



Theomai

ISSN: 1666-2830

theomai@unq.edu.ar

Red Internacional de Estudios sobre Sociedad,
Naturaleza y Desarrollo
Argentina

Padovan, Dario

The concept of social metabolism in classical sociology

Theomai, núm. 2, 2000

Red Internacional de Estudios sobre Sociedad, Naturaleza y Desarrollo
Buenos Aires, Argentina

Disponible en: <http://www.redalyc.org/articulo.oa?id=12400203>

- Cómo citar el artículo
- Número completo
- Más información del artículo
- Página de la revista en redalyc.org

redalyc.org

Sistema de Información Científica

Red de Revistas Científicas de América Latina, el Caribe, España y Portugal

Proyecto académico sin fines de lucro, desarrollado bajo la iniciativa de acceso abierto

REVISTA THEOMAI / THEOMAI JOURNAL

The concept of social metabolism in classical sociology

Dario Padovan

* Department of Sociology, University of Padua. E-mail: dpadovan@ux1.unipd.it

1. Introduction

Recently, social metabolism has been defined as "the particular form in which societies establish and maintain their material input from and output to nature; the mode in which they organize the exchange of matter and energy with their natural environment" (1). However, among early sociologists the concept of social metabolism was widely adopted. At that time it was used to describe the same process: the exchange and the transformation of matter, energy, labour and knowledge carried out between the social system and the environmental system. But it did have various different meanings. For some authors it was one concrete way in which society was embedded in cosmic evolution, which simultaneously offered models to help understand how the social system functioned; for others it was a way of describing the exchange of energy and matter between society and nature, that which permitted the reproduction of the social system and of the social achievement needed for human advancement; for others again, social metabolism was one way in which society could renew its *élite*. I would say that this concept was the product of sociological organicism and when sociology became more rationalist and individualist, it lost this perspective which linked society with its environment.

2. Analogical thought

The theoretical systems of the early sociologists were deeply influenced by contemporary interpretations of nature, both because they thought that the sciences of nature and of the biological body, such as biology and medicine, were becoming more and more accurate and scientifically objective, and because these early sociologists thought that the nature of society itself depended, in many ways on relations with nature that surrounded it, with the environment.

The conviction that there was an indisputable interdependence between social evolution and evolution within nature was due to the analogical cognitive structures which predominated. Analogical knowledge had dominated rational forms of Western scientific thought for many centuries (2). Writings by Plato, Aristotle, Hobbes and Rousseau, who compared society to a living organism are valid examples of the analogical method.

Some argued that analogy was, and in some ways still is, a tool for scientific learning, an indispensable and inevitable means for scientific progress, an epistemological bridge between social sciences and biological sciences. To be more precise, it is not only metaphor, allegory and similarity that shape scientific knowledge, rather it is a special kind of similarity in structure and form between two sets of structures and of particulars, that are manifestly very different but which, structurally, are parallel. Generalising, the physicist and mathematician Robert Oppenheimer wrote, "every analogy presupposes two ontological conditions; one, a plurality of real beings and thus among them an essential diversity. Monism is the born enemy of analogy. And, two, at the very heart of this multiplicity, of this inequality, a certain unity" (3).

Organicist sociologists like Spencer, Worms, Lilienfeld, Schäffle or zoologists like Haeckel and Huxley, based their works mainly on this analogical method. The power of this method gave many sociologists the feeling that they could successfully investigate the nature of Nature, of animals and of human beings contemporaneously, by assuming that all these phenomena were regulated by the same laws of behaviour and of evolution. As the sociologist Jacques Novicow argued, the laws of Biology can equally be applied to single cells, to clumps of cells, to plants or animals and to groups of humans organised in society ".

REVISTA THEOMAI / THEOMAI JOURNAL

The analogical method was not without its critics even among sociologists themselves. The most tenacious adversaries of organicism were the followers of Durkheim, in France; Weber and the sociologists of the Archiv für Sozialwissenschaft und Sozialpolitik, in Germany; and the sociologists of the crowd and of the élite in Italy. François Simiand attacked sociological organicism arguing that "analogy is not, strictly speaking, a scientific method, in itself it proves nothing"; Celestine Bouglé said that "analogy can, without doubt, be a starting point for explanations by suggesting research hypotheses, but it cannot be a substitute for the explanation itself"; Gabriel Tarde wrote that "organicism is not only superfluous, it is also dangerous " (4).

However, organicist analogy does make it possible to somehow keep society and nature together during analysis. Indeed, the end of organicism marked the complete breakdown of any connection between types of phenomena which now appear as completely separate and which are identified by radically different laws and regularities. As Alfred Espinas recognised, "it was possible to recognise the rule of entirely new phenomena within society". But in this way, the centrality of thinking about the ways in which society uses, copies, follows and imitates nature were also lost.

