Threshold, Meaning, and Life

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Abstract In this chapter, essentially, I argue that meaning is an activity that distinguishes the life process from inanimate ones. Since meaning and life are overlapping processes, methodologically, the notion of a threshold zone is an important tool to understand where the meaning process (or *semiosis*) begins and makes sense of life in nature. In arguing that meaning and life are overlapping processes, I endorse a view of continuity in nature. Taking into account Peirce's view of cognition as an indeterminate process, in particular, I suggest an understanding of meaning as a mosaic or web, which begins by a process of beginning. In using the image of the web, notably, I contrast this with Darwin's tree of life. The idea that I have in mind is to put forward the hypothesis that *where there is meaning, there is life*.

Keywords Threshold · Meaning · Life · Continuity · Indeterminateness

1 Introduction

As a hypothesis for dealing with the issue of a threshold to differentiate meaning and life in nature, I will assume that *where there is meaning, there is life—no meaning, no life!* (and vice versa).[1] The idea is that the relation between meaning and life is

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[1] In general terms, I agree with Evan Thompson in *Mind in Life* (2007) and his understanding of continuity between mind and life when he says, "The theme of this book is the deep continuity of life and mind. *Where there is life, there is mind* [my italics], and mind in its most articulated forms belongs to life. . . . From this perspective, mental life is also bodily life and is situated in the world. The roots of mental life lie not simply in the brain but ramify through the body and environment.

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based on a sign inference process or semiosis whose logical form is "since p, q": the first, therefore the second (Manetti 2002: 285). As Umberto Eco (1976: 17) notes, it is not by chance that ancient philosophy has so frequently associated meaning and inference.[2] Although my hypothesis may take the logical form of material implication, what I actually have in mind is to stress the overlapping of meaning and life—that is to say: meaning and life cannot, and do not, exist independently.[3]

To illustrate my hypothesis (*where there is meaning, there is life*), I was inspired by William James's thesis on experience and life from his radical empiricism: experience is the immediate flux of life in the form of radical eventfulness. The ideas of flux and eventfulness stand for "asubstantialism" in James's view of experience (Weber 2013: 96): as the world is either an experiencing or an experienced, experience holds the world relationally together. Summarizing James's radical empiricism, as experience is the immediate flux of life, one can say that *where there is experience, there is life—no experience, no life!* It is important to note that insofar as experience is the immediate flux of life, it means "sensation" or "feeling." Therefore, it is not exclusively *conditio humana* (a human condition). In his radical empiricism, James describes experience as a mosaic structured in constructivist terms. In comparison with James's empiricism, I espouse the idea that life as a whole consists of a dynamic web of meaning relations. Using the image of the web, I will highlight this notion in contrast with Darwin's tree of life.[4] So I will refer to life as a web in which meaning is engendered. Taking into account my hypothesis that life and meaning overlap, and following Thomas Sebeok (2001: 3), it seems fair to assert that meaning is the activity that distinguishes the life process from inanimate ones.[5] As I see it, meaning could not have existed before the evolution of life and vice versa (Sebeok 2001; Hoffmeyer 2008).

Our mental life . . . cannot be reduced simply to brain processes inside the brain" (Thompson 2007: IX). Being philosophically sympathetic to Thompson, however, I have developed my hypothesis independently. If "mind" is replaced with "meaning," this is perfectly in accordance with my hypothesis; that is, *where there is meaning, there is life*. What seems to be my point of distinction from Thompson's understanding of continuity between life and mind is that I regard continuity of meaning and life as extending in the universe as a whole (and not restricted to Earth).

[2] Peirce adopted the designation "semiosis" (in a variant transcription) from Philodemus's fragmentary Herculanean papyrus *On Signs*, where the Greek equivalent appears at least 30 times to represent a type of reasoning or inference from signs (Sebeok 2001: 74).

[3] As I am assuming here a (bio)semiotic understanding of meaning, it comprises non-human and human forms of life. In line with Floyd Merrell (1997: x), I take meaning to be an activity "flowing along within the semiosic process." The result is plurality and continuity more than singularity and discreteness. As a general idea in this chapter, then, I have in mind to merge meaning in the core of process metaphysics.

[4] In *Theoretical Biology* (1926), interestingly, Jakob von Uexküll introduces the expression "web of life." In his understanding, the living world is much more a web than a ladder.

[5] Instead of using "capacity of" with a meaning that may suggest a human-like competence, I think that "activity" seems more adequate to process thought. Once meaning is assumed to be an activity more than *conditio humana*, it is characteristic of life-forms at multiple levels in organic nature. The idea suggests that meaning is an activity of *making sense*.

As presented by Umberto Eco (1976) with regard to the issue of the *missing link*, the challenge here will be to consider whether there must actually be a threshold zone from which one can discriminate meaning and life in nature. As a consequence, the challenge will also be to inquire whether the notion of a threshold zone can be applied in our understanding of where the meaning process or semiosis begins. In this chapter, thus, in accepting that the notion of the threshold zone makes sense of meaning and life in nature as a process of transition from the inorganic to the organic, I will look into how one can understand the differentiation of non-living and living entities, as well as the differentiation of meaningless (or non-semiotic) and meaningful (or semiotic). For that, I will present and review different conceptions on the issue of a threshold. As a particular case for discussion, I will rival David Bohm's conception of meaning (1985). To him, since meaning is taken to be a fundamental physical property of reality, the notion of the threshold does not seem to be epistemologically and ontologically relevant. In my contrary view, without consideration of the notion of the threshold zone, the ideas of meaning and life make no sense in the world at all.

In conclusion, I will argue that the missing link can be seen much more as a *metaphor* than an ontological claim. I will also argue that one needs the notion of the threshold zone to make sense of meaning and life as a process of transition from the inorganic to the organic. Having in mind Peirce's view of cognition as an indeterminate process, finally, I will suggest a mosaic understanding of meaning and life in that the web of life begins by a process of beginning; holistically speaking, as an indeterminate process, the web of life is without a center or periphery. In short, the idea is to put forward my hypothesis that *where there is meaning, there is life—no meaning, no life!* In speaking of life, I am not speaking of the origin and forms of life on earth. In line with Whitehead's cosmology, I have in mind the ideas of meaning and life as processes extending and overlapping in the universe as a whole. Having different contexts in natural sciences, epistemology, and biosemiotics as a background, in short, this chapter exploits a conceptual unity between the threshold, meaning, and life.

2 Threshold and Missing Link

In *A Theory of Semiotics* (1976), Umberto Eco introduces the notion of "natural boundaries" to delineate the borders of the semiotic approach. For both semiotics and biosemiotics, "natural boundaries" is a notion that epistemologically acquires a distinctive value. By "natural boundaries," accordingly, Eco means the point of transition from the non-semiotic to the semiotic as a sort of missing link. Having in mind such a transition, he speaks of a "lower threshold":

> By natural boundaries, I mean principally those beyond which a semiotic approach cannot go; for there is non-semiotic territory since there are phenomena that cannot be taken as sign-functions. . . . The phenomena on the lower threshold should rather be isolated as indicating the point where semiotic phenomena arise from something non-semiotic, as a sort of

> "*missing link*" [my italics] between the universe of signals and the universe of signs. (Eco 1976: 6, 21)

It is evident that Eco assumes the notion of a lower threshold as indicating the point of inflection (in the form of a missing link) from which semiotic phenomena arise. In regarding phenomena such as function, sign, value, and meaning, something seems to be absent in nature, and the door is opened for claiming that there must be a missing link. In delineating an epistemological border for understanding the extent of the semiotic approach, however, Eco's ideas of the missing link and the threshold have motivated interesting questions in semiotics and biosemiotics:

> One important question that divides people in semiotics is the question often referred to as the "semiotic threshold," i.e., the problem of defining the simplest system capable of semiosic activity. (Hoffmeyer 2011: 282)

> It is thus an open and crucial issue of research to determine, empirically and conceptually, the different thresholds in this zone between such simple reproducing and evolving systems and contemporary terrestrial organisms that appear to depend unambiguously on semiotic processes. (Cobley et al. 2011: 27–28)

> Semiotic threshold ... defines "a boundary between semiotic and non-semiotic areas." (Higuera and Kull 2017: 109)

> The concept has helped delimit and shape the whole area of semiotic studies. Theorizing of the so-called "lower semiotic threshold" has also provided biosemiotics with a way to set (and break) some of its boundaries, specifying the level where one can refer to sign action in opposition to non-semiotic activity. (Higuera and Kull 2017: 110)

Not only the notion of the semiotic threshold divides opinions, but also the meaning of the missing link does. "[Even though] the discovery of hominid fossils in Africa is a good example of transitional morphologies, for instance, it is not a missing link" (www.livescience.com/32530-what-is-the-missing-link.html). Also, as Atmanspacher (2020) states, "introducing mental states as the essential *missing link*" [my italics] in relation to the brain's physical states "is highly speculative from a contemporary perspective" in terms of physical theory. In this latter case, many terms have been created to resolve the supposed missing link between the mental and the physical. Orphans of the Cartesian pineal gland, many philosophers of mind and cognitive neuroscientists have created a sort of mythology by attributing psychic additions to the brain—the explanatory gap, the hard problem, supervenience, and so on—as a sort of missing link between the mental and the physical.

