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The meaning of life. Can Hans Jonas's „philosophical biology” effectively act against reductionism in the contemporary life sciences?

Abstract. *Hans Jonas' „philosophical biology,” although developed several decades ago, is still fundamental to the contemporary reflection upon the meaning of life in a systems thinking perspective. Jonas, in fact, closely examines the reasons of modern science, and especially of Wiener's Cybernetics and Bertalanffy's General System Theory, and at the same time points out their basic limits, such as their having a reductionistic attitude to knowledge and ontology. In particular, the philosopher highlights the problematic consequences of scientific reductionism for human nature. As the final result of an overall process of naturalization, the essence of the human being is reduced to its quantitative features only, while the “meaning” of life as such becomes no different from the “fact” of its material consistency. However, the problem is that by such a process, the human being is deprived of his specificity.*

Keywords: *Hans Jonas, Ludwig von Bertalanffy's General System Theory, Norbert Wiener's Cybernetics, Organism, Reductionism*

1. Introduction

This paper assumes that Hans Jonas' „philosophical biology,” although developed several decades ago, is still fundamental to the contemporary reflection upon the meaning of life. Moreover, his thinking reaches beyond the sphere of philosophy, and has relevance to biological and scientific research. Jonas, in fact, closely examines the reasons of modern science, and at the same time defines its basic limits, such as a reductionistic attitude to knowledge and ontology.

In particular, the philosopher highlights the problematic consequences of scientific reductionism for human nature. As the final result of an overall process of naturalization, the specificity of the human being is reduced to its quantitative features only, while the “meaning” of life as such becomes no different from the “fact” of its material consistency.

There are several reasons for urgently addressing these issues. Firstly, even today the “reductionistic attitude” towards the understanding of life and the human being is far from defeated. Secondly, there is a poor degree of consciousness of the theoretical and practical-technical consequences deriving from the above-mentioned position, and it is no mystery that from such consequences several ethical and bioethical problems may arise. Lastly, following the suggestions of Hans Jonas’ “ontological revolution,” it is possible to achieve an alternative path into the comprehension of the phenomenon of life. This is a way which leads to a deeper level of reflection, namely an ontological one, and forces the natural sciences to face the limits of their reductionistic approach and to seek the cooperation of philosophy and other human sciences.

2. The problem of “reductionism” and the naturalization of the human being

As stated by his first works on ancient Gnosticism (Jonas, 1934; Jonas, 1954; Jonas, 1958; Jonas, 1965), Hans Jonas discovered that the first Centuries of our era were generally characterized by a “dualistic” attitude towards life, consisting in the belief that the true destiny of man had to be realized in opposition to nature. This dualism expressed, however, a deeper ontological dualism of spirit (life) and matter (death).

At first, Jonas thought these were the specific features of a historical period, namely the Centuries corresponding to the beginning of the Christian era. However, he then discovered it was not so. He discovered that dualism also characterized the Modern Age up to Heidegger’s existential thinking (Jonas, 1952). Indeed, because of the scientific and technical revolution one of the two sides of the classical dualism – namely, matter – appeared to be stronger (Jonas, 1966, 19–22).

As a consequence, Modern philosophy and science came to reject the concepts of spirit and soul (first phase: the gnoseological reductionistic attitude), and finally “reduced” Being as such to its materialistic and quantitative aspects (second phase: the ontological reductionistic attitude). The universe and nature became indifferent to man’s existence, and they were no longer considered as endowed with life (Jonas, 1952).

These are only some of the distinctive features of this historic and cultural phenomenon of the Modern Age, which is called “disenchantment of the world” (Max Weber). One of the outcomes of this process is the so called “naturalization of the human being,” which culminates in the reduction of man to a cybernetic mechanism

only.¹ A further result – which does not, however, find universal agreement – is the “neutralization” of the human being’s “inner experience of freedom,” which is then understood as an empty epiphenomenon (See, for instance, Dennett, 1991).

