

**the discreet charm of
hippocratism: archaic revival
or avant-garde vitalism?**

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VITALISM: STRONG AND WEAK, OLD AND NEW

First, a word on terminology. One can legitimately feel frustrated at times with the extremely loose usage of the term ‘vitalism’ in different discourses. In the world of Anglophone humanities (not philosophy, not the history of science or even ‘historical epistemology’) it seems to mean any kind of ‘animation’ concept: if all of matter is animate(d), that’s vitalism – as it is for Jane Bennett, who writes:

I believe in one matter-energy, the maker of things seen and unseen. I believe that this pluriverse is traversed by heterogeneities that are continually doing things. I believe it is wrong to deny vitality to nonhuman bodies, forces, and forms, and that a careful course of anthropomorphization can

help reveal that vitality, even though it resists full translation and exceeds my comprehensive grasp.¹

Early modern philosophy scholarship speaks of ‘vitalism’ to mean the claim that ‘mind extends across all of matter’, e.g. in Margaret Cavendish: “Cavendish was also clearly influenced by the vitalist movement of the mid-seventeenth century, which maintained that nature is living and self-aware (although she denied the vitalist “spirit” of nature)”² – one would love to know, what vitalist “movement”? More confusingly, Aristotle is often described as a vitalist: for the eminent historian of medicine Mirko Grmek, “Aristote poursuit un projet de type vitaliste”³; for the Spinoza scholar Paul Vernière, Spinoza’s letter to Oldenburg expresses a “vitalist conception of the universe.”⁴ One could go on in a kind of Borgesian encyclopedia mode: sometimes it is Leibniz who is a vitalist, sometimes it is even Locke, Hume or Adam Smith...⁵ To partly bracket off this kind of loose and/or madly erudite usage, one could start by taking seriously that vitalism is necessarily post-Cartesian, in the sense that it is a doctrine, or family of doctrines, which seeks to conceptualize the unique or specific nature of living entities, partly in reaction to the success of (ontological, or scientific, or even heuristic) mechanism and its array of mechanistic models and analogies.⁶

In a more precise manner, vitalism is also used, often pejoratively, to refer to the ideas of biologists like Hans Driesch, namely, the entelechy understood, rightly or wrongly, as an internal life-force (worse, an *uncaused* causally efficacious internal life-force), and philosophers like Henri Bergson – who in fact did not hold much the same view at all, as can be seen from his explicit criticism of Driesch’s vitalism of “internal purposiveness” in *Creative Evolution*:

The idea of a finality (*better rendered ‘purposiveness’, CW*) that is always internal is therefore a self-destructive notion. . . . There lies the stumbling-block of the vitalistic theories. . . . the ‘vital principle’ may 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.⁷

Bergson’s response to this claim of a life-force in all living organisms is to ask: where? at what level? He expresses doubts that nature can be interpreted strictly in terms of this internal “finality” (teleology, purposiveness).⁸ In passing, I should add that, contrary to popular misconceptions, Bergson’s *élan vital* does not belong to the living organism itself. As Andy Wong puts it, “Bergson has never privileged

'life' as the sole concern in his philosophy. 'Life', for Bergson, is not the master concept from which all other Bergsonian notions are deduced."⁹

If we distinguish between strong and weak versions of vitalism, in which strong vitalism matches the widely held view of vitalism (as a doctrine of an irreducible life-force, ontologically apart from the rest of physical nature), then Bergson is definitely not a strong vitalist: "Since Bergson's account of life and matter is that they consist in two different tendencies instead of two different substantial entities, his philosophy of life does not fit into vitalism in a conventional sense."¹⁰ And this kind of distinction is popular in recent theoretical biology, as well: in a recent review of anti-reductionist trends in different biological fields (systems biology, ecology, developmental biology, etc.), a distinction is made between organicism – the reasonable view – and vitalism, in which "living matter is ontologically greater than the sum of its parts because of some life force ("entelechy," "*élan vital*," "*vis essentialis*," etc.) which is added to or infused into the chemical parts"¹¹; which perfectly matches my distinction between strong (metaphysical) and weak (heuristic, functional, constructivist) vitalism.

But is the problem of vitalism – of understanding vitalism – entirely reducible to a convenient distinction between strong and weak forms of this doctrine? I say 'convenient' because this distinction typically presents the stronger form in such a way that the 'intelligent vitalist', to modify a phrase of Deleuze's¹², is necessarily critical of it, exactly like Bergson contra Driesch above. In fact, it seems rather facile to pull a distinction between 'metaphysics' and 'science' or 'metaphysics' and post-critical philosophy, or a philosophy of intuition, out of one's hat – reminiscent of the nineteenth-century Paris physician Jean Bouillaud, contributing an entry on vitalism to a medical dictionary, and apologizing for the presence of metaphysics therein: "I admit that metaphysics is quite out of place in a dictionary of practical medicine and surgery, but how can one write an article on Vitalism without delving at least in part into the dark depths of metaphysics?"¹³ As Bouillaud seems to say almost despite himself, it is hard to fully do without metaphysics in reflecting on vitalism, and, as I will suggest in closing, the distinction between strong and weak forms of this doctrine (or metaphysical and non-metaphysical forms) may be neither definitive, nor entirely reliable.

