THE MOST INESCAPABLE PERSPECTIVE: REVALUING ANTHROPOMORPHISM IN BIOLOGY AND NATURAL SCIENCES.[1]

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ABSTRACT: Recent philosophical approaches to living organisms share a two-sided concern. On one side, the objectifying attitude of the reductionist-physicalist approach to organisms is put into question, as it eliminates the key dimension of life as a lived experience involving organism agency and purposes. On the other side, attempts to introduce, through phenomenological approaches, an experiential dimension within the current framework of biological sciences are generally seen as entailing some kind of anthropomorphism hardly compatible with scientific programs. This paper aims to contribute to the debate driven by the above theoretical tension, by proposing that the persistent talk about purpose, function, sense-making, choice, interpretation and communication in biology, far from being a merely heuristic tool, reflects a profound and unescapable plexus of pre-conditions of biological understanding rooted in our own experience of aliveness. Valorizing such a mode of narration and comprehension of life phenomena as an index of their ontological status, instead of discarding it as an anthropomorphic surrogate of true scientific knowledge, has the potential to drive the scientific endeavor towards a fuller understanding of nature and man's place in it. In support of this proposal, I will draw both from recent discussions on the attempts and possible approaches to introduce a renewed conception of natural ends in biological sciences, and from the relatively understudied view of life and nature developed by Robert Spaemann on a decades-long path of thought, arguing that a fundamental anthropomorphic stance is an indispensable pre-condition not only of biology but of the whole scientific enterprise.

KEYWORDS: Robert Spaemann; Hans Jonas; Enactivism; Philosophical biology; Phenomenology of life; Teleology; Anthropomorphism; Anthropocentrism

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1. INTRODUCTION

The last 20 years have witnessed a growing number of philosophical studies whose common feature is a theoretical dissatisfaction with the mechanist-reductionist paradigm in biology[2]. A key inspiring motif for a relevant series of studies in this area comes from a theoretical move made by Hans Jonas around half a century ago, then taken up and expanded by several thinkers at the beginning of the third millennium. Central to Jonas' attempt to lay the foundations for a new philosophical biology is the belief that theories about the living cannot exclude, as scientifically irrelevant/intractable, the concerned perspective that unfolds through the living itself: "*life can only be known by life*" concisely reads a Jonas' statement often quoted to summarize this point. Importantly, the whole sentence reads "*There is no organism without teleology; there is no teleology without inwardness; and: life can only be known by life*"[3]. That is, the bold theoretical move to an organism-centered view, which has been aptly called "Jonas' phenomenological inversion"[4], entails the acknowledgment of an inwardness and a positive reappraisal of teleological thought when it comes to all living organisms. Importantly, Jonas specifies that what is called into play is "teleology as a causal mode of nature itself, or immanent teleology, and not transcendent teleology such as might have been exercised" by a hypothetical creator, as "any design on his part in the initial arrangement of universal matter would well be compatible with the strictly mechanical operation of that matter, which would in this very way fulfill the design."[5]

In the last 25 years, several authors have attempted to integrate Jonas'

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[2] Evan Thompson, *Mind in Life. Biology, Phenomenology and the Sciences of Mind*, Cambridge, MA, Harvard University Press, 2007. Arran Gare, 'Approaches to the question 'What is life?': reconciling theoretical biology with philosophical biology', *Cosmos and History: The Journal of Natural and Social Philosophy*, vol. 4, pp. 53-77, 2008. Michael J. Denton, Govindasamy Kumaramanickavel and Michael Legge, 'Cells as irreducible wholes: the failure of mechanism and the possibility of an organicist revival', *Biology and Philosophy*, vol. 28, pp. 31-52, 2013. Thomas Nagel, *Mind & Cosmos: Why the Materialist Neo-Darwinian Conception of Nature is Almost Certainly False*, New York, Oxford University Press, 2012. Brian G. Henning and Adam C. Scarfe (eds.), *Beyond Mechanism, Putting Life Back into Biology*, Plymouth, Lexington Books, 2013. Daniel J. Nicholson, 'Organisms ≠ Machines', *Studies in History and Philosophy of Biological and Biomedical Sciences*, vol.44, pp. 669-678, 2013. Denis M. Walsh, *Organisms, Agency, and Evolution*. Cambridge, UK, Cambridge University Press, 2013.

[3] Hans Jonas, *The Phenomenon of Life: Toward a Philosophical Biology*. New York, Harper and Row, 1966, reprinted by Northwestern University Press, 2001, p. 91.

[4] Andreas Weber and Francisco J. Varela, 'Life after Kant: Natural purposes and the autopoietic foundations of biological individuality', *Phenomenology and the Cognitive Sciences*, vol. 1, pp. 97-125, 2002.

[5] Hans Jonas, *The Phenomenon of Life*, p. 34.

phenomenological analysis of life with empirical theories of self-organization. In particular, the theory of autopoiesis, originally formulated by Maturana and Varela[6], seemed particularly promising as a way of understanding organisms that somehow brings together the objectifying perspective of natural sciences and an organism-centered perspective allowing not to expunge the status of organisms as autonomous agents. According to the autopoietic view, even the minimal living system, a single-cell organism, is characterized in a peculiar way by its being coextensive with a network of processes of fabrication of components such that these components continuously regenerate the network that fabricates them, including a membrane boundary that delimits the system as a three-dimensional physical unity[7]. Envisaged from the outside, autopoietic systems appear as something largely familiar to contemporary molecular cell biologists, who are increasingly accustomed to appreciating the countless facets of self-organization and self-maintenance in cellular systems. The concept of autopoiesis can thus be easily assimilated into contemporary systems perspectives in biological sciences [8]. However, at the same time, by emphasizing the point of view of the system itself, and by assimilating the process of life to a cognitive process, the autopoietic perspective invites to discern the instauration of an inner source of individual self-concern within even the simplest organisms[9]. The recent reevaluation of Jonas's philosophy of life through the lens of the autopoiesis theory appeared as the opening of a viable theoretical path towards the naturalization of teleology and sense-making[10]. In one of the most wide-ranging elaborations of these ideas, they were taken as the foundation for the systematic development of a 'deep life and mind continuity thesis', arguing that living beings instantiate a kind of interiority

[6] Humberto Maturana and Francisco J. Varela, *Autopoiesis and Cognition. The Realization of the Living*, Boston Series in the Philosophy and History of Science, vol. 42, Dordrecht, D. Reidel Publishing Company, 1980.
[7] Francisco J. Varela, 'Patterns of life: intertwining identity and cognition', *Brain and Cognition*, vol. 34, pp.72-87, 1997. Pier Luigi Luisi, 'Autopoiesis: a review and a reappraisal', *Naturwissenschaften*, vol. 90, pp. 105-132, 2003. Pablo Razeto-Barry, 'Autopoiesis 40 years later. A review and a reformulation', *Origins of Life and Evolution of Biospheres*, vol. 42, no. 6, pp. 543-567, 2012.
[8] Fritjof Capra and Pier Luigi Luisi, *The Systems View of Life. A Unifying Vision*. Cambridge, UK, Cambdrige University Press, 2014.
[9] A. Weber and F. Varela, 'Life after Kant', 2002.
[10] Ezequiel A. Di Paolo, 'Autopoiesis, adaptivity, teleology, agency', *Phenomenology and the Cognitive Sciences*, vol. 4, pp. 429-452, 2005.

invisible to the objectivist view of life provided by biological sciences[11]. In such a Jonas-inspired life-mind continuity thesis, referred to as 'autopoietic enactivism' by some authors, living systems, through their autonomous and adaptive organization, instantiate a point of view that corresponds to the unfolding of a meaningful world[12]. In other words, an organism enacts its world from its unique perspective, but it is only by virtue of our own lived experience that we can ascribe this trait to other (non-human) organisms. The recovery of a dimension of inwardness in looking at virtually any living being has led recently to propose a move to a biology of subjects, with the experience of existential values, like need, concern and desire, being at the deep center of biological world[13]. More generally, an existential understanding of the living process entails an assimilation of living and sense-making[14], which, as recently underlined[15], opens up avenues of possible mutual exchange with the theoretical framework of biosemiotics[16]. Such kind of approaches have also been referred to as biohermeneutic, as they are based on the idea that only from within our living corporality can we interpret life according to categories that do not distort or reduce its scope, and they are open to the assumption that non-human living things actually interpret their being in the world[17].

Enactivism, as well as biosemiotic/biohermeneutic approaches to the phenomenon of life, are still largely ignored in most areas of mainstream

[11] Evan Thompson, *Mind in Life. Biology, Phenomenology and the Sciences of Mind*, 2007.

[12] Paulo De Jesus, 'Autopoietic enactivism, phenomenology and the deep continuity between life and mind', *Phenomenology and the Cognitive Sciences*, vol. 15, pp. 265-289, 2016. Hayden Kee, 'Phenomenology and naturalism in autopoietic and radical enactivism: exploring sense-making and continuity from the top down', *Synthese*, vol. 198, pp. 2323-2343, 2018.

[13] Andreas Weber, 'The book of desire: toward a biological poetics', *Biosemiotics*, vol. 4, pp. 149-170, 2011.

[14] Evan Thompson, 'Living ways of sense-making', *Philosophy Today*, vol. 55, pp. 114-123, 2011. Andreas Weber, *Biopoetics. Towards an Existential Ecology*, Dordrecht, Springer, 2016, Ch. 4.