As was very well illustrated by Whitehead in *The Concept of Nature* (1948: 29, 43), for instance, the proponents of the theory of psychic additions treat "the greenness as a psychic addition into nature." As a consequence, they split up nature into real and additional properties. The forms of such a bifurcation are historically known as the theories of primary and secondary properties. All of these theories seem to have in common the belief that there must be a missing link between primary and secondary properties, as well as between mental and physical properties. That is why many philosophers make qualia a sort of disastrously homeless property in their naturalistic explanation of mind.

Like Darwin, who denied any missing link in the evolutionary process, many believe that the notion of a missing link is to be taken much more as a "metaphor" (Donaldson 2015) than as a claim of an evolutionary explanation of behavior and macroscopic order:

> The reluctance of many social scientists to appreciate or take advantage of the richness of the evolutionary approach is a direct consequence of a widespread tendency to overlook a crucial link in the causal chain from evolution to behavior: the level of innate psychological mechanisms, described as information processing systems. (Cosmides and Tooby 1987: 277)

> The fact that there are spontaneous inorganic processes that generate macroscopic order is seen by many as a missing link between living and non-living processes. (Deacon 2012: 264)

In advocating the notion of the threshold, I think one should not understand the meaning of the missing link as the inflection point between non-living and living or between the non-semiotic and the semiotic. In my opinion, the missing link can be seen much more as a metaphor than an ontological claim in favor of a causal chain in nature. Instead of a missing link, it would be more productive to take the notion of a threshold as an epistemological tool for understanding the transition and *continuity* from non-living to living, as well as from meaningless to meaningful in the world. As introduced by Pattee and Rączaszek-Leonardi (2012), interestingly, the notion of an *epistemic threshold* indicates the boundary zone where matter has much more than only physical properties and includes something else such as meaning and life.

In semiotics and biosemiotics, as noted previously, many authors seem to agree that there must be a threshold zone in which meaning and life overlap (*pace* Sebeok). To make epistemologically explicit the notion of a threshold zone, I introduce Whitehead's differentiation of entities as it is presented by him in *Process and Reality*:

> In the actual world, we discern four grades of actual occasions, grades which are not to be sharply distinguished from each other. First, and lowest, there are the actual occasions in so-called "empty space"; secondly, there are the actual occasions which are moments in the life-histories of enduring non-living objects, such as electrons or other primitive organisms; thirdly, there are the actual occasions which are moments in the life-histories· of enduring living objects; fourthly, there are the actual occasions which are moments in the life-histories of enduring objects with conscious knowledge. (Whitehead [1929] 1978: 177)

It is clear that Whitehead makes of life and non-life a difference of degree rather than essence.[6] What results from such a differentiation is "the blurring of the

[6]Concerning Whitehead's ontology, additionally, as organisms are events temporally and spatially differentiated, I agree with Nicholson and Dupré (2018: 1) that "the living world is a hierarchy of processes, stabilized and actively maintained at different timescales . . . molecules, cells, organs, organisms, populations, etc. . . . Although the members of this hierarchy are usually thought of as things, we contend that they are more appropriately understood as processes." There is, however, a critical point on which I disagree with Nicholson and Dupré. I disagree not because they are introducing a non-Whiteheadian approach to the process thought in the philosophy of biology. As I see it, they seem to embrace a physicalist interpretation of the process thought. As a consequence of such an interpretation, they assume that organisms are merely happenings—e.g., something that

difference between inanimate and animate nature" (Jonas [1966] 2001: 96). For Whitehead, accordingly, continuity between life and non-life goes down to the elementary physical entities. Inspired by Whitehead, interestingly, Hans Jonas ([1966] 2001: 1) asserts that "the organic even in its lowest forms prefigures mind." However, unlike Whitehead, Jonas advocates a strict separation between living and non-living entities on the basis of the assumption that the former is a form organically emancipated from matter. In line with my hypothesis in this chapter, presumably, Jonas ([1966] 2001: 96) accepts the idea of a threshold to differentiate non-living and living entities.

Two conceptual clarifications are needed here to make Whitehead's grades of entities more precise. First, it must be noted that an "enduring object" is no more than a succession of entities (Emmet 1932: 173). However, as every actual entity emerges from a background, it must be more or less enduring in different periods and according to a historical route. Depending on the route that an entity takes, it takes the form of a living or biological organism.[7] As a lesson from Whitehead's grades of entities, it is evident that the differentiation of routes sorts the enduring objects (and consequently their respective life-histories) and draws a line between mechanical and organic processes. Second, unlike Descartes's distinction of the two species of substance (bodies and minds), Whitehead ([1929] 1978: 239, 244, 277) points out that an actual entity is always dipolar: while one pole is physical, the other one is mental, and they cannot be separated. The controversial consequence of such a conception may be that it opens the door to pan-psychism: the idea that mentality can be found everywhere, even in elementary atomic particles. Although I acknowledge that the activity of meaning and mind are not *conditio humana*, the idea that elementary particles are alive and capable of meaning sounds extremely unreasonable. In parallel with Whitehead's understanding of grades of entities, for me the activity of meaning (and mind) depends on the organism's bodily plan.[8]

happens. In this sense, Nicholson and Dupré leave untouched important philosophical topics such as agency, intentionality, consciousness, or qualia.

[7] "In the case of an animal, the mental states enter into the plan of the total organism and thus modify the plans of the successive subordinate organisms until the ultimate smallest organisms, such as electrons, are reached. Thus, an electron within a living body is different from an electron outside it, by reason of the plan of the body. The electron blindly rims either within or without the body; but it runs within the body in accordance with its character within the body; that is to say, in accordance with the general plan of the body, and this plan includes the mental state. But the principle of modification is perfectly general throughout nature, and represents no property peculiar to living bodies" (Whitehead 1948: 80).

[8] In line with Gregory Bateson, for instance, to conceive the existence of mind (and arguably the activity of meaning) in some entity, a minimum of organization and complexity is required. It is not the case of atomic particles as such: "there is a lower level of division such that the resulting parts, when considered separately, lack the complexity necessary to achieve the criteria of mind. In a word, I do not believe that single subatomic particles are 'minds' in my sense because I do believe that the mental process is always a sequence of interactions between parts. The explanation of mental phenomena must always reside in the organization and interaction of multiple parts" (Bateson 1979: 92).

Considering Whitehead's differentiation of entities, however, I think one can map a threshold zone from which there are no degrees of meaning and life below the life-histories of enduring living objects. Also, as Whitehead differentiates degrees of entities, every actual entity is a "drop of experience." Borrowing the expression "drop of experience" from William James, Whitehead ([1929] 1978: 18, 68) affirms that the actual entities are ultimately the final facts of which the world is made up. As drops of experience, and insofar as actual entities are complex and interdependent, the world results from emergent and relational processes. Having the idea of drops of experience in mind and stressing the relational nature and eventfulness of reality, in consequence, Whitehead discredits a substantialist ontology. Discrediting such an ontology, accordingly, Whitehead favors the image of life as a relational web of processes.

In following Whitehead's differentiation of degrees of entities and considering that they are drops of experience, I am convinced that one can trace a threshold zone of the transition between life-histories of enduring non-living and living objects. Using Whitehead's differentiation, accordingly, the threshold zone exemplifies the transition between degrees of entities and experience, indicating the point from which there is no activity of meaning (such as quarks, protons, or electrons). For me, it is entirely nonsense to claim that "there is something it is like to be a quark or a photon or a member of some other fundamental physical type" (Chalmers 2017: 19). Although I agree that semiosis supposes interpretation, in many cases it is also sign inference. It is hard to think that atomic particles can perform interpretation and sign inference. In my view, what determines the activity of meaning is the entity's bodily organization. Below the life-histories of enduring living objects and insofar as the entity's bodily organization is rudimentary at that level, there is *no* (activity of) *meaning* and consequently there is *no life*. The most important aspect for differentiating the activity of meaning is that there is no semiosis without sign inference or interpretation. Moreover, once the meaning is taken to be an activity of making sense, it does not seem fair to claim that atomic particles make sense of anything. As I see it, this is the reason why the notion of a threshold should be taken seriously in order to map at which level of natural processes the activity of meaning (or semiosis) is engendered. As Sebeok (2001: xiv) pointed out, incidentally, the idea is that semiosis is life.