Thus, instead of rehashing a version of the opposition between strong and weak vitalisms, and showing how the author of choice (Théophile de Bordeu? Xavier Bichat? Bergson? Driesch? C.H. Waddington? and so on) does not defend the strong version of the claim, and hence is immune to the standard objections of

irrationalism, antinaturalism and so forth, I will proceed somewhat differently, in a partly historical and contextual fashion, and I shall focus on one of the classic rhetorical postures of vitalism: Hippocratism. My attention to this issue was sparked by the statement in *another* nineteenth-century French medical dictionary, this time by the physician Robert-Hippolyte Brochin, in 1889. Vitalism begins, according to Brochin, with “le vitalisme empirique ou *naturisme* d’Hippocrate.”¹⁴ Lest we be thrown off by more contemporary resonances of the term ‘*naturisme*’, let me clarify that the phrase in a Hippocratic context refers to the idea of *natura medicatrix* (or *vis medicatrix naturae*, Nature as the healer, the source of equilibrium and mediation).¹⁵ What it means for vitalism to be equated with Hippocratism – if we understand this equation, neither as a species of ‘medical fact’ nor as some holistic higher truth, but as a rhetorical posture, or a conceptual persona – shall be my main focus in what follows.

Vitalist discourse has been associated for centuries – Brochin’s comment in the late 19th century is merely an example – with Hippocratism, itself a non-stable and non-monolithic medico-theoretical tradition (and reinvented tradition) which constantly stresses notions of ‘the whole’, ‘the circle’, ‘Nature as a healer’. And this standard opposition between, on the one hand, mechanism-experimentalism-interventionism and on the other hand, vitalism-holism-Hippocratic observationalism has had a major effect on the exclusion of the Montpellier ‘school’ from mainstream history of medicine.¹⁶ Now, to put it in a short formula, I believe what this yields as a theoretical construct is a kind of *holism without appeal to ontology*.

Hippocratism is primarily associated with observational, “expectant” medicine. This notion is usually framed in terms of the opposition between the more interventionist, experimentally focused school of medicine, and the non-interventionist, “expectant” approach which seeks to not intervene and thus modify the balancing act of Nature.¹⁷ Curiously, this opposition is both an ancient one (in Greek and Roman medicine) and a nineteenth-century one (between Montpellier vitalism and the more clinical, experimental Paris school). Thus Edouard Auber opposed the “patience” of the Montpellier School to the impatient, “frenetic activity” of the Paris School.¹⁸ And indeed, the prominent Montpellier vitalists – Théophile de Bordeu, Jean-Joseph Ménuret de Chambaud, Henri Fouquet and later Paul-Joseph Barthez to mention the interesting ones – claim to be empiricists, but of a particular sort, given to emphasizing observation, praising Hippocrates (and the ‘English Hippocrates’, Thomas Sydenham, of whom Bordeu says that he should be considered an honorary Montpellier physician¹⁹), and downplaying the merits

of experimentation *qua* intervention. Ménéuret opposes Hippocrates and Galen: “Hippocrates was the first and best of the *observer* physicians.”²⁰ Bordeu, in this respect calling attention to the ‘constructed’ nature of the reference to antiquity – its postmodern character, as it were – asks, in a section of his *Recherches sur le tissu muqueux ou l’organe cellulaire, et sur quelques maladies de la poitrine* (1767): who reads Hippocrates today? And Bordeu answers: only a privileged few; he proceeds to explain why any good physician should.²¹ Which leads back to the theme of the *observer* physician.

Again, like the Hippocratic reference overall, this *observer* attitude is of course a conceptual construct, it is not self-evident or transparent. The problem with extending far backwards in time as that one runs the risk of taking the Hippocratic reference too literally, or in an uncontextualized, ‘ontological’ sense. If we treat it as a conceptual construct, we can see that it comprises various elements, including a professed hostility to vivisection, a scorn for the anatomical ‘gaze’ but also thus – I suggest and will return to this in closing – a non-ontological commitment, that is, a sense that the Hippocratically inspired physician or *médecin-philosophe* observes, studies regularities or dysfunctions (fevers and other crises), but does not posit ‘vital principles’ (metaphysical vitalism) or ‘atomic principles’ (mechanistic atomism). And this attention paid to regularities or otherwise *systemic* features of the organism has a name: it is a species of *holism*. This holism is expressed in 18th-century terms in the language of the “animal economy,” in fact a proto-organism concept, the chief metaphor of which was the bee-swarm: individual bees are to the swarm like organs are to the whole organism.²²

I shall now discuss these three key features of ‘Hippocratic vitalism’ (the observational emphasis, holism and apparent – but deliberate – archaism) in turn.

THE RHETORIC OF OBSERVATION

There are actually several motivating factors in the vitalists’ strategic usage of Hippocratic references. Aside from the rather empty referrals to the Hippocratic *enormon* as an ancestor of the Vital Principle (or the principle of a healing Nature, *natura medicatrix* in general), the most obvious motivation is to underscore the primacy of observation, following from the idea of ‘expectant medicine’, a non-interventionist medicine which, “in contrast to the activist medicine of blood-letting and purging, which poses grave risks to the patient, must “compromise with a powerful nature whose laws he ignores . . .”²³ This patient, observant attitude accords with an idea of Nature as never fully showing itself in any one

instant, so that the wise physician, in Barthez's terms, has to work towards the "full system of knowledge of the art of healing."²⁴ By extension, the notion of the 'critical moment' in an illness does not just highlight the role of the physician as observer, but also, of the necessarily temporal dimension of medicine, in contrast to the mechanical perspective. That is, if the body is just a machine (or, just *like* a machine, as Baglivi, Boerhaave or Descartes might have it), the notion of disease and its stages (thus its temporal character) seems quite absent.²⁵

This is one of the messages of Bordeu's long tour de force article for the *Encyclopédie*, "Crise," where he returns to an idea he had suggested in his main work, the *Recherches anatomiques sur la position des glandes* (1751), that it is important to try and correlate the medical phenomena observed in the body *at a given time* with the workings of specific organs, that is, to seek to correlate (organ) structure and function *temporally rather than just spatially*.²⁶ In a way that will become explicit (and familiar) in some critiques of mechanism and behaviorism in early twentieth-century organicism (e.g. Kurt Goldstein, Maurice Merleau-Ponty and later, Charles Taylor²⁷), the idea here is that to do justice to the organism, it cannot be treated just like a machine, not so much in terms of the whole: parts relation (treated below under the rubric of holism) as of the inherently temporal character of the organism.

