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Vitalism now – A problematic

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Abstract

This paper considers whether and how ‘vitalism’ might be considered relevant as a concept today; whether its relevance should be expressed in terms of disciplinary demarcations between the life sciences and the natural sciences; and whether there is a fundamental incompatibility between a 'vitalism of process' and a 'vitalism as pathos' (Osborne, 2016). I argue that the relevance of vitalism as an epistemological and ontological problem concerning the categorical distinction between living and non-living beings must be contextualised historically, and referred exclusively to the epistemic horizon defined by classical physics. In contrast to this, drawing on the philosophies of Canguilhem, Whitehead, and Atlan, I propose an appreciation of the contemporary relevance of vitalism premised on the pathic and indeterminate character of nature as a whole. From this perspective vitalism expresses a politically significant ethos concerning the relationship between life, knowledge, problems and their solutions.

Vitalism now – A problematic

Monica Greco

The status of life in nature ... is the modern problem of philosophy and of science. (Whitehead, 1968: 148)

Generic definitions of vitalism refer it to the notion that ‘living organisms are fundamentally different from non-living entities because they contain some non-physical element or are governed by different principles than are inanimate things’ (Bechtel and Richardson, 1998).¹ Long discredited as a concept on account of its spiritualist and teleological connotations, until recently vitalism has been invoked derogatively to disqualify discursive opponents more than it has been genuinely debated as to its possible merits. This situation has changed in the last decade or so, with a conspicuous proliferation of publications on the subject in the humanities and social sciences. A new sense of urgency traverses recent engagements with this very old theme. Even historians no longer seem to approach it from the safety of retrospective epistemological distance, and now dare to take seriously ‘the idea of vitalism as a “meta-theoretical commitment”’ (Normandin and Wolfe, 2013: 11). Vitalism, in other words, appears to matter again; not as a rhetorical straw man to be denounced by smugly superior forms of thought, nor as a historical datum to be described and accounted for from a position of detached neutrality, but as something one might want to associate with, and be associated with, despite the theoretical and professional risks involved.

In the anglophone context, this development can be traced to two distinct albeit not unrelated genealogies, each linked to the provocation of a French philosopher who

characterized his thought as ‘vitalist’ while fully cognizant of the hostility surrounding the term and of its compromising connotations.² One of these is Georges Canguilhem, philosopher of medicine and biology, whose reception as a thinker in his own right – rather than as a precursor of Michel Foucault – began in the 1990s, following the appearance of a new anthology (*A Vital Rationalist*, 1994) and a reprinting of his main work (*The Normal and the Pathological*, 1991) by Zone Books. As others have noted, these works initially found their most fertile audience among social scientists, at a time when the conceptual and ethical challenges associated with rapidly developing biotechnologies were becoming central concerns for medical anthropologists and sociologists alike (Geroulanos, 2009). On the whole, Canguilhem tended to be read in this context as a historical epistemologist whose work was interesting *despite*, rather than because of, his vitalist leanings, which were sometimes addressed as a point of criticism.³ Already then, however, there were readers for whom Canguilhem’s approach to vitalism constituted the focus of interest in his work, particularly for the way in which it recast the problem of vitalism into an ethics of ‘problematology’ (Osborne, 2003).⁴ More recently, Canguilhem’s vitalism has become an object of analysis among historians and philosophers of the life sciences; and we can speculate that a resurgence of historiographical research on various forms of vitalism in medicine and biology has similarly been encouraged by his example.⁵

Across the anglophone humanities and social sciences more generally, however, the contemporary buzz around vitalism owes probably more to the reception of Deleuze in the context of the multi-stranded project of a ‘new materialism’ and, more broadly, of a move towards processual and ‘non-representational’ approaches to theory and research.⁶ If, in its classical versions, vitalism expresses a concern with explaining the specificity

of biological life, in this other context vitalism as a concept is addressed to reality as a whole, eliding the categorical difference between animate and inanimate, living and non-living entities. An implicit enthusiasm for the ‘vital’ as a signifier of contingency, potentiality, and the possibility of change is apparent in much writing associated with this intellectual movement. There is now explicit talk of a ‘vitalist turn’, one that would supersede the ‘discursive’ while encompassing the ‘affective’ and the ‘ontological’ (turns) (e.g. Gandy and Jasper, 2017; Susen, 2015; Mitchell, 2013) – the latest in a series of *turns* to claim the theoretical cutting edge in disciplines ranging from geography to sociology, to art and literary criticism.

These recent developments in the discursive landscape of vitalism have transformed the connotations of the term, not in the sense of supplanting the traditional or classical connotations altogether, but rather of adding significantly new and different semantic strata to those already sedimented historically. In this process, the perception of the fallacies and risks involved in taking ‘vitalism’ seriously has also been transformed, prompting new efforts to articulate significant contrasts in order to specify what versions of vitalism (if any) might justify a commitment to the concept in the twenty-first century. Recent examples of demarcatory efforts of this kind include the distinctions between *theoretical* versus *experimental* vitalism (Mitchell 2013); *substantive* versus *heuristic* (or *functional*), versus *existential* vitalism (Wolfe and Wong, 2015; Wolfe, 2011; Wolfe, 2015); and between a *vitalism of process* versus a *vitalism as pathos* (Osborne, 2016). Such distinctions are evaluative and normative as well as descriptive; they are designed not only to bring order to a situation of semantic multiplicity in the spirit of a typology, but also implicitly or explicitly to ‘discipline’ such multiplicity by taming, correcting, or containing a range of perceived excesses. So

for example, in their introduction to the edited volume *Vitalism and the Scientific Image*, Normandin and Wolfe explicitly distance their editorial strategy – which they describe as focused on vitalism in ‘the context of philosophical, natural-historical and biomedical reflections on the nature of living beings’ – from vitalism understood as designating ‘political (or “biopolitical”) positions’ (2013: 3). While multiple rationales could justify an editorial focus on the life sciences and cognate disciplines, the wording of the justification as seen here reproduces a familiar opposition between ‘science’ (or ‘nature’) and ‘politics’, with its baggage of normative implications. Elsewhere, as we shall see in more detail below, Thomas Osborne (2016) proposes that vitalism remains a relevant concept if it is confined to the biological and medical domains, rejecting its appropriations for wider social-theoretical purposes.

My own contribution to this discussion is motivated by a concern that some of the demarcations currently being proposed, while intended to clarify, are at risk of introducing further confusion in debates around vitalism generally; and of obscuring what may be truly interesting and relevant now, more than ever, about a commitment to vitalism. In particular, I am concerned about the way in which this contemporary literature seeks to reaffirm vitalism as *an epistemological and ontological problem* regarding the distinction between the living and the non-living. In contrast to this I will argue that the problematic of vitalism *now*, and indeed ultimately for Canguilhem, no longer concerns this question. The ‘problem of life’ – as we glean it from the configuration of the sciences today, but also, and no less, from the problems that characterize the experience of life in contemporary times – renders vitalism as *an ethical and political problem*, concerning the quality of our engagement with problems and with their solutions.

