



**HAL**  
open science

# The Tangled Dialectic of Body and Consciousness: A Metaphysical Counterpart of Radical Neurophenomenology

Michel Bitbol

► **To cite this version:**

Michel Bitbol. The Tangled Dialectic of Body and Consciousness: A Metaphysical Counterpart of Radical Neurophenomenology. *Constructivist foundations*, 2021, 16, pp.141-151. hal-03469727

**HAL Id: hal-03469727**

**<https://hal.science/hal-03469727>**

Submitted on 7 Dec 2021

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# The Tangled Dialectic of Body and Consciousness: A Metaphysical Counterpart of Radical Neurophenomenology

*Constructivist Foundations*, 16, 141-151, 2021

Michel Bitbol • Archives Husserl, Paris, France • [michel.bitbol/at/ens.fr](http://michel.bitbol/at/ens.fr)

**Context** – Varela’s neurophenomenology was conceived from the outset as a criticism and *dissolution* of the “hard problem” of the physical origin of consciousness. Indeed, the standard (physicalist) formulation of this problem is what generates it, and turns it into a fake mystery.

**Problem** – Such dissolution of the “hard problem” is very demanding for researchers. It invites them to leave their position of neutral observers/thinkers, and to seek self-transformation instead. It leaves no room for the “hard problem” in the field of discourse, and rather deflects it onto the plane of attitudes. As a consequence, it runs the risk of being either ignored or considered as a dodge. How can we overcome this obstacle and restore the argumentative impact of neurophenomenology?

**Method** – I propose a metaphysical compensation for the anti-metaphysical premise of the neurophenomenological dissolution of the “hard problem.” Yet, this alternative metaphysics is designed to keep the benefit of a shift from discourse to ways of being, that is the latent message of neurophenomenology.

**Results** – A dynamical and participatory conception of the relation between body and consciousness is formulated, with no concession to standard positions such as physicalist monism and property dualism. This conception is based on Varela’s formalism of “cybernetic dialectic” and on a geometrical model of self-production. It is in close agreement with Merleau-Ponty’s “intra-ontology”: an engaged ontological approach of *what it is like to be*, rather than a discipline of the contemplation of beings.

**Implications** – Taking neurophenomenology seriously implies a radical shift in our way of tackling the “hard problem” of consciousness. There is no question here of theorizing about the neuro-experiential correlation but of including it in a chain of resonance and continuous research that amplifies our lived life. Even metaphysics partakes of this shift.

**Constructivist content** – The paper advocates a critical stance towards standard realist approaches to the science and philosophy of mind. A complete reversal of the hierarchy of ontological priorities between physical objects and consciousness is proposed, in the spirit of Husserl’s *Crisis of the European Sciences*. Then, the obvious but usually overlooked relation between being conscious and knowing consciousness is emphasized.

**Keywords** –Neurophenomenology, phenomenology, consciousness, experience, mind-body problem, quantum mechanics, neutral monism, panpsychism, Merleau-Ponty.

## Introduction

1. Although it can be used as nothing more than an improved method for the cognitive neuroscience (Rudrauf et al. 2006; Lachaux 2011), neurophenomenology was conceived from the outset as a “methodological *remedy* for the hard problem” of consciousness (Varela 1996; Bitbol 2017; Petitmengin 2017).
2. The “hard problem” is defined as the problem of explaining how first-person experience, with all its lived qualitative features (often reified into *qualia*), may arise from the physical processes taking place in the brains and organisms of humans or animals (Chalmers 1995).
3. According to Francisco Varela (1996), no solution to this so-called “hard problem” can be given “within its original settings.” Indeed, its standard (naturalistic and physicalistic) formulation is precisely what generates it, and turns it into a fake mystery. What is needed to overcome and dissolve the “hard problem” is then an extended research program and a broadened existential attitude (Bitbol 2008, 2012).
4. The extended research program is designed to give us access to a fuller range of epistemic approaches, from close contact with fleeting experience to search of invariants within this experience. It amounts to articulate two usually separate directions of research (reflective and objectifying) without ontologizing one at the expense of the other.
5. As for the broadened existential attitude, it unfolds from the recognition that lived experience is the ultimate presupposition of research. “Lived experience is where we start from and where we all must link back to, like a guiding thread” (Varela 1999). Once it has become obvious that lived experience is the background condition for anything to count as an explanation, how would one consider it as something to be explained?
6. It must be admitted that this kind of dissolution of the “hard problem” is very demanding for researchers, since it invites them to leave their position of neutral observers/thinkers, and to seek self-transformation instead (Bitbol & Antonova 2016; Vörös & Bitbol 2017). It requires from researchers nothing less than a mutation of their state of consciousness. Only then can they *see* lived experience *as* the universally presupposed background of questioning, rather than a theme to be questioned. As a consequence, such unconventional move from thought to existence is usually either ignored (Bayne 2004) or considered as a dodge (Stewart 2017).
7. One reason why Varela’s radical dissolution of the “hard problem” is neglected might be that it leaves no room for this problem in the field of discourse and concepts, and rather deflects questions on the plane of programs and attitudes. The vacant place

left by this non-conventional approach then cries out for an appropriate intellectual handling, and for a location within some system of metaphysical coordinates.

8. The aim of the present paper is to compensate for this apparent lack. It is to offer a mental support to a basically anti-mentalist approach of the “hard problem.” It is to offer a metaphysical compensation for the anti-metaphysical premise of Varela’s dissolution of the “hard problem.” It is to offer a theory, a picture, that may help one understand what is at stake in Varela’s claim that no abstract theory, no objectified picture, may ever be able to solve the “hard problem.”

## Reflective metaphysics

9. In our inquiry, we must be careful not to lose the benefit of a shift from discourse to ways of being, that is the latent message of neurophenomenology. This shift is all the more crucial since what we purport to flesh out metaphysically is an existential “remedy” to the “hard problem” seen as a symptom of some philosophical illness. To avoid drying out this existential resource, even metaphysical positions must incorporate it in some way. Even metaphysical positions about consciousness should be traced back to basic epistemic attitudes and basic experiences. They should adopt a reflective direction of inquiry, and relax their naive striving towards a transcendent realm.

10. Immanuel Kant’s renewal of the concept of metaphysics can serve as a reference at this point. According to him, metaphysics may adopt two diametrically opposite orientations:

“The first is that it serves to solve the tasks which the questioning mind sets itself when by means of reason it inquires into the *hidden qualities of things*. [...] The other [...] is more adapted to human reason, and consists in recognizing whether the task be within the *limits of our knowledge*.” (Kant 1900: 113)

The first orientation is transcendent, and the second one is transcendental. Metaphysics can indeed be used as a guide of reason in the quest for knowledge about the recesses of the world (first orientation), but only after reason has reflected on its own limits so as to turn these very limits into the *a priori* form of the objects of knowledge (second orientation).

