

Conditions of Knowability of Organic Life

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Abstract

This article focuses on the epistemological challenges of comprehending organic life. It explores the cognitive and experiential basis of the perspective that organisms are autonomous agents of their own teleological organization and development. According to Immanuel Kant and Hans Jonas, the conditions of the knowability of organic life lie within our mental faculties and inner experiences. This statement is often interpreted to mean that we cannot attain ontological knowledge about the life of an organism. Alternatively, attempts are made to “naturalize” life, i.e. to explain the self-generating capacity of an organism from the interaction of its material components. In contrast, I posit that through the active mental representation of biological processes, such as the development of a plant, we can gain first-person insight into the life forces at play, suggesting a profound connection between our cognitive processes and the dynamic and teleological nature of life. Specifically, the parallels between life and our mental capacities lie in a blend of sensory perception, imaginative activity, conceptual thought, and the agential self, mirroring the physical structure and the autopoietic, teleological and agential organization of a living organism. It is shown that these parallels comprise four different types of subject-object relationships. I propose and discuss that this correlation is not merely an analogy but reflects a deep ontological correspondence between life and mind and that this correspondence can provide empirical access to the study of life through first-person experience. I advocate for a re-evaluation of the materialistic view of nature to include qualities and experiences of life and mind, proposing that life’s properties can be “naturalized” by recognizing them as qualities we experience mentally. Overall, I call for a broader approach to understanding life that incorporates both empirical evidence and phenomenological, first-person experiences.

“There are two circumstances in particular that keep the complaint about the imperfection of our knowledge of life alive: the impossibility of deducing the life process of the organism from any single detail and the inability of physiologists to precisely prove the moment of its beginning. ‘What actually is the life of the organic body?’ one asks, expecting a solution to the question that derives life from something else, if possible from a sharply defined detail. (...) However, the physiologist soon finds all explanations of this kind highly incomplete, touching only a single direction of life, and he learns to realize that life in general cannot be explained from something else but must be understood and comprehended by itself” (Von Baer, 1837, p. 3).

Introduction

In his book *The Phenomenon of Life*, published in 1966, Hans Jonas characterized the problem of life as a problem of modern thinking (Jonas, 1966). For the ancients, according to Jonas, life was everywhere and “being the same as being alive.”

“Modern thought (...) is placed in exactly the opposite theoretic situation: death is the natural thing, life the problem. (...) (T)he lifeless has become the knowable par excellence and is for that reason also considered the true and only foundation of reality. (...) Accordingly, it is the existence of life within a mechanical universe which now calls for an explanation, and explanation has to be in terms of the lifeless” (ibid., p. 7). Life has become “the stumbling block of theory. That there is life at all, and how such a thing is possible in a world of mere matter, is now the problem posed to thought” (ibid., p. 10).

Almost 60 years after Jonas’s book, the situation is somewhat different. Although there is still a prevailing view that the combination of Darwinism with molecular genetics and population statistics provides a “mechanical” explanation of life, it is becoming increasingly clear that organisms cannot be explained in this way alone (Noble, 2015). Genes depend on the organism as a whole, just as the organism depends on its genes (Moss, 2004; Sultan et al., 2021), and evolution has proven to be more complex than statistical variation and environmental selection can account for (Rosslenbroich, 2014; Laland et al., 2015; Walsh, 2015). In the emerging “organismic” view, organisms appear to be more than just passive objects of their genes and environmental conditions. Rather, they are seen as self-generating, active agents of their own organization (Weber & Varela, 2002), development (Jaeger, 2024) and evolution (Walsh, 2015; Nadolski & Moczek, 2023; Švorcová, 2024), and a processual and organismic view of life (Noble, 2008; Moreno & Mossio, 2015; Nicholson & Dupré, 2018; Mossio, 2024) has been described in great detail (Rosslenbroich, 2023).

Despite this comprehensive phenomenological description of organisms, Hans Jonas’s observation that modern thinking strives to explain living ultimately from the inanimate still applies. An influential movement that pursues this approach is the theory of autopoiesis, which was founded in the late 1970s by Humberto Maturana and Francisco Varela, who attempted to interpret organisms as “living machines”:

“Our approach will be mechanistic: no forces or principles will be adduced which are not found in the physical universe. Yet, our problem is the living organization, and therefore our interest will not be in properties of components, but in processes and relations between processes realized through components” (Maturana & Varela, 1980).