However, the significant point is that both the researchers and philosophers who willingly adopt a reductionistic point of view, and those who intend to reject reductionism, find themselves with the same awkward problem: they all have to clarify the “specificity” of life and of the human being, and the only means available for the fulfilment of this task are a devitalized ontology and “reductionistic” concepts and ideas.²

3. The living organism and the overcoming of “reductionism”

However, Jonas believed that both classical dualism and Modern materialistic ontology were little suited to answering the question “what is life?” Indeed, this is a crucial question. According to Jonas’ first biological works,³ the phenomenon of life is able “as such” to evidence the inadequacy of such perspectives. Life is the most eminent feature of Being, and is able to point out its essential characteristics. Among these, the most relevant is the fact that Being has a dynamic, ambivalent, twofold, and complex structure.⁴

Jonas’ rediscovery of nature has, therefore, an “ontological” meaning and is closely related to the fact that the understanding of the phenomenon of life plays a fundamental role in highlighting the characteristics of Being.⁵ Jonas refers to this rediscovery as the idea of the “ontological revolution” (Jonas, 2003, 351, 356; Jonas, 1966, 81). This revolution is evidenced by life even in its simplest form – namely, “organic metabolism.” Its “ontological” feature depends on the fact that renewed research, starting with the organic metabolism, may lead to understanding the fundamental characteristics of life, and to the renewal of science.⁶

¹ See Becchi (2002); Pessina (2001), 60. The “naturalization” of the human being has, apparently, been employed to “neutralize” its meaning.

² *En passant*, I can only briefly mention the fact that this is all but an irrelevant problem. The seriousness of this issue may, for instance, be understood by considering the long battle that in the XIXth and XXth centuries biological science fought against physics in order to obtain its epistemological specificity and autonomy. See Mayr, 1992; Feltz *et al.*, 1995; La Vergata, 1995; Mayr, 1997; Duprè, 2001; Wolters, 2001.

³ The *Lehrbriefe*, written during the Second World War and now published in Jonas, 2003, 348–383. The philosophical core of these “theoretical letters” will later be developed in *The Phenomenon of Life*.

⁴ See Jonas, 1966, 4, 16–17. In other words, ontological dualism is certainly a hermeneutical mistake, because it exchanges a part (namely, matter) for the whole, and because it considers as “substantially” double what is, in fact, only “dynamically” polar.

⁵ In this respect, the proper-living-body (in German, “Leib”), which is endowed with “interiority,” acts as a link between the understanding of life and the characteristics of Being. See Jonas, 1966, 58, 79.

⁶ The organic and living body “is the memento of the still unsolved question of ontology, ‘What is being?’ and must be the canon of coming attempts to solve it” (Jonas, 1966, 19).

For the above-mentioned reasons, each of these features expresses the polar and dialectical dynamics of life. Moreover, Jonas believes that this dynamic ontology may be indicated as a “dialectics of freedom” (Jonas, 1966, 83–86). This means that the philosophical analysis of the living organism and of its metabolism⁷ highlights that the existence of an organism to some extent depends on its “willingness” to exist.⁸ Its dynamical, dialectical, and ontological characteristics are the following: needful freedom towards matter, autonomy and dependence of living form, the relationship between the self and the world and between interiority and exteriority, self-transcendence, the intensive meaning of temporality, and the teleological or finalistic nature (Jonas, 1966, 79–86; Jonas, 1973, 149–163).

None of these characteristics may be obviously perceived by Modern science, which has reduced any examinable ontological feature to quantity, measurability, and movement. For the same reason Modern science and philosophy have removed any concern for the ontological relevance of “interiority” and of its dynamics, traditionally expressed by the idea of “finalism.”⁹

On the contrary, a “renewed ontology” is able to point out that the living organism is ontologically characterized by a “productive and visible purposefulness (*Zielstrebigkeit*).”¹⁰ Hence, Jonas insists on the fact that his interpretation of life is able to give a deeper insight into the being of nature itself:

⁷ According to Jonas, the organism is the only evidence of life. See Jonas, 1968; Jonas, 2003, 364.

⁸ The existence of an organic individuality is, indeed, a task needing action. For this reason existence becomes a risky challenge: “Without this universal counterpart of otherness, there would be no ‘self.’ And in this polarity of self and world, of internal and external, complementing that of form and matter, the basic situation of freedom with all its daring and distress is potentially complete” (Jonas, 1966, 83).