[15] Paulo De Jesus 'From enactive phenomenology to biosemiotics enactivism', *Adaptive Behavior*, vol. 24, pp.130-146, 2016. Andreas Weber, *Biopoetics. Towards an Existential Ecology*, 2016, p. 3.

[16] Kalevi Kull, Terrence Deacon, Claus Emmeche, Jesper Hoffmeyer and Frederik Stjernfelt, 'Theses on biosemiotics: prolegomena to a theoretical biology', *Biological Theory*, vol. 4, pp. 167-173, 2009. Morten Tønnessen, Timo Maran and Alexei Sharov, 'Phenomenology and Biosemiotics', *Biosemiotics*, vol. 11, pp. 323-330, 2018.

[17] Robert Spaemann, 'Which experiences teach us to understand the world? Observations on the paradigm of Whitehead's cosmology', in F. Rapp & R. Wiehl (eds.), *Whitehead's Metaphysics of Creativity*, Albany, NY, SUNY Press, 1990, pp. 152-164. Anton Markoš, 'Hermeneutics by the living', *Biosemiotics*, vol. 4, pp. 119-125, 2011. Francesca Michelini, *Il vivente e la mancanza: Scritti sulla teleologia*, Udine-Milano, Mimesis, 2011.

biological sciences, where the empirical investigation proceeds successfully without questioning too much about the pre-conditions of its implementation and of the identification of its *explananda*. In contrast, enactivism is an increasingly influential approach in the cognitive sciences, where it is challenging the paradigm of computational cognitivism, as it considers organisms as autonomous agents 'bringing forth' significant worlds, rather than passive objects capable of computational representation of the world[18]. At the same time, however, it has been variously underlined how the appeal to existential categories (such as concern, need, desire) to introduce agency into biological discourse tends to undermine its scientific nature, because it leaves room for two intertwined modes of thought, teleological and anthropomorphic thinking, which are considered at odds with respectable scientific enquiry[19]. After all, this type of concern reiterates, from within an updated framework, the assumption of an incompatibility of scientific practice with any teleological view of nature, dating back to Francis Bacon (for whom the search for final causes in nature is sterile and useless to science)[20], and recalled recurrently up to the present day[21]. Jonas points out that, significantly, a common argument to discredit teleology is that "final causes have relation to the nature of man rather than to the nature of the universe –implying that no inference must be drawn from the former to the latter, which again implies a basic difference between the two. This is a fundamental assumption, not so much of modern science itself as of modern metaphysics in the interest of science"[22]. Confirming this, contemporary philosophical enquiries on the problem of goal attribution and sense-making in biology generally take for granted the need to avoid any anthropomorphism. Significantly, this *a priori* assumption applies both to phenomenologically oriented approaches that

[18] John Stewart, Olivier Gapenne and Ezequiel A. Di Paolo (eds.), *Enaction: Toward a New Paradigm for Cognitive Science*, Cambridge, MA, MIT Press, 2010.

[19] Mario Villalobos and Dave Ward, 'Lived experience and cognitive science: reappraising enactivism's jonasian turn', *Constructivist Foundations*, vol. 11, pp. 204-212, 2016.

[20] Francis Bacon, *De dignitate et augmentis scientiarum,* in *The Works of Lord Bacon, vol. II*, London, William Ball and Company, 1837, p. 340.

[21] For one of the most influential examples, see Jacques Monod, *Chance and Necessity: An Essay on the Natural Philosophy of Modern Biology*, trans. A. Wainhouse, New York, Alfred A. Knopf, Inc., 1971, p. 21.

[22] Hans Jonas, *The Phenomenon of Life*, p. 35.

embrace enactivism[23] and to approaches that, on the contrary, ignore it, integrally framed as they are in a representationalist perspective[24]. Of relevance to this debate, the inescapability of the teleological/anthropomorphic perspective for any fruitful attempt to understand nature is one of the most original themes that recur in the work of the German philosopher Robert Spaemann[25]. However, reference to Spaemann's contributions is almost absent from present-day discussions on natural purposes and organismal agency[26].

The main aim of this paper is to question the general prejudice against anthropomorphism in biology and, by extension, in natural sciences. The arguments will be articulated as follows. First, I will focus on the pervasive presence of an anthropomorphic perspective both in scientific descriptions/explanations of biological phenomena and in creative reasoning leading to biological discovery. Specifically, I will enquire to what extent the fruitfulness of this style of reasoning simply reflects a constitutive bias of human investigator's mind and is not instead revealing some key facet of biological *explananda*. Second, as one of the possible developments of the above quest, I will delve into recent attempts to gain a fuller understanding of the organism's ontological status through phenomenological analysis, with particular attention to the tacit/pre-reflective recognition of the aliveness state presupposed by all investigations of living things. Third, I will attempt to reconsider the main issues raised in the first two sections in the light of Robert Spaemann's philosophical project of rehabilitation of natural teleology and anthropomorphism. Especially relevant in Spaemann's view is the idea that being-oriented-towards, that is one

[23] De Jesus, 'Autopoietic enactivism, phenomenology and the deep continuity between life and mind', 2016. De Jesus, 'From enactive phenomenology to biosemiotics enactivism', 2016.

[24] Samir Okasha, 'Goal attributions in biology: objective fact, anthropomorphic bias, or valuable heuristic?', in P. A. Cornig, S.A. Kauffman, D. Noble & R.I. Vane-Wright (eds.), *Evolution 'On Purpose': Teleonomy in Living Systems*, Cambridge, MA, The MIT Press, 2023, pp. 237-256.

[25] Robert Spaemann and Reinhard Löw, *Natürliche Ziele: Geschichte und Wiederentdeckung des teleologischen Denkens*, Stuttgart, Klett-Kotta, 2005. Robert Spaemann, 'The unrelinquishability of teleology', in A.M. Gonzalez (ed.), *Contemporary Perspectives on Natural Law: Natural Law as a Limiting Concept*, Aldershot/Burlington, Ashgate, 2008, pp. 281-296. Robert Spaemann, 'In defense of anthropomorphism', in *A Robert Spaemann Reader: Philosophical Essays on Nature, God and the Human Person*, ed. and trans. D.C. Schindler and Jeanne Heffernan Schindler, Oxford, UK, Oxford University Press, 2015, pp. 77-96.

[26] But see, as notable exceptions, Weber and Varela, 'Life after Kant', 2002 and Andreas Weber, *Natur als Bedeutung. Versuch einer semiotischen Theorie des Lebendigen*, Würzburg, Königshausen & Neumann, 2003.

with human self-experience, is an absolutely original phenomenon whose recognition makes possible an understanding of nature not separated from the self-understanding of man, and whose disavowal, justified by the ban of anthropomorphism, entails precisely the *anthropocentric* centering of modern naturalistic thought, that works to expunge from the natural world everything similar to it, so that nature becomes a mere object to it, and man itself, paradoxically, ends up being considered an anthropomorphism[27].

2. MAKING SENSE OF PERVASIVE ANTHROPOMORPHISM IN CONTEMPORARY BIOLOGY

In the remarkable text Principles of Neural Science, perhaps the most authoritative resource in neuroscience, in the introductory notes to the section dedicated to the development of the nervous system, we can read the following:

> "A second epoch encompasses the steps by which neurons wire up: the migration of their somata to appropriate places, the guidance of axons to their targets, and the formation of synaptic connections. The complexity of the wiring problem is staggering - axons of many neuronal types must navigate, often over long distances, and then choose among a hundred or more potential synaptic partners."[28]

Words and expressions such as "migration to appropriate places", "guidance to a target", "choice among potential partners" are openly teleological/anthropomorphic. On the same note, in the internationally renowned textbook Molecular Cell Biology[29], at every turn the reader can find teleological/anthropomorphic expressions, such as:

> "Insulin and glucagon work together to maintain a stable blood glucose level" (p.766)
>
> "In order to know in which direction to polarize, or become asymmetric, a cell generally senses specific cues that provide it with spatial information." (pp.1002-1003).
>
> "Whether to synthesize membrane-bound or secreted immunoglobulin is a choice

[27] R. Spaemann, 'In defense of anthropomorphism', 2015.
[28] Eric R. Kandel, John D. Koester, Sarah H. Mack and Steven A. Siegelbaum, *Principles of Neural Science, Sixth Edition*, New York, McGraw Hill, 2021, p. 1104.
[29] Harvey Lodish, Arnold Berk, Chris A. Kaiser, Monty Krieger, Anthony Bretscher, Hidde Ploegh, Angelika Amon, Kelsey C. Martin, *Molecular Cell Biology, Eighth Edition*, New York, W.H. Freeman and Company, 2016.