3. Natural and social metaphors

During the nineteenth century, the prevalent idea was that the social link that cements society is created within the natural conditions in which living beings exist, developing out of the complex of basic needs and of the tools to satisfy them. Both the genesis and the evolution of all societies are ruled by constant and natural laws. These laws embody the origin, characters and evolution of "social facts" and they originate in the biological and cosmological conditions of human existence.

Ernst Haeckel, who "invented" the term "ecology" (5), introduced a new field into the biological sciences, one where the relationships between living beings and the environment in which they live are pre-eminent. Haeckel expressed the idea that a causality relation exists between the ontogenesis and the phylogenesis of organisms. The former, ontogenesis, studies the individual development of organisms, which is fast and is completed before our very eyes; the latter, phylogenesis, studies the genealogical evolution of organisms, which is very slow and must be calculated in terms of centuries. For Haeckel, the scientific link between ontogenesis and phylogenesis made it possible to physiologically link inheritance and reproduction, adaptation and nourishment. Thus, in his view, this approach established a mechanical conception and a physico-chemical explanation of these two biological functions of organisms. In this way he also denied every teleological, spiritual and vitalist interpretation of organic life. Haeckel's ideas spread throughout all areas of the natural and social sciences. For these sciences, Nature was an unique complex system of parts which affect each other. In this system different partial systems produce, apply and spread the living force in different forms that obey universal laws which maintain the unity of the whole. Everywhere, systems of parts in vital communion, appear: not only the social body is an "association", but the natural one is too (6).

Haeckel's use of metaphors to explain the organic management of living beings is very important. Building on the work of Rudolph Virchow, Haeckel stated that a higher organism is like a managed social unity, like a State, whose citizens are individual cells. In all civilised States, citizens are, to a certain degree, independent individuals; but, they are also mutually dependent, because the social division of labour increases the need to subject them to public laws. In the same way, Haeckel argued, the cells of plant and animal bodies are happy about their individual independence up to a certain point; indeed, following the biological division of labour, they fall into a condition of mutual dependence in which they are then subjected to the central power of the community.

In Haeckel's opinion, this comparison could be taken further. The animal body, with its strong centralisation, could be considered to be a cellular monarchy; the plant body, less centralised, could be conceived of as a cellular republic. Haeckel turned the analogy, that we will meet with among sociologists, upside down. The fact that zoologists and biologists like Haeckel used social and political patterns to explain the biological dimension of bodies, and sociologists used the biological viewpoint to justify certain social organisations is, in itself, very interesting.

REVISTA THEOMAI / THEOMAI JOURNAL

Haeckel was probably influenced by the writings of Walter Bagehot, which had appeared in the *Fortnightly Review* between 1867 and 1872. Haeckel, outlined a comparative anatomy of plants and animals similar to comparative political science, which latter was, at the time, very popular. He felt the need to explain natural and biological evolution through social evolution. The process of evolution in the organicist sense was, and is, much more visible in human social groups than in the realm of organic nature. It was too difficult to show the natural and genealogical history of living species. Only the individual and social ontogenetic processes of differentiation and integration can really be seen, indeed, our knowledge of phylogenesis rests solely upon inference. In short, the history of human social groups, where historical records describe numerous cases of a transition from the simple to the complex, could also explain the evolution of polycellular organisms.

For Haeckel, just as comparative political science described a long series of progressive improvements in the field of the forms of political organisation, so too, did the comparative anatomy of plants and animals revealed a long series of progressive improvements in the field of cellular states. Arguing from this perspective, Haeckel stated that the organisation of the cellular field lacks "*telos*" a precise aim, but it is the manifestation of the historical evolution of the cells and of the mutual and reciprocal action of the cells upon each other. This evolutionary process had also taken place in society, therefore the history of human civilisation could explain the history of the organisation of polycellular organisms to us (7).

This circular interpretation of nature and society was very widespread at the time. Indeed, organicism founded its theoretical structures on it. According to organicism, the first social law that provided the basic logic to sociology at that time is that society is an organism, a true living body. This was the main difference between the old and the positivistic organicist conceptions of the social organism. The old idea that society seems to be an organism was simply an analogy; the positivist ideas of Spencer, Schaeffle, Jäger and Espinas, all said that society is a true living system, a homology, an experimental truth (8).