⁹ Jonas, however, seems not to consider that in the XIXth and XXth centuries we have lent assistance to scientific and biological attempts to reintroduce the idea of finalism, or at least forms of “quasi teleology.” It is the case of Claude Bernard, or Jacques Monod. In defence of Jonas, we may say that his idea of “purpose” presents an ontologically deeper meaning. See Szostak, 1997, 59–71; Michelini, 2008.

¹⁰ Jonas, 1973, 157. These words – and many other sentences and paragraphs – are missing from *The Phenomenon of Life* and were added in the German edition of the book in 1973. For the meaning of these differences, see Frogneux, 2001. The German noun “*Zielstrebigkeit*” (Jonas, 2003, 466–467; Jonas, 1973, 157) underlines the dynamical and uncertain essence of living beings. For the history of the idea of “*Zielstrebigkeit*,” see Orsucci, 1992, 236. It is interesting to notice that the identification of the “purposefulness” or “teleology” of organisms recalls the philosophical reflection of another thinker, with whom Jonas will make friends in Canada at the end of the Forties: the biologist Ludwig von Bertalanffy. He distinguishes two meanings of the idea: on the one hand, “Static teleology or fitness,” as the “actual” existence of a structural and functional harmony among the parts (organs) of an organism (Bertalanffy 1950–51, 159); on the other hand, the “Dynamic teleology” (Bertalanffy 1950–51, 159, 147–148), as – to use Jonas’ words – the “dynamic character of a certain mode of existence, coincident with the freedom and identity of form in relation to matter” (Jonas, 1966, 86).

At all events, the teleological structure and behavior of organism is not just an alternative choice of description: it is, on the evidence of each one's own organic awareness, the external manifestation of the inwardness of substance. To add the implications: there is no organism without teleology; there is no teleology without inwardness; and: life can be known only by life.¹¹

However, Jonas' thinking in favour of living ontology and teleology seems to be outdated if compared with the behaviouristic mainstream, which in the same years aimed at giving a scientific explanation to the behaviour of living beings without referring to final causes. In such a *milieu* Jonas' philosophical biology is mistaken for vitalistic metaphysics.¹²

Nevertheless, Jonas makes efforts to make his ontology clear, also through the careful examination of specific scientific attempts – however, only apparently similar to his own – to reintroduce into science the critical idea of “purpose.” Particularly, he develops a comparison with Norbert Wiener's “Cybernetics”¹³ and with Ludwig von Bertalanffy's “General System Theory.”¹⁴

¹¹ Jonas, 1966, 91. On this topic, see also Jonas, 1979, chap. 3. Thus, according to Jonas, it is not “the suppression of teleology and of substantial forms” which ought to be justified; “rather – he states – has the revolution in method, which the sudden obsolescence of these venerable concepts signalizes, itself to be accounted for” (Jonas, 1966, 70). Modern science has opted not to consider such metaphysical characteristics while studying natural facts. Therefore, Jonas states that “the exclusion of teleology is not an inductive result but an a priori prohibition of modern science” (Jonas, 1966, 34). In addition to this, the thinker analyzes the logical and ontological inconsistencies generated by this deliberate decision of Modernity (see Jonas, 1981). In this respect, Jonas agrees with Ludwig von Bertalanffy, for whom the Modern and mechanistic image of the world and its mathematical-symbolical reductionism give rise to several present-day ethical problems. On such a topic, see the letter Bertalanffy wrote to Jonas on February 6th 1950 (Bertalanffy, 1950).

¹² In the above-mentioned letter (Bertalanffy, 1950) Bertalanffy writes that it is a mistake to “draw, in a vitalistic way, a line which separates inanimate nature from living nature.” For the missed opportunity of a dialogue between Jonas and the “new biology,” see Becchi, 2002.

¹³ See Jonas, 1966, 108–127. Cybernetics aims to explain the behaviour of systems which are relatively abstracted from their environment (“the behavioristic approach consists in the examination of the output of the object and of the relations of this output to the input” (Rosenblueth et al., 1943, 18), consisting mainly of self-regulating feedback mechanisms, such as missiles seeking their target, the servomechanisms, and the living organisms. In Wiener's opinion, all of these cases evidence “purposefulness” as a result of a “voluntary choice.” However, in order to make this characteristic clear, there is no need to look deeply into how the aim is chosen. The only relevant thing is the feedback mechanism by which the actor, be it a human being, an animal, or a machine, chooses its aim and makes efforts to reach it. Since, in this respect, Wiener believes there is no difference at all between living being and machines (Rosenblueth et al., 1943, 22), he realizes a radical and deterministic reductionism (Frank *et al.*, 1948; Bertalanffy, 1951c, 347) culminating coherently with the limitation of behaviour to its mere exterior quantitative aspect. He therefore concludes: “Both teleological and non-teleological systems are deterministic when the behavior considered belongs to the realm where determinism applies” (Rosenblueth et al., 1943, 24).