Since then, this processual and relational theory has been complemented and deepened into an elaborate theoretical framework of “minimal autonomous systems”, in which self-maintenance of a system is seen as the result of the complex organization of reciprocal interactive relationships between its components and between the system and its environment (Kauffman, 2000; Di Paolo, 2005; Kauffman & Clayton, 2006;

Mossio & Bich, 2014; Moreno & Mossio, 2015; Moreno, 2018). Autopoiesis, autonomy, agency, teleological organization and adaptability are central concepts that are associated with the phenomenological life of an organism. However, despite the theoretical breadth and depth of this theory, real organisms are far more complex than any logically derived “basic autonomous system” (Ruiz-Mirazo & Moreno, 2004); therefore, this theory is a conceptual framework but not a grounding explanation of real life. In addition, attempts to artificially synthesize organism-like systems are still unsuccessful (Porcar et al., 2011; Chang et al., 2023), and the question of the origin of life, which is assumed to have emerged from complex chemistry (Ruiz-Mirazo & Moreno, 2024), remains unresolved (Sutherland, 2017; Preiner et al., 2020; Lane & Xavier, 2024). Thus, it is still not clear how organic life can be fully “naturalized”, i.e., conceived of if one assumes that organisms are ultimately “build up” – and had originally emerged from – inert matter. Particles of matter act upon each other from outside by mechanical forces, while an organism “is able to perform a creative activity on itself, being not the product of exogenous forces, but of an internal action of self-production” (Bich & Damiano, 2007, p. 462).¹ Thus, the question about life is still open.

The problem received a clear formulation by Immanuel Kant in his *Critique of Judgment* (Kant, 1790/2008). Importantly, however, Kant did not analyze the organism itself but rather our understanding of it. Kant argued that to understand the structure and self-generating power of an organism, we must presuppose a “capacity of acting [which] is determined by concepts. What is required (...) even to know it empirically (...) presupposes concepts of reason” (ibid., p. 369-370). Kant thus drew attention to the fact that the relationship between the parts of an organism, e.g., the wings, bones and tail of a bird, would seem completely arbitrary to us if we did not judge it according to the concept of the whole, which entails purposiveness and self-generation.

However, according to Kant, the idea of purposiveness is not compatible with the idea of nature; *if* nature is regarded as purely material, the “sum of objects of the senses” (ibid., p. 359). Kant, therefore, did not question how purposive, self-producing beings are possible in nature but how we can conceive of their possibility, given that we do not regard nature as “an intelligent being” (ibid.).² Life is a “stumbling block of theory” but certainly not a stumbling block of nature itself.

Since Kant saw the problem of the living organism in our understanding, his analysis can inspire us to examine the mental faculties, concepts and inner experiences involved in organic cognition, i.e., to analyze the conditions of knowability of life. Such a description can provide a clearer picture of the problem of explaining life. This attempt is made here.

Section 1 briefly outlines the general characteristics of an organism that can be described by external observation and analysis. Section 2 describes in general terms a complimentary, inner experiential perspective on life. Section 3 describes different concepts that are necessary for understanding organic development. Drawing from Hans Jonas, who showed that the concept of physical causality is based on bodily experience, section 4 shows in detail the experiential basis of mentally representing organic development, thus implying an intimate relation between life and the mind. Section 5 describes the correspondence between four aspects of the organism and four mental capacities, and in section 6, these correspondences are shown to represent four different types of subject-object relationships. Finally, the methodological and ontological implications of these results are discussed.

¹ Cf. Immanuel Kant’s concept of matter (Pissis, 2018) and life (Nunez, 2021) in the *Metaphysical Foundations of Natural Science* (Kant, 1786/2004): Matter is a “mere object of outer sense”, “lifeless”, “something that is movable in space”, and changes only due to external causes. In contrast, life is “the faculty of a substance to determine itself to act from an internal principle” (ibid., p. 4:544).

² In his *Opus postumum*, Kant dealt with the systematic need to reconcile his view of organisms with his concept of nature. For discussion of his attempt to naturalize teleology by developing a specific account of matter as originating from “moving forces” which encompass organizing forces see (Förster, 2000; Tanaka, 2004).

1. Features of the organism

According to Kant, we generate knowledge (cognition) by uniting sensory perceptions with a priori concepts (Kern, 2006; Schafer, 2022). However, experience is not limited to the outer senses because we also perceive our inner states, feelings, images, memories, etc., and Kant calls these experiences perceptions of the inner sense (Wuerth, 2021, p. 247). We also have an inner experience of being alive. Consequently, as Hans Jonas and others have pointed out (cf. below, section 2), there are two ways of gaining knowledge about a living organism, one through external perception and one through inner experience. The question of how we know about life can therefore describe both the external and the internal perceptions and the concepts involved.

The first way of recognizing organisms relies on observations of the outer senses and attempts to understand them with the help of adequate concepts. A first, informative approach is to compare an organism with a mechanism, as Kant did for a watch and a tree. While a watch is assembled from independent parts by the activity of the watchmaker, an organism creates, maintains, repairs and even reproduces itself (Kant, 1790/2008, p. 374). From such observations, the theory of autopoiesis has been elaborated, which states that organisms are autonomous agents with an intrinsic purposive organization that maintains their structure while continuously exchanging matter and energy with and adapting to their environment (Mossio & Bich, 2014). In addition to these features, the development and evolution of specific organic forms is another obvious distinction between organic and physical entities and should also be included in a comprehensive understanding of the organism (Toepfer, 2021).

Organisms can thus be described as (i) structurally organized, (ii) functionally autonomous, (iii) causally teleological, (iv) materially and energetically open, (v) behaviorally adaptive and agential, (vi) specifically shaped and (vii) temporally developing and evolving, complex systems in which all these attributes are logically interlinked and mutually dependent.