4. Fitting and evolution

Organicism stated that evolution is a permanent process of averaging and of the adaptation of the organism to the environment. The organism's life depends on this equilibrium being maintained. If the environment changes, or is changed suddenly, the organism dies; but when alterations take place slowly and gradually, the organism will find a new equilibrium. Thus, organisms should also be perceived as being within a dynamic process, one in which they undergo incessant differentiation and integration of both structures and functions. Bio-Organicist thinkers argued that the same happens in human society. Improvements could only take place when the adjustment process was both incessant and dynamic. If the transformation process stopped or went too fast, such as during a revolution, society would die. Human society, like any organism, adapts to ceaseless variations of the environment. It harmonises not only with natural environmental modifications such as climate, food and vegetation, but also to the new conditions produced by psychological activity and by economic actions. Organicists said that these activities would create an artificial environment, different but still linked to the natural environment. This mechanism, analogous to the natural one, was termed "social metabolism". In Paul Lilienfeld's opinion, human society, like natural organisms, is a real entity. It is nothing but a continuation of nature, a higher manifestation of the same forces that underlie all natural phenomena. It, like all living organisms, is characterised by the differentiation of parts and the integration of wholes, the development, perfection, multiplication, specialisation and refinement of structures, the storing of energy. Biological and social organisms are similar in this, rather, they are homologous. Society is only the highest form of an organism and, just like an organism, it too is a living unity, absorbing the ingredients of its environment and with a metabolic process. Its individuals are as dependent on the whole society as any cell is within any organism and, like a cell, society too has its nervous system and its reflexes.

Drawing a parallel with Spencer, Lilienfeld argued that the principal difference between a social and a biological organism is that society is somewhat less integrated than an organism. But in this respect there are three degrees of organisms: plants which lack an ability to move in their parts and in their whole; animal organisms which have an ability to move as a whole; and social organisms, which can move in their whole as well as in their parts (individuals). Thus, this difference means only that the social organism is the highest class of organism, and nothing more. Lilienfeld came up against some objections: in a society, unlike in an organism, the parts move, are asymmetrical and each individual has a "self" and a specific integrated consciousness while a society does not.

REVISTA THEOMAI / THEOMAI JOURNAL

Lilienfeld countered these objections by declaring that in an organism parts move from one individual to another like spermatozoa, that social hierarchy is a specific kind of a symmetry in a social body, and that the individual "self", formed by a changing, mosaic, process, is similar to the public mind and to government activity in a society. Basically, sociology should be based on biology and must apply all its laws to the scientific interpretation of social phenomena. *"Nihil est in societate quod non prius fuerit in natura"*, said Lilienfeld (9).

In this stage of bio-organicist thinking, society is not separated from nature. In the eyes of positivist sociology, society was almost completely immersed (or as Spencer said, embedded) in the natural and cosmic evolution of things even when some phenomena could be seen. This could have led one to think that there was increasing differentiation between the "natural" and the "social" or, as Spencer would have said, between the organic and the super organic. Man as well as society are a part of nature and they are, mechanistically, subject to the same rules that govern natural evolution. At most, society is more complex and differentiated than any other living organism. But its functions and goals are very similar. Only with Durkheim did social thinking become aware that the modern social organism was very different from both ancient society and animal or natural organisms.

5. The organism and the environment

This circular interpretation of nature and society was widely accepted and organicism based its theory on it. Society appeared as a true living body, the highest manifestation of the process of organic evolution. The way in which biological and social life are reflected in nature highlights the fundamental relationship between the organism and its environment. This relation was first described by Auguste Comte. When discussing the concept of "life", a concept that reflects the daily life of a living system, Comte argued, quite rightly, that the individual organism cannot live independently of the environment that surrounds it. "Life" was not a property of a particular type of substance, as the metaphysicists would have argued, rather it was the combination of, or the fairly harmonious co-operation between, two inseparable elements: the organism and the environment or *milieu*. Both the living and the inert find themselves in a situation of mutual collaboration and dependence: the more complex the organism is, the more complex will the environment which surrounds it be. This maxim is particularly true in the case of human society where things and events were usually distant both in terms of space and of time.

Comte thought that organisms were, in some way or another, not only able to adapt passively to the environment, but also to interact freely with the environment, thus modifying it. "If everything that surrounds living bodies really tends to destroy them" argued Comte "then the fact that they exist would be radically incomprehensible" (10). Thus he rejected both the idea of total interdependence between the organism and the environment, and the idea of an organism that could be passively deformed by the pressures of the surrounding environment, something which would deny the living being any individual spontaneity.