> made by the B cell during processing of the heavy-chain primary transcript." (p.1101)

Importantly, this way of talking about cells or biological phenomena is generally not perceived as inadequate and is widely used, often inadvertently, by thousands of biology teachers (not to mention students) at schools and universities around the world. What we are touching on here is nothing other than the age-old problem of the legitimacy of anthropomorphic/teleological narratives in the explanation of biological phenomena. There is a vast literature on this topic, especially in the field of science education. Here, what is probably the prevailing view considers teleological reasoning to be a major learning obstacle in biology education[30], but alternative views see it as legitimate or even fruitful[31]. Recently, simply based on the observation of scientific practice in molecular biology, it has been convincingly argued that scientific discovery requires not only rigorous empirical testing with appropriate controls and statistical assessment of the results, but also a more creative, metaphorical mode of thinking in which anthropomorphizing and seeing the world from the vantage point of the object of study (e.g., for a biochemist, 'putting her/himself in the shoes' of the protein under study and look at its cellular context from its 'point of view') is the key to powerful intuitions about it. Such an intuitive, "night science" reasoning and language form the imaginative medium in which new ideas are born, that can then be subjected to scrutiny by the rigorous and objectifying "day science" approach[32].

In general, however, attempts to (re)legitimize teleological reasoning tend to limit its scope to heuristic effectiveness, in the absence of any commitment to theoretical positions recognizing the existence of natural ends. According to this kind of positions, the notion of *telos* is an epistemological tool available to biologists to conceptualize biological structures (e.g. a cellular organelle) or mechanisms (e.g. the feedback inhibition of a metabolic enzyme) as means to an end (e.g. cellular homeostasis) that has been stipulated by the observer within a

[30] Frederike Trommler and Marcus Hammann, 'The relationship between biological function and teleology: Implications for biology education', *Evolution: Education and Outreach*, vol. 13, art no. 11, 2020.
[31] Anat Zohar and Shlomit Ginossar, 'Lifting the taboo regarding teleology and anthropomorphism in biology education – Heretical suggestions', *Science Education*, vol. 82, pp. 679-697, 1998.
[32] Itai Yanai and Martin Lercher, 'The two languages of science', *Genome Biology*, vol. 21, art. no. 147, 2020.

cyclical causal structure which is posited as intrinsically ateleological[33]. However, even from within negative or agnostic stances concerning the ultimate ontological status of natural ends, it has been argued by several authors that teleological reasoning is an enabling condition for the very possibility of experiencing organisms, and thus serves an identificatory function, necessary to single out a special class of objects (organisms and what concerns them) to be investigated[34]. Under this perspective, teleology would be much more than a mere heuristic tool, a "contingent explanatory aid"[35] employed to facilitate the achievement of supposedly ultimate explanations which would necessarily be mechanistic/ateleological; instead, it would be a *constitutive* condition for the possibility of biology[36]. Such a requirement for the use of intentional concepts in addressing biological phenomena has been attributed to a sort of intentionality bias rooted in our brain circuitry, possibly evolved under selective pressures favoring fast predictions for the behavior of other humans/animals[37]. However, it has been convincingly argued that any attempt to provide a non-intentional, naturalistic, strictly biological account of our intentional reasoning conceptually presupposes intentionality in a way that undermines the account itself[38].

How then should we consider this impossibility of the human researcher to place him/herself outside his/her own perspective, necessarily structured around experienced concerns and goals? Should we take it as an insurmountable obstacle to that 'objective' knowledge, to which scientists often refer while overlooking its

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[33] Trommler and Hamman, 'The relationship between biological function and teleology: Implications for biology education', 2020.

[34] Marcel Quarfood, 'Kant on biological teleology: Towards a two-level interpretation', *Studies in History and Philosophy of Biological and Biomedical Sciences*, vol. 37, pp. 735-747, 2006. Georg Toepfer, 'Teleology and its constitutive role for biology as the science of organized systems in nature', *Studies in History and Philosophy of Biological and Biomedical Sciences*, vol. 43, pp.113-119, 2012.

[35] Mirko Prokop, 'Hans Jonas and the phenomenological continuity between life and mind', *Phenomenology and the Cognitive Sciences*, vol. 23, pp. 349-374, 2024.

[36] Quarfood, 'Kant on biological teleology: Towards a two-level interpretation', 2006.

[37] Evelyn Rosset, 'It's no accident: Our bias for intentional explanations', *Cognition*, vol. 108, pp. 771-780, 2008. Robert P. Spunt, Meghan L. Meyer and Matthew D. Lieberman, 'The default mode of human brain function primes the intentional stance', *Journal of Cognitive Neuroscience*, vol. 27, pp. 1116-1124, 2015. Esmeralda G. Urquiza-Haas and Kurt Kotrshal, 'The mind behind anthropomorphic thinking: attribution of mental states to other species', *Animal Behaviour*, vol. 109, pp. 167-176, 2015.

[38] Matthew Ratcliffe, 'A Kantian stance on the intentional stance', *Biology and Philosophy*, vol. 16, pp. 29-52, 2001.

transcendental pre-conditions, or should we try to explore it as a possible way to grasp some aspects of the intertwining between the structure of our cognition and the one of the natural world? The latter option seems to me much more appealing and potentially fruitful, for reasons that I will try to explore and clarify in the following sections. Here I just want to preliminarily underline two main sources of motivation for such an exploration. First, it can profitably look at the horizon opened by phenomenological ontology, in particular by Merleau-Ponty's ontology of the flesh, pointing to the co-constitution of mind and world from within the 'flesh', understood as the elemental "formative medium of the object and the subject"[39], as an alternative to the tacit assumption of harboring within us an ultimate impartial spectator capable of reconstructing the world as a "Great Object", while maintaining an "absolute power to survey the world from above"[40]. It has also recently been underlined how this horizon reveals the possibility of a fruitful rethinking of the very concept of nature[41]. Second, the investigation of the nature-mind intertwining that is at play in science can benefit from the perspective, insistently pointed out by Spaemann, according to which the human conscious life, that we ourselves are, is the only access we have to non-human, unconscious life -of which we can only think negatively, as conscious life minus the consciousness. But even more radically, to regard any aspect of nature, including the inanimate material world, as real, "to recognize it as something that exists in some sense in itself", and that therefore lends itself as something to be investigated, "means to view it under the aspect of similarity with us, and thus anthropomorphically, not as an object, but as something that shares in reality with us"[42]. Accordingly, every natural process can be interpreted causally only by pre-placing it in a context of action and therefore in a teleological horizon, and experienced human life is the tacit prerequisite to qualify as a system every natural system we can possibly theorize about, be it an organism, an ecosystem

[39] Maurice Merleau-Ponty, *The visible and the Invisible*, trans. A. Lingis, Evanston, Northwestern University Press, 1968, p. 147.

[40] *Ibid.*, pp. 15-16.

[41] Shaun Gallagher, 'Rethinking nature: Phenomenology and a Non-reductionist Cognitive Science', *Australasian Philosophical Review*, vol. 2, pp. 125-137, 2018. Arran Gare, 'Natural philosophy and the sciences: Challenging Science's tunnel vision', *Philosophies*, vol.3, art. no. 33, 2018.

[42] R. Spaemann, 'In defense of anthropomorphism', 2015.

or a galaxy[43]. By taking phenomenology of experienced human aliveness and Spaemann's rediscovery of teleological thought as reference theoretical frameworks, I will try to take a few steps towards understanding the very fact, documented above, that anthropomorphic reasoning is evidently effective in biological discovery, learning and communication, a fact that is rarely thematised, despite representing an invitation to explore a new conception of scientific inquiry where nature is humanely conceived and dealt with.

3. INVESTIGATIONS INTO LIVED EXPERIENCE AND THEIR RELEVANCE FOR UNDERSTANDING NATURE

For Jonas, the genuineness of the self-experience of life occurring in humans, which manifests itself as an end-directed inwardness, grounds a legitimate form of anthropomorphism in nature investigation, while denying such a genuineness entails either the exclusion of man from the natural realm or the erasure of teleology from the nature of man, and thus the alienation of man from himself[44]. In other words, the form of anthropomorphism legitimized by Jonas presupposes a fundamental trust in our own embodied self-experience both as the source of our pre-familiarity with living beings and as a paradigm through which only we can access knowledge of the rest of nature. Notably, the scope of such life-mediated knowledge is not necessarily limited to organic nature. When Jonas writes that "the non-dogmatic thinker will not suppress the testimony of life"[45] he intends to extend what he considers to be non-dogmatic thought also to matter and causality and even to being itself. In the author's words,

> "The living body that can die, that has world and itself belongs to the world, that feels and itself can be felt, whose outward form is organism and causality, and whose inward form is selfhood and finality: this 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."[46].

An anthropomorphism such conceived has little to do with the naïve and unsupervised "practice of attributing human features to nonhuman entities"

[43] R. Spaemann and R. Löw, *Natürliche Ziele*, Ch. IX-X.
[44] H. Jonas, *The Phenomenon of Life*, 1966, p. 37.
[45] *Ibid.*, p. 2.
[46] *Ibid.* p. 19.

previously pointed out as a problematic aspect of Jonas-inspired biophilosophies[47]. Instead, within recent top-down approaches to the phenomenon of life that are in line with Jonas' phenomenological inversion, it has been argued that there is large room for forms of anthropomorphism which can resist the criticism of being merely projective, and can instead be shown to play an irreplaceable constitutive role, at least in the study of some forms of non-human life[48].