2. Experiencing life from inside

The second way of recognizing life arises from our immediate inner experience. In contrast to the outer senses, which provide different perceptions of an organism that must be unified by corresponding concepts, our inner sense gives us an immediate and undeniable coherent feeling for quality of life, a fact that has been emphasized by various philosophers of biology. Hans Jonas claimed that “life can only be known by life” (Jonas, 1966, p. 91). Viktor von Weizsäcker wrote, “To research the living, one must participate in life. It is possible to attempt to derive living things from nonliving things, but this endeavor has thus far failed” (Weizsäcker, 1933) (transl. CH). Similarly, Hans Spaemann and Reinhard Löw wrote, “The only sure criterion for life is our self-execution of life. (...) First we live, and then we can define and abstract. However, with these operations, we can by no means abolish the precondition of our own conscious life” (Spaemann & Löw, 1981, p. 255) (transl. CH). Edward S. Russell described the first-person experience of the lived body as “our ultimate standard” of living reality (Russell, 1930, p. 144). However, Russell cautioned that

“We must be very chary of reading into the activities of other organisms the motives and modes of experience which we discover in ourselves. Nevertheless, introspective knowledge does give us insight into the reality of the living organism, which cannot be otherwise obtained, and supplies us with a standard by which to test our conceptions of the living thing” (ibid., p. 138).

Carl Ernst von Baer wrote, “[The physiologist] learns to realize that life in general cannot be explained from something else but must be understood and comprehended by itself” (Von Baer, 1837, p. 3), and even Kant in his *Opus postumum* arrived at the inner perspective of experience of his own living body (Kant, 1936/1993):

“How can we include such [organic] bodies with such moving forces in the general classification, according to a priori principles? Because man is conscious of himself as a self-moving machine, without

being able to further understand such a possibility, he can, and is entitled to, introduce a priori organic-moving forces of bodies into the classification of bodies in general – although only indirectly, according to the analogy with the moving force of a body as a machine. He [must], however, generalize the concept of vital force and of the excitability of matter in his own self by the faculty of desire” (ibid., p. 21:66).

Thus, these authors – and likely others, too – considered the inner experience of being alive as an original intuition that allows us to recognize by inference the life of other organisms. However, to become a workable epistemological tool, this recognition cannot remain a general “feeling of life” but must be described in detail. This tool can potentially be used to determine the abovementioned features of living organisms. To approach this task, I will first analyze the *epistemological conditions* of cognizing the structure and development of an organism.

3. Perceptions and concepts related to the cognition of a developing organism

Any attempt to comprehensively understand a problem in a scientific way should not only focus on the problem itself as an objective content of experience and knowledge but also take into account the subjective conditions of its experienceability and knowability because without these conditions, we would have no experience and knowledge of the object at all.³

To understand the conditions of knowability of an organism, we first have to clearly differentiate between perceptions and concept(s). The development of a plant may serve as a real-world example. The different sketches in Fig. 1 represent a sequence of successive developmental stages, which can be observed through the senses. The connection between these stages must be added by the knowing subject as the concept of development. The necessity to distinguish between perceptions and concepts becomes especially clear if one considers that in a real plant, we cannot observe the different stages side by side but only one stage at a time. The temporal whole of the plant’s development can never be sensually perceived (in an individual plant) but must be grasped through a concept.⁴

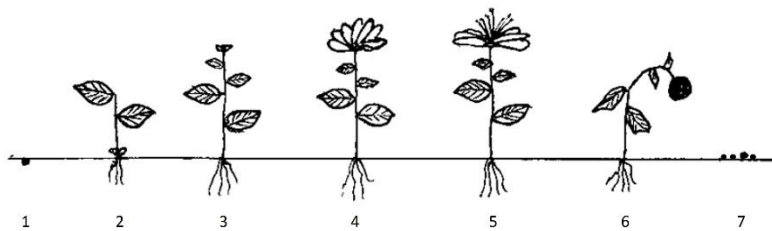


Fig. 1: Sketch of the developmental stages of a flowering plant (adapted from (Förster, 2012, p. 272)).

³ “The conditions of the possibility of experience in general are at the same time conditions of the possibility of the objects of experience” (Kant, 1787/1998, p. B197) With regard to knowing an organism, confer (Van de Vijver & Haeck, 2024).

⁴ As Kant pointed out in the *Critique of Pure Reason*, a unified whole is a product of our mental activity: “[T]he combination (...) of a manifold in general can never come to us through the senses, and therefore cannot already be contained in the pure form of sensible intuition; for it is an act of the spontaneity of the power of representation, and, since one must call the latter understanding, in distinction from sensibility, all combination, whether we are conscious of it or not, (...) is an action of the understanding, which we would designate with the general title synthesis in order at the same time to draw attention to the fact that we can represent nothing as combined in the object without having previously combined it ourselves” (Kant, 1787/1998, p. B129–B130).