11. Conversely, in a quest for knowledge, the epistemic attitudes predetermine the choice of a metaphysics. For instance, adopting an objectifying epistemic attitude prevents us from deviating from the standard object-oriented ontology of scientific research or technological activity (Harman 2018). From that standpoint, the currently dominant monistic physicalist metaphysics just appears as the shadow cast by a goal-oriented objectifying attitude of research. It is tantamount to endowing with ontological exclusivity the targets of the “tensed interest” of what Edmund Husserl (1980) called

our “natural attitude.”<sup>1</sup> If what is deemed to exist is none other than the object-like targets that we can extract and stabilize out of the flow of our lived experience, then one is irresistibly led to think that this very experience must be a byproduct (or an epiphenomenon) of some such objects.

12. Yet, even a little dose of skepticism is enough to become cautious about ontologies of objects of scientific study, as well as of objects of everyday life. The ontological status of the objects of everyday life is challenged by modern physics. It suffices to think of Arthur Eddington’s allegory of the two tables (Eddington 1928: IX).<sup>2</sup> As for the ontological status of the objects of scientific studies, it is challenged by past, present and future scientific advances. It suffices to think of Larry Laudan’s list of obsolete objects in science (Laudan 1981). Furthermore, the ontological status of both types of objects is undermined by most trends in contemporary cognitive science. The cognitivist view of the act of knowing as an influx of information generates Hilary Putnam’s brain-in-a-vat skeptical thought-experiment. As for the enactive view, it construes objects as mere meaningful focal points of the embodied experience of an active cognizant subject co-emerging with its cognized environment.<sup>3</sup> Several contemporary conceptions of the cognitive process thus deeply challenge direct ontic interpretations of manifest objects (Hoffman 2019).

13. When this multifarious doubt is fully taken into account, one is bound to retreat to a post-cartesian phenomenological attitude, according to which:

- the only domain of “apodictic certainty,” of which any claim of inexistence would be performatively contradictory, is the domain of “pure conscious life” (Husserl 1960: §8);
- by contrast, “all positions taken towards the already-given objective world” must be “deprived of acceptance,” or “inhibited” (Husserl 1960: §8). The worlds of science and everyday life are then downgraded to the rank of mere phenomena that “claim being” (ibid), whereas “pure conscious life” is raised to the rank of “the whole of absolute being” (Husserl 1980: §51).

14. This complete reversal of the ontological hierarchy is usually dismissed as a variety of idealism. Husserl somehow endorsed such characterization of his philosophy as

---

<sup>1</sup> According to Husserl (1980: §1), our “natural attitude” is a pre-philosophical view in which the existence of a world of objects, those objects in which we are interested for practical reasons, is taken for granted. As for the “tensed interest”, it is another name of Husserl’s famous “intentionality”, or “intentional directedness” (Husserl 1980: §36): the fact for an act of consciousness to be directed towards some perceptive or imaginative object.

<sup>2</sup> “[My first, common-sense, table] has extension; it is comparatively permanent; it is colored; above all it is *substantial*. [...] My scientific table is mostly emptiness.”

<sup>3</sup> This is the case, at least, in the original formulation of the enactive view by Varela, Thompson & Rosch (1991). Alternative formulations of enactivism are assessed in Vörös, Froese & Riegler (2016).

“idealist,” but he gave the latter word a performative rather than doctrinal acceptance. His

“idealism is not a metaphysical substraction [...] but the only possible and absolute truth of an *ego* ... recollecting itself on its own doing and its own ability to give meaning.” (Husserl 2007: 48)

Dogmatic idealism can be seen as a reification of this performative idealism. It arises when one reifies the phenomenological activity that consists of “recollecting” on one’s own conscious life and identifying the lived roots of one’s “natural” beliefs, into something like a soul. In the same way as monistic physicalism is a deceitful metaphysical counterpart of a goal-oriented practice of techno-scientific research, dogmatic idealism is a deceitful metaphysical counterpart of the practice of phenomenological *epochè*.

15. Beyond the extremes of monistic physicalism and dogmatic idealism, one may wonder about the attitudes that lend plausibility to two intermediate positions: (i) neutral monism, and (ii) either substance dualism (the Cartesian doctrine of the duality of *res extensa* and *res cogitans*), or property dualism (the doctrine that things have both *physical* and *phenomenal* properties (Chalmers 2003).

## From dualist and monist ontologies to “intra-ontology”

16. Dualism, from René Descartes to David Chalmers, arises from a kind of flickering between the phenomenological and “natural” attitudes, associated with a fake ontologization of the phenomenological domain. After a phenomenological first step (the incontrovertible presence of the *cogito* in Descartes, or the felt “intimacy” of experience in Chalmers 1995), dualists tend to convert this starting point into a new object or property in its own right. The first-person *cogito* is thus spuriously converted into the third-person *res cogitans*, and lived experience as a precondition of any ontology is spuriously converted into an additional component of a physicalist ontology. Panpsychism and pan-experientialism, in which elementary psychism or fleeting experience is taken as a further fundamental property of physical objects, usually fall into the same trap (Bitbol 2018).

17. Neutral monism, associated with double-aspect theories or psycho-physical parallelism, is a way to avoid the flickering of dualism between the phenomenological and “natural” attitudes, yet taking both of them seriously. This approach however requires to adopt a “God’s eye viewpoint” located somewhere above both *psychè* and *physis*. Once this is done, the two archetypal attitudes are seen as two complementary approaches to one and the same reality posited “out there,” be it Baruch Spinoza’s Substance *causa sui*, or Mach’s complex of “elements” (sensations).

18. A partial correction of the static character of a “God’s eye viewpoint,” that nevertheless retains the main advantages of neutral monist doctrines, can be reached by imposing a permanent circulation between the two attitudes, reaching one by way of the

other and conversely. This dynamical process can be illustrated as an “Uroboros of consciousness” (Vörös 2014): a naturalization of phenomenology that presupposes a phenomenologization of nature (Thompson 2010; Schewel 2013), and a continuous intellectual process in which one move serves as a preparation for the other. As Bertrand Russell (1986: 131) would have it: “Men will urge that the mind is dependent upon the brain, or, with equal plausibility, that the brain is dependent upon the mind.” In Husserlian terms, consciousness is correlationally dependent upon the brain within a naturalistic framework, but the brain (as an object of perception and active handling) is *constitutively* dependent upon consciousness within a phenomenological framework. Conscious experiences correlate with brain events, but the brain *qua* object is *constituted* out of a carefully selected set of conscious experiences.

