

Rethinking Biopolitics in the Anthropocene. Foucault, Esposito, and the Political Physiology of Social Metabolisms

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Abstract. Michel Foucault and Roberto Esposito have been two of the most influential biopolitical thinkers of the twentieth century, but their respective approaches to the relationship between life and politics do not address the main problem of the Anthropocene: the relationship between life and energy. Thus, this article analyzes the biophysical limits of biopolitics in the works of Foucault and Roberto Esposito and, to overcome these limits, it proposes to analyze the physiological assembly of the devices of power within the energetic flows of social metabolisms. The article concludes that the physio-political approach to human societies allows us to overcome the biophysical limits of both Foucauldian biopolitics and Esposito's immunological paradigm.

Keywords: Biopolitics; Anthropocene; Foucault; Esposito; Social Metabolism.

[es] Repensando la biopolítica en el Antropoceno. Foucault, Esposito y la fisiología política de los metabolismos sociales.

Resumen. Michel Foucault y Roberto Esposito han sido dos de los pensadores biopolíticos más influyentes del siglo XX, pero sus respectivas aproximaciones a la relación entre vida y política no abordan el principal problema del Antropoceno: la relación entre la vida y la energía. Por ello, el artículo analiza los límites biofísicos de la biopolítica en los trabajos de Foucault y de Roberto Esposito. Para superar estos límites, se propone analizar el ensamblaje fisiológico de los dispositivos de poder en el interior de los flujos energéticos de los metabolismos sociales. El artículo concluye que este enfoque biofísico y biopolítico de las sociedades humanas nos permite superar los límites biofísicos tanto de la biopolítica foucaultiana como del paradigma inmunológico de Esposito.

Palabras clave: biopolítica; Antropoceno; Foucault; Esposito; metabolismo social.

Sumario. Introduction. 1. Foucault, Esposito and biopolitics. 2. From immaterial communities to biophysical metabolisms. 3. From biopolitics to physio-politics: the physio-politics of social metabolisms. 4. Bibliography.

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Introduction

In the beginning of the 21st century, Paul Crutzen and Eugene Stoermer presented the hypothesis of the Anthropocene as a significant change in the history of the Earth-system². In the newsletter which introduced the report *Global Change and the Earth System: A Planet Under Pressure*, they wrote: “Until very recently in the history of Earth, humans and their activities have been an insignificant force in the dynamics of the Earth System. Today, humankind has begun to match and even exceed nature in terms of chang-

ing the biosphere and impacting other facets of Earth System functioning”³. From that moment, rivers of ink have flown over the geological, social, and philosophical scope of the term Anthropocene⁴. What we have learnt from these debates, is the importance of understanding the historical relation between social systems and Earth systems. Clive Hamilton, Christophe Bonneuil and François Gemenne pointed out what we interpret as the main epistemological challenge for contemporary biopolitics: “This [the Anthropocene] marks the end of nature as no more than the external backdrop for the drama of human

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² P. Crutzen, and E. Stoermer, “The Anthropocene”, *IGBO Global Change Newsletter* 41, 2000 pp. 17-18.

³ W. Steffen, A. Sanderson, P. Tyson, J. Jäger, P. Matson, B. Moore, F. Oldfield, K. Richadron, H.J. Schellnhuber, B.L. Turner & R.J. Wasson, “The Anthropocene era: How humans are changing the Earth system”, *Global Change and the Earth System: A Planet Under Pressure*, 2015, pp. 82-83.

⁴ For a general introduction to the Anthropocene studies cf. A. J. Hoffman and P. Devereaux Jennings, “Institutional theory and the natural environment: Research in (and on) the Anthropocene”, *Organization & Environment* 28.1, 2015, pp. 8-31. For an introduction to the Anthropocene from the ecosocialist standpoint see: Angus, Ian. *Facing the Anthropocene: Fossil capitalism and the crisis of the earth system*. NYU Press, 2016.

history (...). Modern humanities and social sciences have pictured society as if they were above material and energy cycles and unbound by the Earth's finiteness and metabolisms. Now they must come back to Earth"⁵. Under the light of this epistemological requirement, the principal aim of this article is to propose the transition from bio-politics to physio-politics to understand how political technologies operate within the metabolic dynamics of human societies.

From the invention of the wheel to the steam engine, technological revolutions have enabled humans to exploit increasing volumes of energy. The complexity, speed and volume of anthropogenic metabolisms have changed throughout history. For this reason, the trajectory of the Anthropocene is usually divided into three major phases: the preindustrial, the industrial and the Great Acceleration of the second half of the 20th century⁶. In this trajectory, the steam-engine, and the generalization of oil for industry and transport, are two biggest disruptive technologies which unchained the transition to the industrial revolution and the Great Acceleration of the second half of the 20th century. However, these technological revolutions were preceded by new political techniques and sociopolitical conflicts that cannot be ignored. This is exactly what Foucault pointed out in his lecture entitled *The Meshes of Power*:

We have the habit (...) of saying that the great invention was, as everyone knows, the steam engine, or at least inventions of this sort. It is true, this was very important, but there was an entire series of other technological inventions just as important as this one and which were, in the last instance, the condition of possibility for the functioning of the others. (...) Consequently, we must not only make a history of industrial techniques, but also that of political techniques⁷.

One simple idea can orient the convergence between biopower and the trajectory of the Anthropocene: *there is no growth without constellations of political power pursuing and defending growth*.

However, the sudden growth of CO2 emissions does not reflect the set of socio-political transformations that accompanied and even preceded them. For Foucault, it cannot be understood without the mediation of disciplinary and biopolitical technologies⁸. The controlled insertion of bodies into the machinery of production and the adjustment of the population to economic processes points to a central episode in the environmental history of capitalism: the adjustment between the organic and inorganic elements (workers and machines) required also the set of juridical innovations described in *Discipline and Punish*: laws against begging and laziness, generalization of wage labor, the implementation of surveillance and the convertibility of money into working time and prison time, among others⁹. Hence, if capitalism implies biopower technologies and the Anthropocene implies capitalism, biopower has played a significant role in the making of the Anthropocene. To bring light to this phenomenon, and to fill the gap between biopolitics and biophysics, the article is divided in three sections. The first section offers a synthetic and comparative view of biopolitics in Michel Foucault and Roberto Esposito. The second one introduces the biophysical concept of social metabolisms in opposition to the immaterial conception of community in Esposito. The third section introduces Foucauldian devices and Esposito's immunitary paradigm within the anatomy and the physiology of social metabolisms.

