
Emanuele Leonardi. Post-doc researcher at the Centre for Social Studies, University of Coimbra (Portugal). His research interests include: climate justice activism and theory, working class environmentalism, André Gorz's ecological critique of wage labor. Amongst his latest publications are: "Work as Promise for the Subject of Employability" (co-authored with Ekaterina Chertkovskaya), in *Sociologia del lavoro*, 145, 2017; "EXPO 2015 as Laboratory for Neoliberalization: Great Exhibitions, Urban Value Dispossession and New Labor Relations" (co-authored with Michelangelo Secchi), in *Partecipazione e conflitto: The Open Journal of Sociopolitical Studies*, 9, 2, 2016; "Working Class Communities and Ecology: Reframing Environmental Justice around the ILVA Steel Plant in Taranto (Apulia, Italy)" (co-authored with Stefania Barca), in M. Mayo and M. Shaw,(eds.), *Class, Inequality and Community Development*, Polity Press, Bristol, 2016.

Contact: leonardi@ces.uc.pt

FOR A CRITIQUE OF NEOLIBERAL GREEN ECONOMY

A Foucauldian Perspective on Ecological Crisis and Biomimicry*

Emanuele Leonardi

Universidade de Coimbra

DOI: 1017450/170110

Reception date 4th February 2017; acceptance date 28th February 2017. This research is co-funded by the European Social Fund through the Operational Human Potential and by the National Portuguese Funds through the Foundation for Science and Technology in the context of the Post-Doctoral Grant SFRH/BPD/96008/2013.

Abstract

This article aims at exploring how Foucauldian categories such as biopolitics and governmentality – both liberal and neoliberal – can shed new light on discursive formations that have become mainstream in recent years, namely those of *green economy* and *biomimicry*. While the former is a capitalist attempt to incorporate the environmental limit as a new terrain for accumulation and valorization, the latter proposes the imitation of natural systems to reduce negative environmental impacts without sacrificing economic growth. Overall, the article discusses and criticizes the conditions of possibility that allowed these conceptualizations to emerge and function in contemporary neoliberal societies.

* The author wishes to thank Stefania Barca for her supervision and all the members of Oficina de Ecologia & Sociedade [<http://www.ces.uc.pt/ecosoc/>] for their valuable insights.

Keywords

Foucault, liberalism/neoliberalism, green economy, biomimicry, ecological crisis.

Resumen

Este artículo pretende explorar cómo categorías foucaultianas como la biopolítica y la gubernamentalidad –tanto liberal como neoliberal– pueden arrojar nueva luz sobre las formaciones discursivas que en los últimos años han adquirido importancia, a saber, la economía verde y la biomimética. Mientras que el primero es un intento capitalista de incorporar el límite ambiental como nuevo terreno para la acumulación y la valorización, el último propone la imitación de los sistemas naturales para reducir los impactos ambientales negativos sin sacrificar el crecimiento económico. En suma, el artículo discute y critica las condiciones de posibilidad que permitieron que estas conceptualizaciones emergieran y funcionaran en las sociedades neoliberales contemporáneas.

Palabras clave

Foucault, liberalismo/neoliberalismo, *green economy*, *biomimicry*, crisis ecológica.

Introduction

This article aims at exploring how categories such as biopolitics and governmentality – in both its declinations: liberal and neoliberal –, developed in the late 1970s by Michel Foucault, can shed new light on discursive formations that have become mainstream in recent years, namely those of *green economy* and *biomimicry*. Against the background of the current, devastating economic crisis (whose long-term causes have been silently under way since the early 1980s), the green economy can be defined as a capitalist attempt to overcome such financial turmoil based on the incorporation of the environmental limit as a new terrain for accumulation and valorization. In Foucauldian terms: as an unprecedented key element for a new configuration of governmental practices. Biomimicry can be thought of one example of such practices: it proposes the imitation of natural models, systems and elements to reduce negative environmental impacts of productive activities without sacrificing economic growth.

The exposition will be organized as follows: first, I will discuss how the ecological crisis has become ‘thinkable’ as a political issue only after the crossing of that “seuil de modernité biologique” [*threshold of biological modernity*]¹ which occurred in the second half of the eighteenth century and which disclosed the biopolitical horizon; second, I will advance the hypothesis according to which, although liberal governmentality (with its peculiar constellation of political, epistemological and technological elements) made the multifarious phenomenology of the ecological crisis *visible*, the actual attempts to economically *manage* and politically *deal with* it – *i.e.* the green economy – entirely belong to the epoch in which neoliberalism emerges as the most recent phase of biopolitical governmentality. More specifically, two are the Foucauldian conjunctures I would like to address: a) the relationship between nature and political economy in the context of liberal governmentality; b) the development of such a relationship in the shift from liberalism to neoliberalism. Third, I will analyze biomimicry in some detail from this Foucauldian perspective. Finally, I will briefly discuss how to effectively criticize both green economy and biomimicry.