A keystone of Jonas' philosophical biology is his existential interpretation of metabolism. Metabolism can be seen as the very mode of physical existence of all living organisms. As a material process, metabolism can be traced back to the collective properties of an enormous number of molecular components, whose transactions can be described in chemical-physical terms, well within the established boundaries of scientific knowledge. It is through metabolism that each living individual remains the same despite and through the unceasing renewal of its constituting molecular components and supramolecular assemblies. In Jonas' account, metabolism marks the break point between the inorganic and the organic, and such a point of discontinuity corresponds to the emancipation of a form which, paradoxically, is at once in a relation of independence and dependence from the matter constituting and surrounding it. In Jonas' words, the organism as a whole "sustains its own identity by the very act of foreign matter passing through its spatial system, the living *form*. It is never the same materially and yet persists as its same self, *by* not remaining the same matter"[49]. The use of words like 'identity' and 'self' already hints at an existential rather than scientific discourse, and this becomes explicit when the organism's metabolic way of being is captured through the widely quoted statement that "the organic form stands in a dialectical relation of *needful freedom* to matter."[50] Not surprisingly, on the one

[47] M. Villalobos and D. Ward, 'Lived experience and cognitive science: reappraising enactivism's jonasian turn', 2016.

[48] Peter Gaitsch, 'Modern anthropomorphism and phenomenological method', *Constructivist Foundations*, vol. 11, pp. 220-221, 2016. Hayden Kee, 'Phenomenology and naturalism in autopoietic and radical enactivism: exploring sense-making and continuity from the top down', 2018. For an in-depth discussion of the meaning of Jonas' anthropomorphism from a phenomenological point of view, see Renaud Barbaras, *Introduction to a Phenomenology of Life*, trans. L. Lawlor, Bloomington, Indiana University Press, 2021, pp.169-174.

[49] H. Jonas, *The Phenomenon of Life*, 1966, p. 76 (emphasis in the text).

[50] *Ibid.*, p. 80 (emphasis in the text).

hand such a way of expressing the meaning of metabolism finds the dissatisfaction of naturalistically oriented thinkers[51], on the other hand it simply goes undetected and receives no recognition or even mention in reference textbooks of scientific disciplines, like biochemistry or molecular cell biology, of which metabolism represents a key subject. How should we approach a proposal like Jonas's, which is both revolutionary and well-argued at the same time? And how justified is it that it is ignored by the disciplinary fields that are the main actors in the acquisition and transmission of knowledge about living organisms? As mentioned in the previous section, the aim of this study is to contribute to remedy this lack of integration by exploring the conditions and the implications of conceiving human teleological reasoning as an index of a genuine feature of nature, the same nature that we try to investigate by scientific approaches. To this end, I now turn to consider some developments and criticisms of Jonas' attempt that have emerged in the last 20 years on the phenomenological side, as they provide criteria to highlight some ambiguities and difficulties from which Spaemann's thought could represent a way out - a way that can only be undertaken, however, by introducing a concept of *physis* that is much more inclusive than the conception of nature advocated by naturalism.

A useful starting point is represented by a criticism moved to Jonas' interpretation of metabolism by Barbaras[52]. For Jonas, the metabolic way of being peculiar to organisms can be described as the "need for constant self-renewal, and thus need for the matter required in that renewal"[53]: a continuous exchange of matter and energy is the condition for the self-preservation of the organic form, which itself consists in the continuous process of its self-fabrication. But for Jonas the context in which the organism's metabolic self-preservation takes place is a universe of formless, inanimate matter where the organism is a kind of intruder under the constant threat of extinction. Therefore, notes Barbaras, "life is approached from the point of view of a material world that is fundamentally

[51] M. Villalobos and D. Ward, 'Lived experience and cognitive science: reappraising enactivism's jonasian turn', 2016

[52] Renaud Barbaras, 'Life, movement, and desire', *Research in Phenomenology*, vol. 38, pp. 3-17, 2008.

[53] Hans Jonas, 'Biological foundations of individuality', *International Philosophical Quarterly*, vol. 8, pp. 231-251, 1968.

without life"[54]. It turns out, however, that this decision amounts to assuming as a frame of reference the same ontology of death denounced by Jonas as bound to the imperative to explain life as a variant of the lifeless[55]. According to Barbaras, defining the living state as the dynamic and continuously negotiated preservation of itself results in a circularity which closes any access to the understanding of what is that which preserves itself, i.e. of what is it to be living. As a consequence, "an authentic phenomenology of life that really thinks life on the basis of itself must start by giving up" the presupposition, "shared by most of the philosophies of life", that the intimate dynamics of life can be ultimately and exhaustively described as a dynamics of self-preservation[56].

This criticism may also apply to proposals for the biological grounding of teleology that, through a more or less direct and extensive reference to Jonas' view "that metabolism is intrinsically teleological, a statement that cannot be arrived at by the unprepared, disembodied observer"[57], ultimately tend to refer the teleologically/anthropomorphically connoted traits of the organism to a tension towards self-preservation. So, for example, in their influential attempt to reformulate autopoiesis (originally conceived in a mechanistic ateleological framework[58]) as embodied teleology instantiated into a subject, Weber and Varela see the organism as an individuality concernfully involved "in the fundamental purpose of maintaining its identity". For such an individuality, "stimuli from outside enter the sphere of relevance (…) only by their existential meaning for the keeping of the process of self-establishment", and "it is in life's incessant need, that a subjective perspective is established. Subjectivity is the absolute interest the organism takes in his continued existence."[59] In a critical assessment of the above view, Di Paolo proposed that, for biological grounding of intrinsic teleology, it is essential to integrate the notion of autopoiesis with that of adaptivity. By allowing "an organism access to the implications of the mutually causal links between the processes that achieve self-production", adaptivity gives the autopoietic system

[54] R. Barbaras, 'Life, movement, and desire', 2008, p. 10.
[55] H. Jonas, *The Phenomenon of Life*, 1966, pp. 7-22.
[56] R. Barbaras, 'Life, movement, and desire', 2008, p. 12. For a more detailed discussion, see also R. Barbaras, *Introduction to a Phenomenology of Life*, 2021, pp.169-208.
[57] E. A. Di Paolo, 'Autopoiesis, adaptivity, teleology, agency', 2005.
[58] H. Maturana and F. Varela, *Autopoiesis and Cognition. The Realization of the Living*, 1980.
[59] A. Weber and F. Varela, 'Life after Kant', 2002.

the ability to regulate itself with respect to the norm generated by autopoiesis, that is, "the natural distinction between self-maintenance and disintegration"[60], thus justifying how mere metabolic self-production could result in self-concern. According to a more decisive tendency towards naturalization, recent proposals for the biological grounding of teleology, aimed at bringing back teleology into the realm of science without denying it, tend to forget the reasons that motivated the rediscovery of Jonas' phenomenological inversion, and start from the assumption that any solution, to be acceptable, should specify "how teleology emerges from non-teleological dynamics"[61]. Consistently with this assumption, the *telos* of biological organization ends up being identified with its own conditions of existence, while the theoretical tension to account for organismal inwardness tends to fade away[62].

As far as the fundamental level of nature, from which it is believed that any explanatory attempt must start, is the one of an inert, lifeless, ateleological matter-energy substratum ("a field of inanimate masses and forces which operate according to the laws of inertia and of quantitative distribution in space"[63]), any proposal of naturalizing teleology can only lead to reduce every natural end to more or less conceptually elaborated forms of self-preservation of circumscribed matter-energy patterns. This type of outcome, in which contemporary attempts to naturalize teleology seem to converge, can be traced back to what Spaemann calls the "inversion of teleology".

4. SPAEMANN'S CRITIQUE OF INVERTED TELEOLOGY AND REHABILITATION OF ANTHROPOMORPHISM

The variety and wealth of Robert Spaemann' philosophical work have only recently begun to be the subject of in-depth systematic studies[64]. Within an understanding of "philosophy as a continuing unsettlable controversy", his

[60] E.A. Di Paolo, 'Autopoiesis, adaptivity, teleology, agency', 2005, p.439.
[61] Carl Sachs, 'Naturalized teleology: Cybernetics, organization, purpose', *Topoi*, vol. 42, pp. 781-791, 2023.
[62] Matteo Mossio and Leonardo Bich, 'What makes biological organization teleological?', *Synthese*, vol. 194, pp. 1089-1114, 2017.
[63] H. Jonas, *The Phenomenon of Life*, 1966, p. 10.
[64] Holger Zaborowski, *Robert Spaemann's Philosophy of the Human Person: Nature, Freedom, and the Critique of Modernity*, Oxford, UK, Oxford University Press, 2010. Matteo Amori, *L'irriducibilità del fine. Modernità, antropomorfismo ed etica nel pensiero di Robert Spaemann*, Napoli, Guida, 2012.

critique of the self-interpretation of modernity "as a radical emancipation from what preceded it, and in particular from a teleological view of nature" reveals itself overall as a unique attempt "to take the great positive contributions of modernity -enlightenment, emancipation, human rights, and modern natural science with its accompanying mastery of nature- into a kind of protective custody" from the harm of its own self-interpretation[65]. Particularly relevant to this essay is an influential book focusing of the rediscovery and deepening of teleological thought, to which a major contribution came from Spaemann's coauthor Reinhard Löw[66].