1. Foucault, Esposito and biopolitics

For Michel Foucault, the entrance of biological life in the meshes of political power was not monolineal, neither an expression of a single political phenomenon. Indeed, this general idea can be traced, at least, in five different moments of his intellectual itinerary during the 1970s. The first moment is characterized by the preeminence of medicine and hospitals as a means of political inscription of life¹⁰. The second moment implies a broader institutional process de-

⁵ The paragraph continues: "Their understandings of economy and markets, of culture and society, of history and political regimes need to be re-materialised. (...) In the Anthropocene, social, cultural, and political orders are woven into and co-evolve with techno-natural orders of specific matter and energy flow metabolism at a global level, requiring new concepts and methods in the humanities" In: C. Hamilton, C. Bonneuil, & F. Gemenne, *The Anthropocene and the global environmental crisis*, Routledge, 2016, p. 4.

⁶ The sociometabolic reading of the Anthropocene Marina Fischer-Kowalski, Fridolin Krausmann and Irene Pallua includes what are considered to be the three main chapters of the Anthropocene: "1. The transition from humans as hunters and gatherers to humans as agriculturalists (the so-called Neolithic revolution) initially in the «Fertile Crescent» some 12,000 years and springing up in most other parts of the world during the following millennia (...). 2. The industrial transformation, or rather the time when the industrial era gained strength on a global scale, dated by Crutzen and Stoermer (...) to the «latter part of the 18th century». 3. An additional discontinuity is characterized as the «Great Acceleration» to denote the process of rapid global growth after World War II." M. Fischer-Kowalski and H. Helmut, "Social metabolism: a metric for biophysical growth and degrowth", *Handbook of ecological economics*. Edward Elgar Publishing, 2015, p. 9; W. Steffen, P. J. Crutzen, & J. R. McNeill, "The Anthropocene: are humans now overwhelming the great forces of nature", *AMBIO: A Journal of the Human Environment*, 36(8), 2007, pp. 614-621.

⁷ "This bio-power was without question an indispensable element in the development of capitalism; the latter would not have been possible without the controlled insertion of bodies into the machinery of production and the adjustment of the phenomena of population to economic processes", M. Foucault, "The meshes of power", in *Space, knowledge, and power*. Oxfordshire, Routledge, 2016, p. 172.

⁸ M. Foucault, *Birth of Biopolitics. Lectures at the Collège de France 1978-1979*, M. Senellart (ed.), New York, Palgrave Macmillan, 2008, pp. 140-141.

⁹ M. Foucault, *Discipline and Punish: The Birth of the Prison*, New York, Vintage Books, 1977.

¹⁰ As Adan Salinas has noted, the use of terms as "somatocracy", "social medicine", "medical police" and "nosopolitics" characterizes this period as moment of discursive formation. A. Salinas Araya, "Economía política y biopoder. Foucault en Río de Janeiro 1973-1974", *Fragmentos de Filosofía II*, 2013, pp. 104.

fined by Foucault as the “statization of biological life”. This is explored in the first volume of his *History of Sexuality: The Will of Knowledge* (1976) and in the last lesson of his course *Society Must be Defended* (1976)¹¹. From “making die and letting live” (*thanatopolitics*) to “making live and letting die” (*biopolitics*), the irruption of biopower introduced biological life as a political object for calculus and strategic intervention. This capture came from two different sides: the *anatomopolitics* of the individual body, and the *biopolitics* of the population¹². However, the biopolitical power to make live was also capable of killing¹³. Here, Foucault points to “racism” as the political factor which permitted killing in defense of life. The third and fourth moments present an important methodological turn. In the courses of 1978 and 1979 the appearance of security dispositives (1978) and the study of the liberal governmentality (1979) subsumes the study of biopolitics¹⁴. There is a crucial transition from the arc of biopower to a triangular scheme: law, discipline and security are defined as the three major technologies sustaining the modern exercise of political power¹⁵. It is important to notice that, in 1978’s scheme, the system of correlation between legal mechanisms, disciplinary mechanisms, and mechanisms of security is defined by the logic of juxtaposition or assemblage, and not by technological displacement or epochal succession¹⁶. In *Birth of biopolitics* –fourthly– biopolitics only appears as a problem of comparative politics. Through the comparative analysis of the Physiocrats and the German, French and American neoliberals, Foucault shows that the history of governmentality incorporates many ways of problematizing (or de-problematizing) the government of life¹⁷. In the different stages

of Foucauldian biopolitics, the absence of energetic considerations is the side effect of a methodological criterion, not ontological one. However, at no point in the whole itinerary does Foucault enter into the analysis of the relationship between the government of life and the problem of energy. Thus, the study of the *bio-* and *geo-*historical relationships between coal and liberal biopolitics; oil and the biopolitics of welfare or neoliberal governmentality and neocolonialism (to mention three major examples) is absent¹⁸. This reflects one of the main deficits of Foucauldian biopolitics for the elaboration of a critical ontology of the Anthropocene¹⁹.

In the context of societies that are profoundly petro-dependent, it is symptomatic that this deficit was never noticed by Roberto Esposito in his critique of Foucauldian biopolitics. However, Roberto Esposito could be presented as: “the contemporary thinker who has gone furthest in questioning the traditional categories of political thought in light of the emergence of biopolitics”²⁰. Even though Esposito jumps to the biopolitical arena with *Bios*²¹, the structure of his biopolitical thought must be traced back to his concept of “community”. His leap into the biopolitical arena is structured within the trilogy composed by *Communitas*, *Immunitas* and *Bios. Biopolitics and Philosophy*, published in 1998, 2000 and 2004 respectively²². In this trilogy, the Italian author proposed the dialectic relation between the Latin terms *Communitas* and *Immunitas* to overcome the major limitations of previous biopolitical discourses. In *Bios*, and in *Terms of the Political* (2013), Esposito affirms that the dialectic relation between the *Communitas* and the *Immunitas* –what defines the “Paradigm of immunization”– was the interpretative key

¹¹ These works present the most ambitious conception of biopolitics as a new political era: “During the classical period, there was a rapid development of various disciplines –universities, secondary schools, barracks, workshops–; there was also the emergence, in the field of political practices and economic observation, of the problems of birthrate, longevity, public health, housing, and migration. Hence there was an explosion of numerous and diverse techniques for achieving the subjugation of bodies and the control of populations, marking the beginning of an era of «biopower»”. M. Foucault, *The history of sexuality. An Introduction*, New York, Pantheon, 1978, p. 140.

¹² From individual anatomies to the collective body of the population, the dispositive of sexuality performed as a structural hinge that communicates both poles of the relation. *Ibidem*, pp. 132, 139-141.