1. M. Foucault, *Histoire de la sexualité. I. La volonté de savoir*, Gallimard, Paris, 1976, p. 188.

The biopolitical nature of contemporary ecological crises

In a lecture delivered at the University of California in 1983, Foucault advanced a central distinction between “history of ideas” and “history of thought.”² The former basically concerns questions such as when a specific field of knowledge emerged, how it was structured and through which modalities it influenced the development of other related ideas. In contrast, “history of thought” designates the effort to isolate the ways through which unproblematic areas of research became progressively contested issues, objects of new public interest, targets of social institutions, discursive practices and technologies of power. This is what Foucault, in methodological terms, refers to as *problematization*: the definition of material practices that constitute the conditions upon which what was previously taken for granted emerges as an object of government, namely as simultaneously exposed to power/knowledge relations *and* to potentially autonomous processes of subjectification.

Since the second half of the 1970s, and particularly in the lectures at the Collège de France entitled *Security, Territory and Population* and *Birth of Biopolitics*, Foucault has extensively mobilized this methodological tool to produce analyses which I believe are of great interest for a proper understanding of the current ecological crises.³ In the first series of lectures, Foucault is primarily concerned with the articulation of what may be named *biopolitical hypothesis*. From an empirical perspective, it is possible to situate the emergence of biopolitics in the second half of the eighteenth century, with the progressive implementation of *governmental technologies of power* aimed at empowering individual and collective bodies alike. With the term *governmentality* Foucault refers to the set of institutions, tactics and analyses that allow a specific kind of power to be exercised over the population through a knowledge apparatus defined by political economy and a number of technical devices oriented toward security.

This set of practices was organized around four main fields of intervention: *natality*, *morbidity*, *ability*, and, most importantly from my standpoint, *environment*.⁴ According to Foucault, biopolitics implies the political creation of an intermediate space between natural environment and artificial urbanization, investing in particular the process of

2. M. Foucault, *Fearless Speech*, Semiotext(e), New York, 2001, p. 74.

3. See P. Bresnihan, *Transforming the Fisheries: Neoliberalism, Nature, and the Commons*, University of Nebraska Press, Lincoln, 2016.

4. See M. Foucault, *Society Must Be Defended*, Picador, New York, 2003.

shaping natural systems (both at the climatic and hydrographical level) according to governmental expansive necessities.

More speculatively, the core of the biopolitical hypothesis rests on a novel formulation of the classical theoretical element of the relationship between *life* and *politics*, or between *nature* and *power*. To simplify, it might be said that, before the emergence of biopolitics, the relation between life and politics was *extrinsic*, in the sense that the two poles defined different fields of intervention and development which, although often overlapping, were conceived of autonomously, as irreducibly distinct. On the contrary, once “a society’s threshold of modernity” is crossed, “the life of the species is wagered on its own political strategies”⁵ and the two fields merge into one set of phenomena where-in their respective identities begun to blur. Life turned into a specific target of political power so that their connection became intrinsic, of a *qualitative* kind.

The governmental apparatus through which this epochal passage was accomplished is to be found in the notion of *population*. Clearly, the concept did not arise in the eighteenth century, but in that period its meaning undertook a decisive transformation. Previously, the role of the population was subordinated to its *territorial function*: the mere sum total of individuals inhabiting a determined geographical area, to be managed through the creation of docile bodies, was the main goal of sovereign power. With the emergence of biopolitics, however, what is mainly at stake is the *governmental function* of the population.

Accordingly, the intervention on the laws of development of the population is no longer *external*, namely juridically exercised *over* a flat, disposable, natural given, but rather *internal*, since the active regulation of this development is the peculiar goal of the art of government. In Foucault’s own words:

Taking the effects specific to population into consideration is, I think, a very important phenomenon: *the entry of a ‘nature’ into the fields of techniques of power, of a nature that is not something on which, above which, or against which the sovereign must impose just laws*. There is not nature and then, above nature and against it, the sovereign and the relationship of obedience that is owed to him. We have a population whose nature is such that the sovereign must deploy reflected procedures of government within this nature, with the help of it, and with regard to it.⁶

5. M. Foucault, *The History of Sexuality. I. An Introduction*, Pantheon Books, New York, 1987, p. 143.

6. M. Foucault, *Security, Territory, Population*, Palgrave Macmillan, New York, 2007, pp. 75/104 (my emphasis).

Population is surely defined in terms of *naturalness*, but this naturalness presents very different features than the normative nature that is traditionally opposed to politics as a value-oriented practice. Here politics and nature merge into each other and open up a new object of power intervention, a new field of government – the *environment* – which will be defined as the permanent negotiation between natural and historical determinations.