19. Such dynamical version of neutral monism was illustrated by Raymond Ruyer’s “cosmic consciousness” (Ruyer 1974) and by Max Velmans’s “reflexive monism” (Velmans 2009). Ruyer’s and Velmans’s universe has neither inside nor outside. Its outside is projected by its inside, whereas its inside is immersed within its outside. Spatio-temporal expanse, and the objects within it, are actively constituted by the subject’s consciousness, whereas the subject *qua* living body is immersed in space-time. Thus, according to Velmans (2008):

“While remaining embedded within and dependent on the surrounding universe and composed of the same fundamental stuff, each human, equipped with perceptual and cognitive systems has an individual perspective on, or view of, both the rest of the universe and him or her-self.”

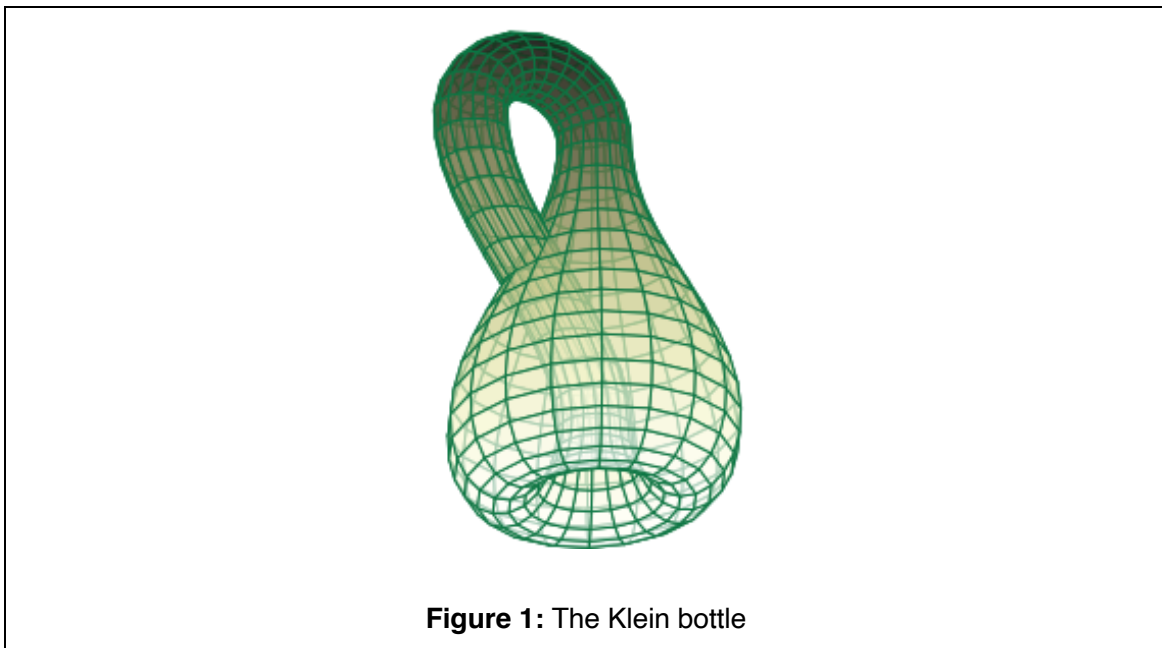
20. However, the problem of those neutral monisms, both in their static and dynamic versions, is that they posit a false symmetry between consciousness and its objects. This symmetry is false because it is a purely intellectual construct, in which the constituted bodily objects and the constituting embodied consciousness are formally put on a par with one another. But whenever intellectual constructs are perceived as such, and one starts to become aware of the lived background of the process of construction, the symmetry is lost. One then understands that the only coherent strategy is to dwell continuously within the lived process of constitution of an objective domain by concrete present consciousness, instead of just *simulating* the constitutive dependence of manifest objects on an abstractly conceived consciousness (as dynamical neutral monisms do). We are thus drawn back to a phenomenological form of performative idealism, after a detour through reflexive monism. This should not be a surprise since even reflexive monism arose from a phenomenological insight: “what I normally thought of as the ‘physical world’ ... and my ‘experience of the world’ were one and the same!” (Velmans 2008).

21. According to Eugen Fink (1994: 120), “(phenomenology) simply claims that *Being is identical with the phenomenon.*” One may be reluctant to adopt such an uncompromising phenomenological ontology. But one can hardly deny that the *de facto* basis for any ascription of being is the phenomenon, since claiming that something *is* necessarily arises from evidence presented in our embodied lived experience. In order to take this *de facto* experiential basis seriously, without adopting a *de jure*

phenomenological ontology, and without falling back into a dubious naturalistic ontology either, a lucid alternative option was proposed by Maurice Merleau-Ponty. It consists in an ontology that retains absolutely nothing of the standard identification of beings with objects; an immersive ontology instead of an ontology for a distant gaze. Merleau-Ponty called it an “intra-ontology” : a discipline of *what it is like to be*, rather than a discipline of the contemplation of beings (Barbaras 1993). Intra-ontology considers the phenomenon as a self-revelation of Being, or as an effect of the self-splitting of the “flesh” out of which appearing appears (according to the scheme of intentionality), rather than the superficial manifestation of beings that supposedly exist beyond appearance.

## The Klein Bottle model of mind-body

22. To clarify this discussion about some doctrines of consciousness, a good option is to develop the geometrical model (or allegory) of the Klein bottle (Figure 1). Three strategies can be used to describe such unusual bottle: external, hybrid, and internal. They closely correspond to three of the most promising approaches to the problem of consciousness among those we have just discussed. Respectively: (i) neutral monism, (ii) reflexive monism, and (iii) phenomenology.



23. Along with the external strategy, one just stares at the bottle from a distance and describe its shape. By such description, one discloses what we may call the “objective topology” of the bottle. Here, the inner volume arises as a consequence of its delimitation by the surface of the bottle, and yet the outer surface of the bottle is in continuity with its inner surface. This picture is indeed analogous to neutral monism, if we identify the bottle with the neutral “substance,” its inner concave surface with consciousness, and its outer convex surface with the body. A concise statement of a similar analogy was given by George Henry Lewes (1874: 112): “(We) do not see that every mental phenomenon has its corresponding neural phenomenon (*the two being as the convex and concave surfaces of the same sphere, distinguishable yet identical*)”



24. The hybrid strategy amounts to considering an *ant* walking on the surface of the bottle, and then describing from a distance its surprising path that goes from the inside to the outside of the bottle without changing direction. This is analogous to reflexive monism, that starts from a first-person standpoint, and then cogently describes the circulation between the first-person and the third-person standpoints as if from a distinct meta-standpoint.

