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Metabolic exchanges and practices of regulation: The assemblage of environment and society in early social sciences

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ABSTRACT

In this paper I discuss the way in which early sociology addressed the metabolic relationships between society and nature. Father founders of social science such as Comte, Spencer, Marx, Schaeffle, Lilienfeld, Giddings, Ward, Kidd, Geddes and some others shared a physiological vision of metabolism and all were concerned on the problem of social regulation of metabolism. On closer examination, early social sciences had realized that social and natural worlds are deeply interconnected even though they were trapped in the dilemma between mechanism and finalism. A metabolic perspective allows us to understand where the organic interchange between nature and society has problems endangering social reproduction. Yet, metabolism is not only a matter of physical sciences but also of social ones for it is ruled and driven by social agents. Given the set of practices, knowledge, and sociotechnical regimes that enable the metabolism, it is notable the almost entirely absence of a sociology of metabolic exchanges, of the manner in which social systems (towns, firms, households) consume "environment", i.e. matter, energy, and bio-capacity. The paper suggests that social scientists should investigate in the field of societal metabolic processes in an interdisciplinary perspective for exploring metabolic activators such as organized labor, consumption, and practice regimes as was suggested by early sociologists.

1. Introduction

Society draws matter, energy and services from nature for the production of goods and services necessary to ensure the bio-psycho-social continuity of its members and of those infrastructures that continually recreate the possibility of its own existence. Problems posed by environmental crises deeply affect the reproduction of global social systems and thus have become an object of social sciences research. However, contemporary sociology has rarely engaged with the reproduction processes that I call social metabolism.

In previous articles, I have dealt with analogies that sociologists of the nineteenth and early twentieth century employed to explain the links between society and nature (Padovan, 2008; 2003). In this paper, I try to show that early sociology developed material approaches that incorporated nature into foundational sociological models. Among early sociologists, the suggestion of social metabolism was widely adopted. It was used to describe mechanisms of action, reaction and adaptation that occur in the context of relations of exchange and transformation between society and nature. This vision could now be called coevolution. However, it also had other meanings. For some authors, coevolution was a matter of morphology and analogy that paid attention to a society's internal organization and its embedding in natural evolution; for others, it was a matter of physiology, a way of describing the functional exchange of energy and matter between society and the environment and how to overcome the resistance of matter, thereby allowing social achievements; for still others, social metabolism was a problem of the organization, transformational activities, and technical regimes of both labor and of a broader social regulation.

At that time, elements of an interesting materialist ontology emerged, most likely derived from the influence of antimetaphysical positivism, as in the case of Comte and Spencer or, among natural scientists, Moleschott and Haeckel. In some sense, they indirectly denied the sociocentric determinism, based on the Cartesian society/nature detachment, which characterized the social sciences of the twentieth century. At that time, there was not yet a functional distinction between the status of actor and *acted-upon* and foot and *footprint* that was as clear as conventional metaphors used today (Moore, 2011). As argued by Jason Moore (2009), the social makes history, but not within biophysical relations and determinations of its own choosing. Society is as much biophysically constructed as nature is socially constituted, even as these constructions and constitutions reveal distinctive modes of operation. In other words, early sociology provides some insights into the reciprocity and circularity of social and material changes, the role of living organisms and "matter" in social sciences and the closing of the separation between the cultural and the material (Reckwitz, 2002).

The prevailing early sociological models, with minor differences, insisted on the metabolic coevolution of nature and society, relying primarily on their formal and functional similarities. However, Comte,

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Spencer, Schaeffle, and Haeckel, just to name a few, went beyond the old idea that society is an organism. They considered this similitude as proof of the coevolution of society and nature. The constant exchange of analogies, metaphors, models and experimental data among disciplines such as biology, astronomy, physics, economics, physiology, and sociology provided an opportunity to investigate living and nonliving organisms (from the smallest invertebrate to human societies) in terms of metabolic systems that coevolve with their environment. Comte developed a societal embryology, Spencer an epigenetic social model, Haeckel a biogenetic fundamental law.

The metabolism approach provides an interesting reading of the relations between exteriority and heterogeneity that stem from the society/nature complex. In addition, this approach highlights the need to think of society and nature as reciprocally embedded. Finally, it seems possible to overcome the classical dualism between idealism and materialism, culture and matter, and language and object, reincorporating the material (natural) into the social (cultural). In a few words, metabolic approaches announce that the "material" coexists and coevolves with the "cultural". This means that, as suggested by Bronislaw Szerszynski, the "metabolism of the human–technology ensemble needs a biosemiotic analysis" simply because "each organism inhabits its own semiotic environment, constituted by the 'carriers of significance' to which its senses are attuned" (Szerszynski, 2010: 13).