A central concept in Spaemann's reflection on the history of the idea of nature and its current understanding, the inversion of teleology corresponds to a fundamental theoretical move, taking shape and consistency at the beginning of the modern era, which establishes the primacy of self-preservation, whereby the existence of any natural thing is ontologically subordinated to the conditions of its conservation. In Spaemann's words, while in classical (essentially Aristotelian) thought

> "everything that exists is not mere presence but is ordered to an activity proper to it, an activity that in turn is ordered to the realization of a specific *bonum*, we now have an inversion of teleology: being does not rise up to activity, but activity instead has as its sole goal the preservation of that which already simply exists. It is (…) Spinoza who gave the classical expression to this ontology, when he defined being simply in terms of this inversion, i.e. in terms of self-preservation: 'The *conatus* with which each thing endeavors to persist in its own being is nothing but the actual essence of the thing itself' (Ethics III, prop.VII)."[67]

Within such a perspective, the idea of *telos* loses its reference to a tendency of each natural thing towards an accomplishment which transcends its factual existence. Equating this accomplishment with self-preservation, as inverted teleology does, ultimately amounts to a kind of "introverted striving", a curvature of the tendency on itself which does not make it differ much from the principle

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[65] Arthur Madigan, 'Robert Spaemann's «Philosophische Essays»', *The Review of Metaphysics*, vol. 51, pp. 105-132, 1997.

[66] Robert Spaemann and Reinhard Löw, *Natürliche Ziele: Geschichte und Wiederentdeckung des teleologischen Denkens*, Stuttgart, Klett-Kotta, 2005.

[67] Robert Spaemann, 'Bourgeois ethics and non-teleological ontology' in *A Robert Spaemann Reader*, 2015, pp. 45-59.

of inertia[68]. Accordingly, "every finalistic orientation, understood only as an immanent organizational principle of a complex material state, for which the term 'good' only means a relationship of certain partial states with this organizational principle, is exposed to causal reductionism."[69].

But what could be the foundation of a conception of natural entities, and in particular of living beings, according to which every living being is in a sense "more than what it is, it is not mere presence but being-oriented-towards, tendency"[70], with this tendency being towards something beyond self-preservation?

For Spaemann, such a conception can be founded on human self-experience. The dimension of "being that comes from and goes towards" is something always already available to us by acquaintance, "and not because we, as acting beings, set ends, but because we find the being-directed-to-ends within us in the form of drive"[71]. To try to understand what life is, we cannot do anything but start, phenomenologically, from our conscious life. Based on our lived consciousness we experience ourselves as genuine primary realities. "I do not experience myself as a state of something that is not human"[72]. That means that I am defined by a selfhood, or ipseity (*Selbstsein*), which implies emancipation from causal conditions of existence[73] together with a directedness towards the accomplishment of the possibilities entailed by such a selfhood. But, importantly, this necessary access to the problem of life through *conscious* life is not to mean that we cannot have an experience of what non-conscious or non-human life could be. If this were the case, we would fall back into the idea that teleology is limited to human conscious action. Here are two passages where Spaemann addresses this key issue:

> "Conscious action only takes place as a secondary appropriation or rejection of tendencies that have, first, a character of instinctive impulse. (…) The decision to eat or fast is simply the conscious appropriation or rejection of that which is forewarned in hunger, and also somehow in the way of 'tending-towards'. And

[68] Robert Spaemann, 'Nature', in *A Robert Spaemann Reader*, 2015, pp. 22-36.
[69] R. Spaemann and R. Löw, *Natürliche Ziele*, 2005, p. 242.
[70] Robert Spaemann, *Chasser le naturel?*, trans. Stéphane Robilliard, Paris, Les Presses Universitaires de l'IPC, 2015, p. 177.
[71] R. Spaemann and R. Löw, *Natürliche Ziele*, 2005, p. 256.
[72] R. Spaemann, 'In defense of anthropomorphism', in *A Robert Spaemann Reader*, 2015, p. 84.
[73] Robert Spaemann, 'What does it mean to say that «Art imitates nature»?', in *A Robert Spaemann Reader*, 2015, pp. 192-210.

> wherever we go to aid non-human life, it behaves in a similar way. One can only aid a being that directs itself towards something, but is too weak to reach it. There is only teleology in human action because and insofar as there is a direction in natural tendency."[74].
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> "When we become aware that we are in a cheerful mood, that we are hungry or have a slight headache, we experience this mood, this hunger or this headache as something we already had, before we became aware of it. If someone were to ask us what this hunger was before we became conscious of it, we would of course find ourselves at a loss. For we are conscious only of conscious hunger. And yet part of this consciousness is that the hunger was beforehand and that becoming conscious of it simply brings it into a new stage. Beforehand it was something similar to what it is as conscious hunger, i.e. it was conscious hunger minus the consciousness. This is something that can be expressed only negatively; there does not seem to be any way to put it positively."[75]

However, such a negatively expressed status is rooted in our being alive, it "is not 'nothing'. In fact, we experience a *continuum* between us as living beings and us as conscious life and, based on this continuum, we can also understand non-conscious life outside of ourselves". In other words, "we experience in ourselves a teleological element –tendency towards something- that we already possess before becoming aware of it"[76]. Such an element bears witness to the teleological character of nature, or at least of living nature. The most immediate experience that humans have of their being-oriented-to is thus not the conscious setting and pursuing of goals, but the experience of those tensions that are part of their heritage as natural living beings: in the "form of self-experience the phenomenon of being-oriented-to is immediately given"[77]. Therefore, in Spaemann's view, natural teleology is recognized as having a sort of primacy over intentional teleology (like the one typical of human action), and life is recognized as the nexus between consciousness and nature, a nexus that had vanished with the Cartesian dualism of *res cogitans* and *res extensa.* Through the fundamental experiences of being alive –feeling, pain, joy, desire, striving, instinct-, all having a vectorial character, we find ourselves always already inside of a teleological framework,

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[74] R. Spaemann, 'The unrelinquishability of teleology', 2008, p. 293.
[75] R. Spaemann, 'In defense of anthropomorphism', 2015, pp. 85-86.
[76] Robert Spaemann, *Cos'è il naturale: Natura, persona, agire morale*, trans. M. Amori, Torino, Rosenberg & Sellier, 2012, p. 30.
[77] M. Amori, *L'irriducibilità del fine*, 2012, p. 134. R. Spaemann and R. Löw, *Natürliche Ziele*, 2005, p. 35.

which precedes all consciousness and connects us with all living things[78]. At the same time, as highlighted above, *conscious* living is the only available access to what living is. Yet, as thoroughly discussed by Amori[79], that the concept of life can only be gained privatively does not imply for Spaemann that it is secondary. Rather, what the conscious living being grasps within itself is that

> "consciousness is something in living [*Erleben*], it is an augmented modality of its actualization, and what living itself was before this actualization cannot be said, since precisely this actualization is the becoming sayable. Living [*Leben*] presses, in a certain way, towards becoming conscious, and where this happens living becomes conscious as a moving-towards which precedes every will and every conscious setting of ends"[80].

A radical implication of Spaemann's thesis of the foundational character of human conscious living is that it constitutes the only substantial unit of reference, not only for every attempt to understand the meaning of what life is, but also of what being is.[81] In particular, the concept of 'mere being' can only be gained through abstraction. Starting from life grasped privatively as "what conscious living experiences of itself without consciousness", once we continue to abstract "from all the immediate experiences that are reflected in consciousness", and then again from all the "significance that an inanimate entity receives within the lifeworld of a living thing", only at this point do we find 'mere being'[82]. Consistently with this line of thought, the prospect of a radical anthropomorphism opens up, which embraces not only other living beings, but every element of nature, be it living or not, while at the same time overcoming the talk "about subjects and objects as two independent spheres of being that are in principle opposed to one another"[83]:

> "We do not claim, of course, to be able to know what it is like to be a bat. But we

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[78] Robert Spaemann, 'The meaning of the «Sum» in the «Cogito Sum»', in *A Robert Spaemann Reader*, 2015, pp. 170-178.

[79] M. Amori, *L'irriducibilità del fine*, 2012, pp. 195-198.

[80] Robert Spaemann, *Schritte über uns hinaus: Gesammelte Reden und Aufsätze II*. Stuttgart, Klett-Cotta, 2011, pp. 83-84.

[81] M. Amori, *L'irriducibilità del fine*, 2012, p. 195. This recalls Jonas' idea, referred to above, according to which the embodied human experience of selfhood should be the canon to address the fundamental question of being.

[82] R. Spaemann, *Schritte über uns hinaus: Gesammelte Reden und Aufsätze II*, 2011, pp. 82-83.

[83] R. Spaemann, 'In defense of anthropomorphism', 2015, p.82.

> take for granted that it does mean something to be a bat (…). In other words, we allow that a bat has 'being'. This being, which it shares with us, is called 'life'. (…) We attribute life to a bat, and therefore think of it as being a self."[84]

> "Even with regard to the inanimate material world that is distant from us, we have to say that to regard it as real, to recognize it as something that exists in some sense in itself, means to view it under the aspect of similarity with us, and thus anthropomorphically, not as an object, but as something that shares in reality with us [*als Mitsein*]"[85].

Now, to recognize, according to the line of thought outlined above, something as existing in itself, or the ipseity of something, implies recognizing in some way a character of absoluteness to it, which makes it an end in itself in a more absolute sense than if it existed only for its own sake (self-preservation), of for something else external to it (extrinsic teleology). The specific absoluteness of what we grasp as being in itself, and thus teleologically, entails possessing a value in itself, being a good. Significantly, Spaemann notes that Portmann's category of self-representation in biology "implies the concept of an ipseity that represents itself, and somehow contrasts with the categories of a context of universal conditioning based on laws."[86]. In synthesis, for Spaemann, to the extent that we want to consider man as a natural being, the question about the ontological status of teleology is a question about ourselves, about the possibility of understanding ourselves as 'selves'.