Ménuret emphasizes how the distinction between observation and experiment is of special relevance to living beings:

As we move from the physics of simple bodies to that of organized bodies, we see the rights of *experiment* (*expérience*) decrease, and the rule and usefulness of *observation* increase; the shape, bearing, location, structure – in a word, the anatomy of plants or animals, the different stages through which they pass, their motions, functions and life, etc., have only been seen by the observer-naturalist (*Observation, Enc. XI, 315a*).

And he adds a bit further on – blurring the human/animal divide or on the contrary reemphasizing an old sense in which the uniqueness of living beings is ultimately a way of defending anthropocentrism or the uniqueness of humans:

Man, however we consider him, is least well suited to being a subject of *experiment*; he is the most suitable, noblest and most interesting object of *observation*, and it is by observation alone that progress can be made in the sciences of man (*qui le regardent*); *experiment* here is often worse than

useless (*ibid.*).

When the Montpellier vitalists polemicize against experiment, it is because they think we cannot know Life through intervention (a category that includes vivisection). Some members of this group are more experiment-friendly than others, so it is not a univocal position either. It is not my intent here to seek to define the place of the vitalist understanding of ‘observation versus experiment’ in some kind of history of scientific observation, if such a history were possible. But it seems obvious that in the vitalist context, observation has become an “epistemic category,” to use Daston’s (artificially strict?) terminology.²⁸ Notice that observation for the vitalist is not so much a ‘positivist’ idea of collecting facts in order to aggregate them, as a kind of ‘existential attitude’, akin to that Canguilhem attributes to vitalism.

Canguilhem proclaims himself to be a vitalist and insists that vitalism has a specifically *philosophical* place, whether it is scientifically ‘validated’ or ‘refuted’, and apart from its status as a scientific ‘construction’. In this sense, he suggests, vitalism is not like geocentrism or phlogiston, i.e. two classic cases of scientific ‘errors’: it is not refutable in quite the same way; thus vitalism is “an ethics rather than a theory,” “an *exigence* of life in living beings”²⁹ – an approach towards living beings rather than an empirical (refutable) theory about them. I cannot develop this point here but Canguilhem, in my opinion, noticed a very important feature of any defensible vitalism: namely, that it does not reduce to empirical claims about the nature of life (life is self-organization; life is reproduction; life is mind; etc.).

The Hippocratically inspired emphasis on observation over and against experiment, as a vitalist motif, can also remind us – again, as “an ethics more than a theory” in Canguilhem’s phrase, or in this case, as an ethically motivated and implicated theoretical position – of the way some biologists or philosophers rather angrily oppose a more ‘holistic’ sense of organism, which is valued, to a seemingly cold-hearted, analytic and dissective attitude associated with ‘mechanism’ and ‘reductionism’. We murder to dissect, or as Niels Bohr warned, we may kill the organism with our too-detailed measurements.³⁰

WHOLES AND SWARMS: THE CONCEPT OF HOLISM

As I have said, what the observer sees and the experimenter kills, so to speak, is the organism. Or, in the language of the Montpellier vitalists; the animal economy. Animal oconomy, was by no means a new word in the mid-eighteenth century. It had a Hippocratic pedigree dating at least back to the sixteenth century, when

it was used by Hippocratic physicians such as Louis Duret in Paris (who spoke of an “*oeconomia naturalis, vitalis et animalis*”³¹), and earlier by followers of Paracelsus, who added onto the older theological sense of an *oeconomia* as an order, an alchemical sense of the body as a distillation vat. But it is used loosely, *not as a technical term*. In the seventeenth century, it was extremely common, in Newtonian medicine³² and in Walter Charleton’s ‘Epicurean’ medicine. But it was explicitly turned into a new, polemical term by vitalists such as Ménuret, in his crucial contributions to the *Encyclopédie*, including “‘*Economie Animale*,” “‘*Inflammation*,” “‘*Mort*” and “‘*Observation*” and many others. It is difficult to express how original and how important Ménuret’s article “‘*Economie Animale*” is, especially for a yet-to-be written history of vitalism. For there, some of the Hippocratic inspiration allows Ménuret to construct a new form of vitalism, navigating in between the Charybdis of Stahl’s animism (explanations of life predicated on the soul) and the Scylla of iatromechanism (or medical mechanism).

My specific interest in the notion begins with Ménuret’s definition, “‘*L’économie animale, c’est l’ordre, le mécanisme, l’ensemble des fonctions qui entretiennent la vie*” (“‘*Economie Animale*,” *Enc. XI*, 362a). The vitalist emphasis here is absent from earlier articles of the *Encyclopédie* which use the notion, such as “‘*Équilibre*,” “‘*Faim*,” “‘*Fibre*,” “‘*Foie*” and “‘*Grossesse*.” When Ménuret or Bordeu use the phrase it has a distinctly assertive and programmatic character; it is there in the first and last sentences of Bordeu’s *Recherches anatomiques*; Ménuret speaks of how the mechanists with their ordinary physical laws will never understand the workings of the animal economy (“‘*Economie Animale*,” *Enc. XI*, 364b). Indeed, the number of doctoral dissertations explicitly devoted to some aspects of the animal economy concept, particularly in Montpellier, in the late eighteenth and early nineteenth centuries, shows that it is almost a kind of trademark of the vitalists: consider titles like Jacques Guitard’s *Influence des corps célestes sur l’économie animale* and Raimond Laroque’s *De l’influence des passions sur l’économie animale, considérée dans les quatre âges de la vie* (both from an VI).³³

The animal economy is both a *structural notion*, dealing with parts of the body and their location, and a *functional notion*, incorporating the “action and movement” of the parts; Ménuret also frequently speaks of their “usage.” And this temporal, active language of function and usage is often opposed to the static, atemporal character of purely anatomical approaches. How is it that a particular arrangement of parts differentiates a dead body from a living body? The difference lies not merely in the arrangement, but in the very nature of the parts: the vitalist will argue that individual organs, or even fibres, are not merely ‘masses’ or ‘aggregates’

but *lives*:

The body should only be considered as an infinite assemblage of small, identical bodies, similarly alive and animated, each possessing a life, an action, a sensibility – [that is] both a specific, particular interaction (*jeu*) and movement, and a common, overall life and sensibility. All parts contribute in their own way to the life of the entire body, and as such they reciprocally correspond to and influence one another (Ménuret, “Pouls,” *Enc. XIII*, 240a).