¹⁴ See Jonas, 1951c; Jonas, 1973. See also Dewitte, 1996, and Russo, 2004, pp. 29 ff. The idea of the open system is similar to Prigogine and Stengers' concept of “dissipative structures.” Prigogine-Stengers, 1979.

For what concerns Wiener, Jonas analyzes his attempt to restore the idea of teleology after having removed its inconsistency, that is, on the one hand, the fact that the cause of a certain phenomenon exists not before, but as a consequence of its own effect; and, on the other hand, the belief that the final cause controls in this way the development of the same phenomenon.¹⁵ Because of this contradiction, teleology fell into disgrace. Until – as Jonas declares ironically – thanks to Cybernetics “for the first time since Aristotelianism we would have a unified doctrine, or at least a unified conceptual scheme, for the representation of reality” (Jonas, 1966, 111).

The aim is, once again, to go beyond dualism. In this respect, Cybernetics seems at first to go in the right direction, because it highlights – although unconsciously – that the overcoming of dualism may be realized only through the reintroduction of teleology. However, at the same time Cybernetics deprives teleology of its causal power, and this – states Jonas – must not happen.

The fact is – according to Jonas – that Cybernetics mistakes “to have an aim” (“einen Zweck haben”) with “to serve an aim” (“einen Zweck ausführen”), and simply reduces the first meaning to the second. We will shortly see that Bertalanffy avoids doing this (See Bertalanffy, 1950–51, 159–160). Therefore, Cybernetics reduces systemic behaviour to what may only be analysed “from the outside.” On the contrary, Jonas believes that the living systems (= organisms) are ontologically different from other systems, because of their “interiority,” that is, because of their free and self-transcending “purposefulness.” Any living being is, thus, radically different from any machine, because – states Jonas – “There is no analogue in the machine to the instinct of self-preservation” (Jonas, 1966, 126).

Many similarities may, on the contrary, be seen between Jonas’ thinking of the peculiarity of living beings and Bertalanffy’s “General System Theory.” Bertalanffy believes that studying life requires the ideas of organization and dynamical interaction, which have been recently adopted by biology and contemporary physics.¹⁶ The core idea of Bertalanffy’s “General System Theory” is, therefore, that “There

¹⁵ See Rosenblueth et al., 1943, 23. A very similar criticism of the ideas of “finalism” and “final cause” may already be found in Spinoza’s *Ethica ordine geometrico demonstrata* (1677, Appendix to part 1).

¹⁶ In other words, Bertalanffy, like Jonas, thinks that the analytical and mechanistic method is limited to Modern science only. However, unlike Jonas, the scientist sees a great difference between Modern science and Contemporary science. In this respect, Jonas seems not to comprehend the revolutionary meaning of contemporary physics. Nevertheless, he appears to be acquainted with its results (see Jonas, 1981; for an analysis, from a mathematical point of view, of Jonas’ idea of science, see Magnus, 1978). As a result, Bertalanffy prefers to distinguish two different meanings of the word “reductionism.” According to a first meaning, dating back to the 19th Century, it consists in the claiming to reduce “the laws of higher levels to physics in the sense of the classical mechanistic view” (Bertalanffy, 1951a, 305; Bertalanffy, 1950–51, 141). The second meaning, instead, is characterized by a “systemic” approach, and believes that to reduce means to recognize that “the mathematical expressions are identical for all these phenomena” (Bertalanffy, 1951a, 305). In this way, Bertalanffy aims to regain the unity of Being, by respecting however the normative autonomy of its different levels.

are principles which apply to the entities called 'systems' in general, whatever the nature of their component elements and the relations or forces between them."¹⁷ The idea of the system "represents a generalized kinetics and dynamics which is applicable not only to physical systems, but to phenomena of any kind."¹⁸