A new metabolic perspective has been developed during the last thirty years, primarily by the Harvard school of industrial metabolism, the IFF Wien school of societal metabolism, and the Oregon school of metabolic rift. These schools of thought encouraged different disciplines—such as physics, ecology, biology, geography, economics, sociology, anthropology, and organizational studies—to reciprocally collaborate. In the beginning, the metabolic perspective was used as a paradigm to describe the exchange of matter between a city and its environment (Wolman, 1965) or among industrial operations in a manner that was analogous to the description of material and energy balances in natural ecological systems. However, the current development of some metabolic approaches is lacking in some aspects. For instance, they are unable to establish a link to the actors responsible for activating and changing metabolic processes, and therefore, it is not clear which social actors should contribute to a strategy of balancing metabolism. In this paper, I attempt to outline a sociological history of metabolism that is a little bit different from that outlined by Fischer-Kowalski (1998) and Fischer-Kowalski and Hüttler (1999) and that is useful, I hope, for fostering ideas to open the chapter on societal metabolism ruling agents.

In the first section, I give a more accurate account of the metabolic basis of early sociological thought, stressing agreements and contradictions. In the second section, I give an account of ontological and epistemological problems connected with the physicism/vitalism and society/nature dualisms, which still exist, albeit in different forms. In the third section, I attempt to show that there already exists a sound basis for a sociology with a strong foundation in society/nature metabolism. In the fourth and fifth sections, I attempt to outline a connection between social metabolism, labor and social practices. In the sixth section, I engage with a critical analysis of the socioeconomic regulation of metabolic mechanisms that transforms them into colonial or imperialistic accumulative regimes.

2. The metabolic approach at the dawn of sociology

Nineteenth-century social scientists believed that society was not only a sui generis entity but also a living organism that based its reproduction on matter and labor. Comte, Spencer, and Giddings were interested in the physiology and functions of organisms; for Novicow, Lilienfeld, Espinas, and Kidd, the morphology of social and biological organisms and their analogies were most important; Marx, Schaeffle and Kropotkin focused on the societal organization of labor and consumption as conditions of metabolism. The metabolic hypothesis increased the need to study peculiar phenomena of the nature/society complex, such as consumption, circulation, exchange, processing, storage, dissipation, growth, structuration, differentiation, evolution, colonization, and so on. The metabolic hypothesis also contains a mutualist perspective because every living organism exchanges energy and matter with its environment so that both can reproduce. Thus, it is possible to call this metabolic approach social "physiology", as suggested by Kropotkin (Padovan, 1999).

To early sociologists, society appeared as a living body, the highest manifestation of the process of organic evolution caused by an unceasing relationship between the organism and its environment. Auguste Comte believed that the study of man must necessarily pass through the study of the external conditions in which he reproduces himself, simultaneously as a biological species and as a society. Depending on the direction of scientific knowledge, from the man to the world that surrounds him or vice versa, different philosophies, one teleological (sometimes mixed with metaphysics) and the other positive, developed. The prevalence of an anthropocentric view meant that phenomena were interpreted on the basis of extranatural willingness, not natural laws. According to Comte, the anthropocentric view reconciled the two perspectives, subordinating the conception of man to that of the external and material world (Comte, 1838: 269–271). How did Comte define life? He considered it to be the condition of the existence of organized beings or their "double interior motion, general and continuous, of composition and decomposition, which in fact constitutes its true universal nature" (Comte, 1838: 295). This definition, as Comte himself admitted, can only be coextensive with the condition of organism/environment inseparability; it can only suggest the joined double existence of an organization ready to allow continuous internal renewal and an environment capable of absorbing and emitting. In short, the living are those organisms equipped with a metabolic process.

Each individual organism cannot have a life independent of the environment that surrounds it. "Life" is not the property of a particular type of substance, as the metaphysicists believed. Rather, it is the combination or the harmonious cooperation of two inseparable elements, the organism and the environment or milieu (ibid: 289). The living being and its environment are therefore in a state of mutual cooperation and dependence. Additionally, the more complex the organism is, the more complex the environment that surrounds it must be. This principle is particularly true for human societies, where things and events are generally remote in time and space. Man cannot live except under the most complex set of favorable external conditions, both weather and chemical–physical in nature (ibid: 292). In short, there is no evidence to support the independence of living bodies from their environmental conditions. Of course, organisms are able not only to adapt passively to the environment but also to interact freely with it, thus modifying it. From this ability to transform the environment derives the power of the organism to withstand high levels of variability in environmental conditions, properties that today we would call "systemic resilience."

Only a deeply disturbed environment could threaten the living, simply because the mode of existence of living bodies is clearly characterized by a strong dependence on external influences, both for the variety of different actions that are required and for the intensity of each of those actions. Comte therefore rejected both the idea of an organism's total independence from the environment and the concept of a body that is passively deformable under the pressure of the surrounding environment, which denies any individual adjustment by the living. In these words, we can see that Comte positioned himself between the two poles of vitalism and mechanism.

In a sociological sense, Comte was very skilled at extending the constitutive relation between organism and environment. Once recognized as necessary for the manifestation of various living phenomena, such as the corelationship and mutual action between organism and environment, or in other words metabolism, it was necessary to define the series of acts or actions that constituted them. According to Comte, it