁸⁵ Harribey, J. M. "Marxisme écologique ou écologie politique marxienne", en Bidet J. y E. Kouvélakis (coord.). *Dictionnaire Marx contemporain*, Paris, PUF, *Actuel Marx Confrontation*, 2001, p. 183-200; ver también Sacher, W. "Recursos socio-naturales. La importancia de la dimensión social de los yacimientos", *Nueva Sociedad*, 252, julio-agosto de 2014.

the turn of the century. It is an important, necessary and urgent task for Marxism to integrate the environmental dimension into the analysis, understanding, critique and attempt to overcome capitalism. In this sense, Foster's theoretical proposal is a laudable effort to construct a Marxist-ecological theory.

In this text, I have described the main characteristics of Foster's proposal, and I have presented a partial compilation of the main criticisms that have been made of it from within ecomarxist thought itself. This exercise has made it possible to highlight the existence of varied and antagonistic tendencies within ecological Marxism.

I have identified two main types of criticism, the "radical" and the "reformist". The radical ones, which reject the concept of metabolic rift altogether, come mostly from authors of the journal *Capitalism, Nature and Socialism*. These criticisms reproach Foster's lack of empirical and quantitative support to justify the validity of the founding example of his concept of the metabolic rift: that of rural-urban migration in 19th century England, which would have been responsible for a marked loss of soil fertility.

Furthermore, he is accused of "greening" Marx by claiming that explicit environmentalist elements in his work and "idealising" pre-capitalist agriculture presuppose its sustainability. Foster's defenders, such as Paul Burkett and Jason Moore, dismiss these critics as positivists and functionalists, preferring to emphasise the methodological interest of the proposal. Another Foster advocate, Victor Wallis, praises the concept for breaking with Marx's Promethean and productivist image.

On the other hand, while also identifying limits in Foster's concept, reformist critics propose to build on it to continue constructing an ecomarxist theory. Jason Moore proposes to "transcend" the metabolic rift by using the concept to build a historical-ecological materialism, where the metabolic rift corresponds to the historical moment of a metabolic regime change. Schneider and McMichael, in turn, propose that metabolic rifts impose ruptures at the socio-cognitive and epistemic levels and imply substantial changes in material flows.

However, the same authors consider - as do the rejectionist critics - that the initial example of metabolic rift identified by Foster in *Capital* "is empirically indefensible". It seems that it would be essential for the defenders of Foster's concept to recognise the need to provide satisfactory empirical foundations since the theory itself is based on reasoning from the natural sciences.

This important shortcoming does not detract from the interest in Foster's concept. First, it is not because there is a lack of foundation for the original example of metabolic rifting that the concept is not relevant for analysing current environmental destruction. The magnitude of this destruction could lead to bifurcations in ecosystem behaviour that could be described as "fractures". Second, Foster's concept has the advantage of highlighting the essential Marxist notion

Foster's theory of the metabolic rift could be of interest in a strategy of struggle and overcoming capitalism, particularly capitalist extractivism. Indeed, this overcoming implies a drastic change of metabolism, not within capitalism, but to get out of it.

of metabolism, which is evidence that there is undoubtedly more to Marx than scattered ecological intuitions. Thirdly, Foster's formulation has the merit of leading to a debate, which sooner or later will have to take place more frontally within ecomarxist thought, about the relevance of the notion of "limits of nature". Resolving this knot would allow us to get out of a dichotomy between antagonistic positions, such as Foster's catastrophism, the aggressive positivism of the CNS authors and the quasi-cornucopianism of David Harvey.

To conclude, I would like to point out that Foster's theory of the metabolic rift could be of interest in a strategy of struggle and overcoming capitalism, particularly capitalist extractivism. Indeed, this overcoming implies a drastic change of metabolism, not within capitalism, but to get out of it. However, in thinking about this change, it is essential to consider dialectically both the material and the social dimension of the new metabolism to which we aspire.



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❖ **About the author:** William Sacher is a researcher in political ecology, social theory, political economy and conflict processes around natural resources at the Universidad Andina Simón Bolívar in Ecuador.



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