Bertalanffy pays particular attention to showing how his "systemic" principles¹⁹ may succeed in interpreting the "organic system," which is understood as an open system like others. An open system exchanges materials with the environment,²⁰ and, because of this, evidences some independence, or – to use Jonas' expression – a certain degree of "freedom." Second, systemic openness justifies the "evolution" of living systems, according to increasing degrees of order, complexity, and differentiation. Third, the existence of a partially independent or free system, as a consequence of the differentiation of its parts (See Bertalanffy, 1950–51, 148–149), depends on two factors: on the one hand, the system displaying an increasing complexity builds a more open relationship with its environment, based on a lower definition of its functioning mechanisms, and consequently on a higher degree of "instability" – or to paraphrase Jonas: the higher the freedom of the living being, the higher the risks for its existence–; on the other hand, the "freedom" of the system is based upon the self-regulation principle, that is, the system's tendency to balance dynamically the two-way flux of matter with the environment (in German, "Fließgleichgewicht"). Maintaining this flux is the aim of the system's self-existence and self-perpetuation. In this respect, Bertalanffy, unlike Cybernetics and like Jonas, states immediately: "the 'directiveness' of the process toward a final state is not different from causality, but another expression of it" (Bertalanffy, 1950–51, 154).

¹⁷ Bertalanffy, 1951a, 304; Bertalanffy, 1950–51, 139. See also La Vergata, 1995, 162. According to Bertalanffy, "the isomorphy of laws is no mere coincidence, but is indicative of a structural uniformity of phenomena and a corresponding unity of science" (Bertalanffy, 1951b, 341). Hence, his "General System Theory" lies upon the theoretical-fundamental hypothesis that the world is not a "game of hazard," but is conceivable as "a hierarchy of integrated wholes" (Bertalanffy, 1951b, 341).

¹⁸ Bertalanffy, 1951a, 304. The idea of "system" may be noticed in different sciences, thanks to the isomorphy of their general principles. Bertalanffy insists on the fundamental idea of dynamism: "The central point of system theory is the dynamic view, trying to explain phenomena of order in terms of the interaction of processes, as contrasted with the Cartesian machine theory, which tries to explain it in terms of pre-established structures" (Bertalanffy, 1951b, 343). The cybernetic idea of teleology, therefore, appears to coincide with a machine theory (Bertalanffy, 1951c, 353).

¹⁹ According to Bertalanffy, such ideas are: "the whole is more than the sum of its parts," emergent evolution, progressive segregation and differentiation, mechanization and centralization, individualization, hierarchical order, control of the parts, principle of action, competition, finality and equifinality. Thanks to their logical-mathematical definition, and according to a common dynamics, these concepts may be applied to different sectors of the scientific or real world, including life. Bertalanffy, 1950–51, 142–157; Bertalanffy, 1952.

²⁰ See Bertalanffy, 1951a, 308–309. Similarly: Jonas, 1966, 46; Jonas, 1951a, 50–52.

However, Bertalanffy warns not to expect that science as such gives a complete, ontological and exhaustive description of the phenomenon of life. This aim would actually lead science beyond its limits, and would force it to take a methodologically unjustified step.²¹

Here lies a relevant difference between Jonas and Bertalanffy. Both aim to explain the meaning of the “essential” autonomy of life (Bass, 1951, 326). However, Jonas – unlike Bertalanffy – insists on the fact that the “highly morphological meaning” (Jonas, 1951c, 333) of organisms – that is, their peculiar ontological feature – cannot be completely explained by the mathematical-quantitative formulas of a system. According to Jonas, there is a “gap between formula and fact”²²: it is, therefore, impossible to resolve by means of a definition, problems which involve facts. Moreover, Jonas believes that “The problem of mechanism or teleology, as also that of wholeness, are (to use the disreputable word) metaphysical and not logical issues” (Jonas, 1951c, 333). As a result he states that quantitative methodologies, such as the “General System Theory,” are only “descriptive, not explanatory, and descriptive of course only of the quantitative aspects of organic facts.”²³

Therefore, Jonas uses Bertalanffy’s “phenomenological” research on the organic dynamics as the starting point for a deeper “ontological” research, which aims to comprehend a) the free and teleological interiority of living being,²⁴ b) its recognizability through exterior facts, and c) the specificity of its affecting (= acting on) plain exteriority.