The ‘disciplining’ of vitalism, as I have hinted above, bears a more or less explicit relation to disciplinarity. This is clearest in Thomas Osborne’s recent contribution to the journal *Biosemiotics*, which articulates his critical response to the ascendancy of a ‘vitalism of generalized becoming and process’, ascribed to the reception of Bergson and Whitehead ‘via the more direct influence of Deleuze’ (2016: 186). The most salient and objectionable feature of this vitalism of generalized becoming, in Osborne’s reading, is its ‘analogical’ generalization of vitality to matter as a whole, and thus the elision between life in a biological sense and nature being conceived as alive ‘*in toto* with no particular privilege for the living being’ (2016: 193). This vitalism is ‘affirmative’ and ‘celebratory’ in that it associates the processual nature of reality with positive values of creativity, dynamism, generativity. What is lost in this generalization, Osborne argues, is the *pathic* dimension of life such as we observe it in (and experience it as) living organisms. A vitalism premised on the recognition of this pathic dimension would characterize life not simply as affirmatively ‘vital’ but as permanently engaged in a relationship with the possibility of its negation – death, disease, sub-normativity, error. Juxtaposing Canguilhem to Deleuze but especially Whitehead, Osborne thus argues that any contemporary renewal of vitalism ‘would have to base itself on the normativity of the living organism’ and would also ‘need to accommodate ... the *pathic* aspects of life ... everything that makes us, as living beings, potentially weak, without power, at a loss’; to do otherwise would be ‘to miss much of the originality – and interest – of the vitalist perspective itself’ (2016: 185). Osborne insists, accordingly, that vitalism as *pathos* must be understood as ‘disciplinary’, that is, as specifically relevant to biology and the life sciences rather than as a concept of more general philosophical, sociological, or political import.

Osborne's text makes a timely and significant contribution by staging the relationship between vitalism and the disciplinary domains of biology and the life sciences as a *question*. This contrasts with most other writing, where a commitment to disciplinarity exists implicitly and by default (often alongside nominal tributes to the contrary) simply as an effect of thinking and writing within the canons of scholarly convention and specialization. The argument I develop in the following pages will focus on this question of disciplinarity. The argument acknowledges the importance of Osborne's contribution in this sense, and is thoroughly in agreement with his characterization of vitalism as *pathos*, which is indeed congruent with Canguilhem's 'problematological' approach. I will argue, however, that this characterization does not imply or require that the relevance of vitalism be confined to the biological domain. Developing a reading of Canguilhem I presented in an earlier piece (see Greco, 2005), I will propose that vitalism in the history of the life sciences has value not as a *representation* of (biological) 'life' but as its valid *representative*, the symptom or indicator of an excess of life with respect to the scope of positive knowledge. This characterization subverts the contemporary relevance of distinctions such as the one between *heuristic* and *substantival* vitalism, in so far as these precisely confine vitalism to the function of a (more or less valid, more or less provisional) representation of living beings as objects of scientific knowledge. In a similar way, the juxtaposition of a *vitalism of process* to *vitalism as pathos* appears misleading, in so far as each indexes life or vitality to a type of entity or object – 'matter' as a whole on the one hand, biological 'organisms' on the other. I will argue that to endorse vitalism as a representation and to limit the pertinence of vitalism to the biological domain reproduces what Canguilhem characterised as a 'philosophically inexcusable mistake' (1998: 95). This limitation is not innocent or

harmless; by constituting vitalism as a false problem, it actively distracts from the ways in which the problematic of vitalism remains itself alive and relevant today.

(The problem of) life is not what it used to be: disambiguating 'science'

As a first step in understanding the evolution of vitalism as a problematic, let me distinguish between two different frames of reference that stem from the history of scientific thought. This appears necessary because the value or tenability of vitalist propositions is typically discussed in relation to implicit epistemological norms associated with scientific knowledge, but often with scant if any attention to normative differences internal to 'science', such that the latter becomes an ambiguous referent and the source of much potential confusion. The following exposition is not intended to provide any detailed account of what Bachelard (1986) would have called 'regional rationalisms' at different points in their history, but rather to sketch, in the broadest terms, the outline of a contrast that is specifically relevant to the problem of vitalism. Borrowing terms from Prigogine and Stengers (1984) for convenience, I will refer to the first frame of reference as that of 'classical mechanics', or Newtonian science; and to the second frame of reference as that of the 'science of complexity', ushered by the second law of thermodynamics. As Prigogine and Stengers briefly discuss in their book, even the animistic vitalism of eighteenth-century chemist Georg Ernst Stahl – currently the most discredited version of the concept – had a *raison d'être* in the conceptual horizon defined by classical science. In that context, it constituted a valid protest against the 'abstract imperialism of the Newtonians' that would reduce 'living processes to peaceful mechanisms and the quiet unfolding of universal laws' (1984: 83). Stahl posited a soul (or *anima*) as the vital principle enabling 'life', which he understood as

resistance to the decay and decomposition that would otherwise follow from the (supposedly) universal laws of matter. Like other forms of spiritualist vitalism, Stahl's constitutes a 'philosophically inexcusable mistake' in so far as it represents the living as an exception to the order of nature – a mistake rooted in the assumption that the order of nature as a whole could be adequately described by classical physics (Canguilhem 1998 [1965]): 95). Nevertheless, Stahl's was more than just an error: it was a justifiable error, one that was logically consistent with the limitations of Newtonian science and that therefore functioned, symptomatically, as an indicator of those limitations. In Prigogine and Stengers' words (1984: 84), 'Stahl's vitalism is relevant as long as the laws of physics are identified with evolution toward decay and disorganization', as they indeed were (and are) in classical mechanics.

The error involved in animistic forms of vitalism like Stahl's appears rather less justifiable when considered in the context of the second, and more recent, scientific frame of reference. In the horizon defined by the science of complexity, processes involving randomness and irreversibility are no longer considered exceptions and it is possible to observe conditions under which matter becomes self-organizing – or, in Stahlian terms, immanently capable of resisting decay and decomposition. The new science thus includes the possibility of accounting for the evolution of living beings as self-organizing phenomena that are of a particularly high order of complexity, but not fundamentally discontinuous, or different in principle, from other complex phenomena occurring at a variety of possible levels of description. From within this horizon it is not only unnecessary but logically inconsistent to posit a supplementary transcendental force or principle (like the soul) at the origin of biological self-organization or 'life'.