This new concept of natural population opens up the possibility to *govern the environment*, conceived of as nothing more than the principle by means of which a set of heterogeneous elements, both natural and artificial, are formalized to be managed, or subordinated to an abstract *mise en serie* in order to be politically regulated. As argued by Laura Bazzicalupo: “For Foucault, bio-politics is the act of governing the human by means of its naturalization; its *bios* becomes governable once the secrets of its dynamic, self-regulating, ‘natural’ laws have been unveiled.”⁷ This is why environmental crises are intrinsically biopolitical: if in the *sovereign paradigm* nature and politics were confronting each other from mutually exclusive vantage points, the *biopolitical paradigm of nature* determines the exact opposite situation: political artificiality and species naturalness melt into a zone of indistinction constitutively exposed to governmental capture.

This constitutive exposition to power is the very condition of possibility for the notion of *ecological crisis* to appear as a specifically political issue: what distinguishes environmental degradation from ecological crisis is the fact that just governmentality necessarily implies a modality of resource-use which describes a systemic tendency towards growth, namely a constant managerial increase. Environmental degradation belongs to “nature idolatry”, to use Marx’s words;⁸ ecological crisis, on the contrary, is a distinctively modern phenomenon.

The environment and political economy: from limit to element of governmentality

With emergence of biopolitics and the first problematization of the environment as simultaneously marked by naturalness and artificiality, the problem of understanding how the concept of nature is put to work in contemporary green economy – and,

7. L. Bazzicalupo, “Biopolitica come governamentalità: la cattura neoliberale della vita”, in *La Deleuziana*, 1, 2015, p. 31-32 (my translation).

8. K. Marx, *Grundrisse. Foundations of the Critique of Political Economy*, Penguin, London-New York, 1993, p. 410.

more specifically, by biomimicry – is far from being solved. On the contrary, it is merely displaced: what must now be explained is how specific articulations of naturalness and artificiality have been translated into governmental practices since the nineteenth century. Within the magmatic context provided by the biopolitical horizon, I read the problematization of the concept of the environment as a ramification of the two fundamental tendencies of governmental (and capitalist) historical development: liberalism and neoliberalism.

My perspective on liberalism is structured around the peculiar way through which Foucault configures the relationship between the concept of nature and political economy. Foucault reads the emergence of liberalism, conceived in terms of a political rationality rather than of a juridical vision or a mere economic theory, as a shift from the attempt to impose external legal limits to the sovereign's absolute power to a new scenario marked by a twofold transformation. First, political economy is assumed as the basis for governmental practices;⁹ second, the market is seen as guarantor of the autonomy of the economic processes. Liberalism, in other words, is seen as a governmental permanent critique of sovereign power in its tendency to govern *limitlessly*. And it is precisely from this critical perspective that the notion of the naturalness of the economic process (namely, the relationship between nature and governmentality) is developed by liberal thinkers. As Foucault writes in *Birth of Biopolitics*:

Nature is something that runs under, through and in the exercise of governmentality [...]. It is the other face of something whose visible face, visible for the governors, is their own action. Their action has an underside, or rather, it has another face, and this other face of governmentality, its specific necessity, is precisely what political economy studies. It is not background, but a permanent correlative.¹⁰

9. Even better: it is *itself* a logic of government. See L. Bazzicalupo, "Economy as a Logic of Government", in *Paragraph*, 39, 1, 2016, pp. 36-48.

10. M. Foucault, *Birth of Biopolitics*, Palgrave Macmillan, New York, 2008, p. 16. In this context it is important to stress that the naturalness of the market as a political principle (the less governing the better) and the natural materiality of the environment as an economic principle (scarcity as a constraining-but-enacting context of production) often overlap but should nonetheless be maintained as distinct from a governmental perspective. As Ottavio Marzocca aptly remarks "the dream of liberalism" is that of "defining and enacting a stable and beneficial relationship between the 'naturalness' of market mechanisms and the 'natural processes' which intervene in the interface between population and the external world" (O. Marzocca, *Il mondo comune. Dalla virtualità alla cura*, Manifestolibri, Roma, 2015, p. 107 – my translation). In his important contribution, Marzocca focuses on the twofold character of *governmental naturalness*: societal economic-productive mechanisms, on the one hand, and biological-reproductive processes pertaining to population, on the other. Accordingly, Marzocca emphasizes a bifurcation between an economic rationality oriented towards quantitative growth and a biopolitical rationality oriented towards demographic prosperity.