In the broadest sense, as noted by William James in 1909 (McDermott 1977: 280), the experience of activity is synonymous with life. That is to say that there is no experience at the level of the inactive world, such as electrons and primitive organisms. Using Whitehead's terminology, the experience of activity is supposed to be found in moments of the life-histories of enduring living entities.[9] *If there is the experience of the activity, there is life—no experience, no life!* Once one

[9] In his Harvard Lectures (1924–1925), paralleling James's conception of the experience of the activity, Whitehead underlines that "the essence of the activity . . . individualizes itself in a plurality of real things" (Whitehead *apud* Ford (1984: 286)). Furthermore, insofar as James understands that experience means the immediate flux of life, it individualizes itself in a plurality of activities.

acknowledges that the life-histories of enduring living entities are engendered in nature in continuity with the life-histories of enduring non-living entities, I do think we can epistemologically accept the existence of a threshold zone as a type of inflection in nature where meaning and life overlap. The idea is that *if there is an activity of meaning, there is life—no meaning, no life!* (and vice versa). In tracing a parallel with James's notion of experience of an activity, in particular, I have it in mind to stress that the activity of meaning indicates something else more than material conditions and merely happenings in nature—that is, meaning stands for the very sense of experiencing life as a transitional process, which results in a threshold zone for creation and novelty to take place in the world.

Illustration 1 Transitional process of experience (TP) and the threshold zone (TZ).[10] According to William James's empiricism, as a process of differentiation between physical and mental contexts in the flux of experience, one can speak of thresholds as transitions.[11] Incidentally, in line with James's conception of

[10] It is interesting to note here William James's use of "threshold." Referring to Gustav Fechner, James sees the "threshold" as the discrete character of sensible experience: "Fechner's term of the threshold, which has played such a part in the psychology of perception, is only one way of naming the quantitative discreteness in the change of all our sensible experiences. They come to us in drops" (James 1909: 231–232). Incidentally, James's considerations of Fechnerian philosophy occur primarily in the *Principles of Psychology* of 1890, in his *Lecture on Human Immortality* of 1898, and, finally, in an article in the *Hibbert Journal*, which became the fourth chapter of his *Pluralistic Universe* of 1909 (Marshall 1974: 304). In *Human Immortality*, particularly, James puts forward the conception of the "threshold" from Fechner's *Psychophysik*. As held by Fechner, James (2010: 165) notes that the condition of consciousness corresponds to a kind of psychophysical movement in the sense of reaching a certain degree of activity, which is called the "threshold." In Fechner's own words, "More general and higher mental phenomena, such as the total consciousness of the people depending on sleeping and waking, the consciousness of individual thoughts, the attention in a given direction have a point of extinction and origination, we will use the term and expression the threshold … the conditional, the elevation of consciousness to the threshold or which they correspond, but it can raise the question whether we are not in favor of adopting a threshold value of the underlying psychophysical movement" (Fechner 1966: 175–176). The idea that I develop in this chapter is that the conditions for mentality depend on a certain threshold of experience in terms of a psychophysical activity. Indeed, as noted by M. E. Marshal (1974: 309), one aspect of Fechner's philosophy becomes important to James's *The Pluralistic Universe*: the constitution of reality is identical throughout. Following James's empiricism and Fechner's metaphysics, it is fair to claim that mentality is distributed in a series of levels throughout the experience.

[11] "If one and the same experience can figure twice, once in a mental and once in a physical context … one does not see why it might not figure thrice, or four times, or any number of times, by running into as many different mental contexts, just as the same point, lying at their intersection, can be continued into many different lines" (James 1977: 210).

experience as a transitional process of differentiation, "there is a primary semiotic threshold opposing physics (that which is not alive) to biology (living things, including internal biological processes, known since Sebeok as endosemiotics), and there is a secondary semiotic threshold, which opposes the latter to that which is language-like (discussed in sociology and semiotics of culture)." (Sonesson 2006: 203)

In Illustration 1, James's conception of experience is depicted as continuity of transitional processes whose image is a dynamic mosaic; indeed, James's radical empiricism is a mosaic philosophy. In perceiving a mosaic when considering the context, admittedly, one experiences a cyclic, non-linear, and continuous process of uniting discrete elements, resulting in a dynamic gestalt.[12] Using the mosaic metaphor, James seeks to show that experience consists of a dynamic field of non-linear relations and is centrifugally structured.

In the sequel to his theory of the transitive parts of the stream of consciousness (introduced in *The Principles of Psychology*), in his essays on radical empiricism, James explores the idea of continuity as designating an unbroken chain of processes in the experience. For James, in its immediate structure, experience consists in a space-time continuity of transitional processes.[13] Accordingly, insofar as experience is the immediate flux of life, life acquires an empirical sense of consisting in the parts as much as in the transition:

> I called [philosophy of pure experience] a mosaic philosophy. In actual mosaics the pieces are held together by their bedding, for which bedding the Substances, transcendental Egos, or Absolutes of other philosophies may be taken to stand. In radical empiricism there is no bedding; it is as if the pieces clung together by their edges, the transitions experienced between them forming their cement. Of course, such a metaphor is misleading, for in actual experience the more substantive and the more transitive parts run into each other continuously, there is in general no separateness needing to be overcome by an external cement . . . the metaphor serves to symbolize the fact that Experience itself, taken at large, can grow by its edges. That one moment of it proliferates into the next by transitions which, whether conjunctive or disjunctive, continue the experiential tissue, cannot, I contend, be denied. Life is in the transitions as much as in the terms connected. (James [1909] 1996: 33)

Since one cannot find gaps in experience because it is an empirical continuity of relations, the idea of a missing link arguably makes no sense. Through countless transitions in experience, accordingly, life grows *here* and *everywhere* as an empirical process.

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[12] As was very well noted by Harry Heft, influenced by James's understanding of psychological experience as an extended flow, for Gibson in his ecological approach, perceiving is a mode of activity rather than the reception of sensory stimulation. In Gibson's own words, "The act of picking up information, moreover, is a continuous act, an activity that is ceaseless and unbroken. The sea of energy in which we live flows and changes without sharp breaks. . . . Hence, perceiving is a stream, and William James's description of the stream of consciousness applies to it. Discrete percepts, like discrete ideas, are as mythical as the Jack of Spades" (Gibson 1979: 204).

[13] Interestingly, in line with Whitehead, James (1983: 227) compares the river of life or river of elementary feelings to the Heraclitean river.

James's understanding of experience as a continuous process points to the fact that it has no bottom and ultimate layer. Metaphysically speaking, such an account of experience commits James's radical empiricism to a form of anti-foundationalism: nothing that is not derived from experience acquires a sense of reality or can be known; by knowing, in particular, James means related to portions of experience. Interestingly enough, in his notes for a psychological seminary of 1895–1896, James describes the immediate data of experience as a "field":

> "fields" that "develop", under the categories of continuity with each other [categories such as]: sameness and otherness [of] things [or of] thought-streams, fulfilment of one field's meaning in another field's content, "postulation" of one field by another, cognition of one field by another, etc. (James *apud* Perry (1976: 365))

As James was well educated in the sciences, there is little doubt that he was aware of the theory of (electromagnetic) fields. In this case, as noted by Heft (2017: 118), "the electrified wire and the needle [are] not bounded, separate entities, but instead they reside in a field of continuous relations that they themselves generate." For James, in parallel with the field theory, both objects and their relations are equally experienced, rather than objects only. Accordingly, there is no relation that is not experienced, and the relations connecting experiences are themselves experienced relations.

As was also observed by Heft (2017: 128), in clear contrast to "the Newtonian–Lockean view that natural phenomena, including mind, are fundamentally composed of discrete units (e.g., ideas)," James claims that experience is essentially a continuous process described as a dynamic field of relations. In occasional moments in the flux of experience as such, and because of the process of differentiation, a field of relational transitions emerges and frames a threshold zone giving rise to meaning, life, and mind.