The relevance of distinguishing between what I have characterised as two frames of reference is not limited to the evaluation of animistic versions of vitalism. Indeed, it is important to stress that Stahlian animism was by no means typical of eighteenth-century vitalism as a whole. Already in 1952, before recent historical studies fleshed out this proposition more systematically, Canguilhem insisted that it was

time to be done with the accusation of metaphysics (hence of fantasy, if not worse) that still pursues the vitalist biologists of the eighteenth century. In fact ... vitalism rejected two metaphysical interpretations of the causes of organic phenomena: animism and mechanism. All the eighteenth century vitalists were Newtonians [as distinct from Cartesians], men who resisted hypotheses about the essences of phenomena and thought they had only to describe and coordinate effects as they perceived them, directly and without bias. (2008: 122)⁷

As others have argued, this point warrants a different evaluation of, for example, the materialist vitalism of Diderot, or the medical vitalism of the Montpellier School. Diderot, in explicit contrast to animism and spiritualist dualism, posited ‘sensitivity as a property common to all matter or as a result of the organization of matter’ for the explanation of life (Diderot 1976: 159). He expected, in other words, that the explanation of life would eventually require scientists to revise the assumptions they made about the nature of matter more generally. As for Montpellier vitalism, recent studies have plausibly interpreted the views of vitalist physicians like Paul-Joseph Barthez and Théophile de Bordeu as a form of proto-emergentism, anticipating developments that would become theoretically and experimentally established only much later (Kaitaro 2008; Wolfe and Terada 2008).⁸ In the discourse of the

montpellierains, Wolfe and Terada argue, the notion of an immanent ‘vital principle’ can be read – and was indeed conceived at the time – as having the function of a placeholder (*nom d’attente*), marking the limitations of classical mechanism and the correlated expectation (*attente*) that a natural science of organized living matter could and would develop in the future. In terms of our two frames of reference, these vitalists were therefore ‘Newtonians’ – but only in the sense that they were *empiricists*, invested in seeking to resolve the problem of life by developing natural science itself, in contrast to those who sought a transcendental solution to the limitations of classical mechanism. Their versions of vitalism cannot be regarded as a ‘philosophically inexcusable mistake’ in the same sense as Stahlian animism, since in principle they do not address life as an exception to the order of nature. This point has an obvious historiographical relevance, by correcting the reductive caricaturization of all forms of vitalism as forms of spiritualist transcendentalism. Some scholars suggest that the version of vitalism exemplified by the Montpellier School offers the grounds for a rehabilitation of the concept, or for the proposition that vitalism is ‘not necessarily dead’ (Kaitaro 2008: 591). We will come shortly to consider whether the contemporary relevance of vitalism can indeed be justified in these terms, or whether something quite different is required.

So far I have presented – albeit very schematically – the distinction between two frames of reference that stem from the history of Western scientific thought. From this preliminary discussion we can begin to draw some basic conclusions concerning the relationship between vitalism and the notion that ‘living organisms are fundamentally different from non-living entities’ (Bechtel and Richardson, 1998). How should we understand this relationship, in light of the transformation of fundamental assumptions that is implicit in the passage from the first to the second of our frames of reference?

Life as exception, life as norm: disciplinarity and the question of 'imperialism'

The conviction of a 'fundamental difference' between living and non-living beings constitutes the problematic of vitalism in so far as vitalist thought developed and expressed itself in the history of modern biology, against an epistemological horizon already shaped by the assumptions of classical physics. An articulation of the difference as irreducible is what allowed the physicians and chemists of the eighteenth century to transgress that normative horizon, to object to the universality of the laws of classical mechanics, and thereby to allow physiology to develop as an autonomous discipline. However, from today's perspective, the limitations of Newtonian science do not only concern biology as the science of living organisms. Diderot anticipated this when his materialist solution to the problem of life involved, not positing life as an exception to the norm of classical materialism, but on the contrary revising materialism so as to accommodate the logical possibility of life: even 'stone must feel', however hard the proposition may be to swallow (1966: 149). Since Diderot's day, our appreciation of the exceptionality or otherwise of phenomena characterized by what he called 'sensitivity' – by instability, temporality, growth and development – has undergone a fundamental reversal. If the laws of classical physics were once assumed as a universal baseline against which living phenomena appeared to be an exception, now it is these very laws that appear narrowly conditional to very specific, and in this sense 'exceptional', situations. To cite Prigogine and Stengers one more time:

The models considered by classical physics seem to us to occur only in limiting situations such as we can create artificially by putting matter into a box and then

waiting until it reaches equilibrium. The artificial may be deterministic and reversible. The natural contains essential elements of randomness and irreversibility. This leads to a new view of matter in which matter is no longer the passive substance described in the mechanistic world view but is associated with spontaneous activity. (1984: 9)

Canguilhem's claim – baffling, to some contemporary interpreters – that 'classical vitalism sins, paradoxically, only in its excessive modesty, in its reluctance to universalize its conception of experience' (2008: 70) should be understood in the context of this general reversal in perspective that occurred in the passage from the first to the second of our frames of reference. In relinquishing assumptions about the fundamentally stable, determinable, and observable character of their subject matter, the physical sciences have come increasingly to resemble biology – contradicting a classical expectation that progress would involve movement in the opposite direction. The 'imperialism' or generalisation of a vitalist conception of experience refers to this fundamental reversal, which occurred autonomously – if unexpectedly – in the physical sciences themselves as they pursued their own problems, remaining 'faithful to their underlying intention ... to determine the laws between objects' (2008:70). On this basis, it is mistaken to imagine the imperialism of a vitalist conception of experience as implying that the biological sciences should hold 'the entire field', or involve forms of 'competition [between the biological and physical sciences] over the same disciplinary territory' (Osborne 2016: 192). An analysis framed in terms of disciplinary distinctions is really quite misleading in this context: the relevant distinction is not between disciplines, but between two underlying frames of reference (or sets of fundamental assumptions) that cut across them.

For the same reason, it is mistaken to read Canguilhem's claim that the domain of biology cannot constitute an *imperium in imperio* through the lens of an unreconstructed scientific materialism, to mean, without further qualification, that 'the laws of the physical world apply to all living beings, humans included, without exception' (Wolfe and Wong 2013: 73). The very idea that nature (and the physical world) should consist of a single homogenous system, with the same laws applying evenly and consistently throughout all objects, no matter their differences, is Newtonian; the perspectival shift to a vitalist conception of experience implies a *pluralist* universe, one that allows for the emergence of singular structures with normativities of their own, tied to local and specific conditions. Canguilhem really could not be clearer on these points. 'This interpretation', he writes,

does not take anything away from a physics as determinist as it wants to be and can be – it does not take away from physics any of its objects. But it includes the physical interpretation within another, which is vaster and more comprehensive, since the meaning of physics is justified within it and the activity of the physicist fully secured. (2008: 71).