> "This is then the alternative: either goal-oriented human action is itself ontologically secondary, ultimately the product of a random constellation of selective deterministic causal processes, and thus interpretable teleonomically, or

[84] *Ibid*., p. 84.

[85] *Ibid*., p. 86. An important precedent for the view that non-human life can only be grasped privatively is represented by Heidegger's idea that non-human life is a particular mode of being only accessible via the *Dasein*, and whose ontology can only be addressed through a privative interpretation (see M. Heidegger, Being and Time, trans. Joan Stambaugh, Albany, SUNY, 1996, in particular paragraph 10 pp.42-47 and paragraph 41 pp.178-183). In Spaemann's view, however, the privative approach reaches the point of involving even inanimate elements, thus highlighting a rooting in the *Dasein* not only of the life sciences, but of natural sciences in general.

[86] R. Spaemann and R. Löw, *Natürliche Ziele*, 2005, pp. 245-246. The use of the category of representation to indicate a mode of emancipation of a living ipseity from the causal circularity of self-maintenance recalls some speculative outcomes in the phenomenology of life, like the idea that life is characterized by a movement that largely exceeds the need for self-preservation, and that can be more fully grasped as a radical desire or striving for manifestation, a tendency to presentation correlating with a fundamental state of lack (see R. Barbaras, 'Life, movement, and desire', 2008).

> the categorical structure of 'being that comes from and goes towards' [*Aus-seins-auf*] is, for different levels of complexity, constitutive of natural being in general, and this being is therefore from the beginning something more than pure positivity and objectivity. And any reconstruction of this finalism is only possible because we already have the dimension of 'being that comes from and goes towards'."[87]

An original aspect of Spaemann's reflection that may be of relevance for recent debates on the naturalization of teleology and/or phenomenology is the contrast that he underlines between anthropomorphism and anthropocentrism. In the recent literature in this field, a tendency can often be found to merge these two attitudes into a single biased and therefore problematic position[88]. In contrast, in Spaemann's view, anthropocentrism is peculiar to a strictly naturalistic vision, that attributes to science a capacity for exhaustive knowledge of nature. Behind the ban of anthropomorphism he sees precisely the anthropocentric centering of modern thought, that works to expunge from the natural world everything similar to it, so that nature becomes a mere object to it.

> "Thomas Hobbes, as one of the fathers of anthropocentric thinking of modern science, already wrote that to know a thing means 'to know what we can do with it when we have it'. In order to know what I can do with something, I do not need to know what it really is in itself. I can therefore renounce anthropomorphism for the sake of anthropocentrism. Insofar as things are pure objects, they stand over against the subject; they have nothing in common with it."[89]

5. INESCAPABILITY OF ANTHROPOMORPHISM IN THE SCIENTIFIC APPROACH TO NATURE

For Spaemann, the human experience of selfhood/ipseity is key to any understanding not only of living things, but more generally of any natural thing or occurrence. A radical implication of this conception is that the scientific approach to nature, even if it tends to consider itself as free from any teleological premise regarding its object of study, cannot take a step that is devoid of any anthropomorphic connotation. This first applies to the key concept of causality. Even after having expunged any purposiveness from natural processes, what is

[87] R. Spaemann and R. Löw, *Natürliche Ziele*, 2005, pp. 252-253.
[88] P. De Jesus 'From enactive phenomenology to biosemiotics enactivism', 2016. M. Villalobos and D. Ward, 'Lived experience and cognitive science: reappraising enactivism's jonasian turn', 2016.
[89] R. Spaemann, 'In defense of anthropomorphism', 2015, p. 86.

left over, i.e. undirected causality or mere efficient causes, "reveals itself as anthropomorphic (…). What a cause is, is something we know primarily only on the basis of the experience of our own action."[90] . "Each process can be interpreted causally only on the assumption that it has already been integrated into a context of action. Mechanical interpretation is essentially possible only under the assumption of a unifying life context."[91] In this regard, Spaemann and Löw refer to similar ideas previously formulated by Jonas in his critique of Hume's account of causality, which are worth quoting in full:

> "The primary aspect of causality is not regular connection, not even necessary connection, but force and influence; (…) these are themselves original contents of experience and not interpolations between contents of experience (=percepts) by a synthetic function, be it association or reason; (…) the source of this experience is, indeed, not sense perception, but our body exerting itself in action; (…) lastly, the right of extrapolation from this source beyond its immediate range of deliverance is a question to be studied, without fear of the blame of anthropomorphism, by an organic philosophy."[92]

Furthermore, "causality cannot even be thought without a teleological moment". Giving a process a causal explanation means to select from the whole realm of nature an event B, and to consider it as the outcome of the occurrence of a series of conditions A based on a proven regular association between A and B. "But if we do not set B as the final condition, no causal explanation is given. (…) *Without 'telos' there is no cause*."[93] These ideas recall contemporary views of causation referred to as agency or interventionist theories of causality, according to which our embodied intentional agency is an indispensable factor in establishing causal chains, without which we would be unable to make any meaningful causal imputation[94]. Even more radically, when, in causal

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[90] *Ibid.*, p. 87.

[91] R. Spaemann and R. Löw, *Natürliche Ziele*, 2005, p. 203.

[92] H. Jonas, The Phenomenon of Life, 1966, p. 33. Both Spaemann and Löw (*Natürliche Ziele*, 2005, pp. 119-121) and Weber and Varela ('Life after Kant', 2002) underline how a similar idea was formulated by Kant as evidenced by some of the writings collected in the *Opus posthumum*.

[93] R. Spaemann, 'In defense of anthropomorphism', 2015, p. 202 (emphasis in the text).

[94] Marco Buzzoni, 'The agency theory of causality, anthropomorphism, and simultaneity', *International Studies in the Philosophy of Science*, vol. 28, pp. 375-395. According to another contemporary, neo-aristotelian theory of causation, referred to as dispositionalism, powers or dispositions are assumed as irreducible property-like features of substances that, being directed toward their manifestation, tend to produce certain kinds of effect, with this connection being primitive and knowable through our bodily experiences. See Stephen Mumford,

explanation, we attempt to trace an event back to some of its precedents, to be used as constitutive elements of the explanation of the event itself, we think anthropomorphically precisely in identifying what needs to be explained, and on the basis of which subset of all the possible precedents. In other words, to say of one thing that it is the cause of another is anthropomorphic[95].

On a similar vein, key scientific concepts that are particularly used in biology, like system, structure, chance and necessity, and even matter, ultimately refer to an overall teleological context only by virtue of which they acquire meaning. Talking about a system as a self-sustaining network of interconnected parts makes sense only in relation to what is not part of it, thus presupposing awareness of an identity together with the possibility of otherness. Therefore, conscious human life, far from being derivable "in terms of systems theory, is *vice versa* the prerequisite for qualifying even just the simplest system as a system"[96], and "systems theory is so little able to teach us what it means to tend towards something, that it is, conversely, rather the system that we cannot understand at all as a system without interpreting it through analogy with our experience of intentionality."[97]

As to the concept of matter, it has as its tacit presupposition the experience of something that can be seized, and its meaning is consolidated thanks to the anthropomorphic concepts of attraction and repulsion[98]. As to chance and necessity,

> "In order to be able to speak meaningfully of 'chance', a normal situation is necessary compared to which the random event appears as an unlikely deviation. The concept of necessity reflects the same anthropomorphic exigency: it can be expelled from every natural-scientific observation as a pleonasm."[99]

Interestingly, Spaemann admittedly found in Nietzsche important insights into the pervasiveness of anthropomorphic thought. "Nietzsche goes so far as to say that even the representation of a thing which, despite its changing properties,

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'Contemporary efficient causation', in T.M. Schmaltz (ed.), *Efficient Causation: A History*. Oxford, Oxford University Press, 2014, pp. 317-366.

[95] R. Spaemann and R. Löw, *Natürliche Ziele*, 2005, pp. 205-206.

[96] *Ibid*., p. 208.

[97] R. Spaemann, *Chasser le naturel?*, 2015, p. 173.

[98] R. Spaemann and R. Löw, *Natürliche Ziele*, 2005, p. 209.

[99] R. Spaemann and R. Löw, *Natürliche Ziele*, 2005, p. 210.

remains identical to itself, can be characterized as anthropomorphism". In fact, it is human subjects that "understand themselves as units identical to themselves that go through changing conditions."[100] For Nietzsche, "virtually all the terms used in scientific claims to knowledge are, in the broadest sense, anthropomorphic."[101] Nietzsche claims that sciences operate with

> "things which do not exist, with lines, surfaces, bodies, atoms, divisible times, divisible spaces – how can explanation ever be possible when we first make everything a *conception*, our conception! It is sufficient to regard science as the exactest humanizing of things that is possible; we always learn to describe ourselves more accurately by describing things and their successions."[102]

For Spaemann, it is the notion of selfhood of natural things that Nietzsche had in mind "when he wrote that the final anthropomorphism that has to be overcome is the notion of things as natural unities. And Nietzsche also in fact took the final step: our very image of ourselves as unity, the notion of our own identity, is anthropomorphic. Man is himself merely an anthropomorphism." Regardless of the outcomes of this view in Nietzsche's thought, Spaemann notes that it reveals the dead end to which a complete deteleologization of nature leads: "We are not permitted to think of things by analogy to ourselves, but we must rather think of ourselves by analogy to things. It turns out, however, that things themselves do not exist, because they can be thought as things only by analogy to us."[103]

In contrast to this nihilistic outcome, which scientism tries to counteract by introducing "science" as a new form transcendental subjectivity not belonging to the world[104], I think that Spaemann's proposal to recognize and come to terms

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[100] Robert Spaemann, *Über Gott und die Welt: Eine Autobiographie in Gesprächen*. Stuttgart, Klett-Cotta, 2012, pp. 220-221.