How is this constitutive link between nature and political economy enacted? According to Foucault, it acquires social effectiveness through the role played by the *market*. Obviously, Foucault refuses to conceptualize the market as a passive, hidden matter progressively brought to light by the improvement of economic theory. Rather, the market is a principle of veridiction that allows the new art of government to concretely work. In other words, the market is the centrepiece of a new biopolitical regime of truth. From this perspective, the natural traits attributed to market laws are justified in that they play a *limiting role* with regard to sovereign power and its will to govern limitlessly. Being unable to fully grasp the opaque totality represented by the economic process, the sovereign must limit its interventions to possible market failures. Those incidental failures, however, do not put into question the spontaneous deployment of the invisible hand that, in connecting individual pursuit of profit to the general interest, naturally leads to the best allocation of social wealth. Such limiting role of nature is reflected in the way classical political economy deals with the environment. David Ricardo, for example, realized that in the early nineteenth century the function of nature was to provide an internal and flexible limit to the process of valorization: “There is not a manufacture which can be mentioned, in which nature does not give her assistance to man, and give it too, generously and gratuitously.”¹¹ This free assistance may take the form of an infinite source of raw materials, at the beginning of the process, or that of an equally infinite garbage bin, at its end. In both cases, however, nature and valorization do not overlap; rather, nature is configured as the mobile border within which value-creation occurs. In its compulsive search for limits to overcome, liberal capital takes nature as its primal hold, as the relatively stable surface upon which differentiated circuits of valorization deploy themselves.

A possible example of such an enacting limitation may be provided by the input/output model formulated in the 1930s by Wassily Leontief,¹² whose graphic rendition can be found in figure 1. It represents the general production of wealth starting from the combination of a series of components provided by the natural environment (populations, raw materials, energy sources, etc.) which, through a transformative process performed by a technical system (machines), eventually generate a product (output). Bringing together all economic sectors in a matrix structured in such a way, it becomes fairly easy to deduce the golden rule of political economy: maximizing

11. D. Ricardo quoted in K. Marx, *Theories on Surplus-Value*, Foreign Languages Publishing House, Moscow, 1963, vol. I, p. 60.

12. See W. Leontief, *Input/Output Economics*, Oxford University Press, New York, 1986.

the value of final products and, simultaneously, minimizing the cost of initial components.

Figure 1. Source: Author.

Leaving aside other possible critical considerations, what is important to show for my current purposes is that, in this model, *nature works as internal (but unaccounted for) limit*, both at the beginning of the process (raw materials, energy sources) and at the end of the process (waste disposal).

One of the main elements of the shift from liberalism to neoliberalism consists in a fundamental modification of the relationship between governmentality and nature. From an environmental perspective, the crisis of liberal governmentality during the 1970s can be interpreted as the result of converging pressures such as (to name just a few): the destabilizing antagonism of ecological movements; the struggle-induced *impasse* of a regime of accumulation exclusively based on industrial production; the Oil Shock and a worldwide increase in conflicts over scarce resources. It can be said that a governmentality based on nature as internal but indirect limit to power had reached its point of exhaustion: instead of facilitating the production and circulation of value, it started to act as an unsurpassable barrier against it. In other words, liberal capital started to perceive the environment as a block to valorization, as an additional cost for

companies or, to use André Gorz's appropriate terminology, as a *crisis of reproduction*.¹³ A new governmental approach was needed to restore profitability while avoiding unnecessary environmental impacts. In other words, liberalism had made the multifarious phenomenology of ecological crisis visible, but was nevertheless unable to politically manage it. Neoliberalism came to rescue, as it were.

According to Foucault, what does *not* change in the shift from liberalism to neoliberalism is the function of the market as a site of veridiction. Thus, also neoliberalism is concerned with the construction of an economic naturalness which is enacted by a political regime of truth based on economics, which in turn represents the pillar of governmental practices, both economic and biopolitical. In other words, the formal invariance of governmentality is the *production of limits to power exercise*. What, on the contrary, *does* change is the specific modality of that production, its historical contingency.