¹³ *Ibidem*, pp. 137-138.

¹⁴ M. Foucault, *Security, Territory, Population. Lectures at the Collège de France. 1977-1978*, Translated by Graham Burchell, New York, Palgrave Macmillan, 2009; M. Foucault, *Birth of Biopolitics. Lectures at the Collège de France 1978-1979*, M. Senellart (ed.), New York, Palgrave Macmillan, 2008.

¹⁵ M. Foucault, *op. cit.*, pp. 22-23. In this moment, biopower is defined as: “the set of mechanisms through which the basic biological features of the human species became the object of a political strategy, of a general strategy of power, or, in other words, how, starting from the eighteenth century, modern Western societies took on board the fundamental biological fact that human beings are a species”. *Ibidem*, p. 1.

¹⁶ *Ibidem*, p. 22.

¹⁷ For example, Foucault analyzed the *Vitalpolitik* of German ordoliberalism as the historical inversion of physiocratic strategies: in the 18th century, the problem was to identify nature within the economic market to avoid the interference of the state; in the 20th century, when the state has disappeared, the problem was to identify nature within society to avoid the destructive effects of artificial markets. M. Foucault, *op. cit.* 2008, pp. 102 ss.

¹⁸ This omission has been pointed out by D. Boyer in his book: D. Boyer, *Energopower and Biopower in Transition*, 2014. Unlike Boyer, however, our work focuses on the assembly of devices that enable the governance and immunization of social energetics, rather than on the sources of energy that sustain each form of governance.

¹⁹ The relationship between coal and the exercise of liberal political power has been studied in: A. Malm, *Fossil capital: The rise of steam power and the roots of global warming*, Verso Books, 2016. The reference work for the study of the oil-neoliberalism nexus is: T. Mitchell, *Carbon democracy. Political power in the age of oil*, New York, Verso Books, 2011.

²⁰ V. Lemm, “Introduction: Biopolitics and Community”, in R. Esposito, *Terms of the Political: Community, Immunity Biopolitics*, Fordham, UP, 2013, p. 9.

²¹ R. Esposito, *Bios: Biopolitics and philosophy*, Minnesota, University of Minnesota Press, 2008.

²² R. Esposito, *Communitas: the origin and destiny of community*, Polity, 2010; R. Esposito, *Immunitas. Immunitas: The protection and negation of life*, Polity, 2011; R. Esposito, *op. cit.* 2008.

that seems to have eluded Foucault²³. It is important to notice that in this book Esposito is reading the biopolitical works that Foucault wrote between 1974 and 1976, where the “threshold of biological modernity” was to be identified in the “dual position of life that placed it at the same time outside history, in its biological environment, and inside human historicity, penetrated by the latter’s techniques of knowledge and power”²⁴.

For Esposito, Foucauldian biopolitics were limited by a structural indecision or indetermination²⁵. On one hand, biopolitics referred to a constructive and defensive modality of governing life. In this sense, biopolitics marked a rupture with sovereign power. On the other hand, biopolitics prolonged the power of death through state racism. Therefore, Esposito argued that Foucault did not decide the relation between biopower and sovereign power: “This aporetic knot prevents us from interpreting the association of sovereignty and biopolitics in a monolineal form or in the sense of contemporaneity or succession”²⁶. What Foucault called biopolitics and thanatopolitics was, at the same time, complementary and contradictory.

The solution proposed by Esposito to overcome this “aporetic knot” was to identify the dialectic between the terms *Communitas* and *Immunitas*. However, the relationship between life, politics and energy will remain unexplored in its theoretical apparatus. What he calls the “immunitary paradigm” refers to the dialectical unity of these two terms: firstly, *communitas*, derived by the Latin term *com-munus*, refers to the totality of persons united not by a property, but by a lack or subtraction. Secondly, the *im-munus* (the negation of this *munus*: translatable as duty, lack or gift) is the most important feature of the term *Immunitas*: “Whereas the *communitas* is bound by the sacrifice of the *compensation*, the *immunitas* implies the beneficiary of the *dispensatio*”²⁷. Meanwhile the *munus* constitute the obligation that is contracted with respect to the other and that invites a suitable release from the obligation, *Immunitas* referred to the *dispensatio* of the *compensatio* obliged by this duty. For Esposito, the advantage of the immunitary paradigm for biopolitics lies in its capability to subsume both vectors of biopolitics without incurring any contradiction –the productive or defensive and the destructive or hostile– in a single semantic

block²⁸. Through this dialectical movement, *immunity* defines and redefines the spatial and foundational difference between the *interiority* and the *exteriority* of the community²⁹. The question is, what is lost with the hermeneutic transfer of biopolitics to the immune paradigm? Our answer is simple: energy. The same energy which defines the social metabolisms of societies and their energetic dependence from oil and gas. It is symptomatic that in his philosophical proposal for Europe the word energy does not appear even once³⁰. However, the identity and values of the European community is deeply conditioned by its energy dependence on Russia, just as Cuba’s political identity was profoundly affected by the energy shortages resulting from the collapse of the Soviet Union in the 1990s. And this dependence takes on the greatest importance in the field of political immunology: Europe’s dependence on Russian gas has incapacitated Europe to activate its immunological potential in defense of Ukraine. Under the light of the Ukrainian tragedy, and at the gates of the energy shortages of the 21st century, any concept of community that does not consider the link between political identity and energy sovereignty must be updated.

2. From immaterial communities to biophysical metabolisms

As Jean Luc Nancy argues in his *Conloquium* with Esposito, the “positive” conception of communities defined the conceptual matrix of the multiple events of racial, nationalist, and ethnic violence of the 20th century³¹. Following Nancy’s steps, Esposito affirms that what is common in the community must be understood as *absence* or *lack*. To define this lack Esposito recurs to the linguistic analysis of the Latin term “munus”, which presents a triple connotation: *onus*, *officium* and *donum*. The first and the second pertain to obligation and office, while the third, *donum*, refers to a form of gift that combines the previous two in the form of a non-property³². Esposito wrote in *Communitas* following Heidegger that this lack is nothing but: “the abyss of being-a-self (*Abgrunddes Selbstseins*)”³³. With Heidegger’s notion of *mitdasein* (being-with there), Esposito avoids committing what he calls an “anthropological misread-

²³ In his dialogue with Foucault, the omission of the course *Security, territory, population* determined his initial reception.

²⁴ R. Esposito, *op. cit.*, 2008a, p. 52.

²⁵ *Ibidem*, p. 32.