By positing the concepts of organism and of environment in relation to the physical conditions of life and inert matter he, in some way, mirrored Cartesian dualism between extension and thought. This dualism was the necessary condition that rendered universal progress, both biological and social, possible. And this progress was none other than the enslavement and the control of inert matter by all life, in the light of an innate social subjectivity which rejected the idea of behaviourism as being derived from the environment. Life had to reproduce and rise by means of an exhaustive struggle against inorganic matter, against non-living nature death. In his final works, Comte maintained that humanity's prime task, or duty, towards life was "to increasingly unite all living nature for an immense struggle against the whole inorganic world". Thus, positive politics should "direct all living nature (in the struggle) against non-living nature, in order to exploit its dominion over the Earth". This was the ontological type of path through which Comte asserted the right of sociology to play a leading role in explaining human progress, but in this very way, he established a principle of natural subordination which was to underpin aggressive industrial Positivism (11).

6. Between material and symbolic metabolism

Analogical thought, and early reflections on the relation between living organisms (biological and social) and the environment laid the foundations for the discovery of the phenomenon termed "social metabolism". For the sociologists of the time, the fact that a living organism depended on its environment posited a problem of the way in which the exchange of matter and energy between the organism and its environment took place. Obviously, in their explanations, they drew heavily on both biology and anatomy both of which, as we have seen, had for some time been trying to discern the nature of the relation between living things and their environment. However, once they began to consider the social organism, not only did the scale of the phenomena being studied change, but also the quality. Above a certain size threshold, quantity took on an entirely different, often inexplicable, qualitative meaning.

Spencer's work, based on close analogies between natural and social organisms, offers an important demonstration of the way in which society and nature are related. A society, Spencer argued, lives by appropriating matter from the Earth. It appropriates the mineral matter used for buildings, fuel and so on; the vegetal matter raised on its surface for food and clothing and the animal matter transformed from vegetal matter. The very process of social metabolism became clear when Spencer said that "the lowest social stratum is the one through which such matter are taken up and delivered to agents who pass them into the general current of commodities" (12). This process of exchange and transformation reveals the true nature of "social metabolism".

But in Spencer there was an other unusual kind of metabolism: when nature becomes a mirror of society. A mirror which reflected the ways in which society transformed itself, reproducing the same rational bases. Furthermore, in this way, the exchange between society and nature became cognitive and symbolic. Nature offered to sociologists the gnoseological structures to survey the workings of society. The functional rationality of Spencer had glimpsed within the natural organisation of biological organisms, and which had burst forth freely from the evolutionary dynamic of such organisms, was soon applied to the analysis of society as a system. Thus, we can also speak of cultural or symbolic metabolism.

Unlike Comte, Spencer did not really consider nature and living organisms as the counterpart of society rather, he saw them as a reflection of social organisation. Thus the social construction of the image of nature was fundamental. For Spencer, society had to go through the same evolutionary stages as did individuals, animals and plants. At the end of this evolutionary process, society would have reached a new level, unlike the animal level wherein the integration of the whole was subordinated to the autonomy and freedom of the parts. Thus society would become a super-organism.

I believe that Spencer had a very clear picture of the type of society he sought, an image that grew out of his liberal ideology which always made him lean more towards liberty than to dominion. But the most interesting aspect concerns his interpretation of nature as a series of evolutionary steps during which organisms acquire new levels of differentiation and integration. Thus society was the ideal conclusion of natural evolution.

For Spencer, the key concept was that of *evolution*. Evolution corresponded to the process of increasing differentiation (that is, of functional specialisation) and to integration (or rather, of the mutual interdependence of the structurally differentiated parts and the co-ordination of their functions). Furthermore, within a group, evolution was linked to the distribution of quantities of materials and movement: "evolution under its simplest and most general aspect is the integration of matter and the concomitant dissipation of motion; while dissolution (the precise opposite of evolution) is the absorption of motion and the concomitant disintegration of matter"(13). The tension between evolution and dissolution was, in Spencer's view, visible everywhere and even as one process triumphed, so would the other triumph in its turn. In ecological terms one could say that Spencer had already identified the process that cybernetics has called "the increase and decrease of negative entropy", that is, the dialectical relation between order and chaos.

REVISTA THEOMAI / THEOMAI JOURNAL

Lastly, the process of evolution is linked to another curious phenomenon that Spencer identified quite clearly: he argued that *heterogeneity* was more stable than *homogeneity*. The passage from a state of unstable homogeneity to one of stable heterogeneity was, in Spencer's view, an almost universal fact. At the time when the *Principles of Biology* was published, this conviction was still without any empirical foundations but, curiously enough, it fits perfectly with what ecologists have recently discovered: ecological communities that contain a large number of interdependent species are very stable, while those with only a few species are subject to violent fluctuations and the population itself may even become extinct.

In Spencer's view society mirrored living organisms in organisational and functional aspects. He argued that social and biological organisms are similar in terms of the system by means of which they are sustained (metabolism): the system of distribution (the vascular and circulatory system in an organism is similar to the arteries, paths, taken by trade and commerce in a society) and, also, the system which regulates the organism (the nervous system of an organism is analogous to the system with which a society is governed) (14).