As depicted in Illustration 1, in occasional moments of experience, the "threshold zone" consists in a transitional process of connecting and differentiating parts of the experience and, for instance, bringing forth life/lifelessness and mind/matter distinctions. Since the parts of experience can be differentiated empirically, the threshold zone stands for a transitional process from which meaning emerges and takes place in the world. The idea here is to put forward an empiricist understanding of the threshold zone as a sort of transitional process in the flux of experience. In the threshold zone, once it connects and differentiates particular parts of the experience, meaning and life overlap: that is to say, *where there is experience, there is life*.

It must be noted that I am using activity of meaning in the sense of semiosis. So, in speaking of semiosis, I speak of the activity of meaning and life.[14] Once more, I stress that there is no meaning and life below the life-histories of enduring living objects. Using Whitehead's differentiation of entities in terms of degree, it is fair enough to say that one can epistemologically assume the transition of life-histories of enduring non-living and living entities as indicating the threshold zone in nature

[14] "We follow Sebeok (1979) in defining the emergence of life as the threshold for the semiosphere" (Hoffmeyer 2008: 5).

from which meaning and life overlap.[15] Even though we lack empirical evidence to affirm the existence of the threshold zone, I insist that it is an important epistemological tool for our understanding of meaning and life in nature.

Although for Whitehead ([1929] 1978, p. 161), every actual entity has the capacity for knowledge, I believe that the notion of the threshold zone is epistemologically needed.[16] For instance, in the third grade of the entity, according to Whitehead's terminology, one can speak of knowledge and meaning without assuming the existence of consciousness. In stressing that the activity of meaning is not *conditio humana*, I believe that there must be a threshold zone of differentiation and transition between the inorganic and the organic, as well as between the meaningless (or non-semiotic) and the meaningful (or semiotic) so that meaning and life can make sense in nature.[17] If one differentiates grades of entities and experiences, it is plausible to assume that what a living entity does is meaningful since the activity of meaning cannot be reduced to mere physical occurrences. It depends on the entity's functional organization. In this sense, I do agree with Sebeok when he claims that "semiosis is what distinguishes all that is animate from lifeless" (Seboek *apud* Cobley et al. (2011: 2)). From a minimal level of functional organization, therefore, one can speak of the activity of meaning, mentality, and life. Perhaps the most important aspect of differentiating grades of entities and experience is the fact that the threshold zone indicates how one can epistemologically understand the transition and continuity from mere happenings to animacy and activity of meaning in nature. As I see it, the idea that meaning overlaps with the activity of living entities stresses epistemologically the need for a threshold zone of differentiation and transition

[15] In *Teoria Semântica da Evolução* (*Semantic Theory of Evolution*), Marcello Barbieri adds to the Darwinian worldview the dimension of meaning in nature. Much more than just variation, adaptation, and selection processes, nature is also rich in plurality and meaning. As Barbieri notes, there is indeed meaning in nature (*pace* von Uexküll (1982)). To the extent that each organism or life-form incorporates processes of meaning, they engender a language in nature: "Life is the language that nature has learned to speak on the surface of our planet" (Barbieri 1985: 169). In the sense that I understand Merleau-Ponty's notion of "prose of the world," in particular, it means the language that nature has learned to speak.

[16] According to Whitehead, all entities are capable of knowledge. If that is so, we need to count on a way of differentiating the entities to understand the levels of knowledge. I think that what can precisely distinguish the degrees of entities is their respective functional organizations. For instance, in comparing an electron with a cell, it is evident that the former has an inferior functional organization. As a result, it is hard to assert that the electron is capable of knowledge if this is taken to be a way of meaning the world. In contemporary contexts of cognitive sciences and philosophy of mind, it is more proper to speak of cognition instead of knowledge. In comparison with Whitehead's lower grades of actual entities, for example, they instance the capacity of minimal cognition and mind: "By accepting the existence of mind in animals, we commit ourselves to answer many difficult questions. For example, where is the lower evolutionary threshold for mind? Does mind require brain or at least some kind of nervous system?" (Sharov 2013: 243).

[17] "I don't like the idea that consciousness should be present in atoms . . . I like to see semiosis as an emergent phenomenon, where the increase in semiotic freedom is indeed the one most conspicuous fact we have about organic evolution" (Hoffmeyer *apud* Pickering (2012: 197)).

between lifelessness and life in the world; in a broad sense and more than *conditio humana*, meaning acquires the sense of experiencing life.

David Bohm has a remarkable understanding of continuity and meaning in nature. On the one hand, he advocates the principle of continuity. For him, it is unhelpful to postulate arbitrary discontinuities in trying to explain reality. On the other hand, he understands meaning as a basic property:

> I want to introduce a new notion of meaning which I call soma-significance. . . . In this approach meaning is clearly being given a key role in the whole of existence. . . . The notion of soma-significance implies that soma (or the physical) and its significance (which is mental) are not in any sense separately existent, but rather that they are two aspects of one over-all reality. (Bohm 1985: 72–73)

> Meaning and matter may not have the same sort of consciousness that we have, but there is still a mental pole at every level of matter, and there is some kind of soma-significance. (Bohm 1985: 89–90)

> Modern physics has already shown that matter and energy are two aspects of one reality. . . . The energy of mind and of the material substance of the brain are also imbued with a kind of significance which gives form to their over-all activity. So quite generally, energy enfolds matter and meaning, while matter enfolds energy and meaning. (Bohm 1985: 90)

Bohm's understanding that physical and mental are not separately existent seems to be in convergence with James's radical empiricism, and I totally agree. In fact, for James, experience presents in itself physical and mental poles. But, regarding Bohm's understanding that meaning is a fundamental concept applied to the human-made world, as well as to the physical reality, I am not in line with him. Even though I assume that meaning is not *conditio humana*, it does not follow that I take it to be applied to the physical reality to a "greater or lesser extent" or that semiosis occurs at all levels of the natural and human-made world (Pickering 2012: 198). Additionally, I am not convinced that "there is a mental pole at every level of matter" as Bohm believes to be the case. Insofar as he takes for granted such a belief, he seems to espouse a form of ultra-experimentalism on meaning. Although I recognize that James's empiricism is a form of pan-experimentalism, I think that there must be a threshold zone from which the very notions of experience and meaning are differentiated in making sense of the world. I do not believe that it makes sense to speak of experience and activity of meaning for quarks, protons, or electrons. In such cases, one would presumably commit a *category mistake* (*pace* Gilbert Ryle).

I am trying to maintain here that there must be a threshold zone from which one can epistemologically understand the transition from non-living to living processes, as well as from meaningless (or non-semiotic) to meaningful (or semiotic). Considering the notion of the threshold zone, it does not seem that there is an activity of meaning below living entities. In stating that, again, I do not have in mind that meaning is *conditio humana*. On this point, I do agree with Bohm:

> Meaning, though, has nevertheless been regarded as peculiar to our own minds and not as a proper part or aspect of the objective universe. However, if there is a generalized kind of meaning intrinsic to the universe, including our own bodies and minds, then the way may be opened to understanding the whole as self-referential through its meaning for itself—in other words, by whatever reality is. And the universe as we now conceive it may not be the whole thing. (Bohm 1985: 92)

Following my hypothesis (that *where there is meaning, there is life*), and following William James's conception of experience as the flux of life, I presumably accept Bohm's ultra-experimentalism on meaning. In contrast to Bohm, however, I understand that the activity of meaning depends on an entity's bodily organization. It is not clear to me whether Bohm assumes such a conceptual distinction in his understanding of meaning. Moreover, I suppose Bohm would regard the notion of a threshold zone as an arbitrary discontinuity and unhelpful in our attempts to explain reality.

In contrast to Bohm, who regards meaning as a fundamental property, in convergence with James's empiricism and in the form of a mosaic philosophy, I consider meaning in terms of constructivism. Just as the very essence of experience, for James, is that everything is structurally related and connected, I think of meaning as resulting from relational processes and forms of life. Unlike Bohm, I have in mind that meaning results much more from a dynamic web of relational processes than from a fundamental physical property.

Despite the absence of empirical evidence for the belief of continuity in nature, interestingly, Darwin assumed the hypothesis of continuity. As part of an epistemological belief in the explanation of the origin and development of species and mental capacities, Darwin ([1859] 1979: 445) endorsed the concept that natura non facit saltum. From Darwin's point of view, continuity corresponds to the uncountable gradation of previous and intermediary stages between species whose reality is unobservable in nature. In contrast to Leibniz's view, Darwin's hypothesis of continuity has no metaphysical or immaterial significance in the explanation of the natural world. In my view, which is consistent with Darwin's hypothesis of continuity, this is also the case with a threshold zone: despite the absence of empirical evidence to affirm the existence of a threshold zone in nature, methodologically, it stands for our understanding of transition and continuity between non-living and living, as well as the emergence of meaning activity in nature.