In liberalism the naturalness of the market is centred around the notion of *exchange* and, as such, it is still clearly distinguished from the artificiality of fluxes of money, commodities and individuals it is supposed to rationally channel. Differently, in neoliberalism the naturalness of the market is directly created in accordance to the artificial principle of formalization represented by *competition*. To put it crudely, nature has to be artificially constructed in order to practically allow the formal structure of economic competition to work. This is why the first wave of neoliberal thinkers considered by Foucault (German 'ordoliberals') could accuse their liberal predecessors of "naturalistic naïveté". According to the 'ordoliberals', the market is not a primary *datum* whose spontaneous structure would be revealed by the competitive logic. Such order of factors must be reversed: for the market to function properly, competition is to be first established and then continually enforced. The very *status* of competition as an economic category is radically displaced:

For what in fact is competition? It is absolutely not a given of nature [...]. The beneficial effects of competition are not due to a pre-existing nature, to a natural given that it brings with it. They are due to a formal privilege. Competition is an essence. Competition is an *eidos*. Competition is a principle of formalisation. Competition has an internal logic; it has its own structure [...]. Competition as an essential economic logic will only appear and produce its effects under certain conditions which have to be carefully and artificially constructed.¹⁴

13. See A. Gorz, *Écologie et liberté*, Galilée, Paris, 1977.

14. M. Foucault, *Birth of Biopolitics*, p. 120.

What takes place here is a sort of *dislocation of the notion of limit*: whereas in liberalism natural limits to artificial interventions are produced to allow social wealth to freely circulate and increase, in neoliberalism artificiality is directly applied onto nature in order to be deployed within the abstract boundaries of the competitive logic. To put it differently: whereas in liberalism nature is internalized to function as an enabling limit to economic exchange, in neoliberalism nature is artificially created to enact a production of value homologous to the formal generative structure represented by economic competition.¹⁵ To put it differently: liberal naturalism posited the environment in terms of a *constraint to economic exchange* – think of the first wave of ecological industrial issues: air and water pollution, nuclear waste, depletion of natural resources, etc. In contrast, neoliberalism envisages the environment as a *driver of economic competition*, a political surface upon which to produce new commodities – consider the second wave of environmental issues: climate change, post-industrial biotechnologies, renewable energy, etc.

Green economy *in actu*: The arcane of biomimicry

Neoliberal capitalism is presently trying to transform environmental crises into profitable business opportunities, that is: to overcome its crisis of reproduction. As François Ewald argued, ecology is not a rupture; rather, it “accomplishes the dream of biopolitics.”¹⁶ The governmental device whereby capital internalizes nature as an element of valorisation or, in Ewald’s terms, biopolitics absorbs ecology, is the *green economy* paradigm. Although scholars as well as practitioners do not share a single and unitary understanding of such paradigm, I propose to define it as a neoliberal capitalist attempt to overcome the spectre of resource exhaustion on the basis of a further incorporation of the environmental limit as a new terrain for accumulation and valorization. Through the rhetoric of *sustainability*, and in full synergy with capital’s need for profit-making, this process is supposed to governmentally harmonize two elements once considered mutually exclusive: economic growth and environmental protection. It is this markedly neoliberal framing that, even though rarely in an explicit fashion, sets the boundaries within which the green economy debate could first arise and then develop.

15. See T. Terranova, “Another Life. The Nature of Political Economy in Foucault’s Genealogy of Biopolitics”, in *Theory, Culture and Society*, 26, 6, 2009, pp. 234-262.

16. F. Ewald, “Bio-Power”, in *History of the Present*, 2, 1985, p. 9.

In Foucauldian terms: the green economy is an unprecedented key element for a new configuration of governmental practices.

Actually, the recent rise of so-called *bioeconomy* constitutes a good case in point to appreciate nature as element – as opposed to limit – of governmentality. Such a concept refers to the expansion of the logic of valorization to the field of life itself through the development of biotech industries, which is to say a complex entanglement of cognitization of labor and financialization of the economy.¹⁷ Appropriately, Melinda Cooper notes how this development is configured as inextricable from the planetary diffusion of neoliberalism: “the history of neoliberal theories of growth and biotechnological visions of growth needs to be pursued simultaneously.”¹⁸ Contrary to the common-sensical idea according to which political leaders would have been in denial about the ecological crisis, Andrew Ross has pointed out how they have been collecting data to overcome the challenge of resource exhaustion at least since 1972, namely since the publication of Club of Rome’s *The Limits to Growth*. As Ross explains: “The élites heed the message [...] and they responded by squirreling away whatever resources they could carry off from the commonweal. Hoarding in anticipation for oncoming scarcity is a plausible explanation of the patterns of sharp upwards wealth redistribution since the mid-1970s.”¹⁹