²⁶ *Ibidem*, p.40.

²⁷ R. Esposito, *Communitas: the origin and destiny of community*, Cambridge, Polity, 2010, pp. 5-6.

²⁸ R. Esposito, R. *Terms of the political: Community, immunity, biopolitics: Community, immunity, biopolitics*, Fordham Univ Press, 2013, p. 21. Via immunitary paradigm, the legal and the biomedical meanings of *immunity* can be unified within a singular hermeneutic block: “while community causes the breakdown of the protective barriers of identity, immunity reconstructs them, in defensive and offensive forms, against any external element with the capacity to threaten it”. R. Esposito, *A philosophy for Europe: From the outside*, John Wiley & Sons, 2018, p. 240.

²⁹ D. Campbell, “Bios, Immunity, Life: The Thought of Roberto Esposito”, *Diacritics*, 36(2), 2006, pp. 9-11.

³⁰ R. Esposito, *op. cit.*, *A philosophy for Europe*, 2018, pp. 257-ss.

³¹ J.L. Nancy, & J. Watson, “Conloquium”, *Minnesota Review* 75(1), 2010, pp. 101-108.

³² D. Campbell, *op. cit.*, p. 4.

³³ R. Esposito, *op. cit.*, 2010, p. 87.

ing³⁴, which means exactly to construct the concept of community on any positive anthropological element that, in terms of property, would be common to all the members of the community. And even when Esposito claims to follow the Deleuzian concept of life in his concept of *affirmative biopolitics*, his approach to the relationship between immunity and biological life never problematizes the energetic and thermodynamic constitution of the organism. And this same deficit remains intact in his biopolitical analysis of societies³⁵. However, energy can be considered a positive property common to all the living human communities.

As Dominic Boyer pointed out: “Energieia, for Aristotle, was being-at-work. In modern physics, power is the rate at which energy is transferred, used, or transformed³⁶, but none of these conceptions of Energieia can be predicated from Esposito’s conception of community. From the materialistic standpoint, *the philosophical election of an “existential lack” as the common ground of the communitarian subject is contradictory with the ontological acknowledgment of “energy” as the common property of all the living communities*. As biophysical entities of the planet Earth, all the living communities are materially and energetically dependent on the thermal gradient between the Earth and the sun—all possible human histories belong to this gradient—. For all living beings, the interchange of matter and energy between the organism and the environment is necessary to keep the organic process away from thermodynamic equilibrium.

Far away from the current ecological and energetic crisis, this consideration has been present in the tradition of materialist philosophical thought. Already in the 19th century, for example, Karl Marx used the concept of *Stoffwechsel* (material interchange) to define the process of labor as the transhistorical law of all human societies. For Marx, labor was the interface between society and nature: during labor, work transformed simultaneously human nature, material substances and natural environments³⁷.

In French, *Stoffwechsel* was translated as *metabolisme*. This is the reason why the term *Stoffwechsel* is nowadays translated as “metabolism”, and the social interchange of matter and energy is translated as “social metabolism”. Far away from Marxist studies³⁸, in contemporary industrial, economic, and political ecology, this term has transited from being considered an analogical method of analysis to a genuinely descriptive methodology³⁹. The main reason for this success is that this instrument overcomes the society-nature dichotomy by showing the intertwined irreversibility of socionatural processes. In terms of Marina Fischer-Kowalski and Helmut Haberl:

Essentially, metabolism is a biological concept which refers to the internal processes of a living organism. Organisms maintain a continuous flow of materials and energy with their environment to provide for the functioning, for growth and reproduction. In an analogous way, social systems convert raw materials into manufactured products, services and, finally, into wastes. The way of looking at the society-nature-interaction as a matter of physical exchange dates back as far as Marx and was revived with “ecological economics”⁴⁰.

The life-energy nexus is what the concept of social metabolism brings out, and also what Esposito overlooks in his reception of the medical concept of immunity. This principle defines the “sociometabolic paradigm”, understood—using Plato’s concept of paradigm—as the heterogeneous current of social studies that uses the social metabolism as the “ideal model” to understand the biophysical dimension of human societies⁴¹. This ideal model has been improved and clarified by Victor M. Toledo, who defines “social metabolism as an indispensable tool for contemporary political ecology”⁴². From *biophysical inputs to outputs*, Toledo distinguishes five prototypical phases of the social metabolism: appropriation, transformation, circulation, consumption, and excretion (Cf. Figure 1).

³⁴ *Ibidem*, p. 94.

³⁵ What Esposito calls *affirmative biopolitics* represents his rejection of understanding life as a mere object of politics. For Esposito, life can use immunological dispositives to create new forms of society based on vital freedom and social justice. These affirmative biopolitics determine a second a second important rejection in Esposito’s thought. As he defends in his article “Totalitarianism or biopolitics”, biopower shall be understood in opposition of Hannah Arendt’s or Giorgio Agamben’s schemes. Cf. R. Esposito, “Totalitarianism or biopolitics? Concerning a philosophical interpretation of the twentieth century”, *Critical Inquiry*, 34(4), 2008b, pp. 633-644.

³⁶ To overcome the biophysical limitations of the Foucauldian concept of biopower, Dominic Boyer proposes “energopower”. Above all, Boyer wrote: “energopower is a genealogy of modern power that rethinks political power through the twin analytics of electricity and fuel”, D. Boyer, *op. cit.*, *Energopower and Biopower in Transition*, 2014, p. 325.

³⁷ This is particularly clear in the first volume of *Capital*, where labor is defined as a transhistorical process mediating the natural confrontation between the environment and the human body: “Labor is, first, a process between man and nature (...). It [the labor process] is the universal condition for the metabolic interaction [Stoffwechsel] between man and nature, the everlasting nature-imposed condition of human existence”, K. Marx, *Capital: A Critique of Political Economy*, Penguin Books, 1976, pp. 283, 290.

³⁸ John Bellamy Foster and Kohei Saito have defined the concept of social metabolism as the kernel of the eco-Marxist approach. This perspective began with: J. B. Foster, *Marx’s ecology: Materialism and nature*. NYU Press, 2000. However, the complete analysis of his importance in Marx’s work can be found in: K. Saito, *Karl Marx’s Ecosocialism: Capital, nature, and the unfinished critique of political economy*, NYU Press, 2017.

³⁹ R. U. Ayres, “Industrial metabolism”, *Technology and environment*, 1989, pp. 23-49; T. Wassenaar, “Reconsidering industrial metabolism: From analogy to denoting actuality”, *Journal of Industrial Ecology*, 19(5), 2015, pp. 715-727.