Thus Spencer, if he is read carefully offers a mine of observations, concepts, theories and explanations concerning the relation between society and nature and the way in which society and nature can reciprocally influence each other.

7. Social metabolism as exchange of matter and labour

Organicism thought that evolution was the permanent process of an organism's adaptation to an environment. The organism's life depended on maintaining this equilibrium. If the environment were to change suddenly, the organism risked death, if changes took place slowly and gradually, the organism would find its place in a new and well balanced state. Thus organisms should be seen as being part of a dynamic process, within which they show phenomena of unceasing differentiation and integration of both structures and functions.

The same happens within human society. This can only improve if the process of adjustment is both unceasing and dynamic. If the process of transformation is blocked, or goes too fast, as for example during a revolution, there is a risk that society will collapse. Human society, like any other organism cannot not adapt to incessant variations in the environment. It must adapt not only to natural environmental changes in climate, food and vegetation, but also to the new conditions produced by economic and social activities. Activities of a social nature, create an artificial environment, different from but linked to the natural environment. This mechanism of differentiation of the environment outside of society was, like for the natural environment, called social metabolism.

A fairly clear description of social metabolism was offered by the German sociologist Adam Schäffle. He sociologist, was one of the best at interpreting the process which allowed society to reproduce itself. In Schäffle's opinion, the pre-condition for every activity, from those of the smallest, least important parts, to the activities of the largest parts of the social body, was a "base" (Vorrath) of labour power in the form of population and goods. All effective work consumed part of this "base" of energy and made renewal of the base necessary. In the same way the social body too requires an exchange of materials, which simultaneously penetrates every part of the social body: production, circulation, distribution, intermediary exchanges, use and elimination of the materials necessary for maintaining both the person and institutions of the social unit.

Indeed, continued Schäffle, every day an immense mass of the materials and the energy of nature are, through work activity, appropriated by the social body, only to be adapted to its needs, through production activity and then distributed to the various parts through circulation; transformed into the social fabric by means of absorption (as for food) by both institutions and individuals, and returned into the lap of nature through the consumption of goods and bodily forces. Thus Schäffle clearly outlined the mechanism of that social metabolism by means of which the energy and the matter existing in nature enables the social body to maintain itself.

REVISTA THEOMAI / THEOMAI JOURNAL

Furthermore, the exchange of materials does not only serve as a means of conserving the bio-organic substratum of society, that is conserves biological bodies, it is also indispensable for maintaining the extra-organic parts of the social body: the functions of social life, the spiritual, religious, ideas, culture and symbolic aspects which cannot exist without an exchange of materials. Even though it is still elementary, Schäßle recognised and described, very clearly, the ecological interdependence of society and nature.

The economic and physiological exchange of material does not entail the destruction of the material and energy but, rather, it entails their re-organisation into sources of energy and into institutions which make their social use possible. Basically, Schäßle applied thermodynamic principles to social exchanges. According to these principles energy and matter are not destroyed but are only transformed, dis-organised and then re-organised for other uses. An efficient mechanism of social metabolism can neither allow any energy to be lost nor permit increasing entropy, the result would be crisis within the social organism itself (15).

Schäßle distinguished between a *progressive* and a *regressive* exchange of materials or matter. The former corresponds to the production and manipulation of raw materials; the second to the consumption and elimination of used materials (waste/rubbish/garbage). This distinction renders the social exchange of material that is carried out by the human community unique, different from that of animals and plants. Even though the organic process of transformation of materials is similar in humans and in other animals at the bodily level, Schäßle, quite rightly argued, that the social economics of the exchange of materials was very different from the natural economy of exchange as practised by other organisms.

Economic regulation of social metabolism depended on the conscious needs and reasons developed by society. According to Schäßle, socially manipulated goods, other than raw materials, contained a *quid* of uniqueness, spirituality, rationality, work and social techniques that made them completely different from the goods required for animal life. Traces of marxian thought seem to hover around these words. Work makes the social exchange of materials possible and this work is, at a high level, conscious, spiritual, guided by rationality. The rational activity of intelligence, feeling, will, makes the energy and the matter in nature available to humans, modifying, dis-organising and re-organising both energy and matter in order to meet humanity's specific needs. Thanks to agriculture and animal husbandry, the same process for the production of food rationally dominates the whole organic kingdom of nature: nutrition becomes both rational agriculture and culinary art.