Thus, biotechnology as a scientific enterprise is closely linked both to new circuits of valorization and to new articulations of governmentality. Moreover, it involves knowledge in a very peculiar sense: mobilised by the need to inscribe profit-making in the very core of life and nature, informationalized science transforms the living in such a way that, instead of turning it into a solid background upon which it could find support, science makes it more and more artificial, hence ready to be deployed along the competitive lines of contemporary value creation. As Cooper remarks, the molecularization of scientific knowledge aims at “destandardizing life” in order to make it further manipulable in bioeconomic terms.²⁰

The conceptual innovation of *biomimicry* has emerged in parallel with the field of bioeconomy. It denotes both a field of study and an organizational framework that link industrial design, engineering explorations and biological research as key drivers of

17. For further exploration of such an entanglement, see E. Leonardi, *Biopolitics of Climate Change: Carbon Commodities, Environmental Profanations and the Lost Innocence of Use-Value*, PhD Dissertation, University of Western Ontario, Canada, 2012.

18. M. Cooper, *Life as Surplus. Biotechnology and Capitalism in the Neoliberal Era*, University of Washington Press, Seattle, 2008, p. 19.

19. A. Ross, *Creditocracy and the Case for Debt Refusal*, Or Books, New York, 2013, p. 229.

20. M. Cooper, *Life as Surplus*, p. 31.

socio-economic innovation. I do not pretend, by discussing such example, to fully cover its contemporary relevance;²¹ rather, my aim is to highlight the *novelty* brought to the foreground by the rise of neoliberal capitalism. In fact, my general hypothesis is that whereas liberalism made the multifarious phenomenology of the ecological crisis *visible*, neoliberalism mobilized the actual attempts to politically *deal with* it.

It is in this context that the notion of biomimicry has been advanced and discussed in the circles of green economists since the 1990s. At first, the new concept was meant to express a severe criticism to dissipative growth models which were typical of industrial capitalism and, in particular, to oil lobbies which strongly opposed their abandonment (or even their slightest revision). By the late 2000s, however, with green economic policy riding a profitable wave of success – United States *American Clean Energy and Security Act* (2009) doubtlessly represented its apex – biomimicry seemed to have lost a great deal of its critical potential. The recent election of an outspoken climate denier at the White House may change the situation anew, but beyond the ups and downs of its reception what is interesting from my perspective is the silent paradox upon which biomimicry ultimately rests. In- and for-itself, subtly removed from its material background, this concept is configured as rather linear and self-explanatory: given unsustainable levels of pollution and resource consumption, the industrial system is doomed to fail economically (dramatic rise of raw materials price) and, consequentially, to collapse socially. This is due to the indirect artificiality of such a system, whose indifference towards environmental feedbacks brings about a fatal neglect of natural limits to growth. More precisely, according to Janine Benyus – a key biomimicry thinker and supporter – the industrial system forgot the nine statements that explain nature’s “laws, strategies, and principles”:

- Nature runs on sunlight.
- Nature uses only the energy it needs.
- Nature fits form to function.
- Nature recycles everything.
- Nature rewards cooperation.
- Nature banks on diversity.

21. Solely in economic terms, according to Biomimicry 3.8 – world’s leading bio-inspired consultancy – “[i]t’s estimated that by 2030, bio-inspired products and services will generate \$1.6 trillion to the global GDP. By accessing the powerful intelligence embedded in 3.8 billion years of evolution, we have collaborated with innovation teams and individuals at more than 250 companies in over 25 industries to achieve competitive advantages through biomimicry” (see: <https://biomimicry.net/our-effect/>).

Nature demands local expertise.
Nature curbs excesses from within.
Nature taps the power of limits.²²

This forgetfulness could easily be solved if *productive systems* were conceived of as *living, circular systems*. In other words, productive systems should *imitate* living systems and, in so doing, they would simply erase the notion of *waste* from their practical-theoretical toolbox. As it is notorious, waste does not exist in nature. In Benyus's words: "Our transition to sustainability must be a deliberate choice to leave the linear surge of an extractive economy and enter a circulating, renewable one."²³ Here Benyus suggests to look at nature as a *model* for the economy, underlying what Henry Dicks aptly proposes to define as a Heideggerian *poetic principle* of biomimicry, since it calls on society to imitate or draw inspiration from natural processes of "bringing forth" (*poi sis*).²⁴