Even though we do not have empirical evidence, the notion of a threshold zone can be likened to the belief in continuity in nature. Although the conception of continuity corresponds to an unobservable reality in nature, it acquires a strategic relevance in explaining the development of species and mental capacities in the world. In my opinion, comparatively, the notion of a threshold can also be an important epistemological tool for our understanding of the transition and continuity from non-living to living entities, as well as from meaningless to meaningful in nature; that is to say, methodologically, the threshold acquires strategic relevance in our understanding of the world as a dynamic and systematic continuity.

3 Two Paradigms of Continuity

I will use the term "paradigm" in Thomas Kuhn's sense to mean a particular type of worldview. In such a sense, a new paradigm introduces a worldview in that it rivals a previous one. In the first place, as illustrated below, it is depicted as the paradigm of the chain of being, or *Scala Naturae*. An important historical aspect in the

pre-Darwinian and pre-Lamarckian period, the chain of being stands for the idea of continuity between species that presents a solution to the problem of an interval between man and the rest of the natural world.

The chain of being meant an attempt to establish order among creatures in the world by a hierarchical scale of ascendancy, whose top would be reserved for man as the work of God's creation (Lewin 2005: 4).

Wikipedia: http://en.wikipedia.org/wiki/Great_chain_of_being

Illustration 2 Introduced by Charles Bonnet (1781) as "Contemplation de la Nature," the idea of *Scala Naturae* can be found among different authors (from Plato to naturalists and philosophers of the eighteenth century) and means three general characteristics of the universe: completeness, continuity, and gradation. The chain of being is the conception according to which life is organized on an ideal and linear progression from the simplest atom to the most complex and perfect being (or human being). Since the chain of being constitutes a continuous progression, it is not broken and includes no intervals. In general terms, the chain of being indicates a fixist, essentialist, and determinist worldview.

Replacing the worldview of *Scala Naturae*, a new paradigm emerges in giving an alternative interpretation of the idea of a *continuum* in nature. As noted by Terrence Deacon, quoting Gregory Bateson:

> The turn on the logic of the classic "Chain of Being":
>
> As Gregory Bateson has described: "Before Lamarck, the organic world, the living world, was believed to be hierarchic in structure, with Mind at the top. The chain, or ladder, went down through the angels, through men, through the apes, down to the infusoria or protozoa, and below that to the plants and stones. What Lamarck did was to turn that chain upside down. When he turned the ladder upside down, what had been the explanation, namely: The Mind at the top, now became that which had to be explained." (Deacon 2012: 119)

To explain continuity in nature, the nascent paradigm rivals the ideas of fixism, essentialism, and determinism as they can be found in the worldview of *Scala Naturae*. Besides regarding the problem of the interval between man and the rest of the natural world, for instance, the idea is to interpret continuity as resulting from dynamic processes, gradual changes, and individual variation. That is to say: as an alternative to the worldview of *Scala Naturae*, the idea of continuity indicates that life is dynamically activity and process. Thus, much more than being organized on an ideal and linear progression, life has to do with non-fixism, non-essentialism, and non-determinism.

Bearing in mind that continuity can be dynamically explained in nature, the new paradigm can be divided into two moments: the "tree of life" and the "web of life." Although the notion of the web contrasts with the Darwinian view of the tree of life, they have in common the idea that life is a continuous process dynamically structured without a center or periphery.

(a) *The tree of life*

Illustration 3 Darwin's first sketch of a phylogenetic tree, from *Notebook B [Transmutation of Species (1837–1838)]* (Darwin 2008: 64).

In contrast to the essentialism of *Scala Naturae*, Darwin takes up the principle of continuity and introduces a dynamic and causal explanation of the supposed intervals between species. As such, Darwin's explanatory structure has three basic elements: (1) the individual is the matter of biological variation, (2) natural selection engenders the mechanism of efficient action on the individual, and (3) it is believed that gradual changes occur between species as a result of individual variations. Particularly on this last point, Darwin traces his maxim of gradualism:

> On the theory of natural selection, we can clearly understand the full meaning of that old canon in natural history, "Natura non facit saltum". This canon, if we look only to the present inhabitants of the world, is not strictly correct, but if we include all those of past times, it must by my theory be strictly true. (Darwin 1859: 206)

Under the maxim that natura non facit saltum, one may identify the philosophical matrix of Darwin's continuity hypothesis by reference to Leibniz's principle of continuity. In other words, the development of different species and mental characteristics corresponds to a continuous and gradual process in nature:

> Nothing takes place suddenly; one of my great and best confirmed maxims says that nature never makes leaps. I have called this maxim the Law of Continuity. . . . This law does a lot of work in natural science. It implies that any change from small to large or vice versa passes through something in between. (Leibniz [1765] 1996: 57)

> As for the gradual connection of species: we have already had something to say about that in a previous discussion, when I commented that philosophers have in the past reasoned about a vacuum among forms or among species. In nature everything happens by degrees, nothing by jumps; and this rule about change is one part of my law of continuity. (Leibniz [1765] 1996: 473)

It seems evident that Darwin and Leibniz share the belief that everything proceeds by degrees in nature and nothing by jumps. Moreover, given such an understanding of gradualism in nature and differently from the essentialism of *Scala Naturae*, for Darwin, continuity means a dynamic process in nature much more than a fixed property.

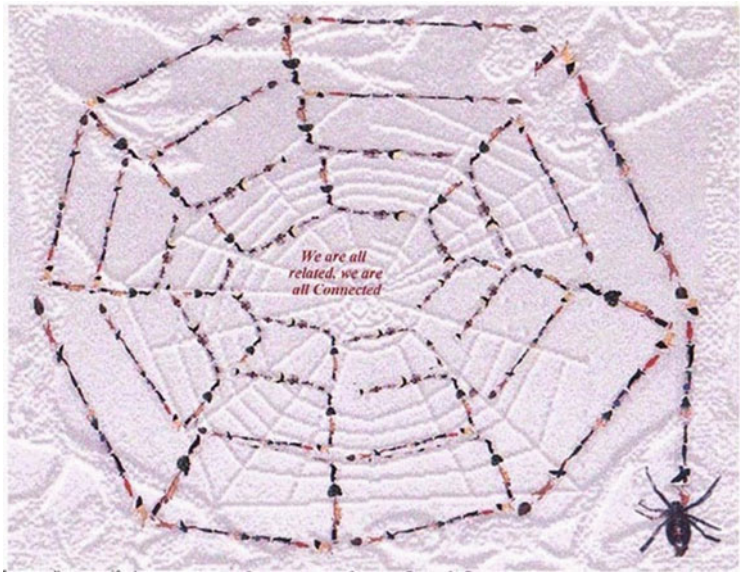
(b) *The web of life*

As a type of deflection in the new paradigm of continuity, von Uexküll (1926: 258) employs the expression "web of life" in contrast to the Darwinian view of the "tree of life." In using the image of the web in a chapter titled "The Species" in *Theoretical Biology*, von Uexküll intends to replace the concept of life expressed by the Darwinian image of the evolutionary ladder. For him, evolution results from modifications in a web of complex relations in nature. The idea is that the natural world is best depicted as a web of linked entities (Ricou and Pollock 2012):

> What happens with evolutionism when moving from Modern to Post-Modern, is that we leave behind the whole concept of life's progress as expressed in the tree of life and instead understand the evolution as modifications in the web of life. (Kull 2004: 101)

> This is a paradigm that can be best characterized by the metaphor of web, as used by Thomas A. Sebeok in the expression of "the semiotic web", and as introduced by Jakob von Uexküll. (Kull 2004: 100)

> The complex web of causal dependencies between the various levels means that we cannot fully specify the nature of an entity merely by listing the properties of its constituents and their spatial relations. It also means that we cannot pick out any level in the hierarchy as ontologically or causally primary. Whereas a substance ontology that presupposes a structural hierarchy of things only allows bottom-up causal influences, a process ontology has no trouble in recognizing that causal influences can flow in different directions. (Nicholson and Dupré 2018: 21–22)



Urbaniak, 2000 (https://www. ncy.netnaturalfreque/Ray/webofLife.htm)

Illustration 4 The web of life—a complex web of causal dependencies between the various levels in the world: "Displaced was the long-held schema of nature as a static chain of being (*Scala Naturae*) comprised of a succession of material entities and culminating in spiritual entities [... in] its place there is a dynamic realm of thoroughly natural, co-evolved entities functioning in a web of environmental interdependencies" (Heft 2001: 13). Holistically speaking, as an indeterminate process, the idea is that the web of life is without a center or periphery.