A similar consideration applies to the spatial whole of the organism. While the individual parts are perceived through the senses, the “whole” is an actively added, connecting concept. A spatial whole is also conceptual.⁵

In addition to the concept of an organized, developing whole, other concepts are involved in understanding Fig. 1. The comparison of individual stages of development results in a certain temporal order of changes, and the series has a – conceptual – inner logic (from one seed to several seeds). Development is intrinsically teleologic because the processes that take place in the germinating seed already carry the potential of the entire series. Furthermore, it is clear that development is internally driven and not caused by external forces. (However, it depends on certain environmental conditions, the fluctuations for which the organism can adaptively compensate.) Finally, we know that the same spatial and temporal whole can emerge from the seeds repeatedly and that the different stages therefore all belong to the same species.

Therefore, a variety of concepts – developmental series, logical order, teleology, internal forces, and adaptability – are applied to such perceptions to understand them. Without these concepts, we could only stare at Fig. 1, but it would make no sense to us at all. Unfortunately, the linking of such perceptions with their respective concepts does not happen slowly and consciously but rather instantly and mostly unnoticed, and we therefore usually believe that we “see” a developmental series. However, it is not seen, but thought.

To summarize, we cannot perceive the organized and developing whole of a living being through our senses but can only think it. The forces that produce this whole can thus also be approached only through thinking.

4. *Experiential grounding of organic concepts*

According to Kant, the conditions of knowability of a living organism are to judge it under the concepts of teleological organization and self-generation. To understand the purposeful structure and self-generating power of an organism, Kant wrote, we must presuppose a “capacity of acting [which] is determined by concepts. What is required (...) even to know it empirically (...) presupposes concepts of reason” (Kant, 1790/2008, p. 369-370), or, in another formulation, it “emphatically presupposes the idea of a whole as that upon which the very nature and action of the parts depend” (ibid., p. 408). Kant regarded the concept of teleology as an a priori principle of reflective judgment (ibid., p. 181), but he also considered that it was analogous to human purposefulness, an analogy to “a causality such as we *experience in ourselves* [nach der Analogie einer solchen Causalität (dergleichen wir in uns antreffen)]” (ibid., p. 360) (*italics added*).

On the one hand, the analogy of teleology to human action is problematic since we cannot attribute purposes to nature if we regard nature as the “sum of objects of the senses” (ibid., p. 359). On the other hand, this analogy can inspire a closer examination of the inner experience of teleological causality. Such an analysis was carried out by Hans Jonas, although he did not examine the specific case of teleological causality but rather of causality in general. Nevertheless, his analysis is important for my argument.

In contrast to Kant, Jonas did not understand causality as an a priori category of reason but rather as an experience through personal, bodily action and resistance.

“Not the pure understanding but only the concrete bodily life, in the actual interplay of its self-feeling powers with the world, can be the source of the ‘idea’ of force and thus of cause. (...) The experience of living force, one’s own, namely, in the acting of the body, is the experiential basis for the abstractions of the general concepts of action and causation. (...) And advancing from my body, nay, myself advancing bodily, I build up in the image of its basic experience the dynamic image of the world – a world of force and resistance, action and inertia, cause and effect. Thus, causality is not the a priori of experience in the understanding but the universal extrapolation from propriobodily prime experience into the whole of reality” (Jonas, 1966, p. 22-23).

⁵ Kant showed with the example of apprehension of a house, that not only temporal but also spatial wholeness is generated from successive perceptions (ibid., p. B235).

Furthermore, Jonas stated that this experiential basis is generally omitted from causal explanations.⁶ The reason for this omission, according to Jonas, is that “force (...) is not a ‘datum’ but an ‘actum’, cannot be ‘seen’, i.e., objectified, but only experienced from within when exerted or suffered” (ibid., p. 31).

Therefore, if the concept of physical change through a (mechanical) cause–effect relationship is based on the inner, bodily experience of force and resistance, can a similar reasoning be applied to the concept of organic development?

At first glance, such a transfer seems problematic because although we experience physical forces through our physical body, we do not experience the organic forces of development in the same way. However, since we have a concept of teleological organic development, we may nevertheless search for an inner, experiential basis. To this end, the developmental series of a plant leaf is shown in Fig. 2.

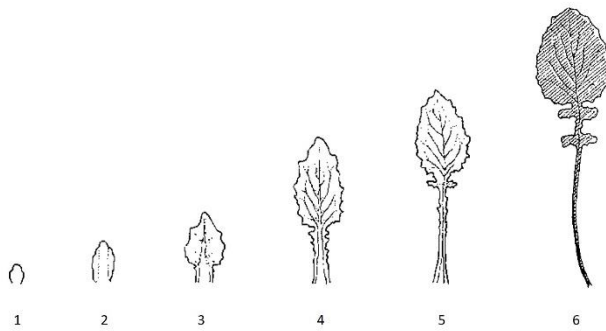


Fig. 2: Sketch of developmental stages of an individual leaf from common nipplewort (*Lapsana communis*) (Bockemühl, 1982).