Ménuret suggests that “we cease to consider the human or animal body as the mechanists do, namely, as a crude machine in which all actions and parts are independent of one another” (*ibid.*). The key metaphor for this is the bee-swarm, in Bordeu’s 1751 *Recherches anatomiques sur la position et la fonction des glandes*:

Might I make use of a comparison which, however rough, may be useful?

I compare the living body, in order to properly assess the particular action of each part, to a swarm of bees which cluster together, and hang from a tree like a bunch of grapes; I find the image . . . that one of the lower organs was an *animal in animal*, to be quite helpful. Each part is, so to speak, not quite an animal, but a kind of independent machine which contributes in its way to the general life of the body.

Hence, following the comparison to a bee-swarm, it is a whole stuck to a tree branch, by means of the action of many bees which must act in concert to hold on; some others become attached to the initial ones, and so on; all concur in forming a fairly solid body, yet each one has a particular action, apart from the others . . .³⁴

Bordeu uses the image of a circle, which we would today describe as ‘circular causality’; other vitalists including La Caze speak of the “cercle d’action” which exists in the body and render mechanistic explanations of cause and effect inapplicable therein.³⁵ Even Boerhaave (who was one of La Caze’s mechanist targets in this passage) says that “It is clear, according to the most true words of Hippocrates, that *in our body, as in the circle, neither a beginning can be found, nor an end exists*; its parts are indeed so entwined and tied up with others that the single parts are dependent on the whole.”³⁶ The swarm and circle are a vitalist metaphorical constant: in the article “Observation,” Ménuret mentions the bee-swarm and Bordeu in order to emphasize that life in the body occurs, or is best

described as, a “connection of actions” (“*liaison d’actions*”):

One could . . . compare man to a flock of cranes which fly together, in a particular order, without mutually assisting or depending on one another. The Physicians or Philosophers who have studied and carefully observed man, have noticed this sympathy in all animal movements – this constant and necessary agreement in the interaction of the various parts, however disparate or distant from one another; they have also noticed the disturbance of the whole that results from the sensory disagreement of a single part. A famous physician (M. de Bordeu) and an illustrious physicist (M. de Maupertuis) likewise compared man, from this luminous and philosophical point of view, to a swarm of bees which strive together to hang to a tree branch. One can see them pressing and sustaining one another, forming a kind of whole, in which each living part contributes in its way, by the correspondence and direction of its movements, to sustain this kind of life of the whole body, if we may refer in this way to a mere connection of actions (*liaison d’actions*) (*Enc. XI, 318b-319a*).

Whether the term used is ‘metaphorical’, like the bee-swarm, ‘technical’, like that of ‘organic sympathies’, or somewhere in between the two, like the ‘circle of action’, we can see that Ménuret (and Bordeu) are trying to articulate a structural, relational concept of interaction amongst living parts (“lives”) which does not rely on strictly linear causality. This is also shown by the frequent usage of the Hippocratic maxim, ‘everything concurs, consents and conspires together in the body’.³⁷ The forces and actions of the animal economy are too intimately intertwined to be quantified according to purely mechanical laws of force and motion.

An additional point in Fouquet’s article “Sensibilité” which points towards a kind of minimal credo of ‘holism’, is that Haller’s vivisection experiments³⁸ also neglect, and of course destroy the “solidarity” of parts with each other. The idea is that once one particular area has been irritated, it draws to itself the entire sensitivity of a nervous centre, with a consequent loss in organic “solidarity” or “consensus” of the parts, as Fouquet says.³⁹ “Consensus” functions like a technical term here, similar to “conspiration,” “coordination,” “connection” and “sympathy.” That is, all of these are terms meant to describe ‘synergies’ in the organism, typically presented as non-mechanistic or non-reducible to basic mechanistic properties. To give two examples from the later decades of the century, Diderot describes organismic unity as the “coordination of molecules” in the *Éléments de physiologie*,

and Vicq d'Azyr states that when we study cadavers, “all connection, all sympathy is lost.”⁴⁰ Similarly, Ménuret in “Observateur” criticizes the physiologists who isolate functions without calling attention to their mutual action and influence, what vitalists called the “circle of action.”

The forces and actions of the animal economy are too intimately intertwined to be quantified according to purely mechanical laws of force and motion. That the image or metaphor of the bee-swarm and its close analog, the image of the musical instrument with vibrating strings producing a unified resonance, is not merely poetic inspiration but is interwoven with the ‘technical’ developments of the vitalists, can be seen in Ménuret’s article “Pouls,” this time influenced, not so much by Hippocratism as by the Chinese medicine of the pulse.

VITALISM: ARCHAISM OR AVANT-GARDE?