And here the resonance between Canguilhem and Whitehead's process philosophy, *pace* Osborne, is equally remarkable:

An occasion of experience which includes a human mentality [and the activity of the physicist!] is an extreme instance, at one end of the scale, of those happenings which constitute nature. But any doctrine which refuses to place human

experience outside nature, must find in descriptions of human experience factors which also enter into the descriptions of less specialized natural occurrences. If there be no such factors, then the doctrine of human experience as a fact within nature is mere bluff, founded upon vague phrases whose sole merit is a comforting familiarity. We should either admit dualism, at least as a provisional doctrine, or we should point out the identical elements connecting human experience with physical science. (Whitehead 1935: 237)

Before moving to unfold this passage in more detail, let us briefly return to the question of the difference between living and non-living beings, and to how the character of that difference should now be conceived. One implication of the discussion so far is that biological phenomena certainly retain specificity as a particular type or class of self-organizing being. At the same time, however, the generic concept of ‘life’ understood as a being’s capacity to be active, to be sensitive, and to grow no longer applies exclusively to biological beings but has rather become relevant beyond biology, across nature. This fundamental conceptual shift might also be expressed in a diametrically opposite way. To paraphrase Jean Rostand, we might say that in the context of our second frame of reference it has become possible *‘to completely explain life without life’* (Rostand 1939: 155, cited in Canguilhem 2008: 69). Henri Atlan, a biophysicist and information theorist, echoes this point when he cites Albert Szent-Györgyi to claim that ‘life does not exist as such, at least not as an object of scientific investigation’ (2011 [1999]: 376). In the context of our second frame of reference, in other words, vitalism and the concept of life have become redundant and irrelevant for the purpose of scientific description.⁹

Process, life, pathos

This double or reversible proposition – one whereby the whole of nature (and therefore none of it specifically) is ‘alive’ – corresponds to what Osborne identifies as the fundamental flaw of processual vitalism: ‘[p]recisely in stressing the ubiquity of processual becoming there is a tendency to collapse everything into itself, into generalized *process*, thus perhaps losing anything much to do with what is in fact, so to speak, *originally* ‘original’ to life’ (2016: 186). Yet it is not by insisting on a demarcation arbitrarily set along disciplinary lines that we may come any closer to understanding this ‘originality’, or what is fundamentally at stake in it. The concept of *pathos*, indexing ‘life’ to polarized and dynamic existence, does indeed come closer but – as Osborne (2016: 193) himself briefly acknowledges in relation to Whitehead – these features are if anything *core* to a processual understanding of nature, and by no means exclusive to the biological domain. To paraphrase Whitehead, who wrote that ‘life refuses to be embalmed alive’ (1978: 339), we might say that the concept of life refuses to be embalmed in biology, or indeed in the reference to any particular (type of) *object*.

It is important to stress that denying any ‘fundamental difference’ between living and non-living beings does not mean that all difference is denied. The ‘happenings which constitute nature’, to use words from the quotation above, occur on a scale and admit of gradations along a continuum. This is no place to offer even a brief summary of Whitehead’s processual cosmology, so let it suffice to say that in *Modes of Thought* he specifies a hierarchy of six types of occurrences in nature, ranging from ‘human existence’ to ‘happenings on an infinitesimal scale’, albeit also cautioning that the

list had ‘purposely been made roughly, without any scientific pretension’ because ‘[s]uch classification hides the truth that the different modes of natural existence shade off into each other’ (1968: 157). Four of the six levels broadly correspond to phenomena that constitute objects of the life sciences, and Whitehead is happy to refer to them conventionally using terms like ‘animal life’, ‘vegetable life’, ‘living cell’, and so on. But the technical term he uses for such occurrences across the six levels – to discuss their comparative modes of functioning and organization, including their relative degree of stabilization and specialization in relation to their environments – is *societies*. And his discussion of the concept of life makes it clear that ‘the nature of life is not to be sought by its identification with some society of occasions’ (1978: 107). Life ‘is the name for originality, and not tradition’: therefore, since structured societies are identifiable as such by virtue of their conformity to their own past (that is, by virtue of their tradition), ‘life cannot be a defining characteristic’ of them (1978: 104). In a sense, the concept of life is needed to characterize precisely the opposite: not what a certain type of being *is* but what it is *not* (yet). Specifically, it refers to the ‘origination of conceptual novelty’ in the passage from one to the other, and thus to a being’s capacity to *become different* (1978: 102).¹⁰ This capacity, while relevant to nature as a whole, is not equally distributed across nature, or even across the internal structure of specific societies. Whitehead uses the term ‘inorganic’ to refer to structured societies where this mode of becoming is relatively ‘unimportant’ and cannot therefore be observed.

In sum, Whitehead’s philosophy certainly admits a distinction between societies that have greater or lesser degrees of ‘life’, and even between ‘organic’ and ‘inorganic’ societies based on how important life is as a factor in their becoming; but it forbids

us from confining the relevance of the concept of life to any particular type or category of being (or society). This is because the concept of life applies, and logically *needs* to apply, to even the most basic category posited in his philosophy, ‘the really real things which in their collective unity compose the evolving universe’ (1968: 151), which Whitehead called *actual entities*, *actual occasions*, or *occasions of experience*. We will not dwell on his characterization of life at this level of description, which would require a more detailed exposition of his technical concepts than we have room for here. Far more important, for our immediate purposes, is to remind ourselves of what Whitehead’s whole philosophical construction, and the whole insistence on the primacy of process over substance, was set up to achieve. Its aim, to again invoke the quotation above, is to offer a self-consistent account of nature that *includes human experience – and human mentality – as part of nature*, rather as a transcendent factor outside of it. And this involves pointing out ‘the identical elements connecting human experience with physical science’ (1935: 237). Its aim, in other words, is to conceive nature so that the qualitative vividness of experience – including human experience, in all its positive *and* negative vicissitudes – appears intrinsic to it, arising out of its most basic elements, rather than sequestered away from the world into the mind of a subject. This is in direct and explicit contrast to the image of an indifferent, ‘silent world’ yielded by the development of scientific materialism in the seventeenth century, an image from which all meaning and value had been expunged. ‘[A] dead nature’, writes Whitehead, ‘aims at nothing. It is the essence of life that it exists for its own sake, as the intrinsic reaping of value’ (1968: 135). In other words: the possibility of articulating *pathos*, the experience of value, as a full-fledged factor in and of the world is the entire point of a ‘vitalism of process’.

It is thus both inaccurate and unfortunate to interpret processualism *per se* in the spirit of a ‘flattening out’ of meaningful, *pathic* differences, such as those that obtain between living and non-living beings, between humans and non-humans, or between other categories as they become relevant in different contexts and situations. This type of flattening gesture is indeed evident in certain appropriations of Whitehead or other sources of ‘process thought’, notably within non-representational theory, actor-network theory, or affect theory. In each of these cases the gesture initially has a strategic purpose – often targeting specific sets of dominant assumptions – and in each case the ‘vitality’ of the gesture itself appears to be spent as soon as it is consolidated into a fixed, and inevitably partial, theoretical form.¹¹

Whence ‘vitalism’?