Such a model for productive systems "is not reliant on linear processes, which are indifferent to waste; rather, on circular processes, which reuse waste by getting inspiration from the most effective and efficient biological system we have ever encountered: nature."²⁵ A deeply significant articulation of the link between green economy and biomimicry is proposed by Paolo Ricotti, heterodox economist who has dedicated the last years of his research to this issue:

In green economy there is full awareness of operating with high *strategic and competitive value*. Also in nature there is strategy, intelligence, capability of action in any observed case in point. Also in nature there is competition and, in fact, the fittest and the genetically strongest survives. Or the one who adopts the best procreation strategy [...]. The green economy and the social model which it shapes are fully sustainable insofar as their general processes are engrained in a closed-cycle, 'systemic' vision. Such a vision is similar to the natural one, whose basic logics are determined by chemical-physical-biological elements.²⁶

22. J. Benyus, *Biomimicry: Innovation Inspired by Nature*, Harper & Collins, New York, 1997, p. 7.

23. *Ibid.*, p. 56.

24. H. Dicks, "The Philosophy of Biomimicry", in *Philosophy and Technology*, 29, 3, 2016, pp. 223-243.

25. D. Reina, S. Vianello, *Green Web Economics*, EGEE, Milano, 2011, p. 50. See also A. Bonomi, F. Della Puppa, R. Masiero, *La società circolare: fordismo, capitalismo molecolare, sharing economy*, DeriveApprodi, Roma, 2016.

26. P. Ricotti, *Sostenibilità e Green Economy. Quarto settore*, Franco Angeli, Milano, 2010, pp. 103/171 (my translation).

At a first sight the argument seems reasonable and scientifically sound; moreover, its ostentatious simplicity seems to mantle it with an aura of indisputability: after all, ‘nature knows better’ and all humans should follow its example, re-entering in it, re-integrate the realm of anthropic production within the much broader realm of living production. Things, nonetheless, are not exactly like this. In fact, under which condition is it possible even to ‘think’ that natural cycles work ‘better’ than industrial ones? Obviously, under the condition of their respective *comparability*. What is needed, in other words, is the transformation of nature from material basis of living being’s reproduction to *provider of biological services*.²⁷ For biomimicry to become a viable politico-economical platform it is necessary to *have preliminarily economized ecology*. This is a perfect representation of the process through which *neoliberal environments* are created: we are kept in the paradox of proposing a ‘return to nature’ which is nothing else than a further step in the direction of omni-pervasiveness of the subject of economic thinking. This is why it becomes possible – even ‘natural’ – to think of 3.8 billion years of evolution as a massive R&D repository from which to extract economically valuable information. A perfect example of what Jessica Dempsey defines *enterprising nature*, a concept which “involves the creation of ‘enterprising units’ of nonhuman life in order to set the conditions wherein *differential value* of species, nonhuman communities and spaces can be calculated – the creation of what I describe [paraphrasing Foucault] as an ecological-economic tribunal for life.”²⁸ Similarly, as Jesse Goldstein and Elizabeth Johnson remark, biomimicry sets in motion a twofold process of enclosure: on the one hand, nature is reduced to intellectual property (artificial production of scarcity as an accumulation strategy for capital); on the other hand, nature ceases to be portrayed as passive raw material/waste disposal only to be turned into an active subject which only knows the logic of valorization.²⁹

27. Hawken, Lovins and Hunter Lovins frame the issue of monetarily measuring nature as provider of biological services in the following terms: “Valuing natural capital is a difficult and imprecise exercise at best. Nonetheless, several recent assessments have estimated that biological services flowing directly into society from the stock of natural capital are worth at least US\$ 36 trillion annually. That figure is close to the annual gross world product of approximately US\$ 39 trillion – a striking measure of the value of natural capital for the economy. If natural capital stocks were given a monetary value, assuming the assets yielded ‘interest’ of US\$ 36 trillion annually, the world’s natural capital would be valued at somewhere between US\$ 400 and US \$500 trillion – tens of thousands of dollars for every person on the planet. That is undoubtedly a conservative figure given the fact that anything we can’t live without and can’t replace at any price could be said to have an infinite value” (P. Hawken, A. Lovins, L. Hunter Lovins, *Natural Capitalism: Creating the Next Industrial Revolution*, Back Bay Books, New York, 1999, p. 5).

28. J. Dempsey, *Enterprising Nature: Economics, Markets and Finance in Global Biodiversity Politics*, Wiley, Oxford, 2016, p. 10.

29. See J. Goldstein, E. Johnson, “Biomimicry: New Natures, New Enclosures”, in *Theory, Culture and Society*, 32, 1, 2015, pp. 61-81.