Although structurally similar to Fig. 1, this sketch allows us to even more closely observe the inner movements required to link the different stages. Thus, if we want to move from one shape to another, we have to transform them within our imagination. For example, if one wants to transform the 5th shape into the 6th shape, one has to enlarge and round off the leaf blade, allow a second lateral separation to grow, and lengthen and thin the petiole. All these processes are carried out in our minds, but they also occur in nature. We just reproduce them inwardly. Although it is our own activity, it is not subjective or arbitrary because it is precisely guided by the developing shapes of the plant. We are doing the same thing in our mind that nature is doing “out there”. Even if we do not consciously reproduce this transformation of form, we still imply it.

Therefore, in the same sense that we imply bodily forces of push, pull, etc., to interpret mechanical causality, we use mental, dynamic forces to understand biological development. This shows an intimate relationship between mental and biological forces and, thus, between mind and life. In fact, in the same sense that we can ground the ontological reality of mechanical forces through our bodily experience, we can ground organic forces through our inwardly experienced mental activity. As the experience of our bodily activity provides access to the ontological reality of physical forces, our mental activity provides access to the ontological reality of the formative forces of living organisms. Furthermore, as mechanical forces are physical, externally efficient interactions of push and pull, etc., biological forces are internally coherent and teleological interactions of mental organization and development. In other words, a living being is organized and functions in a similar way as our mental space of active imagination and thinking. This is the reason

⁶ Carl Hempel and Paul Oppenheim, for example, considered scientific explanation of observed phenomena to result from the knowledge of specific preconditions and general laws (Hempel & Oppenheim, 1948). The dynamic processes involved and the forces that cause these processes are not explicitly considered in this equation.

why we experience physical forces through our physical body but forces of life through our mental capacities.

In this sense, all biological developmental processes (and other biological phenomena as well, see below) can be followed by reproducing them internally. One immerses oneself in the processes, as it were, and uses the same forces in one's imagination that the organism uses for its growth and development. One learns to experience life from the inside. All it takes is some time, attention, patience and dedication to the details to get to know the life processes of nature and to learn to "listen" to them. Consider, for example, the beautiful description of a developing embryo, written by Thomas Henry Huxley in 1860:

"The student of Nature wonders the more and is astonished the less, the more conversant he becomes with her operations; but of all the perennial miracles she offers to his inspection, perhaps the most worthy of admiration is the development of a plant or of an animal from its embryo. The recently laid eggs of some common animals, such as salamanders or newts, have been examined. (...) [S]trange possibilities lie dormant in that semifluid globule. When a moderate supply of warmth reaches its watery cradle, the plastic matter undergoes changes so rapidly, yet so steadily and purposelike in succession, that one can only compare them to those operated by a skilled modeler upon a formless lump of clay. As with an invisible trowel, the mass is divided and subdivided into smaller and smaller portions until it is reduced to an aggregation of granules not too large to build within the finest fabrics of the nascent organism. In addition, then, it is as if a delicate finger traced out the line to be occupied by the spinal column and molded the contour of the body; pinching up the head at one end, the tail at the other, and fashioning flank and limb into due salamandrine proportions, in so artistic a way, that, after watching the process hour by hour, one is almost involuntarily possessed by the notion, that some more subtle aid to vision than [a microscope], would show the hidden artist, with his plan before him, striving with skilful manipulation to perfect his work" (Huxley, 1893, p. 29-30).

It is this "hidden artist with his plan before him" that reveals itself when we take a closer, dedicated look at living organisms, that is, when we recreate them in our minds.

5. *Correspondence between organic and mental faculties*

Mechanical explanations of physical phenomena imply an inner, bodily activity and experience of force. In the case of organisms, this activity is not bodily but rather mental. To understand organic development, this activity must come to the fore and become fully conscious. We just need to be very clear about what we perceive through the outer senses and what we add to these perceptions through our mental activity. In its development, an organism is only ever given to us as a specific, sensually perceptible, present content. We only ever see the egg, the embryo or the adult salamander, but never all in one place at the same time. The connection between these individual perceptions (developmental stages) must occur through mental activity. We have to make this connection ourselves.⁷ However, what we create in this way is by no means subjective. In our inner, mental activity, we are actually close to *experiencing* the organic activity of the organism from within. This gives meaning to the thoughts quoted in section 2 that "life can only be known by life".

The mental activity with which we recreate the organism's development is guided by the conceptual principle of teleological organization. Teleology or purposiveness is the principle (or at least one of the principles) that governs organic formation. Such a governing principle is grasped as a concept. Teleology – the purpose of the living whole – is the concept that guides our understanding of the organism. Finally, the autonomous

⁷ As Kant stated, that "among all representations combination is the only one that is not given through objects but can be executed only by the subject itself, since it is an act of its self-activity. (...) [F]or where the understanding has not previously combined anything, neither can it dissolve anything, for only through it can something have been given to the power of representation as combined" (Kant, 1787/1998, p. B129–B130).

agency of the organism corresponds to and is comprehended by the inner activity of our self.⁸ Like the organism integrates and maintains its individuality in dynamic adaptivity as an autonomous agent⁹, we integrate our adaptive mental capacities by our autonomous, spontaneous self. Therefore, I suggest that this correspondence provides a key to understanding – as well as accessing in inner experience – the nature of organismal agency.