25. Finally, according to the internal strategy, one describes the path and tactile experiences of the surface-*ant* exclusively from its own first-person standpoint, and then reconstruct a topology (let us call it the “subjective topology”) by unfolding step after step of its report.

26. One is likely to discover that the “subjective topology” is isomorphic to the “objective topology” of the bottle; yet it would be misleading to take the “subjective topology” as an insider view of the “objective topology.” Here, indeed, it may well be the case that there is no objective nature of the “bottle,” except what is reconstructed from the subjective standpoint. Just as there is no outside of the universe, except what is tentatively imagined by its insiders. And just as there is nothing outside present experience, except what can be reconstructed from its memorized, perceptive, imaginative, and intellectual components.

## On the metaphysical status of neurophenomenology

27. What about the status of neurophenomenology? How should this discipline be located in the system of metaphysical coordinates we have just drawn?

Neurophenomenology has sometimes been seen as an extended variety of naturalism, due to its association with a project of “naturalizing phenomenology” (Petitot et al. 1999). However, Varela’s way of naturalizing phenomenology is by no means tantamount to “reducing” lived experience to a property of natural objects, but rather to broadening the concept of nature so as to accommodate in it the primal status of lived experience. This goes beyond property dualism or pan-experientialism (Nixon 2010), that remain embedded within the standard concept of nature and just make room for experience as if it were some additional ingredient of it.

28. Alternatively, neurophenomenology has also been taken as a variety of dualism (or as something similar to reflexive monism), due to its method of establishing reciprocal “mutual constraints” between first-person and third-person reports. But this metaphysical characterization of neurophenomenology is just as misleading as the former ones (Bitbol 2012). The claim that neurophenomenology is just a variety of dualism arises from a reification of its dual method. And the possible claim that neurophenomenology is just a variety of reflexive monism would be too “hybrid” to account for Varela’s unambiguously phenomenological stance.

29. So, the only adequate characterization of neurophenomenology is to take it as a variety of phenomenology of embodiment. Renaming it “Phenoneurology,” as I

proposed (Bitbol 2017), may serve as a verbal reminder of this prioritization of phenomenology. Only then can one make sense of Varela's insistence on a systematic discipline of phenomenological reduction as a preliminary step in the practice of neurophenomenology (Varela 1996); only then can one understand his claim that the phenomenological reduction brings us back to a region of experience where no substantial distinction is to be made between subject and object, between a subjective knower and a known objectified nature.

30. After all, even the famous neurophenomenological "mutual constraints" are established between two "phenomenal domains" (Varela 1996):

- a selected domain of objectified phenomena (that includes neurobiological phenomena); and
- a broader domain of immediately lived, unfabricated phenomena.

31. Embodied lived experience is the unique phenomenal field in which, and from which, every variety of knowledge is assessed; both objectifying knowledge and participative knowledge are assessed in it and from it.

32. It therefore appears that neurophenomenology belongs to the class of "internal strategies" for addressing the problem of consciousness. In good agreement with Merleau-Ponty's "intra-ontology," neurophenomenology stems from becoming clearly aware of the primacy of lived experience and of its embodied character.

Neurophenomenology fully develops the kind of knowledge that can be drawn from clear awareness of *one's experience of the flesh*.

33. In the latter expression "awareness of one's experience of the flesh," "of" has two grammatical statuses: objective and subjective genitive. It may indicate the flesh *qua* experienced, and/or the experiencing flesh. Here, far from being a marginal fragment of an objective world, the flesh is taken as the locus and origin of the process of objectification. It triggers objectification by way of its characteristic inner split or "dehiscence" between the seeing-hearing-feeling and the seen-heard-felt (Merleau-Ponty 1963).

34. Then, to remain faithful to the spirit of neurophenomenology as it has just been stated, what we have to build is a metaphysical account of the relation between conscious experience and the living body that *starts from lived experience and links back to it*. Its pattern should be uroboros-like, or, even better, Klein bottle-like, yet entirely unfolding from within lived experience.

## Two objections against phenomenology

35. Before we develop this kind of metaphysical account, however, we must consider two standard objections against its thoroughly phenomenological stance (Holenstein 2014).

36. According to the first objection, naturalism is a research program that purports to explain every phenomenon on the basis of the laws and objects of the natural sciences. Its open-ended character seemingly makes it immune from impossibility clauses concerning the explanation of any particular phenomenon, including consciousness. By contrast, the objection continues, phenomenological accounts of science look far-fetched and elusive.

37. According to the second objection, naturalism makes a consistent and exclusive use of its own ontological categories, whereas phenomenologists are often forced to borrow from naturalistic categories (especially when they address the issues of everyday life and scientific research).

38. It is quite easy to address these two objections. To start with, consciousness is no particular phenomenon; it is the very phenomenality that is presupposed by any phenomenon whatsoever. Consciousness is no objective feature of the world either. Then, the open-endedness of the naturalistic research program is *in principle* irrelevant to it. Indeed, this program only bears on an objective domain of inquiry; and it automatically leaves aside the experiential, pre-objective, condition of any such inquiry. No amount of scientific effort can recover what has been lost as a result of the very decision to enact objectification for the sake of founding science.

39. Moreover, scientific naturalism has proved to be an epistemological dead-end in many circumstances where scientists are actors and participants of their research, rather than detached observers. This is trivially the case in the science of consciousness, since here the “object” of research is identical to its subject. But this is also the case, to a lesser extent, in the most fundamental theory of modern physics, namely Quantum Mechanics. Indeed, the variables involved in this theory are insuperably contextual, and they cannot therefore be detached from the experimental conditions of their assessment.

40. Quantum Mechanics looks full of paradoxes and enigmas when one interprets it as an incomplete and cryptic description of some independent reality out there. And many of these so-called paradoxes still resist after one century of effort. But as soon as one accepts that Quantum Mechanics is nothing more than a general method for predicting experimental and technological phenomena that are co-produced by our own activity, every such “paradox” is easily disposed of (Bitbol 1998; Peres 1995; Fuchs & Schack 2015; Healey 2017). It then turns out that instead of being far-fetched, a reflective account of science, be it pragmatist, neo-kantian or phenomenological, is exceptionally clarifying and fruitful (Bitbol, Kerzberg & Petitot 2009). It is our best epistemological research program for the next future.