⁴⁰ M. Fischer-Kowalski, & H. Haberl, “Sustainable development: socio-economic metabolism and colonization of nature”, *International Social Science Journal*, 50(158), 1998, p. 574.

⁴¹ J. Ferrater Mora, *Diccionario de Filosofía*, Tomo 3, Madrid, Ariel, 1994, pp. 2691-2693.

⁴² V. M. Toledo, “El metabolismo social: una nueva teoría socioecológica”, *Relaciones. Estudios de historia y sociedad*, 34(136), 2013, pp. 42, 47-48.

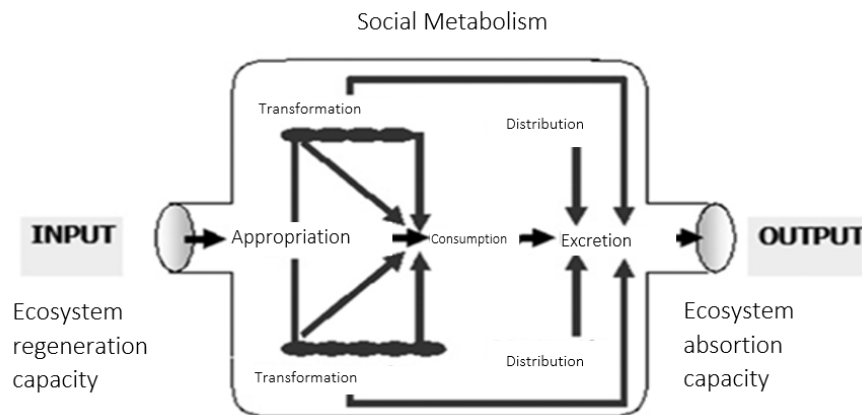


Figure 1. Social Metabolism. Source: González y Toledo 2011

Toledo, former Secretary of Environment and Natural Resources of the Mexican president López Obrador uses the metaphoric distinction *hardware-software* to distinguish two sets of elements: “While the first [the hardware] is represented by material, identifiable and quantifiable material, identifiable and quantifiable processes, the second [the software] is made up of dimensions is made up of dimensions (cognitive, symbolic, institutional, legal, technological, etc.)”⁴³. However, *metabolism* is a physiological concept, not a cybernetic one. For these reasons, we consider that the distinction anatomy-physiology is more suitable for the bio-sociological study of the structures and processes that make possible the reproduction of social metabolism⁴⁴. Thus, the *political anatomy of social metabolisms* would refer to the formal and structural dimension of the dispositives, while the *political physiology of social metabolism* will analyze the compound effects of their functional assembly.

In the effort to conceptualize the internment of political power in the biological dynamics of society, the German scholar Maria Muhle has been the first who found the first solid approach to the physio-politics of power dispositives. She argued that power does not only take life as its object, but as its functional model. Through mimesis and inscription, biopower reflects the two fundamental tendencies of life: self-conservation, through the elimination of normative deviation, and self-transgression, through the homeostatic regulation of the population. This is the core of her argument⁴⁵. However, the limit of Mule’s hypothesis lies in the following paradox: on one hand, she affirms that the correct genealogy of biopolitics requires to take into consideration the triangular scheme of dispositives presented by Foucault in 1978 –the scheme conformed by law, discipline,

and security⁴⁶–. On the other hand, it only considers two dispositives (discipline and security), leaving the physio-political effect of law out of consideration. Hence, our argument differs with Muhle in this crucial point: for Muhle, discipline guarantees self-conservation and security guarantees self-transgression; for us, the *three main dispositives or technological devices –law, discipline, and security– must work for both physiological tendencies*.

3. From biopolitics to physio-politics: the physio-politics of social metabolisms

The *physio-political* reading of social metabolisms takes as its starting point the triad of institutional devices analyzed by Foucault. More precisely, three different physio-political dispositives can be pointed out as the basis of the historical physiology of the social metabolisms. Firstly, juridical immunization defines the external and internal borders of the social metabolisms –a. dispositive of law–. Secondly, physical metabolization produces and destroys the different forms of techno-organic assemblage –b. dispositive of discipline–. Thirdly, the economic government provides the homeostatic balance of social metabolisms by connecting different social metabolisms through the global market –c. dispositive of security–. Each of these physio-political dispositives emerge in different historical contexts, deploy different operative models –a. exclusion of lepers, b. inclusion of plague-stricken, and c. smallpox inoculation– and produce different kinds of immunological effects in the social metabolisms as a whole: a. immunization of juridical practices; b. immunization of organized social forces, and c. immunization of bioeconomic flows.

⁴³ *Ibidem*, p. 51.

⁴⁴ From birth to death, living beings must remain physiologically active, whereas cybernetic systems are designed to be able to connect and disconnect without suffering damages. This is a characteristic of organic and irreversibly thermodynamic systems.

⁴⁵ M. Muhle, “The vitality of power. A genealogy of biopolitics with Foucault and Canguilhem”, *Revista de ciencia política* 29(1), 2009, pp. 143-163; “A genealogy of biopolitics: The notion of life in Canguilhem and Foucault”, In *The government of life: Foucault, biopolitics, and neoliberalism*, V. Lemm (ed.), 2014, pp. 77-97.

⁴⁶ M. Muhle, *op. cit.*, 2009, pp. 148, 157.

a. *The juridical immunization of communities.* For Foucault, law represented the negative or pre-technological conception of power which had in its center the negativity of the power of rejection. This functionality responds to one model: the exclusion of lepers; “A negative practice that used rejection for creating a clear division or distance between two groups or human masses”⁴⁷. This line does not have to be singular or absolute. It also refers to: “exclusion, disqualification, exile, rejection, deprivation, refusal, and incomprehension; that is to say, an entire arsenal of negative concepts or mechanisms of exclusion”⁴⁸. Furthermore, both Esposito and Foucault identify negativity as the main problem of law. Law must confront negativity⁴⁹. From Esposito’s point of view, each norm is a sort of communitarian antibody: the experience of negativity is inverted in the form of the norm and, once the same danger or threat is recognized, the norm is confronted against it⁵⁰. Here, Esposito is very close to Georges Canguilhem, who was a great influence on Foucauldian biopolitics. As Canguilhem wrote in *The Normal and the Pathological*, every form of value is nothing but the cancelation of an anti-value: “The normal is not a static or peaceful, but a dynamic and polemic concept. Gaston Bachelard, who was very preoccupied with values in their cosmic or popular form and in valorization following the axes of the imagination, has rightly perceived that every value must be earned against an anti-value. It is he who writes: The will to cleanse requires an adversary its size”⁵¹.