I do not wish to take this reflection on Schäßle's social metabolism any further, it speaks for it itself. I would only like to add some concepts that Schäßle used to explain social economy. The first is *nature*, which he meant as a "font or spring" and as the "place of defecation/evacuation" for the exchange of matter. Nature was one of the three factors of production identified by Schäßle, which could be associated to labour and capital (the influence of Marx?) (16). Nature demonstrated two contrasting aspects in its relation with social labour: on the one hand, resistance to the use of its resources and energy which had to be overcome through the rational intelligence of human beings; on the other, however, nature could be of help to society without this help having to be exchanged with social labour. Schäßle here was referring to light, heat, rain, the air we breathe, that is, a group of "free goods", (*res communes*) which have recently been defined as being "services supplied free of charge by the ecological systems of society for the good functioning of the support system for life on Earth" (17).

The second concept was that of *scarcity*. For Schäßle quantitative scarcity and the qualitative lack of natural resources was the basis of all need, hence of the social economy of exchange which was effectively a complex of means for satisfying needs. Here he seems to be reasoning along the lines of the classical economists, except, one should remember, he was writing in 1874.

The third concept was that of *labour*, in the broadest physical meaning of the word: every effort made by living forces, every use of this living force. According to Schäßle, both the labour of every person and every service (utility) supplied by a thing, every service and every personal use was labour. This definition is quite close to Lilienfeld, for whom labour is the combination of the physiological forces of natural organisms with the forces of human bodies or, to use an other formula, the combination of matter and force [p. 92].

8. Social metabolism as social achievement

Another interpretation of metabolism came from Lester Ward. For him, life consisted of a power that pushes matter forward and upward into a higher state. The life force is a new phase of the universal force which drives evolution. It presses forward everywhere and transfers the largest possible quantity of inorganic matter to the organised state (18). Metabolism was, in this respect, a normal process which conserves and reproduces the organism itself. Its functions are to copy and repeat, grow and multiply, but always to retain the same structures. The same is true within society: social metabolism will never produce a new structure (19).

However in society, just like in organisms, there is a surplus of energy that must be worked off. This energy is not, however, equally distributed: such surplus social energy is restricted to favoured groups and all social innovations emanate from them. In brief, said Ward, social innovation has been largely due to this form of social inequality in the distribution of surplus social energy. Even though most of this energy is expended to supply physical needs, a large part of such energy overflows in the direction of social innovation. The final criterion of the dynamic action of innovation is *human achievement*.

Connected to the process of innovation was the process of "*conation*". Ward described this as the efforts to satisfy desire and to preserve life. In this perspective, social metabolism became a relevant concept, because the aims of "*conation*" required major modification of the surrounding environment. Social metabolism was thus identified with the process of considerable transformations within the environment (20). In order to explain human action upon the environment, Lester Ward used two different kinds of concepts: the utilitarian concept, connected to the satisfaction of desire and the biological one, related to the preservation of life. The satisfaction of every such desire effects extensive changes in the immediate environment. Many of these changes are permanent, contributing to the civilising influences in society. Thus dynamic action, called "transformation of the environment", is crucial for all social progress.

According with Schöffle's principles, Ward thought that nature was able to freely provide help and commodities. But, without rational tools was unable to have anything from the environment to consume in society. He further stated that civilisation, as expressed by human achievement, is simply the means by which transformations, those in the interest of human beings, can be wrought within the material environment. Furthermore, social progress is undesired/unsought, unintended and unknown by most human beings. It takes place in opposition to the desires of individuals and in spite of the universal conservatism and misoneism of mankind. It is the *natura naturans*, the mysterious power of nature working for ends that are beyond the scope of human wisdom. This statement of Ward's is very curious, but it did introduce the concept of the social role of science. It was the mission of true science, of the owners of surplus energy, to lift the veil and peer behind it into the workings of this power (21).

Social conation had, for Ward, a biological homologue, the Lamarckian principle of exercise or effort. This is a principle of dynamic biology, which co-operates with chance variations, whose sociological equivalent would be innovation. The principle is the same in sociology as in biology. But there is an important difference: "in biology the environment transforms the organism, while in sociology man transforms the environment" (22).

Material civilisation consisted in the utilisation of the materials and forces of nature. The civilisation utilised heat, light, gravitation, wind, water, steam, matters which are freely a disposition of the men. Matter was, for Ward, casuality, power, force. He, in some way, shared with Saint Simon the idea that matter possessed some inherent power. Social progress is conditioned by the principal that *matter is dynamic*, and each time man has touched it with the wand of reason it has responded by satisfying a want. Ward was aware that "progress is in direct ratio to the action of man on things, and in inverse ratio to the coercive action of man on man" (23).

But, even though he agreed with some of the principles of organicism, he had already distanced himself from them more than we perhaps realise. Social achievement did not merely consist of the wealth, objects and commodities, needed to preserve the life of an organism. Achievement was, for Ward, permanent, eternal and non-material. The products of achievement were not material things, but methods and ways, principles, devices, arts, systems, institutions, in a word, *inventions* as Gabriel Tarde said at the time.