41. Now about the second objection. I agree that phenomenologists cannot dispense with naturalistic words and categories, not only in normal social interaction, but also when they try to express their highly elaborated views. However, this is not due to some transient imperfection of the phenomenological approach, but to a constitutive feature of language. Language is used to “mean” or to “refer to” something. In other terms, it is used to alter attention, from openness to focusing. It is also used to displace attention from the immediate experience of uttered sounds and written marks to some object or

situation that is or will be accessible by perception, imagination or intellection. Communicating an episode of lived experience by means of language then raises a fundamental problem, because this requires to reflect attention towards its very source, instead of displacing it far from such source. Fortunately, this difficult task is not entirely impossible to perform. The normal strategy for that sake consists in using ordinary language enriched by “folk-psychological” vocabulary, and then deflecting it from its standard use by way of evocative metaphors and backward-directed gestures. When others feel that they have recognized a similar lived episode in themselves, by just listening to our metaphors and guessing the intent of our gestures, the intersubjective understanding can be considered a success. This standard strategy of using the naturalistic subject-to-object lexicon as an oblique tool to enable an experiential subject-to-subject communication, is then amplified and systematized by phenomenology (Findlay 1948).

## A “cybernetic dialectic” of body and consciousness

42. The two former objections being overcome, it is time to sketch the metaphysical account of the relation between conscious experience and the living body that best fits neurophenomenology. This metaphysical account has one feature in common with neutral monism: its monistic ontology and ternary structure (mind, matter and their unique source). It has also one feature in common with reflexive monism: the dynamical character of the relation between the three poles of neutral monism. Last but not least, it has one essential feature in common with Merleau-Ponty’s phenomenology, in so far as it implies a unified intra-ontology of lived embodiment.

43. But how can we reconcile a ternary structure, a dual access, and a radical monism of embodied experience? By using a conceptual resource that was developed at the very beginning of the research that led Varela to neurophenomenology: the idea of a dynamics that produces its own apparent target by a process of self-transcendence (Dupuy 2017). This general idea takes the particular form of a “cybernetic dialectic,” aimed at overcoming prevalent conceptual dualities by changing the very logical framework from which they are derived. It is expressed by what Varela called *star-statements* that “tell us *how* to go from duality to trinity” (Varela 1976: 62).

44. Star-statements display a possibility to move from the two opposite poles of a duality to a broader third framework where these poles are seen as complementary parts of a single process. Formally, they write: “Trinity=the it/the process leading to it.” Dynamically, a Whole (“it”) breaks down into its parts, whose pattern determines the processes whose integration yields the Whole. In other terms, higher and lower levels of organization (the Whole and its parts) are completely entangled in a virtuous circle. Indeed, one element of the pair (the “it,” the Whole) emerges from the other (the process); and yet, retroactively, the “it” guides the process thereby determining their dynamical unity.

45. We come closer to the problem of consciousness if we consider the way Varela applied his “cybernetic dialectic” to the mind-body problem. According to the physicalist prejudice, the mind is just a byproduct of bodily processes ruled by physical laws. But, according to the new dialectical framework, mind and body are two complementary levels of organization tangled into a unique dynamics. Let’s see how this works within the framework of the “cybernetic dialectic.” In this latter framework, the mind is *prima facie* a “conversational pattern” emerging from “processors.” These processors are not restricted to the parts of an individual living body (let alone of an individual brain). They rather include a multiplicity of bodies with intersubjective mutual relations. However, unlike the biased ontological hierarchy maintained by physicalism, the new dialectic maintains a strict balance between the levels of organization. That the mind emerges as a conversational pattern determined by the bodily processors, cannot be separated from its reciprocal: that the workings of the bodily processors is guided by the emerging mind. The two levels cannot be separated either from the dynamical unity of emergence and guidance that holds the role of a third term.

46. Yet, such tangled dialectics of mind and body remains a purely intellectual device. In it, even experience can be defined “objectively,” as “the subject side of the computations in a conversational pattern” (Varela 1976: 67). The problem is that the latter intellectual definition completely misses the phenomenological order of priorities.

47. Varela immediately compensated for this serious defect of his early conception of the mind, by adding two things:

- a. that the intellect is embedded within experience; and
- b. that experience is identical to *Being* (“by ‘Being’ I mean ... the same as experience”).

48. Point (a) is a phenomenological testimony of the obvious point that even logical forms and truth assessments are given *qua* experiences, and acquire meaning through experience. As for point (b), it can be read as a clear statement of a phenomenological ontology, or even perhaps as a cryptic adumbration of a phenomenological intra-ontology of embodied experience.

## An intra-ontological conception of knowledge

49. Now, an intra-ontology of embodiment has momentous implications for how we conceive knowledge. In the framework of a standard ontology, we strive to acquire knowledge about what is given out there, and this non-committal knowledge can be encoded intellectually. But in the framework of an intra-ontology, non-committal knowledge appears as a non-sense. According to a Merleau-Pontian phenomenologist, knowledge affects the two sides that arise from the self-splitting of what there is (namely of embodied experience). In other terms, knowledge of something arises concomitantly with a mutation of ourselves *qua* knowers. And this mutation of ourselves *qua* knowers manifests as a mutation of (our) experience that cannot be

encoded intellectually, since the very processes and conclusions of the intellect depend on it.

50. Such intra-ontological pattern of knowledge is universal. It may look superfluous or contrived in the field of a classical science of nature, where the objectification of a limited set of appearances is so complete that everything happens as if the objects of knowledge were completely separate from the act of knowing. But it becomes unavoidable in many other situations where this separation is in principle unattainable, such as the human sciences or quantum mechanics (Devereux 1967; Busemeyer & Bruza 2014).

51. This is why Varela considered that a purely intellectual operation (“a change in our understanding” *about* some object) is not enough to solve the mind-body problem, and even less the “hard problem” of the origin of phenomenal consciousness, namely of lived experience. For these problems are archetypal cases in which the inseparability between subject and object of knowledge is impossible to ignore. What is needed to overcome them, according to the lesson of the intra-ontological view of knowledge, is nothing less than “a change in experience (being)” (Varela 1976: 67). Addressing properly the problem of lived experience is tantamount to undergo a change in experience.

52. In some sense, this is almost obvious. After all, experience is not one node in an intellectual graph among other nodes; it is not one box in a functionalist diagram among other boxes. Experience is the lived origin and byproduct of any process, including the intellectual process. Experience is all that there is at this very moment when I am writing and you are reading. Indeed, experience is the lived background of the very intellectual inference that there is something beyond experience. Every problem then has to be struggled with and hopefully given a solution within experience. But since the problem of experience itself cannot be confined to a part of that experience, then, to address it properly, there is no other option than to involve the whole of it in a global mutation.

53. This confirms that in order to reconcile a ternary structure, a dual access, and a radical monism of experience, using the intellectual device of a “cybernetic dialectic” is not enough. What we must do is to apply this dialectic from within lived experience, and let the whole tangled hierarchy of consciousness, body, and their unity arise from experience itself, in good agreement with the “internal strategy” of phenomenology. But how can we do this?