My use of the image of the web of life is my tribute to the brilliant description of the spider's web by Jakob von Uexküll. As an illustration of the theory of meaning, which is the second part of his Umwelt theory, von Uexküll ([1934] 1982: 42) describes the spider's weaving of the web. For the spider, since the web *means* the fly, it functions as a way of significantly relating to the world. According to von Uexküll's theory of meaning, life takes the form of a dynamic semiotic web in the sense that *where there is meaning, there is life—no meaning, no life!* That is to say: meaning or semiosis is life (*pace* Sebeok (2001)).

As a metaphor, the notion of a web depicts an image of life in which organisms are all dynamically related and connected in the world.[18] In parallel with James's mosaic philosophy, for instance, the idea is that one understands life as resulting

[18] *Process-Relational Philosophy—An Introduction to Alfred North Whitehead*, C. Robert Mesle (2008: 9, 59) makes use of the "web" to assert that the universe is a web of relational processes. As such, the universe does not correspond to a hierarchy of things based on a substance ontology and

from a dynamic web of plural facts in the form of constructivism. Whitehead highlighted that since every actual entity is a "drop of experience," they all construct a web of experiences and reach the sense of activity together. For James (1909: 373), such a sense of activity is nothing but synonymous with the very sense of life. Insofar as the web of life takes the form of a dynamic mosaic, one must point out two points here: first, no level is taken to be ontologically or causally primary; second, the causal influences flow in different directions and not necessarily in a bottom-up sense (*pace* Nicholson and Dupré (2018)). As Illustration 4 suggests, life consists of a hierarchy of continuous processes rather than ontologically separate things.

4 Threshold and Ententionality

In retaking the threshold's notion, I will explore the ideas of transition and continuity in nature in that they give rise to life and meaning. Even though one takes for granted that life consists of a hierarchy of continuous processes, the issue seems to be from which level in nature one can differentiate life and lifelessness. As I am trying to argue, the notion of a threshold assumes a distinctive epistemological function through which one can differentiate the processes of transition and continuity from lifelessness to life in nature. Once again, I stress that the notion of a threshold does not contradict the assumption of continuity in nature. Quite the opposite is true: in assuming that there is a threshold zone in nature, one can make intelligible the processes of transition and continuity in nature from which life and meaning emerge.

As was interestingly noted by Lewis Ford (1984: 3), unlike the traditional view of pan-psychism, Whitehead's assumption is that there are no degrees of mentality below the threshold on which organisms can sustain intellectual and cognitive activity. However, for the later Whitehead, as "all actualities have some degree of mentality," mentality here means "novelty of response" (Ford 1984: 42). Nevertheless, as many organisms have a rudimentary functional organization, they lack the activity of meaning and any degree of mentality. In this sense, once again, I believe that one can epistemologically differentiate a threshold zone from which meaning is supposedly found in nature, indicating cognitive activity as a distinctive trace of living organisms. The idea of the threshold indicates a zone of deflection where much more than material conditions matter by giving rise to mentality and activity of meaning as the novelty of response in nature.

Then, as I see it, one can only speak of the activity of meaning from the life-histories of enduring living organisms. Accordingly, instead of being a fundamental property, meaning seems to indicate much more an emergent process in nature that

"the idea of ... continuously persisting entities which can be integrated into various material structures" (Koutroufinis 2014: 17).

separates living processes from merely physical–chemical processes (Deacon 2012: 144).[19] In my view, such a separation indicates the transitional character of reality and does not suggest absolutely the ideas of bifurcation or discontinuity in nature.[20] As I am developing here, the activity of meaning does not correspond to a phenomenologically discontinuous aspect of experience and must be taken to be as real as anything in nature.

To avoid undue assimilation with a substantialist ontology and the idea that reality consists of successive levels of organization as a hierarchy of things (elementary particles, atoms, molecules, cells, organisms, etc.), I understand the organism as a process and transition of processes in asymmetric forms in nature (*pace* Whitehead ([1929] 1978)). Each organism has certain temporal stability at different scales (atoms, molecules, organs, organisms, populations). Accordingly, in metaphorical terms, I agree with Pattee (Pattee and Rączaszek-Leonardi 2012: 228) that "life is matter with meaning." In this sense, it is plausible to claim that there must be a threshold as a zone of transition and continuity from which meaning, life, and mind take place in nature:

> Though subjective awareness is different from the simple functional responsiveness of organisms in general, both life and mind have crossed a threshold to a realm where more than just what is materially present matters. (Deacon 2012: 26)

[19] I am assuming here a weak version of emergence. The idea is that "although in emergent transitions there may be a superficially radical reorganization, the properties of the higher and lower levels form a continuity, with no new laws of causality emerging." In the sense of strong emergentism, contrarily, "emergent transitions involve a fundamental discontinuity of physical law" (Deacon 2012: 551–552).

[20] As noted by Whitehead, "What I am essentially protesting against is the bifurcation of nature into two systems of reality, which, in so far as they are real, are real in different senses. One reality would be the entities such as electrons, which are the study of speculative physics. This would be the reality which is there for knowledge; although on this theory it is never known. For what is known is the other sort of reality, which is the byplay of the mind" (Whitehead 1919: 30). In Robert K. Logan's *The Extended Mind—The Emergence of Language, the Human Mind and Culture* (2007), incidentally, one finds a defense of bifurcation and discontinuity in the origins of speech and the human mind. The argument is based on the premise of a transition from percept-based thinking to concept-based thinking (Logan 2007: 5). The whole idea is that such a transition represented the emergence of language as a major discontinuity in human thought. For Logan (2007: 18–19), indeed, the discontinuity results partially from the discontinuity between linear and non-linear dynamics in that non-linear systems exhibit emergent behavior. By assuming Terence Deacon's claim that human speech is "an evolutionary anomaly and not merely an evolutionary extreme," Logan commits himself with a form of strong emergentism. In his view, accordingly, to the extent that non-linear dynamics exhibit emergent behavior, the emergence of language represents a "discontinuity, a quantum leap, in the behavior of animal life" (Logan 2007: 18). In Ian Tattersall's *L'Emergence de l'Homme* [*The Emergence of Man*] (1999), one also finds a similar defense of a strong emergentism in human evolution: "*Homo sapiens* who eliminated the Neanderthals . . . are in one way or another linked to language. . . . From the point of view of our species, the crucial cognitive leap that was that of complex symbolic reasoning was . . . accomplished very late in human evolution" [my translation] (Tattersall 1999: 307, 309).

In the wake of Deacon, therefore, it is fair to affirm that the existence of meaning, life, and mind depends on the organism's functional organization. Once one speaks of the activity of meaning, one can speak of types of mind in nature. Also, in speaking of the activity of meaning and types of mind, the door is opened to state the existence of life. That is why I do not believe that one can speak of meaning, life, and mind below the life-histories of enduring living objects.[21]

In assuming that the activity of meaning depends on the organism's functional organization, for instance, I commit myself to a strong assumption of continuity of life and mind—"the view that the organizational structures and principles distinctive of mind are simply enriched versions of the structures and principles grounding life itself" (Ward et al. 2017: 370). In my opinion, meaning, life, and mind are spatially and temporally overlapping processes. The idea here is that the world consists of a hierarchy of levels and processes all related and connected—just like the web image, which depicts the world as a mosaic of plural facts (*pace* James). Moreover, it is not the case to look for the hierarchy level as ontologically or causally primary. As I will present in the last part of this chapter, from Peirce's conception of cognition, meaning arises by an indeterminate process of beginning (as well as life), and nothing has ontological priority in the web of life. Very briefly, the idea is that the world consists of a hierarchy of levels and processes, all of them related and connected, giving rise to the emergence of meaning, life, and mind.