REVISTA THEOMAI / THEOMAI JOURNAL

Language, science and mental attitudes, which all improve social efficiency, are manifestations of achievement. Labour itself, said Ward quoting Gustav Cohn, "has its basis not in nature, but in civilisation; it does not depend on physiological but on psychological labour" (24).

The sociology of Ward was a bridge between an organicist and deterministic interpretation and a rational and psychological view of society. In this respect, social metabolism furnished both the elements for social functions: on the one hand it provided matter and raw materials for the basic biological reproduction of society; at the same time nature permitted the acquisition of knowledge, skills, inventions and control of natural power which were the true social achievements. Social metabolism lost its purely materialist meaning and revealed that spiritual and rational achievement which created the bases for social continuity.

9. Social metabolism inside the social system

With Vilfredo Pareto, Max Weber and Emile Durkheim, sociology began to neglect the relationships between society and the environment and to concentrate solely on the social system itself. Pareto thought that the form of society was influenced by the following elements: 1. the soil, climate, flora, fauna and all other geological and environmental factors; 2. external elements of society, such as the actions which reside in external space and time; 3. internal elements, such as race, feelings, interests, attitudes to reasoning and knowledge, in brief: "derivations" and "residues" (25). But, Pareto did not directly analyse these environmental elements, rather, he considered them indirectly.

Pareto was very interested in movements within the social system. His theory of the circulation of *élites* shifted the concept of *metabolism*, originally coined in relation to the study of living organisms, onto the social plane. Under the influence of the organicism of the period, the early paretian theory about social circulation used some organicist metaphors. In the introduction to *Les Systèmes Socialistes*, Pareto argued that the molecules which make up the social aggregate, or group, are not at rest, i.e. are not fixed, some individuals get richer, others become poorer. Broad, fairly widespread movements shake up the social system from within "which, because of this, seems even more like a living organism". In a living organism, "the circulation of blood makes some molecules move fast, the processes of assimilation and excretion constantly modify the molecules that make up the tissues, while the external shape of the organism, for example an adult animal, only undergoes insignificant changes " (26).

When examining the question of the degeneration of the elements that make up the *élite*, Pareto used another organicist metaphor. He stated that the aristocracy can only survive through the elimination of degenerate elements and the contributions of the new. This is a process "like that which one can see in living animals, which would not survive if they did not eliminate certain elements and substitute them with others which they then assimilate. If this circulation is blocked, the animal dies, it is destroyed. The same happens to the social *élite* [...]" (27).

The circulation of social elements within society was a spontaneous way of re-establishing the equilibrium of the social system. Social equilibrium was fairly similar to that of a living organism, and in this analogy is possible to discern the novelty in this paretian theory which adopted the concept of metabolism to explain the movement of the social substitution of *élites* among the different social strata. Furthermore, circulation was closely linked to the phenomenon of social heterogeneity. The equilibrium of a social system depended on the speed of this circulation: whenever circulation between different strata and classes was either too fast or too slow, the social system would lose its equilibrium and revolution could take place.

Thus, is it not difficult to interpret the paretian theory of social equilibrium in biological terms. It is in some way close to that of autopoiesis. The condition of equilibrium is analogous that of a river: a river is not stationary, it flows. Even a minor modification to the form (organisation) of the river triggers a reaction which serves to maintain the original form. In this way, the equilibrium of a social system is analogous to that of material or living systems. This equilibrium is obviously a dynamic equilibrium, and biology, as Pareto said, knows only too well that life is movement (28).

REVISTA THEOMAI / THEOMAI JOURNAL

The circulation of the aristocracy, was, for Pareto, crucial for maintaining social equilibrium. Such circulation was analogous to the living metabolism process of any living organism. However, by placing the phenomenon of metabolism entirely within the social system, Pareto ignored the role and function played by the environment in the preservation of social equilibrium.

10. Conclusions

In the eyes of positivist and organicist sociology, society was not separate from nature: the two could perhaps compete or struggle or, more often, co-operate and collaborate, but they were never considered in different ways. Human beings, like society, were part of nature and were linked, both mechanically and dialectically, to the same laws that govern natural evolution. Furthermore, society was more complex and more differentiated than any other living organism. But both the ends and the function of society and nature were very similar. Only after the advent of sociologists like Durkheim, Weber and Parsons, did sociological thought reach the conclusion that the modern social organism is very different from plant and animal organisms. However, in stating this, and even though they had good reason, sociologists separated society from nature once and for all. The ecological crisis is in some ways the consequence of this intellectual and methodological divide that was created.