[101] George J. Stack, 'Nietzsche and anthropomorphism', *Crítica: Revista Hispanoamericana de Filosofía*, vol. 12, pp. 41-71, 1980.

[102] Friedrich Nietzsche, *The Complete Works of Friedrich Nietzsche. Volume Ten: The Joyful Wisdom*, trans. T. Common, New York, The Macmillan Company, 1924, p. 158.

[103] Robert Spaemann, 'What does it mean to say that «Art imitates nature»?', 2015.

[104] For Spaemann, this bears witness to the oscillation of modern *Weltanschauung* "between an acosmistic transcendentalism and a reductionistic naturalism" (Robert Spaemann, *Schritte über uns hinaus: Gesammelte Reden und Aufsätze I*. Stuttgart, Klett-Cotta, 2010, p. 19). There is a notable similarity between this observation, which is recurrent in Spaemann's works, and Merleau-Ponty's criticism of the conception of science as a path towards the complete objectification of the world.

with the inescapability of anthropomorphism opens up new spaces for the rational exploration of the connection between the tacit assumptions of scientific investigation and the nature of the contents that it discovers. This is what I will try to roughly outline in the conclusive section.

6. CONCLUSIONS

In contemplating the "gigantomachias" around the problem of teleology throughout the history of Western thought, Spaemann asked himself as few others "what exactly are the interests that lie behind 'teleophily' and 'teleophoby'."[105] For Spaemann, these are two interests of the human reason, that highlight a constitutive polarity of human condition.

> "At the beginning (…) lies the interest in asserting oneself in a predominantly hostile nature. This self-affirmation occurs through an increasing mastery of nature. However, there is also an interest in establishing a relationship of trust with the things of the world, in living in being as in a homeland, in understanding oneself in the context of the universe."[106]

For the mastery of nature, the teleological mode of understanding we use for our fellow humans is superfluous and even annoying, as the task is not *to understand* nature in such a way that man, at the same time, also understands himself, but *to explain* nature inner workings so as to know what we can do with it. So modern science "does not ask what truly is and what therefore has the character of existing side-by-side with us, but it asks instead how it appears to us as object and how it is able to be manipulated by us."[107] At the opposite pole, the interest of reason that underlies the anthropomorphic/teleological understanding of natural processes and entities is "the interest in appropriating nature as something familiar, so that we can realize the decision to belong to it without giving up, at

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Such a conception presupposes "the ontology of the *Kosmotheoròs* and of the Great Object correlative to it" –a pre-scientific prejudice, indeed, as "the *Kosmotheoròs* capable of constructing or of reconstructing the existing world with an indefinite series of its own operations, far from dissipating the obscurities of our naïve faith in the world, is on the contrary its most dogmatic expression, presupposes it, maintains itself only by virtue of that faith." (M. Merleau-Ponty, *The visible and the Invisible*, 1968, p.15).

[105] R. Spaemann and R. Löw, *Natürliche Ziele*, 2005, p. 230.

[106] R. Spaemann, *Über Gott und die Welt: Eine Autobiographie in Gesprächen*, 2012, p. 332.

[107] R. Spaemann, 'In defense of anthropomorphism', p. 86.

the same time, to understand ourselves as beings who act."[108]. While the first interest objectifies natural things to enable us, at least in principle, to intervene on their course, the second one is "the interest for what the other is in and for itself. It presupposes an ipseity, a being-itself, on the basis of which the object encountered is similar to the subject of the encounter."[109] For Spaemann, "such a unity of subjectivity and objective content is what the ancient Greeks called *physis*", and "questioning something about its *physis* is equivalent to attempting to understand it in analogy to our self-understanding. In fact, *physis* designates exactly what unites us with all that is."[110]

Based on several passages of his work, one gets the impression that Spaemann tends to see the two ways of observing nature, mechanical-causal and teleological, as somehow competing with each other, and it is clear which of the two he sides with:

> "There is a practical imperative that requires us not to give up, in relation to life in nature, the mode of teleological observation that is natural to us. It results from the fact that on the one hand we must and want to understand ourselves and our fellow human beings as acting beings, on the other that we are forced to *also* understand ourselves as part of nature. (…) If we want to understand man as nature, but without giving up his self-understanding as that of an acting being, then we cannot help but think of nature in teleological terms. (…) Either we decide to interpret living nature in anthropomorphic terms, or we ourselves become an anthropomorphism, that is, subjects without a world who dig the ground under their feet. The ever-recurring discussion of the problem of teleology - and this not only in the field of biology - must be seen in this context."[111]

While acknowledging the importance of his advocating a recovery of teleological thought, I believe that Spaemann, by contrasting the two types of observation of nature so clearly, somehow neglects to bring out the ultimate implications of the ineradicability of anthropomorphism even from science itself.

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[108] R. Spaemann and R. Löw, *Natürliche Ziele*, 2005, p. 20.
[109] R. Spaemann, *Über Gott und die Welt: Eine Autobiographie in Gesprächen*, 2012, pp. 340-341.
[110] R. Spaemann, *Über Gott und die Welt: Eine Autobiographie in Gesprächen*, 2012, p. 342. Related to this issue, it was previously noted that an existential conception of nature, drawing on Heidegger's late emphasis on nature as *physis*, has the potential to foster constructive recognition of nature not primarily as a *resource*, but as a *source* from which we cannot separate ourselves existentially (Todd Mei, 'The relevance of an existential conception of nature', *Cosmos and History: The Journal of Natural and Social Philosophy*, vol. 10, pp. 138-157, 2014).
[111] R. Spaemann and R. Löw, *Natürliche Ziele*, 2005, p. 239.

If we seriously try to put ourselves in this perspective, we may have access to a new and better way of understanding both the process of scientific discovery and the very contents of the scientific description of phenomena. As to scientific creativity, I have mentioned in section 2 the intriguing realization, based on direct experience in molecular biology practice, that a sympathetic identification of the researcher with her/his object of study, implemented through "the language of night science" in which "we are allowed to anthropomorphize freely", is of great help "to grasp why and how something may be happening"[112]. Although it would perhaps be too simplistic to attribute the language of day science, underlying the precise formulation and testing of scientific ideas, to Spaemann's first interest of reason, and the language of night science to Spaemann's second interest, nevertheless this observation can be seen as an example of how our self-experience, in its prevenient and irrepressible movement of familiarization with the world, allows us fruitful access to knowledge not only of non-human organisms, but also of sub-organismic or subcellular entities or even individual macromolecules. That said, I believe that the relevance of anthropomorphizing is not limited to mediating initial access to biological entities under the perspective of a pre-given familiarity with them. The consideration of the same entities under the aspect of their ipseity is also fundamental, albeit generally unnoticed, to the construction and deployment of a scientific account of them (i.e. for 'day science'). In other words, it follows from the idea of the ineradicability of anthropomorphism even from science that the scientific account of phenomena can never correspond to their complete naturalization, if naturalization indicates full conformity to an abstract ideal of total ateleologism (something that perhaps cannot even be thought or said). This amounts to say that we will never have a completely naturalized nature at our disposal, from which any trace of *physis* has been removed. A completely deteleologized nature is a nature we cannot even begin to think or talk about.

But then, based on all this, how can we place science in its rightful position in the general context of human knowledge? Does not the inescapabability of anthropomorphism leave science deprived of its peculiarities and prerogatives? A possible way to make a virtue of necessity is paradoxically suggested by

[112] I. Yanai and M. Lercher, 'The two languages of science', 2020.

Nietzsche's statement quoted above ("to regard science as the exactest humanizing of things that is possible"), provided that, contrary to Nietzsche's intention, the anthropomorphic pre-conditions of science are not considered as "those primevally embodied fundamental errors"[113], but as an original endowment whose recognition, combined with the immense treasure of scientific knowledge accumulated over the last four centuries, can open a new path towards the joint unveiling of nature and ourselves[114].