As it seems plausible to speak of minimal cognition in primitive forms of life such as bacteria, the notions of meaning and value can perfectly describe when something becomes good in the organism's environment. By virtue of the dynamics of an organism's embodiment of the environment, some cognitive functions have satisfaction conditions in that they engender forms of meaning and value from a

[21] However, in many cases in nature, one can speak of minimal cognition as indicating types of mind. Paraphrasing Antonio Damasio (1999), one can say that the mind is based on an organism's capacity of feeling; e.g., the organism feels itself as well as it feels the environment. Moreover, considering Whitehead's conception of feeling as positive prehension, it is clearly not an anthropomorphic view of feeling. The idea is that feeling has to do with grades of feeling the world; hence, it is not *conditio humana*. In *Self Comes to Mind* (2010), Antonio Damasio devotes an analysis to qualia in which he seeks to understand how organisms' ability to sense has an origin at different scales in nature: "There are aspects of cell life that suggest the presence of forerunners of a 'feeling' function. Unicellular organisms are 'sensitive' to threatening intrusions. Poke an amoeba, and it will shrink away from the poke. Poke a paramecium, and it will swim away from the poke. We can observe such behaviors and are comfortable to describe them as 'attitudes,' knowing full well that the cells do not know what they are doing in the sense that we know what we do when we evade a threat. But what about the other side of this behavior, namely, the cell's internal state? The cell does not have a brain, let alone a mind to 'feel' the pokes, and yet it responds because something changed in its interior. Transpose the situation to neurons, and therein could reside the physical state whose modulation and amplification, via larger and larger circuits of cells, could yield a protofeeling, the honorable counterpart of the protocognition that arises at the same level" (Damasio 2010: 197). In convergence with Damasio, and in responding to the Dalai Lama's question as to whether a one-celled creature such as an amoeba is a sentient being, Varela says, "From this point of view, there is no question. There is no way for me to draw a line and distinguish my cognition from the cognition of frogs, hydras, amoebas, or bacteria" (Hayward and Varela 2001: 66).

subjective perspective. For instance, in the chemical composition of the bacterium's environment, some have positive meaning and value, and some do not. Such a process of meaning and value corresponds to what Terrance Deacon calls "ententional phenomena." Although "ententionality" has a certain degree of kinship with the traditional conception of intentionality, it has nothing to do with a human-like mental property:

> I propose that we use the term ententional as a generic adjective to describe all phenomena that are intrinsically incomplete in the sense of being in relationship to, constituted by, or organized to achieve something non-intrinsic. By combining the prefix en- (for "in" or "within") with the adjectival form meaning something like "inclined toward" . . . ententional phenomena include functions that have satisfaction conditions, adaptations that have environmental correlates, thoughts that have contents, purposes that have goals, subjective experiences that have a self/other perspective, and values that have a self that benefits or is harmed. (Deacon 2012: 30)

> Ententional: A generic adjective coined in this book for describing all phenomena that are intrinsically incomplete in the sense of being in relationship to, constituted by, or organized to achieve something non-intrinsic. This includes function, information, meaning, reference, representation, agency, purpose, sentience, and value. (Deacon 2012: 550)

To the extent that ententional phenomena achieve something non-intrinsic, they are essentially relational. As understood here, meaning, in particular, is a case of an ententional phenomenon in the sense that it is never complete in itself, depending on an actual process of achievement. Besides, according to Deacon, ententional phenomena are asymmetrically and hierarchically interrelated. For instance, representations depend on the information, and information depends on the functional organization. That is why one can speak of ententional phenomena as transitional processes and essentially incomplete in nature. Once ententional phenomena apparently depend on the organism's functional organization, they indicate a threshold zone in the natural world from which one can differentiate meaning and value in multiple degrees. As I see it, this is why one must place a threshold zone in order to differentiate ententional phenomena from the rest of natural processes (Deacon 2012: 40).

In comparison with Deacon's ententional phenomena, Wilfrid Sellars (1981), one of the most important analytical philosophers, introduces a process-based ontology and distinguishes between different normativity degrees. For Sellars, even in the lowliest primitive organisms such as bacteria, cognitive content is nothing but a function. In parallel with Peirce and James's pragmatism, Sellars has in mind to bridge the supposed bifurcation between "fact" and "norm." The idea is that many natural processes accomplish certain forms and degrees of normativity and so meaning and value are not *conditio humana*.[22] As such, I think it is fair to take

[22] Interestingly paralleling the notion of linguistic convention, Marcelo Barbieri claims that "natural conventions add meaning to information." According to him, "The processes that have created the genetic code and those that have led to the choice for dextrorotatory sugars or levorotatory amino acids are more well-known examples of natural conventions . . . the biological evolution has been produced not only through natural selection but also through natural conventions" [my translation]

meaning and value to be the very essence of the web of life in that they differentiate many forms of ententional phenomena in nature. Taking into account Sellars's process-based ontology and following Deacon's notion of ententional phenomena, I believe they strengthen the need for epistemologically defining a threshold zone in which one differentiates the activity of meaning as indicating the transition and continuity from lifelessness to life in nature.

Additionally, as noted by Whitehead ([1929] 1978: 214), the notion of a "process" has two interconnected species: microscopic and macroscopic processes. The former is efficient, and the second is teleological. That is to say: whereas microscopic processes bring about the transition from the present conditions to the future, macroscopic processes provide the ends for the transition. For Whitehead ([1929] 1978: 214–215), moreover, once an "organism" means a combination of processes in a twofold manner, "the community of actual things is an organism; but it is not a static organism." To the extent that an organism consists of dynamically inefficient and teleological processes, the structural coupling between organism and environment means process, hierarchy, and transition of processes (including microscopic and macroscopic levels). The idea is that the structural coupling results in a web of transitional processes much more than a simple arithmetic combination of organism and environment, indicating continuity in different directions. As a result, the transition and continuity of processes are gradually transformed into ententionality, activity of meaning, and life-forms in nature.

5 Meaning, Life, and Indeterminateness

To affirm the need for a threshold in the natural world from which one differentiates meaning and life, I start this last part of the chapter with the following question: Must there have been a first semiosis for making sense of meaning and life in the world? In my opinion, the answer is no. The reason is quite simple. Having in mind the image of life as a web, there is no level taken to be ontologically or causally primary, and the causal influences flow in different directions (and not necessarily in a bottom-up sense). As I will show, the image of the web discredits the idea of a first semiosis as a necessary condition for meaning and life to be accomplished in the world. Borrowing Peirce's conception of indeterminate cognition, I will argue that meaning and life consist of overlapping processes.

The series of papers in which Peirce criticizes the Cartesian foundationalism on cognition is known as the Cognition Series, and it appears in the *Journal of Speculative Philosophy* (1868). In *Questions Concerning Certain Faculties Claimed for Man* ([1866] 1958: 37), particularly, Peirce criticizes the traditional view of intuition as "a cognition not determined by a previous cognition." Once he embraces

(Barbieri 1985: 159). What Barbieri contends is, in short, that conventions can also be found in nature.

an epistemological anti-foundationalism, Peirce argues that our knowledge is by nature inferential and so any cognition is determined by a previous cognition:

> No cognition not determined by a previous cognition, then, can be known. It does not exist, then, first, because it is absolutely incognizable, and second, because cognition only exists so far as it is known. (Peirce 1966: 37)

> The reply to the argument that there must be a first is as follows: In retracing our way from conclusions to premises, or from determined cognitions to those which determine them, we finally reach, in all cases, a point beyond which the consciousness in the determined cognition is livelier than in the cognition which determines it. (Peirce [1868] 1958: 37)

For Peirce, therefore, it is not true that there must be a first cognition. The idea is that cognition consists of a dynamic web of sign inference processes. According to him, the first cognition consists in an epistemologically undecidable question and a paradox of Achilles:

> Suppose an inverted triangle ▽ to be gradually dipped into water. At any instant, the surface of the water makes a horizontal line across that triangle. This line represents a cognition. At the subsequent date, there is a sectional line so made, higher upon the triangle. This represents another cognition of the same object determined by the former. . . . The apex of the triangle represents the object external to the mind which determines both these cognitions. The state of the triangle before it reaches the water represents a state of cognition which contains nothing which determines these subsequent cognitions. . . . For any such section is at some distance above the apex, otherwise it is not a line. Let this distance be a. Then there have been similar sections at the distances $1/2a$, $1/4a$, $1/8a$, $1/6a$, above the apex, and so on as far as you please. So that *it is not true that there must be a first* [my italics]. Explicate the logical difficulties of the paradox (they are identical with those of Achilles) in whatever way you may. I am content with the result as long as your principles are fully applied to the particular case of cognitions determining one another. . . . The point here insisted on is not this or that logical solution of the difficulty, but merely that cognition arises by a process of beginning, as any other change comes to pass. (Peirce [1868] 1958: 37–38)