The symmetry between the norm and the negativity that precedes it is crucial to understanding the immunological character of the juridical power. Its antiquity and anthropological preponderance lie in its

technological simplicity. From antiquity, law only needed somatic energy, symbolic tools, registration systems and guardians: the energy coming from the bodies that dictated and executed the laws, the symbols used for the drafting of the laws and the images used to recognize the deviations. In three words: bodies, symbols, and images; the oldest elements of human interaction and also, the oldest weapons in the communitarian struggle against negativity. Thus, when Foucault points out that law imagines the negative –“since the law imagines and can only formulate all the things that could and must not be done by imagining them. It imagines the negative”⁵²–, he is also identifying the interdependence between political immunity and the production of social images. What is to be tolerated, and what is to be rejected, needs images to discriminate between conformity to the norm and deviation from it. Through the political, legal, and symbolic immunization of the community, the image of the immunized community is incessantly reinforced and purged from the negativity of non-tolerated images. Imagine, for example, a white, Christian, and patriarchal community: the effective difference between tolerance and rejection is deployed in the totality of practices mediated by community norms. This normative immunization would be oriented to the recognition, prevention, and elimination of deviations. In such a way this normative immunization would rely on the symbolic differences between Christian and non-Christian, white and non-white, subversive or non-subversive practices. All this to carry out the recognition, prevention and elimination of deviations within the temporal flow of images. (Cf. Figure 1).

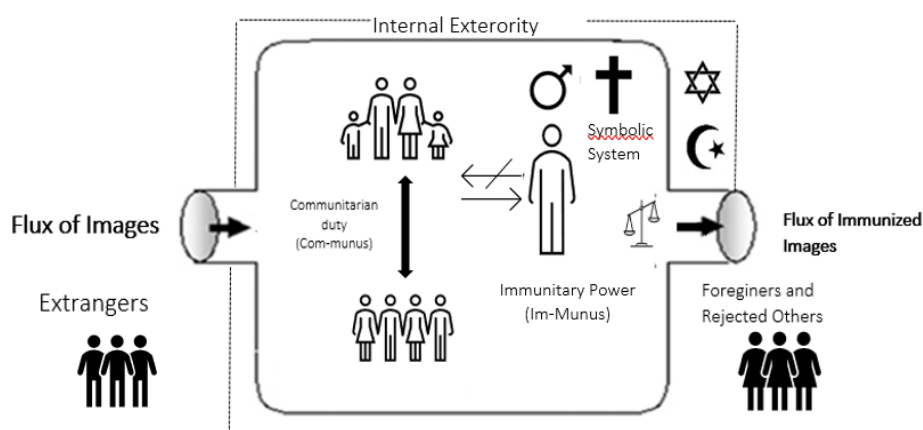


Figure 2. Physio-political immunization

⁴⁷ M. Foucault, *Abnormal: lectures at the Collège de France, 1974-1975*, New York, Palgrave Macmillan, 2003a, p. 43.

⁴⁸ *Idem*.

⁴⁹ R. Esposito, *op. cit.*, *Immunitas*, 2011, pp. 14-ss.

⁵⁰ *Ibidem*, pp. 66-ss.

⁵¹ G. Canguilhem, *The Normal and the Pathological*, New York, Zone Books, 1991, p. 239.

⁵² M. Foucault, *op. cit.*, *Security, territory, population*, 2009, p. 69.

This problem points to the heart of the relationship between immunological power, the real, the symbolic and the imaginary: as in biological immunological diseases, the immunological power of norms can orient its power of rejection against non-pathological agents, and these reactions can trigger pathologies without the need for real threats. In other words, the possibility of error is also a non-cancelable possibility of the immuno-political process⁵³. This is how law can work not only for self-conservation (rejection) and self-transgression (creating new laws) but also, as Esposito insists, for self-destruction. Indeed, it was Niklas Luhmann who first formalized the *immunological power* of juridical power in relation with social contradictions: “Because contradictions make possible (but do not impose) the elimination of deviations, they have characteristics that foster the development of a system of immunity, which, under changing conditions, must be compatible with self-reproduction”⁵⁴. And this compatibility points directly to the dynamic link between immunology and social metabolism.

At this point it is crucial to remember that, in terms of biological immunology, the spatial distinction inside-outside is much less immunological than the distinction between the assimilation or excretion. As John Protevi wrote, for immunology: “the question is never one of inside and outside, but of the economic distribution between intakes, assimilation or rejection and excretion. (...) The outside is already inside, in relation to the inside; the regulation of the interchange is the job of the immune system”⁵⁵. Therefore, immunization must work to define the external and internal borders of the community, and the *internalization of borders* must be metabolically functional to guarantee the self-reproduction of the community. Once again: the system of immunity must be physiologically coherent with the material and energetic interchange (*Stoffwechsel*) implied in the self-reproduction of the social body⁵⁶. Considering that social metabolism is also an historical and socio-natural process, we can differentiate how colonization, demographic and economic growth made necessary new systems of immunization.

b. The disciplinarian government of physical forces. Unlike law, discipline is inscribed in the mechanics of bodies and prescribes a physics of power. Specifically, discipline was briefly defined by Foucault as the: “the unitary technique by which the body is reduced as political force at the least cost and maximized as useful force”. Coherently, it emerged as a techno-political correlation of economic growth: “The growth of a capitalist economy gave rise to the specific modality of disciplinary power”⁵⁷. For this purpose, the discipline worked as the “inclusion of the plague-stricken”: producing a spatial grid where bodies and surveillance were spatially and temporally distributed⁵⁸. The ubiquity of surveillance controls, and the composed effects of the anatomic distribution of forces within the disciplinary grid, allows Foucault to identify the model of plague regulations within armies, fabrics, schools, prisons or hospitals; in all the institutions that permitted power to execute a microphysical and continuous power over anatomies or mechanic bodies⁵⁹.