As an attempt to exemplify what such a perspective might show, let us consider some of the molecular components and interactions that underlie the activity of a human neuron in synaptic transmission. Neurons are strongly polarized cells. One of the supramolecular structures underlying such a polarization are microtubules, formed by the oriented assembly of myriads of globular protein molecules, called tubulins. In neurons, bundles of microtubules form the longitudinal scaffold of the axon, the long threadlike cellular extension along which the nervous impulse (action potential) is conducted towards the axon terminus (pre-synaptic terminus) where it causes an influx of calcium ions that in turn triggers the release into the extracellular synaptic space of a specific neurotransmitter, a small molecule mediating the communication with the post-synaptic cell (another neuron, or a muscle or gland cell). Tubulins self-assemble asymmetrically, so that each microtubule has a polarity, with biochemically distinguishable (+) and (-) ends. Because of the way microtubules are initially nucleated within the neuron, their (+) end points toward the axon terminal. This is essential to both neuron development (axon growth and synaptogenesis) and to the functioning of mature neurons. In particular, the maintenance of a functional axon terminus requires the active delivery of newly synthesized subcellular components such as synaptic vesicle precursors and organelles (mitochondria) that supply chemical energy (ATP molecules) to power neurotransmitter release and recycling, thus driving synaptic function[115]. The process of axonal transport

[113] F. Nietzsche, *The Complete Works of Friedrich Nietzsche. Volume Ten: The Joyful Wisdom*, 1924, p. 154.

[114] Perhaps a path similar to the one Merleau-Ponty alludes to in his notes: "the Nature in us must have some relation to Nature outside of us; moreover, Nature outside of us must be unveiled to us by the Nature that we are." (Maurice Merleau-Ponty, *Nature: Course Notes from the Collège de France*, trans. R. Vallier, Evanston, Northwestern University Press, 2003, p.206).

[115] Pedro Guedes-Dias and Erika L.F. Holzbaur, 'Axonal transport: Driving synaptic function', *Science*, vol. 366, no. 6462, eaaw9997, 2019.

is highly directional, with well distinct anterograde and retrograde modes, the former allowing the supply of newly synthesized material to the axon terminus, the latter allowing to remove damaged components from it. The anterograde and retrograde modes of axonal transport rely on specific types of ATP-powered motor proteins, kinesin and dynein respectively, that interact dynamically with the microtubule track and move along it, loaded with specific cargoes, in just one direction, which is towards the (+) end in the case of kinesin and away from it, towards the (-) end, in the case of dynein[116].

In the description I just provided of the main molecular players in axonal transport, which is entirely compatible with a standard scientific discussion of this process, I recognize as fundamental my considering the neuron in terms of its similarity to my being as it reveals itself in my self-experience, in particular as being-oriented-towards; and I cannot help but view also the subcellular structures (microtubules, migrating vesicles) and even their macromolecular components (tubulin, kinesin, dynein) under this fundamental aspect of similarity with me. At the same time, a neuron is part of, it participates in, the organism that I am, and axonal microtubules and end-directed motor proteins in turn participate in what the neuron is. But what does it mean that a neuron is part of me, and that microtubules are part of the neuron that is part of me? To address this crucial issue in a non-reductive way, one that fully accounts at the same time for my nature and the one of my cellular and molecular components, some conclusions from a recent reevaluation of Aristotelian hylomorphism can be of help[117]. Based on interpretations of hylomorphism as non-mereological, the material parts or elements, through their participation in the whole of a substance, are *re-identified*, meaning that they are stripped of their distinctness and transform into something different[118] (Marmodoro, 2013). To return to the example, as elements of the substantial unity that I am, my cellular and subcellular and molecular components are something different from what they are when conceptually or

[116] H. Lodish *et al.*, *Molecular Cell Biology, Eighth Edition*, 2016, pp. 835-840.
[117] Anna Marmodoro, 'Aristotle's hylomorphism without reconditioning', *Philosophical Inquiry*, vol. 36, pp. 5-22, 2013. Denis M. Walsh and Kayla Wiebe, 'The being of living beings: Foundationalist materialism versus hylomorphism', in A.S. Meincke and J. Dupré (eds.), *Biological Identity: Perspectives from Metaphysics and the Philosophy of Biology*, Abingdon – New York, Routledge, 2021, pp. 107-127.
[118] A. Marmodoro, 'Aristotle's hylomorphism without reconditioning', 2013.

empirically extracted from the whole, because in the substance they have no distinctness: "they exist in it holistically", while at the same time "a substance is all its parts, re-identified"[119]. But then, following Spaemann, what is this substantial unity lying behind their transformation? A conscious experiencing, a lived human life. My embodied self-experience, my own experienced directedness allows me to understand microtubule orientedness, as well as kinesin and dynein opposite directedness, together with their functional implications. At the same time microtubule orientedness underlies my experienced being-oriented-towards both as one of its innumerable conditions of occurrence and as one of the holistically re-identified parts of the living and conscious organism that I am. Instead of simply occurring as distinct ateleological elements of a network supporting the supervenience/emergence of a teleological whole, each of my cellular, subcellular, molecular components, stripped of their distinctness, participates in my lived orientedness as their very nature, and their participatory nature makes one with the readableness of their face.

In principle, the same arguments may apply to other material elements, such as calcium or iron or sodium chloride, that we are used to ascribe to the inorganic world despite the fact that they are involved in essential life processes. To the extent that these elements are re-identified in our substantial whole, their contribution to it as indispensable conditions of its existence is one with their participation in our being as ipseities, and we have to get to this level if we question their nature. Even more radically, since the causal chain that underlies every molecule or atom or subatomic particle that participates in our being can be traced back to the origin of the universe, any natural element or process or entity lends itself to being recognized in some way as imbued with sense and even dignity by virtue of their more or less direct participation in our being[120].

Under the general perspective outlined above, there are some issues that deserve to be addressed more in depth in future studies. The main one is

[119] *Ibid.*, p. 18.

[120] These considerations could be seen as an attempt to sketch a possible development of what is implicit in Jonas' exhortation in the first pages of *The phenomenon of life*: "Since matter gave such account of itself (…), it ought to be given its due, and the possibility for doing what it did should be attributed to it as residing in its primary nature: this genuine potency must then be included in the very concept of physical 'substance', just as the purposive dynamics seen at work in its actualizations must be included in the concept of physical casuality." (H. Jonas, *The Phenomenon of Life, 1966*, pp.1-2).

represented by the ontological position and peculiarity of life as a way of being common to all living organisms and correlating with a particular organization of matter, in a worldview where, from the sole point of access of our conscious self-experience, any physical entity is interpreted as sharing in reality with us, regardless of whether it falls into the organic or the inorganic realm. What happens to the differences between these two realms, which we have pondered so much over the centuries? To what extent and how is it possible and appropriate to keep the peculiarities of life well delineated, within a vision of nature that in some respects recalls that of Schelling when, as reported by Spaemann, he claims that "what is currently called 'inorganic' (…) is 'apparent death', available for a renewed organic becoming, it is 'sleeping world of plants and animals', 'the skeleton, revolted outside, of the entire organic world' and that, consequently, 'inorganic nature does not properly exist'"?[121]. In the anthropomorphic vision of reality developed by Spaemann, life occupies a central position as a nexus between consciousness and nature, and therefore as the true dimension of being. But, as detailed in section 4, this conception is based on a sort of subtractive reasoning:

> "If we want to attribute reality to inanimate beings, then we can do so only insofar as we determine the being of this being as similar to life, from which we then remove the particular phenomena that is characteristic of life, such as metabolism, just as we cannot but understand life as anything but conscious life, from which we remove consciousness."[122]

This, however, could lead to unduly overlooking what, in terms of material organization, living things stand out for (which for Jonas is summed up in the concept of metabolism).

A second theme that will need to be addressed is the one opened by the question of whether or not our self-experience, the paradigm for recognition of something as being in itself (i.e. beyond its being an object for others), is in turn

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[121] R. Spaemann and R. Löw, *Natürliche Ziele*, 2005, p. 133.

[122] R. Spaemann, 'In defense of anthropomorphism'. 2015, p. 92. As recently argued, for Jonas himself, despite the centrality of metabolism in his philosophical biology, "it is through our lived experience of internal identity alone that the metabolic mode of being is ontologically plausible *as a real mode of being* characteristic of living organisms." (M. Prokop, 'Hans Jonas and the phenomenological continuity between life and mind', 2024).

something immediately accessible. Spaemann's answer is unambiguous: "The self-consciousness that allows us to distance ourselves from every way we appear to others is itself inconceivable without those very others. (…) It is only through the gaze of others that we become visible and real to ourselves."[123]. This can be linked to aspects of Jonas' thought that have only recently been highlighted, which can be summarized in the idea of an irreducible intersubjectivity of human self-experience, thus raising other questions, such as what role do "concrete encounters with non-human others" play in this intersubjectivity, and how the centrality of relationship of mutual recognition can help to more fully understand the expressiveness or self-communication of living things[124].

As a final remark, it is worth recalling Spaemann's claim that the ecological crisis, to the extent that it is attributable to the explosive expansion of man's dominion over nature ateleologically conceived as a mere object, poses the practical imperative of "not giving up, in relation to life in nature, the mode of teleological observation that is natural to us."[125] The alternative is "the anthropocentric reduction of nature to pure objectivity", which entails the reduction of man himself, as a natural being, to a mere object, thus paradoxically allowing us to glimpse the only way in which the deteleologization/deanthropomorphization of nature can be completed: the abolition of man[126].

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[123] R. Spaemann, 'In defense of anthropomorphism'. 2015, p. 93.
[124] Sigurd Hverven and Thomas Netland, 'Projection or encounter? Investigating Hans Jonas' case for natural teleology', *Phenomenology and the Cognitive Sciences*, vol. 22, pp.313-338, 2023.
[125] R. Spaemann and R. Löw, *Natürliche Ziele*, 2005, p. 239.
[126] R. Spaemann, 'The unrelinquishability of teleology', 2008.

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