Peirce's assertion that cognition arises by a process of beginning can be illustrated as follows:

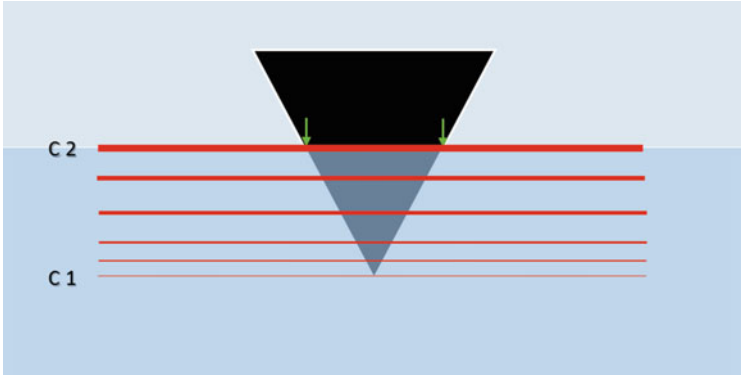


Illustration 5 In Peirce's conception of cognition, it arises by a process of beginning—C1: cognition 1; C2: cognition 2, and so on. According to Peirce, it is not the case that there is no beginning of cognition. The cognition begins gradually, and there is no cognition that is not determined by another cognition.

In referring to Peirce's Cognition Series, I basically intend to point out that meaning begins with an indeterminate process of beginning. Furthermore, in tracing a parallel with Peirce's description of the cognitive states, I have in mind to illustrate the idea that meaning and life are overlapping processes; that is, there must not have been a first semiosis in order to make sense of meaning and life. As an overlapping of processes, the web of life arises by a process of beginning in that meaning makes no sense except in the *rush* of semiosis (Merrell 1997: xi). The idea is that the overlapping of meaning and life consists in an indeterminate process; consequently, there is no first semiosis taken to be ontologically or causally primary in creating the web of life. Retaking William James's image of a mosaic, incidentally, the idea of the web of life is that of a dynamical structure without a center or periphery.[23]

In parallel with Peirce's conception that cognition arises by a process of beginning, for instance, William James insists on characterizing experience (as a whole) as a continuous process in space and time. As well as the visual field's form, for instance, James asserts that the field of experience (or world experienced) is equally fringed and has no definite boundaries. Unlike traditional empiricism, for James, the connecting relations between experiences are taken to be experienced relations. Consequently, in James's radical empiricism, experience has no bottom layer, and the structure of an experience is in the transitions of the experienced relations as a type of dynamic gestalt. Indeed, according to such an anti-foundationalist view, there is no gap in the structure of experience, and it forms a sort of continuum. Moreover, since experience consists in an immediate flux of life, "life is in the transitions as much as in the terms connected" (James [1904], in McDermott (1977: 212)). The idea of transition discredits the need for a substantialist ontology on which life is supposed to be built up.

[23] In many aspects, I think, the idea that the web of life begins by a process of beginning is akin to Tibetan Buddhism's picture of the "Wheel of Life" (*Bhavacakra*). In this context, incidentally, the word *nidāna* means the processes by which a being comes into existence, and it is bound to the Wheel of Life (Humphreys 2005: 152, 259). Being a "wheel," it portrays the concatenation of cause and effect; nevertheless, there is no starting point. In Buddha's teachings, indeed, it is said that our beginning is inconceivable and that its starting point cannot be indicated (Buswell 2004: 185). Additionally, in the words of the Dalai Lama (1999: 30), "what is the substantial cause of the material universe way back in the early history of the universe, we trace it back to the space particles which transform into the elements of this manifest universe. And then, we can ask whether those space particles have an ultimate beginning. The answer is no. They are beginningless. Where other philosophical systems maintain that the original cause was God, Buddha suggested the alternative that there are no ultimate causes. The world is beginningless. Then the question would be: Why is it beginningless? And the answer is: It is just nature. There is no reason. Matter is just matter." Indeed, it is interesting to note that in Buddhist cosmology, "the universe has no specific creator; the sufficient cause for its existence is to be found in the Buddhist cycle of causal conditioning known as *Pratityasamutpada* [or dependent origination]" (Gethin 2004: 183).

Once again, concerning James's anti-foundationalism, it is in parallel with Peirce's Cognition Series. Both discredit the epistemological need for a bottom layer in order to understand the cognition process. As I see it, this line of thinking can be extended to the conception of the web of life. Assuming there is no bottom layer taken to be ontologically or causally primary, it is fair to say that the web of life begins by a process of beginning as a sort of continuity. The idea of continuity does not rule out the need for a conception of a threshold zone in which one epistemologically differentiates the transition between non-living and living processes, as well as the beginning of the web of life.

As I am assuming that *where there is meaning, there is life (no meaning, no life!)*, the web of life is based on an indeterminate process. For the web of life to be coherent, however, the meanings (that make up the web) must cohere with each other. That is to say, since meaning arises by a process of beginning, such a process forms the very essence of the web of life. In line with Peirce's view of cognition, I think it is plausible to assert that the web of life consists in a dynamic web of meaning processes. Similarly to coherentism in epistemology, for instance, the idea that the web of life is based on meaning processes discredits essentialism. Indeed, to the extent that meaning and life are overlapping processes, the web of life acquires a holistic nature (see Illustration 4). In tracing a parallel with Peirce's Cognition Series in that cognition begins by a process of beginning, holistically speaking, I contend that the web of life is without a center or periphery and that it begins by a process of beginning.

Inspired by Peirce's Cognition Series, and in order to characterize the overlapping of meaning and life, I retrace Anaximander's *ἄπειρον* (apeiron): an indeterminate process engenders everything in the universe. Insofar as the web of life comprises an unlimited and indefinite activity, there is no need for a process taken to be ontologically or causally primary. As a consequence of such indeterminateness, the web of life arises from a process of beginning in overlapping with meaning. When some processes reach a threshold zone indicating a sort of deflection in nature, something else makes a difference more than only material presence. Using Whitehead's vocabulary, meaning and life overlap supposedly from the third grade of entities on which one may differentiate the transition and continuity in nature between non-living and living processes.

In comparison with Peirce's Cognition Series, it is fair to assert that everything arises from a process of beginning in the web of life without a process taken to be ontologically or causally primary. Accordingly, more than what is materially present in the web of life, what matters is its relational nature from which meaning emerges as resulting from transition and continuity with lifeless processes in the sense that "something … stands for something else by reason of a relation" (Pattee and Rączaszek-Leonardi 2012: 156). As can be seen in Illustration 4, likewise, the web of life consists in a dynamic mosaic of relational processes, which begins by a process of beginning. Having in mind the image of the web of life, in brief, I want to stress the fact that life as a relational process is matter with meaning (*pace* Pattee and Rączaszek-Leonardi (2012)). In following James's mosaic metaphor, once again, I insist that meaning should be understood in terms of constructivism more than

according to Bohm's ultra-experimentalism and the idea that meaning is a fundamental property of nature.

6 Final Remarks

It is not easy to conclude a chapter in which one seeks a conceptual unity between three thorny themes in contemporary contexts in natural sciences, epistemology, and biosemiotics: the threshold, meaning, and life. The idea here may well be to outline the prospects for an investigation that justifies a conceptually coherent approach to themes and problems related to the threshold, meaning, and life. Since it is not a matter of understanding the significance and origin of life on earth, the notions of the threshold and meaning indicate an alternative to an understanding of life as a dynamic web of relations. Therefore, in considering the image of the web of life, the idea is to understand that meaning and life cannot, and do not, exist independently. And to the extent that the notion of the web of life suggests a process of dynamic relations in the form of constructivism, it does not seem to make sense to understand that meaning consists in a basic physical property.

In this chapter, I have tried to indicate in what sense one can understand meaning and life according to the notion of a threshold zone from which transition and continuity are differentiated between non-living and living, without, however, accepting the idea of a supposed missing link in nature. In considering that the notion of a missing link does not seem to justify a coherent understanding of continuity in nature, what I show is that like the very notion of meaning, the image of the web of life suggests an indeterminate process that begins by beginning as illustrated by Peirce's Cognition Series. Insofar as the web of life takes the form of a dynamic mosaic, meaning and life overlap and begin when certain processes reach a threshold zone of transition and continuity with the non-living. What derives from such a process without a bottom layer is the understanding that *where there is meaning, there is life—without meaning, without life!* (and vice versa).

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