4. The organic paradigm and the specificity of the human being: open questions

As already stated, Jonas’ leading question is: “what is life?” An understanding of the knowledge he offers of the phenomenon of life requires a further level of reflection: one which goes beyond the explicative results both of Cybernetics and of the “General System Theory,” which only aim at highlighting “how” life acts

²¹ Indeed, according to Bertalanffy, “the indication of the actual conditions and factors as well as of the specific laws of phenomena” (Bertalanffy, 1951a, 307) is an aim which exceeds the scientific description of the dynamics of life.

²² Jonas, 1951c, 333. See also Jonas, 1973.

²³ Jonas, 1951c, 335. See also Wolters, 2001, 89–90. The same opinion could be extended to Maturana and Varela’s attempt at explaining living beings. Even though they profess themselves against reductionism, they seem after all to have a reductionistic approach – at least, in comparison with the philosophical issues of Jonas’ biological philosophy. Indeed, their mechanistic approach aims to explain the organization of living beings by means of the idea of “autopoiesis,” and rejecting the idea of “teleology,” which does not sufficiently clarify the autonomy of the living systems. Maturana-Varela, 1980. See also Weber-Varela, 2002; Di Paolo, 2005; Michelini, 2011.

²⁴ See Jonas, 1951a, 52; Brune, 2004; Costa, 2008.

and operates.²⁵ On the other hand, according to Jonas, to understand life means to comprehend its complex and polar dynamics, and to recognize the "ontological" relevance of its evolutionary and causal principle, which is the idea of "freedom." These concepts are not simply invented by Jonas, but are testified through the phenomenological analysis of the living organism and its teleology. Hence, the first question may sound as follows: what role might science play in the comprehension of life, when its reductionistic attitude is defeated? What form of cooperation between science and philosophy might be envisaged?²⁶

In addition to this, it is important to remember that – according to Jonas – any phenomenological analysis is set within a specific context: the human being's existence and the concrete peculiarity of his/her bodily experience (Jonas, 1966, 22–25, 170–173). Hence, the position of the human being in the world is characterized by the following twofold peculiarity: on the one hand, human experience is the only way into the phenomenon of life (methodological centrality), while, on the other hand, the concreteness of this experience – due to its bodily-centeredness – is one of the strongest reasons in support of the possibility that the knowledge of that phenomenon may lead to the comprehension of its ontological structure (ontological centrality).

We are finally approaching another relevant turning point, that is, the transformation of the previous question ("what is life?") into the following: "what is the human being?" To some extent, the answer to this second question appears to be the real aim of much scientific and philosophical research which apparently deals with the first topic only. According once again to Hans Jonas (whom I chose as my guide in this brief investigation), the philosophy of organic life may probably make its contribution in clarifying the meaning of life, and still leave unanswered the question on the "specific difference" of the human being (Jonas, 1966, 157). In this respect, it is necessary to gain a "philosophy of the human being," which – in the opinion of Jonas – ought to be based on the idea of "symbolic action."²⁷

However, the preliminary task of a philosophy of organic life is absolutely essential, especially in the face of those past attempts on the part of certain philosophers to understand man without taking into consideration his constitutive relation with his organic body. Indeed, such attempts ended in serious trouble. On the other hand,

²⁵ This is the reason for which, concludes Jonas, both Wiener's Cybernetics and Bertalanffy's "General System Theory" manifest their inadequacy: they decide to stay strictly within the range of the so-called "scientific explanation"; therefore, they miss a wider comprehension of life, and they fall back into "reductionism."

²⁶ Clearly, philosophy too ought to overcome its arrogance toward science. Indeed, philosophy ought to recognize the epistemological legitimacy and the gnoseological priority of science in comprehending the phenomenon of life and in experiencing the world.

²⁷ See the article *Homo Pictor and the Differentia of Man* (in Jonas, 1966, 157–175). The specificity of the human being might be understood as a further ontological principle or as the same ontological principle of organic life. Micheline, 2008.

questions still to be answered are, for instance: what relevance has the philosophy of organic life in comprehending human specificity? What role does the philosophy of organic life play within the philosophy of the human being?

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