So now we find ourselves faced with a strange ambivalence. On the one hand, there is organicist thought which by combining nature and society in a certain sense subjected society to the rules of natural evolution, transposing these ideas directly into political decisions and, in this way justifying a conservative style, and even an authoritarian point of view. On the other hand, there is sociological thought which, by rejecting the idea of there being a biological basis to social life, allowed society to exploit nature and human beings in every way. This antinomy is a demonstration of the lack of dialectical or dialogical thought, of that thought which, in some way or another, we must seek within our experience and our thinking.

Notes

1. See Fischer-Kowalsky and Haberle H., *On the cultural evolution of social metabolism with nature*, "Schriftenreihe Soziale Ökologie" - Iff Vienna, n. 40, 1994, p. 3.
2. For a recent reflection on the scientific use of analogy as a bridge between biological and social sciences see: Khalil L. E., *Social Theory and Naturalism. An Introduction*, in Khalil L. E. and Boulding E. K., *Evolution, Order and Complexity*, Routledge, London and New York, 1996, pp. 1-39.
3. Oppenheimer R., *Analogy in Science*, in "The American Psychologist", vol. 11, n. 3, 1956, pp. 127-135, cit. p. 129.
4. For this quotation see Mucchielli L., *La découverte du social*, La Découverte et Syros, Paris, 1998, pp. 270-276.
5. Haeckel E., *Generelle Morphologie der Organismen*, 1866.
6. Schäffle A., *Bau und Leben des sozialen Körpers* (Structure and Life of Social Bodies), 1874, ed. it., *Struttura e vita dei corpi sociali*, Utet, Torino, 1881.
7. For this part see Haeckel E., *Essais de psychologie cellulaire*, Librairie Germer Baillière, Paris, 1880.
8. For this distinction between analogy and homology see Boccardo G., *L'animale e l'uomo*, Introduction to Schäffle A., *Bau und Leben des sozialen Körpers* (Structure and Life of Social Bodies), 1874, ed. it., *Struttura e vita dei corpi sociali*, Utet, Torino, 1881.

REVISTA THEOMAI / THEOMAI JOURNAL

9. Of Paul Lilienfeld see *Gedanken über die Sozialwissenschaft der Zukunft*, 5 voll., Mitau, Hamburg, 1873-1881; *La pathologie sociale*, Giard & Brière, Paris, 1896.
10. Comte A., *Cours de philosophie positive*, Paris, 1830-1842, vol. III, lecture 43rd; see also Canguilhem G., *La philosophie biologique d'Auguste Comte et son influence en France au XIX siècle*, in Canguilhem G., *Etudes d'histoire et de philosophie des sciences*, J. Vrin, Paris, 1975, pp. 61-74.
11. For this part see Bridges J. H., *Comte's definition of life*, in "Fortnightly Review", n. CLXXIV, June 1881, pp. 675-688.
12. Spencer H., *The Principles of Sociology*, Williams & Norgate, London, 1876, vol I; now in Spencer H., *Structure, Function and Evolution*, edited by S. Andreski, Charles Scribner's Sons, New York, 1971, p. 146.
13. Spencer H., *First Principles*, Williams & Norgate, London, 1900; now in Spencer H., *Structure, Function and Evolution*, edited by S. Andreski, cit., p. 59.
14. Spencer H., *The Principles of Sociology*, cit.
15. Schäffle A., *Bau und Leben des sozialen Körpers*, cit.
16. See Schäffle, cit., vol. I, pp. 974 e sgg.
17. Cfr. Costanza R. and others, *The values of the world's ecosystem services and natural capital*, in "Nature", vol. 387, 15 May 1997.
18. Ward L., *Pure Sociology*, MacMillan, New York, 1919 (first edition 1903), p. 120
19. *Ibidem*, pp. 243-244.
20. *Ibidem*, pp. 248-250.
21. *Ibidem*, p. 251.
22. *Ibidem*, p. 254.
23. *Ibidem*, pp. 18-20.
24. Cohn G., *A History of Political Economy*, Philadelphia, 1894, cit. in Ward L. cit, p. 29.
25. Pareto V., *Trattato di sociologia generale*, Barbera, Firenze, 2 voll., 1916; now edited by Utet, Torino, 1988, 4 voll., quotation vol. IV, pp. 1957-1959.
26. Pareto V., *Les Systèmes socialistes*, Cours professé a l'Université de Lusanne, Giard et Brière, Paris, 1902, 2 voll; italian translation, *I sistemi socialisti*, Utet, Torino, 1974, p. 130.
27. *Ibidem*, pp. 132-133.
28. Pareto V., *Trattato di sociologia generale*, cit., pp. 1965-1966.