The main physio-political function of discipline is the physical decomposition of the useless social forces (masses, criminal gangs, strikes) and the composition of the useful social forces (battalions in armies, workers in fabrics, medical forces in hospitals, criminals in prisons). Thus, the disciplinarian metabolism presents two main processes or movements, catabolism, and anabolism: the production of the individual is the result of the *disciplinarian catabolism*, which consists in the split of social masses into useful individuals, and the *disciplinarian anabolism* composes individual forces into collective forces or functional cells and tissues of the disciplinary metabolism. From the *useless forces* to the *useful* (using the individual as the social atom) the incessant composition and decomposition of social forces reflects the first systematic presence of *disciplinarian* anabolism and catabolism within the physical politics of the social body. In other words, it governs the flux of physical bodies through the metabolic distribution of anatomies from birth to death to guarantee the normative allocation of bodies in different spaces within the flux of chronological time. This is the main effect of the disciplinarian circuit (Cf. Figure 3):

⁵³ Esposito identifies in Hobbes the problem of sovereignty as the icon of political immunity, where the problem and the right of self-conservation (*conservation vitae*) became the main object of politics. Hobbes symbolizes a philosophical threshold: the conceptual expression of the immunological form of law through the correlation of law with self-conservation and death with political disobedience. Also, in Hobbes is present the counterpart of immunization, *autoimmunity*, interpreted by Esposito as a pathological excess of the preventive immunitary response. Cf. R. Esposito, *op. cit. Immunitas*, 2011, pp. 162-197.

⁵⁴ N. Luhmann, *Social systems*, Stanford University Press, 1995, p. 334.

⁵⁵ J. Protevi, *Political physics: Deleuze, Derrida and the body politic*, Bloomsbury Publishing, 2001, p. 102. Quoted in: I. Mutsaers, *Immunological discourse in political philosophy: Immunisation and its discontents*, New York, Routledge, 2016, p. 113.

⁵⁶ Common law is the paradigmatic example during the Middle Ages: from shortage riots to flour wars, custom served to immunize the social metabolism of primarily agrarian communities.

⁵⁷ M. Foucault, *op. cit., Discipline and Punish*, p. 221.

⁵⁸ M. Foucault, *Security, territory, population, op. cit.*, 2009 pp. 9-10.

⁵⁹ In the history of European social metabolisms, the irruption of discipline in the first half of the 18th century already expresses the shift of political power to the objectives of indefinite maximization. Long before the steam engine, colonialism and slave labor had already enabled an acceleration of continental metabolisms. As John MacNeill pointed out: “Slavery was the most efficient means by which the ambitious and powerful could become richer and more powerful. It was the answer to the energy shortage. Slavery was widespread within the somatic energy regime, notably in those societies short on draft animals. They had no practical options for concentrating energy other than amassing human bodies”, J.R. McNeill, *Something new under the sun: An environmental history of the twentieth-century world*, WW Norton & Company, 2001, p. 12.

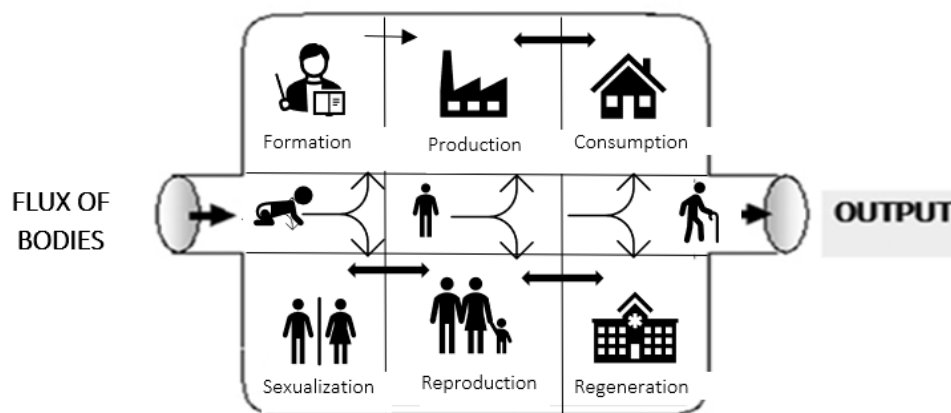


Figure 3. Physio-political metabolization

In the disciplinarian grid, communitarian immunization –the code which determines physio-political tolerance or intolerance– is not substituted but extended from the realm of images to the mechanical cosmos of physical politics. The docility-utility effect of discipline breaks with legal power in many ways⁶⁰. First: the scale is not collective or massive, but individualized. Second: the object is no longer the communitarian meaning of behavior or the language of the bodies, but the economy of their movements. Third: the temporal modality also changes; discipline implies an interrupted or continuous exercise of power that operates within chronological time. Fourth: the abject behavior is redefined, as Foucault studies in *The Punitive Society*, for example, the dissipation of human forces through laziness or vagrancy had to be redefined as the *improperness* of the disciplinarian state⁶¹. In *The Birth of Social Medicine*, Foucault shows how, at the end of the eighteenth century and in the beginning of the nineteenth, capitalism socialized the body as a factor of productive force: “For capitalist society, it was biopolitics, the biological, the somatic, the corporal, that mattered more than anything else. The body is a biopolitical reality; medicine is a biopolitical strategy”⁶². The transition from physical politics to biopolitics implies another physio-political social jump which implies the problematization of circulation of bio-physical forces within the urban *milieu*.

c. Immunization of the physical forces of communities, territories and populations. Instead of leprosy and plague, security takes the model of anti-smallpox campaigns: “this is a radical novelty of the po-

litical technologies of the 18th and 19th centuries”⁶³. Even though smallpox and inoculation practices are semantically linked to immunization, the logic here is not essentially immunological but *homeostatic*. In terms of Foucault, the function of security, is to respond to a reality in such a way that:

this response cancels out the reality to which it responds – nullifies it, or limits, checks, or regulates it. I think this regulation within the element of reality is fundamental in apparatuses of security. In other words: within the space of the population, security: *aims to establish a sort of homeostasis (...)* by achieving an overall equilibrium: the security of the whole with regard to its internal dangers⁶⁴.

Taking the population as its main object, the immunization of the circulation in the urban metabolism is the compounded effect of security devices⁶⁵. Once again, as Foucault explained in the course of 1978: “[security] was a matter of organizing circulation, eliminating its dangerous elements, making a division between good and bad circulation, and maximizing the good circulation by diminishing the bad. It was therefore also a matter of planning access to the outside, mainly for the town’s consumption and for its trade with the outside”⁶⁶. In physiopolitical terms, the main function of security is to *interconnect regional and national metabolisms through the regulation of the bioeconomic circulation*; this is the metabolic meaning of the adjustment between the population and the economic process. This adjustment required what Ian Hacking called

⁶⁰ M. Foucault, *Discipline and Punish*, *op. cit.*, 1977, pp. 137-ss.

⁶¹ M. Foucault, *The punitive society: Lectures at the Collège de France, 1972-1973*, Springer, 2016, pp. 104-ss.

⁶² M. Foucault, “*The Birth of Social Medicine*”, in: *Power*, J.D. Faubion (ed.), New York, The New Press, pp. 134-156.