I have argued against a ‘disciplinary’ interpretation of the contemporary relevance of vitalism. If vitalism can remain interesting as a form of commitment today, it is precisely to the extent that it can be reconciled with the notion that there is no ‘fundamental difference’ between living and non-living beings. This is entirely congruent with Canguilhem’s position. Indeed, his own philosophical reflections on vitalism take the refutation of vitalism on the part of biologists as a given and as a point of departure: what must be accounted for, philosophically, is the tenacity and vitality of vitalism as a biological ‘illusion’ (2008: 60), *not* the originality of biological phenomena as such. I have also argued that the universalization of a vitalist conception of experience, as advocated by Canguilhem and implicit in Whitehead, does not imply the ascription of a generalized, uniformly distributed quality of aliveness or vitality across nature, or to matter as a whole. Indeed, the conceptual shift involved is of a

different order altogether, such that '*vitalism*' no longer concerns how to describe and explain what is alive versus what is not.

Canguilhem famously described vitalism as 'an imperative rather than a method and more of an ethical system, perhaps, than a theory' (1994: 288).¹² He paraphrases Emanuel Rádl to elaborate on what a vitalist ethos entails, in a passage that again resonates strongly with Whitehead's project:

Man, [Rádl] says, can consider nature in two ways. Either he *feels himself* a child of nature and experiences a sentiment of belonging and subordination to it; he sees himself in nature and nature in himself. Or else, he *holds himself* in front of nature as before a foreign, indefinable object. A scientist who experiences a filial sentiment, a sentiment of sympathy toward nature, does not consider natural phenomena to be strange and foreign – he finds life, soul, and meaning in them, completely naturally. Such a man is fundamentally a vitalist. (2008: 63-64)

The significant difference here in terms of defining what vitalism is about is not a difference 'out there', between living and non-living beings, between the objects of biology or physics. The difference concerns rather the quality of relation that man establishes with nature, where one possible version of that relation involves 'filial sentiment' and subordination, while the other consists in affirming a separation, positing the relationship in terms of a subject standing before an alien object to be known. Mechanism renders man 'a living being separated from life by science and attempting to rejoin life through science' (2008: 62). By contrast, vitalism comprehends 'science itself ... within the activity of the living' (2008: 70); to adapt a phrase from Whitehead, it

regards science as part of ‘the cumulation of the universe and not a stage-play about it’ (1978: 237).

Vitalism as ethos, then, is characterized first of all by an attitude that acknowledges that there is a mutually constitutive relationship between life and knowledge. For a vitalist, the quality of that relationship at any one time constitutes an open problem, an object of permanent reflection, one that by definition cannot defer to ‘science’ the expectation of a solution. In a scientist, a vitalist ethos tempers the impulse to pay attention to problems, to consider them relevant, only to the extent that they can be appropriated into the idiom of scientific description; it institutes the principle of a limit or a boundary to the relevance of such descriptions, and the importance of a dialogue between science and a relevant beyond. The *originality* of life that vitalism affirms must similarly be interpreted in the spirit of a ‘filial’ relationship of subordination. In this sense, originality means that life (as the totality of nature alive) has logical and genealogical priority over knowledge, as origin and source; knowledge is a product, a subset, a child of nature alive, although of course, once it has come into being, it is also a factor in the becoming of nature. This characterization certainly admits of more specific inflections in relation to distinct branches of knowledge; in medicine, for example, it signals the (genea)logical priority of the pathological (the experience of sickness) over the scientific definition of the normal: physiology ‘is the collection of solutions to problems posed by sick men through their illnesses’ (Canguilhem 1989: 100). But stressing the importance of local specificities and differences should not obscure the fact that that there is a *general* relevance to vitalism as ethos in terms of the acknowledgment that knowledge *abstracts* from life, and as such it is only ever partial, incomplete, provisional on a variety of temporal scales, not least because the universe evolves and changes, forever ahead of our descriptions. Trust and confidence in life here point to the

cultivation – alongside knowledge and *not* against it, as we shall see – of a certain childlike naivety in our encounters with the world, an ability to follow the invitation of such encounters without knowing where they might lead, and to let the encounter make a difference to our assumptions. Vitalist doctrines in the history of biology can be read, and respected, in this sense: not as scientifically valid *representations* of ‘life’ but as *representatives*, markers of a scientist’s encounter with ‘life’ as a question and as a relevant beyond.

Coming full circle: vitalism as wisdom

Vitalism understood as an ethos and mindset, as I have presented it here, and which I propose corresponds to Canguilhem’s version of a vitalist commitment, may now appear very distant from any concern with differentiating living from non-living beings. It appears distant, in fact, from any concern with the specific nature or character of ‘living’ phenomena as objects of scientific description. As such, this characterization may seem so counter-intuitive as to make us wonder whether using the term ‘vitalism’ is warranted, other than in the spirit of a provocation. This is a good question, and of course neither Canguilhem nor Deleuze – and certainly not Whitehead – subscribed to ‘vitalism’ in any straightforward, conventional, or unprovocative sense. And yet, this distance from the problem of ‘life’ as conventionally understood is only a superficial impression, for a vitalist ethos indeed emerges from acknowledging the implications of contemporary scientific descriptions of biological phenomena, even when these descriptions deny any ‘fundamental difference’ between living and non-living beings. This is best explained with reference to what Henri Atlan calls ‘philosophy in the shape of wisdom’ (2011 [1991]: 384). Before dwelling on the details of his proposition, and to

avoid possible misunderstanding, it is worth recalling that Atlan has written extensively about his antagonism towards vitalism, conventionally understood as per Bechtel and Richardson's definition. It is not surprising therefore that he should avoid using the term 'vitalism' to describe a form of thought and philosophical activity that he advocates.

We have already seen that Canguilhem's commitment to vitalism, as I have characterized it, also rests on a rejection of the unique or exceptional character of living beings. Despite this terminological difference, there is a profound affinity between Canguilhem's rendering of vitalism and Atlan's advocacy of 'philosophy in the shape of wisdom'.