As I have shown elsewhere, the *montpelliérains* are not *neo-vitalists* like Hans Driesch in the late nineteenth and early twentieth centuries: they do not look for a metaphysical foundation for the inquiry into organic nature, and specifically do not ‘multiply entities’ by suggesting that there are, e.g. “entelechies,” that is, non-physical causes of physical events. However, *historically* it is not clear that there is anything like a ‘paradigm’ here (whether it makes any sense at all, or is useful, to search for paradigms, is beyond the scope of the present essay). There are some distinctive, useful heuristic concepts such as the animal economy or *organisation*, which combine structural and functional levels of explanation in an original way; and there are constant traits found in the various versions of the theory, such as the ‘dialectical’ relation to mechanism and animism; the opposition between observation and experiment with the related invocation of Hippocrates and Hippocratism, and the focus on temporal and dynamic features of organisms. But there is not a fully coherent doctrinal whole. However, this does not diminish the interest of the vitalist outlook, historically: my task is then to seek to render intelligible the occasionally archaic-seeming, patchwork theory. Indeed, the archaism— here with the case of Hippocratism — is more of an appearance than anything else. Commentators often react with some scorn to this overt invocation of a very ancient medicine over and against ‘modern’ mechanical medicine, but it must be understood in context, including the vitalist emphasis on observation contra experiment.

Rather than being a sign of archaism, a ‘return’ to humoralism,⁴¹ the vitalist appeal to Hippocrates is something new. As we know from other historical examples

(such as the tale of Machiavelli putting on a toga in order to write or Robespierre's 'return' to Rome to think present-day revolution⁴²), archaism is a typical feature of revolutionary rhetoric, as it connotes 'new beginnings'. And Ménéuret bears witness exactly to this, with his invocation of Hippocrates as the father for a new medicine finally about to emerge: "*La Médecine paroît être sur le point d'une grande révolution; les systèmes bien appréciés sont réduits à leur juste valeur ; plusieurs médecins s'appliquent comme il faut à l'observation; ils suivent la nature, ils ne tarderont pas à faire revivre la Médecine d'Hippocrate, qui est la véritable Médecine d'observation.*"⁴³ There is here an explicit language of revolution, which can be observed a few years earlier in Diderot as well, when he speaks of a coming "revolution in the sciences" in the *Pensées sur l'interprétation de la nature*:

We are on the verge of a great revolution in the sciences. Given the taste people seem to have for morals, *belles-lettres*, the history of nature and experimental physics, I dare say that before a hundred years, there will not be more than three great geometricians remaining in Europe. The science will stop short where the Bernoullis, the Eulers, the Maupertuis, the Clairaut, the Fontaines and the D'Alemberts will have left it. . . . We will not go beyond.⁴⁴

For Diderot, the coming revolution in the sciences will be non-mathematical and will focus instead on the emerging ontology of Life (and the newly constituted sciences thereof). In the case of Ménéuret, the revolution wears the colors of a rebirth or renaissance of Hippocratism! Indeed, even in D'Alembert's very visible "Discours préliminaire" to the *Encyclopédie*, Hippocrates is presented as a radical reformer like Francis Bacon, and in his article "Expérimental" D'Alembert presents Hippocrates as a father of the experimental method.⁴⁵

If it is not archaic, the 'patchwork' quality of the *montpelliérain* conceptual framework would still suffice to disqualify it from 'paradigmatic' status, in the eyes of commentators for whom iatromechanism possesses a comfortable theoretical foundation, in conformity with the methodological and epistemological aspirations of the Scientific Revolution, whereas vitalism lacks such a foundation, and, in the words of Ernst Mayr, never reached the status of a "cohesive theory": it was primarily a negative movement, against mechanism, against physicalism, against the animal-machine, with great "explanatory diversity."⁴⁶ Nor can Hippocratism provide it. Even if we disagree with Mayr, and there are various reasons to do so, including his extremely flat vision of scientific progress, truth, validation, etc., it is true that – fortunately? – there is no monolithic vitalist doctrine or *Denkform*.

However, there are unmistakable signs in the vitalist conceptual edifice of a systematization of fields of inquiry, which in the earlier part of the period examined here would have been called ‘animal economy’, and which bears real resemblance to what was later called ‘biology’ (nineteenth-century discussions of vitalism repeatedly ask if it is metaphysics or a new science; some sought to discredit vitalism by equating it with metaphysics, while others found this to be its strong point!). Thus Barthez insists that the separate classes of animals and plants should be brought together in a common scale of living beings⁴⁷ and defines the objects of his planned “science of man” as: “the forces of the Vital Principle in man, their communications or sympathies, their unification into a system, their distinctive modifications in the various temperaments and ages, and their extinction at the time of death” (*ibid.*, 35-36).

The point isn’t to say that Barthez rather than Treviranus and Lamarck is the founder of ‘biology’ but that the conceptual space of the animal economy, as sketched above, is close to that of biology, albeit not on reductive grounds. Indeed, Jacques Lordat, Barthez’s main disciple (he was amongst other things his literary executor), did indeed restate the doctrine of the Vital Principle as ‘biology’, adding embryological and cerebral analyses to complete the picture.⁴⁸ So the archaic is the new! And, one wishes to add, the demarcation between science and metaphysics never happened; especially if one considers just how much spiritualist metaphysics got reinvested into the vitalist toolbox and vocabulary, in the mid-to late 19th century.⁴⁹ (This is also a far cry from Driesch’s very empirical entelechies which, in good Aristotelian fashion, were meant to legitimate a metaphysics.) Brooke Holmes points to something similar, I think – keeping in mind my points about the novelty of ‘Hippocratic’ archaism in vitalism, and the irreducibility of metaphysics therein – when she writes,

because vitalism recurs within the history of the life sciences across a field of discontinuities, it points to the entanglement of the philosophy of life within the timebound “construction” of the life sciences. This entanglement points to the persistence of the Greeks transhistorically, blurring any strict boundary between antiquity and modernity.⁵⁰

The transhistorical dimension Holmes evokes is not that of a higher, *a*historical truth. And one could bring up different cases of how Hippocratism was used in more less ‘modernizing’ ways in the history of medicine (like, e.g., the way the psychiatric reformer Philippe Pinel was described as the “French Hippocrates” in the early 19th century⁵¹). But my concern is more with how this raises the question,

which Canguilhem took more seriously than Bergson did, of the ‘truth’ of vitalism and its potentially metaphysical status.