In summary, four aspects of the organism correspond to four mental capacities: (i) individual developmental stages are sensually perceived; (ii) the formative force, which accounts for the development of the organism, is experienced in inner, active combination and transformation of different developmental stages; (iii) the overarching, teleologically organizing whole is comprehended by conceptual thinking; and (iv) the autonomous agency of the organism is experienced within the realm of our autonomous, spontaneous self (Fig. 3).

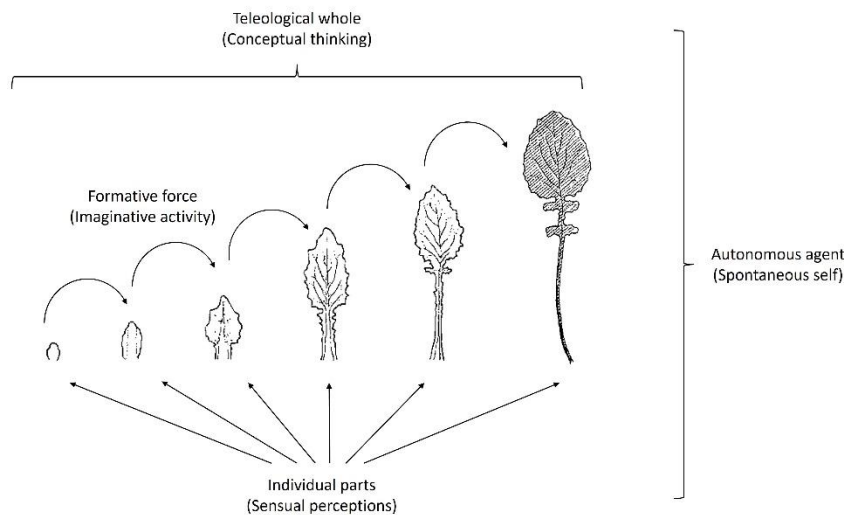


Fig. 3: Aspects of organic development and corresponding mental capacities.

Therefore, I suggest that with regard to life, Jonas’ notion of a correspondence between mechanical causality and bodily activity and experience can be extended to a correspondence between teleological causality and mental activity and experience. Jonas has pointed out that through our living body, we belong to both the world of external, material expansion, which is perceived through the senses, and the world of inner, mental experience (Jonas, 1966, p. 19). Based on my analysis, one might say by analogy that there is a (sensually not perceptible) reality of organic life that corresponds to our inner, mental experience. Just as we experience the mechanical connections of the material world through our bodily activity, we experience the teleological organization, development, and agency of the living organism through our mental concepts, imaginative activity, and inner spontaneity.¹⁰

⁸ Kant called this integrative faculty the unity of apperception of the I: “Synthetic unity of the manifold of intuitions, as given a priori, is thus the ground of the identity of apperception itself, which precedes a priori all my determinate thinking. Combination does not lie in the objects, however, and cannot as it were be borrowed from them through perception and by that means first taken up into the understanding, but is rather only an operation of the understanding, which is itself nothing further than the faculty of combining a priori and bringing the manifold of given representations under unity of apperception, which principle is the supreme one in the whole of human cognition” (ibid., p. B 134-B 135).

⁹ Dennis Walsh wrote that “agency consists in the fact that (...) the agents initiate their own changes” (Walsh, 2018, p. 176).

¹⁰ Cf. Andrea Gambarotto, who wrote about the drives and desires of organisms with respect to Jonas’ first-person perspective: “Jonas argues, in classic phenomenological style, that the only way we can access that intrinsic purposiveness is to observe from within ourselves the peculiar drives and desires that are manifest in us and to apply them through analogy to all other living beings. (...) When I take a ‘look from without’ on the agency of a cat or a bacterium, I can claim that they are actively striving for food only because I have a direct experience ‘from within’ of my very own strivings as a living being. In this sense, Jonas’ answer to

6. Different subject-object relations

Thus far, I have shown a correspondence between four objective aspects of an organism (physical appearance, dynamical development, teleological organization and agential autonomy) and four subjective mental capacities (sensual perception, dynamically transformative imagination, conceptual thinking and spontaneous, inner activity). However, the relationships between the object and subject are not the same for these four correspondences (Fig. 4). The physical appearances of the organism are perceived in a clear inner-outer, subject-object division. In fact, their sensual perceivability is exactly the reason why they appear to us as external objects. Developmental transformations, however, cannot be perceived in this divisive subject-object mode. Here, the subject performs in inner, imaginative activity as transformative movements that connect the different outer appearances. Subjective and objective aspects mutually “swing” into each other, as it were. With respect to the overarching concept of teleological organization, there is no separation between the subjective and objective sides of the concept. What I subjectively think is the necessary condition of knowability of the objective, living organization.¹¹ Finally, in the experiential conception of organismic, autonomous agency, object and subject merge into one. I can only conceive of autonomous agency because I am an autonomous, agential being myself.