Such a philosophy, Atlan argues, is the appropriate complement or partner to science for the purpose of analyzing 'complex and singular' situations and phenomena. Now let us recall that, in the context of the second frame of reference discussed earlier in this paper, 'complex and singular' phenomena are exactly what living beings are understood to be. A philosophy in the shape of wisdom is called for by the fact that 'the more complex and singular a phenomenon is, the more underdetermined any [scientific] theory giving some account of this phenomenon will be' (2011 [1991]: 384). What this means is that, due to its singularity, much of the phenomenon will remain unobservable under conditions of experimental reproducibility; and for this reason, multiple theories, each with a relative and probabilistic truth value, will be able to give some account of the phenomenon that has some explanatory power. It is worth citing Atlan in full on the implications of this point:

... if a norm must be erected ... on the basis of a theory ... then each theory will permit us to erect very different norms. ... without sacrificing any rigour in

predicting observable facts, we can choose among different theories the one (or the ones) favoring the norm that suits us (for reasons very different from those internal to theorizing itself). This choice of theory will be an exercise in controlled wishful thinking. This is, apparently, how the choice of theory works – without its being conscious, of course – in the development of ethical and political norms that proclaim themselves true because they are erected on scientific theories. This activity, though dangerous because it is at the origin of modern ideologies, is not pointless if it manages to recognize itself for what it is, that is, a construction of a rational world, coherent with a certain explicit or implicit project, a project that expresses itself in the norm. It must be understood, however, that this norm does not come from our rational knowledge of reality, nor is it grounded in or founded by this reality. This knowledge does not necessarily emanate from transcendence, so to speak, but from concatenations of the imaginary and desires. (2011 [1991]: 385)

It is thus that, in the words of a scientist committed, *qua* scientist, to a theoretical assumption of absolute determinism (on this see Atlan 2011 [2002]), we find the expression of an ethos not dissimilar from Canguilhem's vitalism. Both address the importance of acknowledging the value *and* the limitations of scientific abstractions; both invite us to pay attention to what I have called a 'relevant beyond', consisting (in Atlan's vocabulary) of all the determinations that remain unknown to us. The title of the chapter in which Atlan's reflections appear, *Knowledge of Ignorance*, is almost a literal rendition of Bergson's famous dictum, here congruent with Canguilhem's position, that 'the "vital principle" might indeed not explain much, but it is at least a sort of label affixed to our ignorance, so as to remind us of this occasionally, while mechanism

invites us to ignore that ignorance' (Bergson, 1911: 42).

The value of associating Canguilhem's vitalist ethos with Atlan's reflections lies in demonstrating that there is indeed something more to vitalism than a simple 'refusal to grant mechanism the time it needs to complete its project' (Canguilhem 2008: 69).

Atlan stands here for a mechanism whose project has indeed been 'completed' – or is at least well on its way to being completed – as far the problem of theoretically explaining living phenomena is concerned. And yet from this vantage point, as his discussion of the underdetermination of theories makes clear, we can see that a mature mechanism yields inherently 'incomplete' (or underdetermined) representations; and that such representations still call for markers of their incompleteness. A mature mechanism, for Atlan, requires that we distinguish the domain of the sciences from what he characterizes as 'another knowledge, one condemned to confront the irreducible underdetermination of theories', namely 'philosophy in the shape of wisdom' (2011 [1991]: 384). Atlan advocates such a philosophy to avoid surrendering the analysis of singular and complex situations either to forms of irrationalism ('ideology') or to forms of scientism ('rationalizing ideology'), whilst affirming the creative, 'constructivist' dimension involved in engaging with scientific theories for the purpose of erecting norms. As a form of 'controlled wishful thinking' that 'recognize[s] itself for what it is', philosophy in the shape of wisdom takes the ensemble of scientific knowledge as its starting point but radically differentiates itself from it in two ways: on the one hand, by rejecting the reference to science as a source of legitimation for normative visions of the order of nature as a whole; and correlatively, by acknowledging the importance of our imaginaries and our desires as ingredients in the becoming of nature itself. Imaginaries and desires become 'determinations' as they feed into the construction of the world

through the choice of particular theories – and the norms they imply – among a multiplicity of possible ones. When Atlan writes that ‘[i]n our knowledge of our ignorance lies our experience of our will’, he therefore invites us simultaneously to rejoice in the relative freedom and creative potential of that experience of choice, and to take responsibility for what our choices add to the world (2011 [1991]: 389).

Philosophy in the shape of wisdom can thus be imagined as a form of knowledge (‘another knowledge’) whose task is to mediate between the domain of scientific knowledge and the experience of life. Its role is

to speak of what cannot be formalized, to use natural language with its metaphors, analogies, and all the vagueness that comes with them, yet without giving up on rationality ... on distinguishing good analogies from bad ones, enriching metaphors from misleading ones, the vagueness [*le vague en moins*] that conceals what should be said from the vagueness [*du vague en plus*] that stands for the potential of creation. (Atlan, 2011 [1991]: 386)

If there is a practical prescription to be drawn from Atlan’s formulation, therefore, this might concern the need for a new pedagogy, designed to cultivate the sensibilities and skills required for this role. In contrast to the current situation, where the balance of investments (in every sense of the term) is perilously skewed towards the natural sciences, it would mean reclaiming the importance of forms of knowledge that engage with ‘natural language’ in its multiplicity and diversity, while cultivating forms of intellectual rigour that differ from scientific or mathematical formalization. What Atlan advocates as ‘philosophy in the shape of wisdom’ in this sense is not dissimilar from

developments associated with the ‘narrative turn’ in bioethics and with the field of ‘medical humanities’ (Charon, 2001; Greco, 2013).

Engaging with the problematic of vitalism in the spirit of Canguilhem points to a more general conclusion, suggesting that a mature mechanism demands something more and other than the development of a new kind of knowledge to supplement or complement the status quo. What it demands is the cultivation of a collective *ethos* – in the etymological sense of *custom, character, disposition* – a way of being in the world and a way of life. A vitalist ethos differs specifically from the form of wishful thinking associated with the project of modernity, fuelled by imaginaries of a passive, indifferent nature and by desires of ultimate control. It points instead to a mode of life that is relatively comfortable with indetermination as a fact of existence, and not predicated on its implicit denial. Vitalism as *ethos* posits nature as a whole in the register of *pathos*, assuming sensitivity as the ontological norm rather than the exception. It admits death – disease, pain, disintegration – into its imaginary of what is irreducibly real, as the ebb and flow of becoming, instead of treating it as a clandestine occurrence with no right of existence in our experience, forever surprising us. What follows from this attitude is the cultivation of an art of life that is simultaneously cautious and adventurous, in ways that differ profoundly from the ethos implicit in the scientific materialism of modernity. More cautious, in terms of the insistence on the need to be attentive, to take care of the multiple and diverse forms of ontological sensitivity, including sensitivity to our imaginaries and our desires. And more adventurous, in terms of not being equally driven by a fear and denial of death, of *pathos*, but rather by the confidence that every occurrence can expand and add value to experience, and should be honoured and respected as such. Here, in this confidence, unsupported by the false reassurances of

scientism, and yet alien to the temptations of nihilism – here lies the relevance of vitalism now.