## A “cybernetic dialectic” of constitution and emergence

54. As a preliminary move, let’s develop a non-standard star-statement that has lived experience as an origin. Lived experience (the Whole) breaks down into stabilized focal spots of attention (the parts, the objects), that in turn guide processes (the object’s

conversational patterns) whose integration within certain clusters (living bodies and brains) is said to yield the Whole (lived experience).

55. The first step of this star-statement is known as “the constitution of objects” in phenomenology and in Kant’s epistemology. It illustrates Husserl’s celebrated claim that pure consciousness is able to project transcendence from within its own immanent domain. The second step states the law-like behavior of objects (according to the very categories that allow objectification in Kant’s sense). And the third step is usually called “emergence,” a beautiful word with an essentially negative meaning: that there is no way to predict *a priori* that the Whole will occur from the mere knowledge of the parts and their dynamical relations<sup>4</sup>.

56. Of course, the mystery is still there. How can it be that a process involving parts of experience eventually yields back this very same experience? Things become a little less mysterious when one makes a distinction between the *presence* of lived experience and its mental or perceptual *structure*. Focal spots of attention are picked out and stabilized around stable poles of identity (objects), within present experience. By contrast, what can be derived from a “conversational” process involving some of these objects (living bodies and brains) is by no means this present experience itself, but an account of the space-time *structure* of what is experienced.

57. To inquire further into the tangled hierarchy of experience, its objects, and its “emergence,” we must go beyond structure towards dynamics. More precisely, we must describe the connection between object-centered and subject-centered dynamics. Indeed, as Renaud Barbaras (2016) pointed out, *motion* is the central axis of the two sides of the self-splitting of *what there is*, namely the object side and the subject side.

58. Motion takes two different forms according to which side is concerned by it. Object-centered motion transports a body from one point to another, after some clock-time has elapsed. By contrast, subject-centered motion makes appear that towards which it is moving; it illuminates its path by running through it (Barbaras 2016); and it generates time by linking memory, expectation (associated with desire), and assessments of simultaneity by clock-readings (Bergson 1889). Subject-centered motion also sets the stage for what we call “space.” It does so by way of a general coordination of the group of displacements (Poincaré 1902; Piaget 1973).

59. This being granted, how does the subject/object self-splitting of *what there is* work? How is the transcendence of objects generated within the immanence of lived experience in flux, and opposed to a subject-observer? By the following procedure, that was carefully described by Husserl (1970).

---

<sup>4</sup> An alternative approach of emergence was provided by Bedau (2002: 10). His thesis is called “weak emergence,” the view according to which “the system’s global behavior derives just from the operation of micro-level processes, but that the micro-level interactions are interwoven in such a complicated network that the global behavior has no simple explanation.” See also Bedau (2008).

60. The flow of experience is attentionally focused on certain spots that have two crucial features:

- they are connected to a memorized series of similar experiences continuously linked to one another, and
- they open up onto a “system of radiating expectations.”

61. The flow of experience is then interpreted as a sequence of aspects of one and the same thing, each moment of the sequence being indefinitely open to anticipated or unanticipated future aspects of “this” thing. The firmness of the thing, its being perceived as “substantial,” arises from its association with a series of law-like interconnected past appearances, and on the ascription of permanence that this interconnection allows. As for the “transcendence” of this thing (its being considered as autonomously existent), it arises from the openness of the system of expectations, from the insight that expectations could be disappointed by forthcoming perceptions. By contrast with such concept of an enduring thing that moves according to certain laws, the residual unruly (perspectival) changes in experience are taken to be “purely subjective.”

62. Among these things, some of them have an exceptional status. Their object-centered space time dynamics are strictly correlated with subject-centered dynamics of reminding, willing and desiring. These exceptional “things” are our *own bodies*. They are accordingly endowed with a striking reversibility: being seen and seeing, touched and touching, heard and hearing, etc.

63. Does this strict correlation prove that the object-centered dynamics of our body *causes* the subject-centered dynamics of our lived experience? Such conclusion would only arise in the framework of a physicalist ontology, that mistakes immanent projections of transcendence, for real entities and intrinsic causal factors. The obvious incorrectness of this inversion of the hierarchy of the given, manifests itself through the stubborn hardness of the “hard problem.”

64. By contrast, in the framework of a standard phenomenological ontology, the said correlation just remains an uninterpreted basic feature of the continuum of appearances. Here, the correlation is understood as a mirror-like correspondence between the structure of experience as a whole, and the structure of some of its objectified elements (e.g., the manifold appearances ascribed to the cerebral cortex). Since the latter objectified items are *constituted* by linking back present experience with memorized experiences through laws, the correlation itself remains entirely internal to experience. No difficulty, no “hard problem” of causation between highly heterogeneous entities (such as material brain and immaterial consciousness), is generated by this flatly phenomenological account. But it has a major drawback: being purely descriptive, it does not fulfil the need for standard *explanations*.



# Beyond “explanation”: How to *live* with the neuro-experiential correlation

65. We can appease this urge for explanation to a certain extent by going deeper in Merleau-Ponty’s intra-ontological framework. In his earliest study of embodiment, Merleau-Ponty (1990, 234) pointed out that, from a phenomenological perspective, the brain processes are nothing more than perceptual or conceptual “logical meanings” within the lived experience of their observers. By this act of projecting “meanings,” by the intentional distension it undergoes, lived experience moves away from itself towards the meant item, and it self-splits thus. Merleau-Ponty nevertheless insists that there remains a permanent relation between experience and its meant items. A pattern that is given to me as my *lived experience* can also be given to a spectator of my brain cortex as a *logical meaning* of her own experience. Similarly, a pattern that is given to me *now* as my lived experience, will be given to myself *a little later* as a logical meaning of my future experience, provided I use a device of functional imaging to observe the pattern of my own brain processes.

66. Here, the neuro-experiential correlation is seen as an expression of the unity of embodied experience and the internal rules of its self-splitting.

67. The dialectic between (a) dwelling in actuality, and (b) seeking something beyond actuality by *logical meaning*, is then precisely what should enable us to appease the need for explanations. But how can this be done? By going back to the very source of “explaining.”

68. Remind that meaning is an invitation to seek and to act. One acts to reach or to change the signified object. When one can successfully predict the outcome of this activity, and when the rules of prediction have been formalized into (apparently) autonomous laws of phenomena, it is usually said that an “explanation” of phenomena has been provided.

69. In classical physics and in some related areas of knowledge, the phenomena to be predicted can be treated as if they were occurring spontaneously in nature. Accordingly, the connecting law between phenomena behaves as if it were autonomous. This is why explanations in the ordinary deductive-nomological sense are readily available in classical physics.

70. Yet, there are other cases where, although phenomena are correctly predicted to a certain extent, they are strongly intermingled with the very activity of producing them. These are cases where knowledge implies a high level of participancy. And in these cases, “explanation” must be understood otherwise.