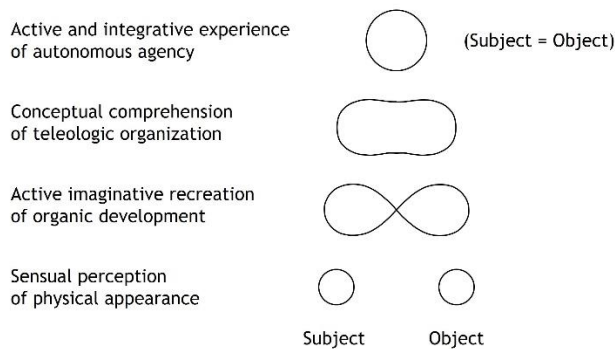


Fig. 4: Subject-object relations on four levels of cognizing an organism.

In accordance with this idea of an altered subject-object relation in the cognition of living beings, Luca Illetterati and Andrea Gambarotto wrote in an article on Schelling’s and Hegel’s criticism of Kant’s concept of teleology:

“A philosophy bound to a radical separation between subject and object, between thinking and reality, and between spirit and nature is unable to grasp life, finds it impossible to think something like life. (...) The main idea of the post-Kantian philosophers was that modern thought, dominated by the fracture between subject and object, mind and world, nature and spirit, is incapable of In thinking the complex dimension of being that is life – *a dimension in which the subject is also the object and the object is also the subject*. A dimension which deconstructs the strong separation between epistemology and ontology from the inside, or which deconstructs the possibility to maintain as different discourses the one that focuses on our possibility of knowing what there is and the one that focuses on what there is. The question of life shows the artificiality of this separation” (Illetterati & Gambarotto, 2020, p. 116) (italics added).

biological machine theory, from Descartes through cybernetics, is this ‘inwardness’ of living organisms, which we can access through our first-person experience of ‘what it’s like to be an organism’. This ‘inwardness’ ultimately stands as the core of Jonas’ philosophical biology – adequately synthesized in the motto that ‘life can be known only by life’ (Jonas 1966, p. 91)” (Gambarotto, 2020, p. 258).

¹¹ Purposiveness as a “capacity of acting [which] is determined by concepts. What is required (...) even to know it empirically (...) presupposes concepts of reason” (Kant, 1790/2008, p. 369-370).

And summarizing their thoughts, these authors wrote:

“Life is not simply a ‘substance’, indifferent to the dimension of the subject; on the other hand, it is neither simply the product of subjective thought. For this reason, the thought of life cannot simply be closed within ontology, leaving the subject in a way to mirror reality, or within epistemology, thus risking to reduce reality to a projection of the subject” (ibid.).

Discussion

In this paper, I have shown that four different (albeit related and intermingled) features of a living organism – its physical appearance, formative force, organizational (teleological) principle, and autonomous agency – correspond to four different capacities of the human mind: sensual perception, imaginative or representational activity, conceptual thought, and personal spontaneity. I propose that this correspondence is not only by analogy but that in our mental capacities, we actually experience these features of the organisms “from within”. With this notion, I build on the idea of Hans Jonas and others that our own inner experience provides the means to understand organismal teleology. Thus, in a famous essay, Andreas Weber and Francisco Varela wrote that

“Before being scientists, we are first living beings, and as such, we have the evidence of our intrinsic teleology in us. And, in observing other creatures struggling to continue their existence – starting from simple bacteria that actively swim away from a chemical repellent – we can, by our own evidence, understand teleology as the governing force of the realm of the living. Theories about the living can only be conceived from the fragile and concerned perspective of the living itself” (Weber & Varela, 2002, p. 110).¹²

This idea may be criticized as a projection of anthropomorphic features onto external reality, with anthropomorphism generally seen as detrimental to science. Mario Villalobos and David Ward, for example, criticized the philosophy of Hans Jonas as unscientific: “What is gained by, under the banner of a questionable anthropomorphism, trying (...) to teach us lessons about bacterial experience?” (Villalobos & Ward, 2016, p. 208). In my view, however, such a critique is not justified for the following reasons.

(i) We can determine the properties of an organism only through our corresponding mental faculties.

We recognize purposiveness, autonomy and agency in other living organisms because we are purposive, autonomous and agential beings ourselves. As Kant already pointed out, the concept of a living organism cannot be derived from the representation of dead matter: “Where we consider a material whole and regard it as (...) a product resulting from the parts and their powers (...), what we represent to ourselves in this way is a mechanical generation of the whole. However, *from this view of the generation of a whole, we can elicit no concept of a whole as end*” (Kant, 1790/2008, p. 408) (italics added). Therefore, teleology, autonomy and agency (and, as I have noted in section 3, even the concept of an organized whole) cannot be derived from sensual perceptions. We simply would have no concept of life, of purpose or of autonomy if we did not experience these features within ourselves. As Edward S. Russell wrote, “[I]ntrospective knowledge does give us an insight into the reality of the living organism which cannot be otherwise obtained, and supplies us with a standard by which to test our conceptions of the living thing” (Russell, 1930, p. 138). Moreover, Sigurd Hverven and Thomas Netland recently stated that any attempt to nevertheless derive the concept of

¹² Interestingly, Evan Thompson wrote about a conversation that he had with the late Francisco Varela: “Varela and I (...) had both independently been reading Kant and Jonas, and I asked him whether he would still maintain his earlier antiteleological stance in light of Jonas’s argument (...) that one cannot recognize something to be a living being unless one recognizes it as purposive and that one cannot recognize something as purposive unless one is an embodied agent who experiences purposiveness in one’s own case. (...) [Varela] indicated that as time had gone by he had come to have a ‘broader view.’ He had begun to see that ‘in a funny way you do recover a full fledged teleology, ... but this teleology ... is intrinsic to life in action,’ and ‘does not require an extra transcendental source’ in the Kantian sense” (Thompson, 2007, p. 453-454).

teleology on materialistic grounds “presupposes an idea of what counts as evidence of purposiveness in the first place, which (...) brings us back to the anthropomorphic inference” (Hverven & Netland, 2023, p. 315).