Notes

¹ This characterisation – drawn from the Routledge Encyclopaedia of Philosophy and featuring at the start of the Wikipedia entry on vitalism (accessed on 5/2/2018) – elides a number of significant differences among vitalists in the history of biology and medicine (see Benton, 1974 for a useful typology). We will return below to the significance of differences among eighteenth-century vitalists.

² It is not my purpose in this paper to offer an exegetical reading Canguilhem or Deleuze, whether to assess the extent of each author's ultimate commitment to 'vitalism' or the relationship between their respective philosophies. In terms of the latter, let it suffice here to note that Deleuze – unlike many of his anglophone readers – was intimately familiar with Canguilhem's work and directly inspired by it. Canguilhem had been Deleuze's dissertation supervisor (with Jean Hyppolite) at the Sorbonne; he later solicited the publication of a collection of Deleuze's essays (*Instincts et Institutions*, 1953) in the series he edited for Hachette; and multiple of Deleuze's later books include references to the work of his former teacher. Keith Ansell Pearson (1999: 8) credits Canguilhem's influence with mediating Deleuze's reception of Weissman's neo-Darwinism, and thereby indirectly all of Deleuze's biophilosophy.

³ e.g. Rose (1998: 164-5); Lecourt (1998: 223), and cf Greco (2005). See Gordon (1998) for a detailed discussion of the early reception of Canguilhem outside France and particularly in Britain.

⁴ See also Gordon (1980 and 1998); Rabinow (1996); and Greco (1998, 2004, 2005). Historical 'problematology' in the sense proposed by Osborne (2003:1) as 'a good collective description of the endeavours of thinkers such as Georges Canguilhem and Michel Foucault' must be not be confused with the *problématique* proposed by Belgian philosopher Michel Meyer (1986) as a new paradigm for the humanities; as Osborne aptly puts it: 'those who work with problems [in the spirit of Foucault or Canguilhem] are *not* legislators or theorists' (2003: 10).

⁵ For recent writing on Canguilhem see for example several of the essays in the collection edited by De Beistegui, Bianco and Gracieuse (2015); Sholl (2016); Bianco (2013).

⁶ References on 'new materialism' are too numerous to cite, but for key works see Barad (2007) Bennett (2010), Braidotti (2011). Similarly for process-theoretical and non-representational approaches in social science see Whatmore (2002); Massumi (2002); Fraser, Kember and Lury (2005); Thrift (2008); Brown and Stenner (2009); Anderson and Harrison (2010); Stenner (2017).

⁷ For historical studies that flesh out this proposition see, e.g., Duchesneau (1982), Duchesneau and Cimino (1997), Rey (2000), Williams (2003), and the collection of papers in the special issue edited by Wolfe (2008).

⁸ Wolfe and Terada (2008) and Kaitaro (2008) stress the continuities between the vitalism of Diderot and that of the *montpelliérains*. By contrast Elizabeth Williams, in her landmark book-length study of Montpellier vitalism (2003), stresses key differences between them. In particular she underlines how the Encyclopaedists 'envisioned a unified science of nature encompassing cosmos, earth, and humanity' (2003: 147) whereas the Montpellier vitalists, while searching for an *empirically verifiable* 'vital principle' (and differing, in this sense, from animists), insisted on the distinction between the living and the non-living (with the vital principle applying only to the former), and particularly on the singularity of the human.

⁹ See also Bechtel (2013).

¹⁰ It is to describe exactly this kind of processual relation between being and its negation in becoming that Viktor von Weizsäcker, Whitehead's contemporary, used the terms *pathic* (in contrast to *ontic*) and *antilogical* (see Weizsäcker 1987 [1946], and Greco 2009 for a fuller discussion). There is also a close affinity between Whitehead's concept of 'life' and Canguilhem's account of health as organic 'normativity'. Health as greater normativity would correspond, in Whitehead's terms, to greater degree of 'aliveness'.

¹¹ See Stenner (2008), (2016), and (2017) for a critique of this 'flattening' gesture in these fields.

¹² I use here Arthur Goldhammer's translation in preference to the more recent one by Geroulanos and Ginzburg, where the French original is rendered as 'an exigency rather than a method and a morality rather than a theory' (2008: 63).

References

- Anderson, Ben and Harrison, Paul (eds) (2010) *Taking-Place: Non-Representational Theories and Geography*. London: Ashgate.
- Ansell Pearson, Keith (1999) *Germinal Life – The Difference and Repetition of Deleuze*. New York: Routledge.
- Atlan, Henri (2011 [1991]) The knowledge of ignorance. In *Selected Writings – On Self-Organization, Philosophy, Bioethics, and Judaism*. New York: Fordham University Press.
- Atlan, Henri (2011 [1999]) Does life exist? In *Selected Writings – On Self-Organization, Philosophy, Bioethics, and Judaism*. New York: Fordham University Press.
- Atlan, Henri (2011 [2002]) Is science inhuman? An essay on free necessity. In *Selected Writings – On Self-Organization, Philosophy, Bioethics, and Judaism*. New York: Fordham University Press.
- Bachelard, Gaston (1986 [1949]) *Le Rationalisme Appliqué*. Paris: Presses Universitaires de France.
- Barad, Karen (2007) *Meeting the Universe Half-Way: Quantum Physics and the Entanglement of Matter and Meaning*. Durham and London: Duke University Press.
- Bechtel, William (2013) Addressing the vitalist's challenge to mechanistic science: Dynamic mechanist explanation. In Normandin and Wolfe (eds) *Vitalism and the Scientific Image in Post-Enlightenment Life Science, 1800-2010*. Dordrecht: Springer.
- Bechtel, William and Richardson, Robert C. (1998) Vitalism. In Craig (ed) *Routledge Encyclopaedia of Philosophy*. London: Routledge.
- Bennett, Jane (2010) *Vibrant Matter: A Political Ecology of Things*. Durham and London: Duke University Press.
- Benton, E. (1974) Vitalism in nineteenth century thought: A typology and reassessment. *Studies in the History and Philosophy of Science* 5 (1): 17-48.
- Bergson, Henri. (2011) *Creative Evolution*. Lanham, MD: University Press of America.
- Bianco, Giuseppe (2013) The origins of Canguilhem's 'vitalism': Against the anthropology of irritation. In Normandin and Wolfe (eds) *Vitalism and the Scientific Image in Post-Enlightenment Life Science, 1800-2010*. Dordrecht: Springer.
- Braidotti, Rosi (2011) *Nomadic Subjects – Embodiment and Sexual Difference in Contemporary Feminist Theory*. New York: Columbia University Press.
- Brown, Stephen and Stenner, Paul (2009) *Psychology Without Foundations – History, Philosophy, and Psychosocial Theory*. London: Sage.
- Canguilhem, Georges (1991) *The Normal and the Pathological*. New York: Zone Books.
- Canguilhem, Georges (1994) *A Vital Rationalist*. New York: Zone Books.
- Canguilhem, Georges (1998) *La Connaissance de la Vie*. Paris: Vrin. 2nd Edition.
- Canguilhem, Georges (2008) *Knowledge of Life*. New York: Fordham University Press.