71. An intermediate situation is quantum mechanics. In quantum mechanics, there are *no autonomous laws governing the relations between successive phenomena*, because phenomena are somehow dependent on the (experimental) activity of bringing them out. The only quantum laws are *laws of the probabilistic prediction* of those phenomena

whose circumstances of detection of are also conditions of their production (Bitbol 2014). These laws are autonomous, but they rule the time-evolution of mathematical symbols from which probabilities of phenomena can be derived (the so-called state vectors), not directly the phenomena themselves. The archetype of such laws of probabilistic prediction is the Schrödinger equation.

72. But then, how can one derive explanations from quantum mechanics? According to Richard Healey (2017: 138), this can easily be done provided the concept of explanation is appropriately redefined. Quantum mechanics can be said to *explain* phenomena for three reasons.

- Quantum mechanics shows that certain phenomena should be *expected*, even before the relevant experiments are performed.
- Quantum mechanics completely *specifies* the technological conditions under which these phenomena are to be expected.
- Quantum mechanics thereby *unifies* a variety of phenomena that look dissimilar.

73. Self-knowledge implies an even higher level of participancy. In this case, it is obvious that predictions cannot be made entirely autonomous with respect to the activity of the predictor. Acting and predicting here do not lead to any formal invariant residue that can be called a “law”; not even a law that governs the evolution of probabilistic predictors.

74. As a consequence, there is no possibility of “explaining” the neuro-experiential correlation in the standard sense of considering it as an expression of some autonomous law-like succession. One can consider it neither as an expression of a physical law nor as an expression of a psycho-physical law (as advocated by Chalmers). Indeed, one cannot predict the neural correlate of a type experience *a priori*, before the conditions of this type of experience have ever been observed. Therefore, not even quantum-like explanations of experiences are available.

75. If one can still “explain” the neuro-experiential correlation, it is then only in a third sense, neither deductive-nomological, nor quantum-like.

76. One can “explain” the neuro-experiential correlation in the etymological sense of *un-folding*, in us, the new possibilities of perceiving and acting that this correlation opens to us. The neuro-experiential correlation thus unfolds new possibilities of self-knowledge and self-transformation by neurofeedback. The neuro-experiential correlation also unfolds a program tending towards its own continuous refinement. Indeed, by working on the “generative mutual constraints” of neurophenomenology, one can make the correlations between the two types of phenomena increasingly detailed and precise.

77. This alternative meaning of “explanation” is in close agreement with Merleau-Ponty’s program of an *intra-ontology*. In the framework of an intra-ontology, explaining can no longer mean encapsulating phenomena within a rule of succession that is posited once and for all, and then considering the phenomena and their law from

a distance. Instead, explaining here means participating in both the production and the prediction of phenomena, and disciplining them. Explaining here means becoming an informed actor in the connection between the two types of phenomena (as it is the case in neuro-feedback), rather than a spectator of their regularity. Self-orientation in the making here replaces ready-made formulas. Dynamic self-expounding replaces static law-like explanation of oneself.

## Conclusion

78. According to Varela, one can find no theoretical solution to the hard problem of the physical origin consciousness; but there is a pre-theoretical, methodological, remedy to it. Varela then proposed a path of self-transformation that would end up into a dissolution of the problem; he sought a state of being in which we immediately *see* that the “hard problem of consciousness” is just a fake enigma fabricated by our naturalistic prejudice.

79. Although this is the deepest possible approach of the hard problem, its complete suspension of the quest for a metaphysical explanation of the relationship between consciousness and nature may be perceived as a limitation or a lacuna. It has been an obstacle to the dissemination and appreciation of neurophenomenology amongst the philosophers of mind who try to elaborate a metaphysics of mind and consciousness.

80. This is why, in this paper, I accepted the challenge. I attempted to formulate a metaphysical counterpart to an approach of the hard problem that aims at bypassing metaphysical views of how consciousness fits with nature, and that rather invites us to dwell consciously in nature. This attempt had to satisfy a crucial constraint. It had to be faithful to the purely descriptive status of phenomenology, and to the purely pragmatic status of neurophenomenology, and yet retain some features of an “explanation” of consciousness. As a result, my quasi-metaphysical proposal has some features in common with neutral monism and reflexive monism, but it parts company with these views insofar as it arises from a purely first-person phenomenological standpoint. It appeals to a cybernetic dialectic of constitution and emergence: constitution of brains and bodies as objects of consciousness, and emergence of consciousness from brains and bodies. But it endows this dialectic with an exclusively phenomenological meaning by way of Merleau-Ponty’s non-conventional (intra-) ontology.

81. From this strengthened phenomenological standpoint, there is no question of theorizing about the neuro-experiential correlation but of metabolizing it, of bringing it into a circular chain of resonance and continuous research. There is no question of us opposing nature, facing it and carrying out a task of *mimesis*, but rather accepting our own condition of being-nature and letting the (neurophenomenological) research grow as one of the many forms of this nature of which we partake. Practicing neurophenomenology in this sense is a way to accept that “Being is not in front of us, but behind us” (Merleau-Ponty 1995), or, even better, that Being is woven of us and with us. Thus, practicing neurophenomenology is not just an evasion from ontology. It is a living effort to braid the inner knot of Being so as to reveal itself to itself.

# References

- Barbaras R. (1993) *De l'être du phénomène*. Jérôme Millon, Grenoble.
- Barbaras R. (2016) *Le désir et le monde*. Hermann, Paris.
- Bayne T. J. (2004) Closing the gap: Some questions for neurophenomenology. *Phenomenology and the Cognitive Sciences* 3: 349–64. <https://cepa.info/2260>
- Bedau M. (2002) Downward causation and the autonomy of weak emergence. *Principia* 6: 5–50.
- Bedau M. (2008) Is weak emergence just in the mind? *Minds and Machines*. 18(4): 443–459.
- Bergson H. (1889) *Essai sur les données immédiates de la conscience*. Félix Alcan, Paris.
- Bitbol M. (1998) Some steps towards a transcendental deduction of quantum mechanics. *Philosophia Naturalis* 35: 253–280. <https://cepa.info/3658>
- Bitbol M. (2008) Is consciousness primary? *NeuroQuantology* 6(1): 53–72. <https://cepa.info/2261>
- Bitbol M. (2012) Neurophenomenology, an ongoing practice of/in consciousness. *Constructivist Foundations* 7(3): 165–173. <https://constructivist.info/7/3/165>
- Bitbol M. (2014) Quantum mechanics as generalized theory of probability. *Collapse* 8: 87–121.
- Bitbol M. (2017) Phenoneurology. *Constructivist Foundations* 12(2): 112–115. <https://constructivist.info/12/2/150>
- Bitbol M. (2018) Beyond panpsychism: The radicality of phenomenology. In: Menon S. Nagaraj N. & Binoy V. (eds.) *Self, culture and consciousness*. Springer Nature, Singapore: 337–356.
- Bitbol M. & Antonova E. (2016) On the too often overlooked radicality of neurophenomenology. *Constructivist Foundations* 11(2): 359–361. <https://constructivist.info/11/2/354>
- Bitbol M., Kerzberg P. & Petitot J. (eds.) (2009) *Constituting objectivity*. Springer, Berlin.
- Busemeyer J. & Bruza P. (2014) *Quantum models of cognition and decision*. Cambridge University Press, Cambridge.
- Chalmers D. (1995) Facing up to the problem of consciousness. *Journal of Consciousness Studies* 2: 200–219.
- Chalmers D. (2003) Consciousness and its place in nature. In: Stich S. & Warfield T. (eds.) *Blackwell guide to philosophy of mind*. Blackwell, Oxford: 102–142.
- Devereux G. (1967) *From anxiety to method*. Mouton & Co, Paris.
- Dupuy J. -P. (2017) Ni un ni deux (introduction) In: Varela F. J., *Le cercle créateur: Écrits (1976–2001)*. Seuil, Paris: 73–78.