- (ii) According to Kant’s epistemological turn, the conditions of knowability of the properties of an organism are the conditions of the possibility of the existence of these properties at all.

“The conditions of the possibility of experience in general are at the same time conditions of the possibility of the objects of experience” (Kant, 1787/1998, p. B 197), and, more specifically with respect to organisms: “The notion of inner purposiveness is the condition of possibility for thinking life” (Illetterati & Gambarotto, 2020, p. 111). If we knew nothing about the life of organisms, we would not be able to recognize that they are alive. If we did not recognize their life, it would not exist for us, and if it did not exist for us, it would be as if it did not exist at all. Kant holds that knowledge of the organism (“even to know it empirically” (Kant, 1790/2008, p. 370)) is simply impossible without conceptual teleological implications.

Kant’s notion, however, refers to the living qualities of an organism, but not to its sensually perceived, physical appearance. The physical structure of an organism is observed like other physical objects. However, from the mere sight of a tree, I cannot deduce the idea that it is alive. I have to use nonsensory, mental faculties (memory, imagination, conceptual thinking) to recognize that it is alive. If I could not judge the various memorized images of the different stages of the tree’s growth under the concept of teleological organic development, I would not be able to make sense of these images or their context at all.

Clark Zumbach has argued that we necessarily must judge biological objects according to the law of causality – because any physical phenomenon is possible only if it is preceded by another physical phenomenon – whereas we are *free* to judge organisms additionally according to the principle of teleology (Zumbach, 1984, p. 139). However, if we only judge them causally, we will only grasp their physical appearance (that which remains of them in the moment of death). To grasp their quality of life, we must judge organisms teleologically.

These arguments lead to the notion that the formative force, teleological organization, and autonomous agency of an organism are not physical but rather of a similar quality as our mental faculties. Similia similibus cognoscuntur (like is recognized by like). This notion is certainly unusual. However, physical substances and laws are also known to us only through our mental faculties (sensory perception and conceptual thinking) and therefore, in principle, have no ontological status other than internally experienceable properties (formative power, teleology, autonomous agency) of an organism. It is simply not clear why the experience of external, sensual content should give us reality, while internally experienceable content should be unreal. In my view, this is just a dogmatic notion and an – albeit deeply rooted – habit of thought, which needs to be overcome to understand the living.

The notion of qualitative similarity between our mental faculties and the properties of a living organism suggests a solution to the eternal problem of how the living is compatible with physical reality. It also provides empirical and comprehensible evidence for the often repeated remark that “life can be known only by life”¹³.

In summary, I propose that the problematic aspects of life can be “naturalized” by ascribing qualities to the properties of the organism that we mentally experience in ourselves. I believe that this opens up *an empirical approach to the field of life through inner experience*. Although these are nonquantifiable first-person experiences, they are exact, reproducible, intersubjectively communicable and possibly even testable in thought experiments. Such experiences are subjective but not arbitrary because they are based entirely on physical and physiological facts of the organic. They merely establish the connections between these facts and –

¹³ (Von Baer, 1837; Russell, 1930; Weizsäcker, 1933; Jonas, 1966; Spaemann & Löw, 1981).

when they are taken by what they are themselves – provide a different, nonreductionist and nonmaterialist explanation.

This paper outlines the basic principle of an inner approach to the riddles of life. The treatment of more specific problems will be described elsewhere. Such problems include the question of organic morphology and development, the connection between the macro- and microscopic levels of the organism (morphology, physiology and genetics), the connection between unconscious organic life and consciousness, and others.

Finally, I propose that the concept of nature as merely composed of dead matter needs to be extended to include the possibility of life and mind. Nature, apparently, is more than the “sum of objects of the senses” (Kant, 1790/2008, p. 359). This notion is in perfect agreement with Illetterati and Gambarotto, who wrote:

“[T]he question of the realism of purposes implies the necessity of re-thinking not only the relationship between thinking and reality, between epistemology and ontology, but even more importantly, the necessity of conceiving a new concept of thinking and a new concept of reality” (Illetterati & Gambarotto, 2020, p. 117).

Thus, I suggest that dynamic and purposeful, autonomous and autopoietic life and the internally conscious and cognizing mind are not mere epiphenomena of a dead and external material cosmos. They are ontological realities, as real as matter itself.¹⁴

¹⁴ Cf. (Nagel, 2012).

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