CONCLUSION: BERGSON, CANGUILHEM AND VITALISM AS METAPHYSICS

Is vitalism – and/or, the ‘family’ of doctrines insisting on the ‘singularity’ of life – necessarily a metaphysics? As has been observed by several commentators, the common theme connecting Bergson and Canguilhem is the affirmation of life’s creative character.

The living is precisely a center of reference. It is not because I am thinking, it is not because I am a subject in a transcendental sense; it is because I am alive that I must look to life for the reference of life.⁵²

But curiously, just as strongly as Canguilhem emphasizes this ‘reality’ of life and the living – in this, coherent with Hippocratic references including the circle of action –, he also stresses that it is not an empirical state of affairs: “It is normal, if vitalism is primarily an *exigence* that it is difficult to formulate it in a series of determinations.”⁵³ Is vitalism a metaphysics? Here, it is not just a ‘way of knowing’ or an epistemology. Yet at the same time, an interest in the phenomenon of vitality itself is not necessarily a metaphysics, is it? As Claude Bernard put it,

In order to study the phenomena pertaining to living beings and discover the laws that govern them, it is not necessary to know the essence of life itself.⁵⁴

Bergson himself, commenting on Bernard, insisted on this non-metaphysical position of the inquiry into Life.⁵⁵ One should recall that Bergson himself rejected metaphysical (or ‘strong’) vitalism, and presented more of a philosophy of ‘process’, of ‘striving’, of ‘impetus’ (in which even the (poorly?) named *élan vital* turns out to be not specifically *vital*⁵⁶); as I mentioned at the outset, he speaks of the notion of ‘vital principle’ as a kind easy way out, a label covering up our ignorance: “the ‘vital principle’ may indeed not explain much, but it is at least a sort of label affixed to our ignorance.”⁵⁷ In Ansell-Pearson’s words, “If vitalism entails an appeal to some mysterious vital “stuff ” that is then held to be the transcendent motor or agent of evolution, then Bergson is no vitalist.”⁵⁸ That said, one can also find plenty of (weakly) vitalist statements in Bergson’s work, such as when he affirms that “life is not composed of physico-chemical elements any more

than a curve is composed of straight lines.”⁵⁹ This implies that the distinction between strong and weak vitalism (a) is a useful one but must be handled with care, i.e. contextually and relationally, and (b) applies only in part to authors such as Bergson and Canguilhem, who despite their criticisms of certain forms of strong vitalism, can sometimes also be seen to defend a version of it.

I am not sure in the end how useful the category of vitalism is for understanding Bergson; however, conversely, Bergson is useful for our efforts to understand this category and its implications – even if he seeks to keep some distance from it. It is well known that it was the reading of Bergson that pushed Canguilhem into a much more favorable relation to vitalism.⁶⁰ As regards my approach here – reflecting on the Hippocratic motif in order to question the metaphysical reading of vitalism – Canguilhem played on the different dimensions of this issue, stating on the one hand that Montpellier vitalism in the eighteenth century was ‘scientifically reasonable’ and non-metaphysical, but also, hinting that maybe vitalism could never do without a metaphysics. In reflecting on the Hippocratic motif in vitalism, notably its insistence that Life resists the experimenter, or conversely, that if the experimenter wants to grasp something about Life it will have to be without torturing or at least radically intervening in it, I have sought to raise this question of the metaphysical and/or scientific status of vitalism from a different angle.

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NOTES

1. Jane Bennett, *Vibrant Matter: A Political Ecology of Things*. Durham, N.C.: Duke University Press, 2010, 122.
2. Anne M. Thell, “[A]s lightly as two thoughts”: Motion, Materialism, and Cavendish’s Blazing World.” *Configurations* 23 (2015): 1-33, here 9n.
3. Mirko Grmek, “La conception mécaniste de la vie,” in *La Première révolution biologique*. Paris: Payot, 1990, 117. The important case of whether or not Aristotle is a vitalist deserves further study – contrast Walter Pagel’s ahistorical, and unargued-for statements on Aristotle and Harvey are vitalists (“Aristotle’s conception of the vital principle, the Anima”; “W. Harvey: Some Neglected Aspects of Medical History,” *Jr. Warb. & Court. Inst.* 7 (1944), 147; “Harvey advocated vitalism”: “Harvey’s Vitalistic Criticism of Ancient Materialism,” in Pagel, *William Harvey’s Biological Ideas. Selected Aspects and Historical Background*. Basel: Karger, 1967, 249) and Hans Driesch (for whom Aristotle was “the first exponent of a scientific ‘vitalism’”; his “theory of life is pure Vitalism”: *The History and Theory of Vitalism*, trans. C. K. Ogden (London, 1914), 11, 19) with Sophia Connell’s carefully argued-for position according to which, given that “soul and form are causally efficacious and can be immaterial” for Aristotle, he “turns out, in this context at least, to be a vitalist” (*Aristotle on Female Animals: A Study of the Generation of Animals*, Cambridge: Cambridge University Press, 2016, 197). Aristotle is a theorist of the vital principle in this sense, given that “soul (*psuchê*) [...] plays a role in the processes of animal generation”; “*Psuchê*, for Aristotle, indicates whatever it is that makes something alive, including a wide variety of living functions and activities” (198).
4. Vernière, *Spinoza et la pensée française avant la Révolution*, Paris: PUF, 1954, 2nd edition 1982, 599.
5. On Leibniz as a vitalist: John Henry, “Medicine and Pneumatology: Henry More, Richard Baxter, and Francis Glisson’s *Treatise on the Energetic Nature of Substance*,” *Medical History* 31 (1987), 16 and Jean-Marie Brohm, “Le corps, un référent philosophique paradoxal,” in Brohm, *Ontologies du corps*, Nanterre: Presses universitaires de Paris Nanterre, 2017, online at <https://books.openedition.org/pupo/7126>); for reflections on odd claims about Locke, Hume and Smith as vitalists see C.T. Wolfe, “Smithian vitalism?,” *Journal of Scottish Philosophy* 16:3 (2018): 264-271.
6. For further suggestions on this point see Charles Wolfe, “Vitalism in early modern medical and philosophical thought,” *Encyclopedia of Early Modern Philosophy and the Sciences*, eds. D Jalobeanu and CT Wolfe (2020) https://doi.org/10.1007/978-3-319-20791-9_314-1 and “Expanded mechanism and/or structural vitalism: further thoughts on the animal economy,” in CT Wolfe, P. Pecere and A. Clericuzio (eds.), *Mechanism, Life and Mind in early modern natural philosophy* (Dordrecht: Springer, forthcoming)
7. Henri Bergson, *Creative Evolution*. Trans. Arthur Mitchell. New York: Random House / Modern Library, 1944, 48-49 (modified); *L’évolution créatrice*, Paris: PUF, 1941/1991, 41-42. See for discussion, Keith Ansell-Pearson, “Bergson’s Encounter with Biology: Thinking Life.” *Angelaki* 10:2 (2005): 59-72.
8. M. & A. Wolsky, “Bergson’s vitalism in the light of modern biology.” *The crisis in modernism*.