- Eddington A. (1928) *The nature of the physical world*. Dent, London.
- Fink E. (1994) *Proximité et distance*. Jérôme Millon, Grenoble.
- Fuchs C. & Schack R. (2015) QBism and the Greeks: Why a quantum state does not represent an element of physical reality. *Physica Scripta* 90: 015104.
- Harman G. (2018) *Object-oriented ontology*. Pelican Books, London.
- Healey R. (2017) *The quantum revolution in philosophy*. Oxford University Press, Oxford.
- Hoffman D. (2019) *The case against reality: How evolution hid the truth from our eyes*. Allen Lane, London.
- Holenstein E. (2014) *Categorical pluralism: Naturalizing phenomenology and phenomenologizing natural science*. *Metodo, International Studies in Phenomenology and Philosophy* 2: 251–270.
- Husserl E. (1960) *Cartesian Meditations*. Kluwer, Dordrecht. German original published in 1929.
- Husserl E. (1970) *Expérience et jugement*. Presses Universitaires de France, Paris. German original published in 1938.
- Husserl E. (1980) *Ideas pertaining to a pure phenomenology*. Martinus Nijhoff, Amsterdam. German original published in 1913.
- Husserl E. (2007) *De la réduction phénoménologique*. Jérôme Millon, Grenoble. German original published in 2002.
- Kant I. (1900) *Dreams of a spirit-seer*. Swan Sonnenschein & Co, New York. German original published in 1766.
- Lachaux J. -P. (2011) If no control, then what? Making sense of “neural noise” in human brain mapping experiments using first-person reports. *Journal of Consciousness Studies* 18: 162–166.
- Laudan L. (1981) A confutation of convergent realism. *Philosophy of Science* 48: 19–49.
- Lewes G. H. (1874) *Problems of Life and Mind I*. Trübner & Co, London.
- Merleau-Ponty M. (1963) *Le visible et l’invisible*. Gallimard, Paris.
- Merleau-Ponty M. (1990) *La Structure du comportement*. Presses Universitaires de France, Paris.
- Merleau-Ponty M. (1995) *La nature, notes de cours du collège de France*. Seuil, Paris.
- Nixon G. (2010) From panexperientialism to conscious experience: The continuum of experience. *Journal of Consciousness Exploration and Research* 1(3): 216–233. <https://cepa.info/364>
- Peres (1995) *Quantum theory: Concepts and methods*. Kluwer, Dordrecht.

- Petitmengin C. (2017) Enaction as a lived experience: Towards a radical neurophenomenology. *Constructivist Foundations* 12(2): 139–147. <https://constructivist.info/12/2/139>
- Petitot J., Varela F. J., Pachoud B., Roy J. M. (1999) *Naturalizing phenomenology*. Stanford University Press, Palo Alto. <https://cepa.info/2034>
- Piaget J. (1973) *Introduction à l'épistémologie génétique 1: La pensée mathématique*. Presses Universitaires de France, Paris.
- Poincaré H. (1902) *La science et l'hypothèse*. Flammarion, Paris.
- Rudrauf D., Lutz A., Cosmelli D., Lachaux J. -P. & Le Van Quyen M. (2003) From autopoiesis to neurophenomenology: Francisco Varela's exploration of the biophysics of being. *Biological Research* 36: 27–65. <https://cepa.info/1140>
- Russell B. (1986) *Mysticism and logic*. Unwin Paperbacks, London.
- Ruyer R. (1974) *La gnose de Princeton*. Fayard, Paris.
- Schewel B. (2013) Naturalizing phenomenology, phenomenologizing nature. *Radical Orthodoxy: Theology, Philosophy, Politics* 1(3): 504–15.
- Stewart J. (2017) Saying what cannot be said. *Constructivist Foundations* 13(1): 50–52. <https://constructivist.info/12/2/155>
- Thompson E. (2010) *Mind in life*. Harvard University Press, Cambridge MA.
- Varela F. J. (1976) Not one, not two. *Coevolution quarterly* 12: 62–67. <https://cepa.info/1903>
- Varela F. J. (1996) Neurophenomenology: A methodological remedy for the hard problem. *Journal of Consciousness Studies* 3: 330–35. <https://cepa.info/1893>
- Varela F. J. (1999) Dasein's brain: Phenomenology meets cognitive science. In: Aerts D. (ed.) *Einstein meets Magritte: The white book*. Kluwer Academic Publishers, Dordrecht: 185–197. <https://cepa.info/2030>
- Varela F. J., Thompson E., Rosch E. (1991) *The embodied mind*. MIT Press, Cambridge MA.
- Velmans M. (2008) Reflexive monism. *Journal of Consciousness Studies* 15: 5–50.
- Velmans M. (2009) *Understanding consciousness*. Routledge, London.
- Vörös S. (2014) The uroboros of consciousness: Between the naturalisation of phenomenology and the phenomenologisation of nature. *Constructivist Foundations* 10(1): 96–104. <https://constructivist.info/10/1/096>
- Vörös S. & Bitbol M. (2017) Enacting enaction: A dialectic between knowing and being, *Constructivist Foundations* 13(1): 201–210. <https://constructivist.info/13/1/031>
- Vörös S., Froese T., Riegler A. (2016) Epistemological odyssey: Introduction to special issue on the diversity of neurophenomenology and enactivism. *Constructivist Foundations* 11(2): 189–204. <https://constructivist.info/11/2/189>