It is instructive to note that, according to biomimicry supporters, the best (but most often the only) way to imitate living systems is to *measure and enforce their monetary value*. “Give a price to nature!” was, in fact, one of the slogans of *Grenelle de l’environnement*, an ambitious, world-wide celebrated and eventually failing program – launched in 2007 by newly elected French President Nicolas Sarkozy – whose main goal was to make environmental policies the cornerstone of a new model of economic development, no longer based on a quantitative increase of the volume of exchanges but rather based on a valorisation of the quality of life. One of the most interesting aspects of the debates surrounding the event was the argument according to which by considering raw materials “gratuitous”, what is obtained is a series of “deliberate distortions in the marketplace.”³⁰ Here we find ourselves in the very core of neoliberal governmentality: by turning the environment from ‘condition’ to ‘factor’ of production – from ‘limit’ to ‘element’ of governmentality – it becomes a crucial element of the process of value creation, opening up unprecedented opportunities for profit-making. It is as though, in a Marxian sense, capital reaches emancipation from nature just to reshape it in its own image and likeness.

Conclusion

The main point I wanted to make with this article is that a Foucauldian perspective can be of use to grasp the core governmental element of the green economy, namely its exclusive reliance on a market-based logic whose main feature is competition as indisputable principle of veridiction. Thus, the green economy – as well as its practical instances, amongst which is biomimicry – ‘sees’ nature as an economic subject which actively participate to valorization. My hope is that this reflection provides new ground for an effective critique of such paradigm.

However, it is important to stress that my contribution here intends to complement rather than substitute existing critiques of the green economy paradigm. Elsewhere I have argued, for example, that processes aimed at the *greening of markets* have actually worsened rather than reduced negative environmental impacts.³¹ Other scholars have scrutinized and questioned the emergency-based character of contemporary ‘*day after*’

30. P. Hawken, A. Lovins, L. Hunter Lovins, *Natural Capitalism*, p. 15.

31. See E. Leonardi, “Carbon Trading Dogma: Theoretical Assumptions and Practical implications of Global Carbon Markets”, in *Ephemera: Theory and Politics in Organization*, 17, 1, 2017 (forthcoming).

governmentality.³² Moreover, poor working conditions in supposedly sustainable economic sectors have been reported by activists and denounced by unions³³ – just as much as scholars have exposed the lack of community participation in decision making processes.³⁴ Last but certainly not least, the uneven development upon which World Bank and International Monetary Fund environmental policies are based has been dissected and strongly criticized.³⁵

Beyond all this, there is the political problem of the profound *ambivalence* of the green economy (and of biomimicry): does their elective affinity with capital's value-based logic make them useless – if not nefarious – from an ecologically sound emancipatory strategy,³⁶ or else does it frame them as the struggle terrain upon which a just transition to sustainability can be envisaged and enforced?³⁷ It seems to me such questions are extremely relevant, but they should be addressed by linking theoretical investigations to the environmental conflicts which proliferate at a global scale and whose stake is the prefiguration of an ecologically sustainable and socially desirable future.

For the time being, let me use a distinctively Marxist terminology to draw my conclusion in the form of a provisional, even embryonic suggestion: as the critique of classical political economy intended to demystify the attempt of *naturalising capital*, of placing its specific relations of production outside historical becoming, so the critique of this new phase of the economic process should assume as its main goal the demystification of the attempt of *capitalising nature*, which is to say its being imprinted by the homogeneous (and so far destructive) grammar of the market.

32. See O. Marzocca, *Il governo dell'ethos: la produzione politica dell'agire economico*, Mimesis, Milano-Udine, 2011, pp. 73-104.

33. See S. Barca, "Labor in the Age of Climate Change", in *Jacobin* (on line), 2016 (<https://www.jacobinmag.com/2016/03/climate-labor-just-transition-green-jobs/>).

34. See I. Scotti, "Sfera pubblica, conflitto ambientale e transizione energetica", in *Prisma*, 3, 2014, pp. 31-53.

35. See T. Fatheuer, L. Fuchs, B. Unmüssig, *Inside the Green Economy: Promises and Pitfalls*, Green Books, Munich, 2016.

36. See G. Dale, M.V. Mathai, J.A. Puppim de Oliveira (eds.), *Green Growth: Ideology, Political Economy and the Alternatives*, Zed Books, Chicago, 2016.

37. E. Johnson, "Reconsidering Mimesis: Freedom and Acquiescence in the Anthropocene", in *South Atlantic Quarterly*, 115, 2, 2016, pp. 267-289.