Bergson and the vitalist controversy. Eds. F. Burwick & P. Douglass. Cambridge: Cambridge University Press, 1992, 156f.

9. Andy Wong, *Critical Life: Bergson, Canguilhem and the Critical Investigation of Life and the Living*, PhD thesis, Dept of Philosophy, U. of Liège, 2016, 26.

10. *Ibid.*, 27.

11. Scott F. Gilbert and Sahotra Sarkar, “Embracing Complexity: Organicism for the 21st Century.” *Developmental Dynamics* 219 (2000): 1–9, here, 1.

12. Deleuze speaks of “intelligent materialists,” who “should speak of power rather than of bodies” (*Spinoza and the Problem of Expression*, trans. M. Joughin. New York: Zone Books, 1990, 257).

13. Jean Bouillaud, “Vitalisme.” In *Dictionnaire de médecine et de chirurgie pratiques*. Eds. Gabriel Andral *et al.* vol. XV. Paris: Méquignon-Marvis, J.-B. Baillière, 1836, 759.

14. Robert-Hippolyte Brochin, “Vitalisme,” in *Dictionnaire encyclopédique des sciences médicales*, éd. A. Dechambre, 5^e série (U-Z), vol. III, Paris: Masson, puis Asselin et Houzeau, 1889, 719-728; 720. For more on nineteenth-century Hippocratism see Sebastian Normandin, *Visions of vitalism : medicine, philosophy and the soul in nineteenth-century France*, PhD thesis, Department of History, McGill University, 2005.

15. Georges Canguilhem, “Aspects du vitalisme.” In Canguilhem, *La connaissance de la vie*. Revised edition. Paris: Vrin, 1965, 86. On Canguilhem’s reading of antiquity, including Hippocratism, see Brooke Holmes, “Canguilhem and the Greeks: Vitalism between History and Philosophy,” in *Vitalism and its Legacies in 20th-century Life Science and Philosophy*. Eds. C. Donohue, C.T. Wolfe. Cham: Springer, forthcoming.

16. Witness Joseph Schiller’s strident polemic in his history of physiology, against these misty-eyed holists, in favor of proper mechanists like Descartes, Bernard and Lamarck: *La notion d’organisation dans l’histoire de la biologie*. Paris: Maloine, 1978. When the distinction between organicism and vitalism is made, this can complicate the exclusionary task, but that is another story (see Charles Wolfe, “Varieties of organicism – a critical analysis,” in M. Mossio, ed., *Organization in Biology*, forthcoming)

17. Dominique Boury, “Hippocrate.” *L’Encyclopédie du Rêve de D’Alembert de Diderot*. Eds. Sophie Audidière, Jean-Claude Bourdin and Colas Duflo. Paris: Éditions du CNRS, 2006, 216-218.

18. É. Auber, *Philosophie médicale. Esprit du vitalisme et de l’organicisme, ou Examen critique des doctrines médicales des écoles de Paris et de Montpellier*. Paris: Baillière, 1855, 34; cf. Raphaële Andrault, “Définir le vitalisme. Lectures de Claude Bernard.” *Claude Bernard et la méthode de la physiologie*, Eds. F. Duchesneau *et al.* Paris: Editions Rue d’Ulm, 2013, 135.

19. Théophile de Bordeu, “Crise (Médecine).” *Encyclopédie ou Dictionnaire raisonné des arts et des métiers*, eds. J. D’Alembert & D. Diderot, vol. IV, Paris: Briasson, David *et al.*, 1754, 471-489, here 477b (articles from the *Encyclopédie* will hereafter be cited by title, followed by *Enc.*, volume and page number).

20. “Observation.” *Enc.*, vol. IX, 1765, 316a.