⁶³ M. Foucault, *op. cit.*, *Birth of Biopolitics*, 2008, pp. 13–37.

⁶⁴ M. Foucault, *Security, territory, population*, *op. cit.*, p. 249; M. Senellart, “Summary of the course”, In: M. Foucault, *Security, territory, population*, *op. cit.*, p. 490.

⁶⁵ François Quesnay (a doctor) projected the medical and mechanical comprehension of circulation to the economic flows between cities and the countryside (2009: 294). The maintenance of price balances in the *urban milieu*, compromised security with the good circulation of elements in the streets.

⁶⁶ M. Foucault, *op. cit.*, *Security, territory, population*, 2009, p. 18.

an “avalanche of printed numbers”⁶⁷. The purpose: the statistical normalization of the population; its homeostatic conservation against excess or defect of certain elements, such as births, deaths, crimes, thefts, accidents or illnesses. Instead of the disciplinarian binary division between the permitted and the prohibited, security: “establishes an average

considered as optimal on the one hand, and, on the other, a bandwidth of the acceptable that must not be exceeded”⁶⁸. In other words, the governmental power regulated and stimulated the economic growth of the population defending the economic unbalance (its continuous growth) against the pathologies of excess or defect⁶⁹ (Cf. figure 4).

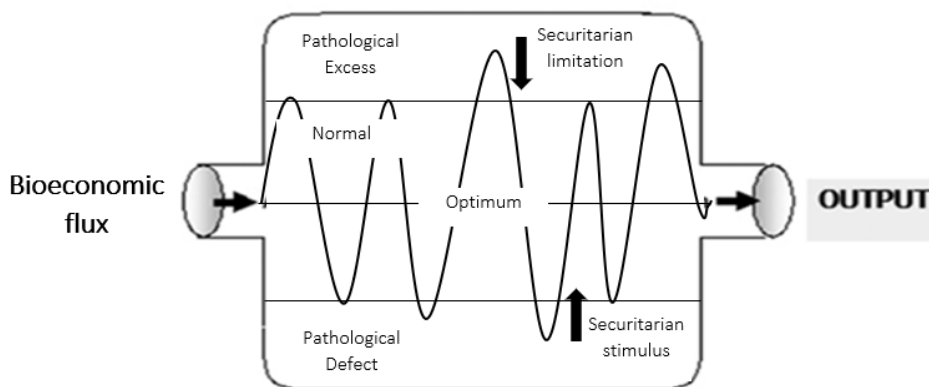


Figure 4. Physio-political homeostasis.

a-b-c. The physiopolitical complexity of social metabolisms. The birth of the liberal governmental-ity implies the adjustment of these three dispositives. Therefore, the political physiology of liberalism implied an strategical adjustment between juridical immunization against the poor and the nonproductive forces, physical metabolization for the routinary

organization and control of the labor force and the bioeconomics regulation of the balance of payments. For every dispositive, one different field of objectivity (Cf. Table 1). However, their simultaneous functioning required continuous exercises of political and technological adjustment.

Table 1. The Triad of Physiopolitics.

Dispositive	Model	Form of power	Object	Physiopolitical function
Law	Leprosy	Negative power	Communitarian images and symbols	Legal and cultural immunization
Discipline	Plague	Physical power	Physical forces & Anatomies	Anatomic composition and decomposition of social forces
Security	Smallpox	Biopolitical power	Bioeconomic population	Homeostatic circulation of bioeconomic flows

The making of what Jason W. Moore has called the world-ecology –the historical assemblage of social metabolisms– was the result of two interdependent processes: on the one hand, colonialism expanded the colonial social metabolisms, on the other hand, security interconnected the different capitalist social metabolisms with their own territories and with oth-

er metabolisms, producing a network of energetic spirals that have experimented an enormous growth during the last two centuries. Its expansive dynamics –producers of the eco-pathological exhaustion of territories and resources– were already identified by Foucault as a distinctive feature of the security dispositives:

⁶⁷ I. Hacking, “Biopower and the avalanche of printed numbers”, *Biopower: Foucault and beyond*, 2015, pp. 65-80.

⁶⁸ M. Foucault, *Security, territory, population, op. cit.*, p. 6.

⁶⁹ “So population does not have an absolute value, but simply a relative value. There is an optimum number of people desirable in a given territory, and this desirable number varies according to resources, possible work, and the consumption necessary and sufficient to bolster prices and the economy generally”, M. Foucault, *Security, territory, population, op. cit.*, p 345.

the apparatuses of security (...) have the constant tendency to expand; they are centrifugal. New elements are constantly being integrated: production, psychology, behavior, the ways of doing things of producers, buyers, consumers, importers, and exporters, and the world market. Security therefore involves organizing, or anyway allowing the development of ever-wider circuits⁷⁰.

Hence, the irruption of liberal governmentality marks a turning point in the circulatory dissemination of political immunology: the immunization of physical forces –the maximization of the useful and the rejection of the useless– is now articulated with the immunization of bioeconomic flows and environments. From the 19th century to our days, the economic competition and the growth of anthropogenic energetic metabolisms has driven the rapid transformation of earth systems. Is the entrance of mankind in the Anthropocene the necessary result of technological development? Yes, but only if we take into consideration the role of techno-political dispositives in its bio-historical trajectory. Inverting John A. Whitehead formula, who said that life is the struggle for available energy (Whitehead, 1987), we could argue that, at least from the 19th century, available energy has been a tool in the struggle for power.

To sum up, throughout this article it has been tried to justify the need and the method to move from biopolitics to physiopolitics for the convergence between biopolitical studies and metabolic studies in the framework of the Anthropocene. Energy is the great forgotten of biopolitics in the 20th century. However, the starting point of this analysis is that the political history of the Anthropocene is intertwined with the history of the acceleration and dissemination of capitalist social metabolisms. From the acceleration of the colonial economies in the 17th and the 18th centuries to the emergence of industrial metabolisms in the 19th and the 20th centuries, the genesis and the development of capitalist social metabolisms constitutes the triggering force of the current socio-natural crisis. In this socio-natural itinerary, the historical and physiological assemblage of power dispositives constitute a paramount in the political history of the Anthropocene. Thus, the concept of *physiopolitics* has tried to open a new dialogue between biophysics and biopolitics. The presentation of this new hermeneutic block –the transition from biopolitics to physiopolitics has been the main object of this work. Its use for the physiopolitical diagnosis of the present will be the subject of future research.

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⁷⁰ M. Foucault, *Security, territory, population*, op. cit., p. 45.

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