-
- Charon, Rita (2001) Narrative medicine: A model for empathy, reflection, profession, and trust. *JAMA*, 286: 1897-1902.
- De Beistegui, Miguel, Bianco, Giuseppe and Gracieuse, Marjorie (eds) (2015) *The Care of Life – Transdisciplinary Perspectives in Bioethics and Biopolitics*. London & New York: Rowman & Littlefield.
- Diderot, Denis (1966) *Rameau's Nephew and D'Alembert's Dream*. London: Penguin.
- Duchesneau, François (1982) *La Physiologie des Lumières – Empirisme, Modèles et Théories*. The Hague: Martinus Nijhoff.
- Duchesneau, François and Cimino, Guido (eds) (1997) *Vitalisms from Haller to the Cell Theory*. Florence: Olschki.
- Fraser, Mariam, Kember, Sarah and Lury, Celia (2005) Inventive life: Approaches to the new vitalism. *Theory, Culture and Society* 22 (1): 1-14.
- Gandy, Matthew and Jasper, Sandra (2017) Geography, materialism, and the neo-vitalist turn. *Dialogues in Human Geography* 7 (2): 140-144.
- Geroulanos, Stefanos (2009) Beyond the normal and the pathological: Recent literature on Georges Canguilhem. *Gesnerus* 66 (2): 288-306.
- Gordon, Colin (1980) The normal and the biological: A note on Georges Canguilhem. *Ideology and Consciousness* 7: 33-36.
- Gordon, Colin (1998) Canguilhem: Life, health and death. *Economy and Society* 27 (2-3): 182-189.
- Greco, Monica (1998) Between social and organic norms: Reading Canguilhem and 'somatization'. *Economy and Society* 27 (2-3): 234-248.
- Greco, Monica (2004) The politics of indeterminacy and the right to health. *Theory, Culture and Society* 21 (6): 1-22.
- Greco, Monica (2005) On the vitality of vitalism. *Theory, Culture and Society* 22 (1): 15-27.
- Greco, Monica (2009) On the art of life: A vitalist reading of medical humanities. *Sociological Review* 56 (2): 23-45.
- Greco, Monica (2013) Logics of interdisciplinarity: The case of medical humanities. In Barry, Andrew and Born, Georgina (eds) *Interdisciplinarity: Reconfigurations of the Natural and Social Sciences*. London: Routledge.
- Kaitaro, Timo (2008) Can matter mark the hours? Eighteenth-century vitalist materialism and functional properties. *Science in Context* 21(4): 581-592.
- Lecourt, Dominique (1998) Canguilhem on the question of the individual. *Economy and Society* 27 (2-3): 217-224.
- Massumi, Brian (2002) *Parables for the Virtual – Movement, Affect, Sensation*. Durham and London: Duke University Press.
- Meyer, Michel. (1986) *De la Problématique: Philosophie, Science et Langage*. P. Mandaga: Bruxelles.
- Mitchell, Robert (2013) *Experimental Life – Vitalism in Romantic Science and Literature*. Baltimore: Johns Hopkins University Press.
- Normandin, Sebastian and Wolfe, Charles T. (2013) Vitalism and the scientific image: An introduction. In Normandin and Wolfe (eds) *Vitalism and the Scientific Image in Post-Enlightenment Life Science, 1800-2010*. Dordrecht: Springer.
- Osborne, Thomas (2003) What is a problem? *History of the Human Sciences* 16 (4): 1-17.
- Osborne, Thomas (2016) Vitalism as pathos. *Biosemiotics*. 9 (2): 185-205.
- Prigogine, Ilya and Stengers, Isabelle (1985) *Order Out of Chaos – Man's New Dialogue with Nature*. London: Flamingo.

-
- Rabinow, Paul (1996) *Essays on the Anthropology of Reason*. Princeton, NJ: Princeton University Press.
- Rey, Roselyne (2000) *Naissance et développement du vitalisme en France de la deuxième moitié du dix-huitième siècle à la fin du premier empire*. Oxford: Voltaire Foundation.
- Rose, Nikolas (1998) Life, reason and history: Reading Georges Canguilhem today. *Economy and Society* 27 (2-3): 154-170.
- Sholl, Jonathan (2016) Contextualizing medical norms: Canguilhem's surnaturalism. In Giroux (ed) *Naturalism in the Philosophy of Health*. Dordrecht: Springer.
- Stenner, Paul (2008) A. N. Whitehead and subjectivity. *Subjectivity*. 22: 90-109.
- Stenner, Paul (2016) On standards and values: Between finite actuality and infinite possibility. *Theory and Psychology* 26 (2): 144-162.
- Stenner, Paul (2017) *Liminality and Experience – A Transdisciplinary Approach to the Psychosocial*. London: Palgrave Macmillan.
- Susen, Simon (2015) *The 'Postmodern Turn' in the Social Sciences*. London: Palgrave Macmillan.
- Thrift, Nigel (2008) *Non-Representational Theory – Space, Politics, Affect*. London: Routledge.
- Weizsäcker, Viktor von (1987) Anonyma. *Gesammelte Schriften*. Band 7. Frankfurt-am-Main: Suhrkamp Verlag.
- Whatmore, Sarah (2002) *Hybrid Geographies – Natures, Cultures, Spaces*. London: Sage.
- Whitehead, Alfred North (1935) *Adventures of Ideas*. Cambridge: Cambridge University Press.
- Whitehead, Alfred North (1978) *Process and Reality*. New York: The Free Press.
- Whitehead, Alfred North (1968) *Modes of Thought*. New York: The Free Press.
- Wikipedia (2018) Vitalism. Available at <https://en.wikipedia.org/wiki/Vitalism> (accessed 17 March 2018)
- Williams, Elizabeth A. (2003) *A Cultural History of Medical Vitalism in Enlightenment Montpellier*. Aldershot: Ashgate.
- Wolfe, Charles T. (2008) (ed) Vitalism without metaphysics. *Science in Context* 21(4) Special Issue.
- Wolfe, Charles T. (2011) From substantialist to functional vitalism and beyond: Animas, organisms and attitudes. *Eidos*. 14: 212-235.
- Wolfe, Charles T. and Terada, Motoichi (2008) The animal economy as object and program in Montpellier vitalism. *Science in Context* 21 (4): 537-579.
- Wolfe, Charles T. and Wong, Andy (2015) The return of vitalism: Canguilhem, Bergson and the project of a biophilosophy. In De Beistegui, Bianco and Gracieuse (eds) *The Care of Life – Transdisciplinary Perspectives in Bioethics and Biopolitics*. London and New York: Rowman & Littlefield.

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