21. To be clear, I shall not provide a full historical reconstruction of the interrelations between vitalism and Hippocratism (although the latter is not unrelated to the topic of parrhesia, if we recall Foucault's reference to Hippocratic physicians as "parrhesiasts", guides to truth (Alexandre Klein, "La métaphore chez les hippocratiques : entre pouvoir et éthique," *Que peut la métaphore ? Histoire, savoir et poétique*. Eds S. David, J. Przychodzen, F. Boucher. Paris: L'Harmattan, 2009, 81-89; Michel Foucault, *Le Courage de la vérité. Le gouvernement de soi et des autres* (1984). Paris: Gallimard/Seuil, coll. Hautes Etudes, 2009), and examples of this sort abound even in the restricted context of Enlightenment vitalism in Montpellier, e.g. Barthez's lecture on the "genius of Hippocrates": see R. Rey, "Anamorphoses d'Hippocrate au XVIII^e siècle." In *Maladie et maladies, histoire et conceptualisation. Mélanges en l'honneur de Mirko Grmek*, ed. Danielle Gourevitch. Geneva: Droz, 1992, 257-276. Sebastian Normandin has noted that physicians with a theoretical bent continued to use the Hippocratic philosophical tradition as a means of separating medicine from the many influences of the emerging biological sciences and the new realm of science generally: Normandin, *Visions of vitalism*. See also Ann F. La Berge, "The Rhetoric of Hippocrates at the Paris School," in David Cantor, ed., *Reinventing Hippocrates*. Aldershot: Ashgate, 2002, 178-199.
22. Cf. Sylvie Kleiman-Lafon and Charles Wolfe, "Unsystematic vitality: from early modern beeswarms to contemporary swarm intelligence," in *Active Materials*, eds. Peter Fratzl, Wolfgang Schäffner, Michael Friedman and Karin Krauthausen. Berlin: De Gruyter, 2021.
23. Dominique Boury, "Hippocrate," 218.
24. Barthez, *Nouveaux éléments de la science de l'homme*, 3^e édition, 2 vols., Paris: Germer Baillière, 1858 (first edition 1776), "Discours préliminaire," 33.
25. For an interesting attempt to derive normative notions such as a health from a mechanistic framework (with some echoes of Canguilhem, who presumably would have disagreed), see Lisa Shapiro, "The Health of the Body-Machine? or Seventeenth Century Mechanism and the Concept of Health," *Perspectives on Science* 11:4 (2003): 421-442.
26. Bordeu, *Recherches anatomiques sur la position des glandes*. Paris: Quillau père, 1751, § 127 and Bordeu, "Crise," 488.
27. Charles Taylor, *The Explanation of Behavior*. London: Routledge Kegan Paul, 1964; Charles Wolfe, "Was Canguilhem a biochauvinist? Goldstein, Canguilhem and the project of 'biophilosophy'." *Medicine and Society, New Continental Perspectives*. Ed. Darian Meacham. Dordrecht: Springer, 2015, 197-212
28. Lorraine Daston, "The Empire of Observation, 1600-1800." *Histories of Scientific Observation*. Eds. Lorraine Daston and Elizabeth Lunbeck. Chicago: University of Chicago Press, 2011, 81-113.
29. Canguilhem, "Aspects du vitalisme," 84, 86, 88.
30. Niels Bohr, "Light and Life", Part 2, *Nature* 133 (1933): 457-459, here 458; *Atomic Theory and the Description of Nature*, Cambridge: Cambridge University Press, 1961, 22. On Bohr's anti-reductionism about biology see Paul Hoyningen-Huene, "Niels Bohr's Argument for the Irreducibility of Biology to Physics." *Niels Bohr and Contemporary Philosophy*, Boston Studies in the Philosophy of Science.

Eds. J. Faye, H. Folse, Dordrecht: Kluwer, 1994, 231-255.

31. Duret, *Hippocratis magni Coacae Praenotiones* (1588), in Bernard Balan, “Premières recherches sur l’origine et la formation du concept d’économie animale.” *Revue d’histoire des sciences* 28 (1975), 301.

32. Theodore M. Brown, “From Mechanism to Vitalism in Eighteenth-Century English Physiology.” *Journal of the History of Biology* 7:2 (1974):179-216

33. Philippe Huneman, “‘Animal Economy’: Anthropology and the Rise of Psychiatry from the *Encyclopédie* to the Alienists.” In *The Anthropology of the Enlightenment*. Eds. Larry Wolff and Marco Cipolloni, Stanford: Stanford University Press 2007, 390 n. 1, and overall Charles Wolfe and Motoichi Terada, “The Animal Economy as Object and Program in Montpellier Vitalism.” *Science in Context* 21 :4 (2008): 537-579.

34. Bordeu, *Recherches anatomiques sur la position des glandes*. In *Œuvres complètes*, 2 vols., Paris: Caille et Ravier, 1818, xxxx.

35. Louis de La Caze, *Idée de l’homme physique et moral pour servir d’introduction à un traité de médecine*. Paris: Guérin & Delatour, 1755, 66-68. On the figure of the ‘circle of action’ in these texts, cf. Charles Wolfe, “Il problema del tutto e delle parti: il caso del vitalismo di Montpellier.” *Morfologie del rapporto parti-tutto*. Eds. Giuseppe D’Anna et al. Milano: Mimesis, 2019, 257-270; forthcoming in French in Bertrand Nouailles, (ed.), *Les équivoques du vitalisme*, Paris: Garnier.

36. “Discourse on the achievement of certainty in physics” (1715), § XXVII, in Herman Boerhaave, *Boerhaave’s Orations*, translated and edited by Elze Kegel-Brinkgreve & Antonie M. Luyendijk-Elshout. Leiden: E.J. Brill / Leiden University Press, 1983, 172.

37. Ménuret, “*Œconomie Animale*,” 363b.

38. Hubert Steinke, *Irritating experiments. Haller’s concept and the European debate on irritability and sensibility 1750-1790*. Amsterdam/New York: Rodopi, 2005

39. “Sensibilité,” *Enc.* XV, 46a, 51a, 51b.

40. Denis Diderot, *Œuvres complètes*. Eds. Herbert Dieckmann, Jacques Proust, and Jean Varloot. Paris: Hermann, 1975-, XVII, 297; Félix Vicq d’Azyr, *Traité d’anatomie et de physiologie avec des planches coloriées représentant au naturel les divers organes de l’Homme et des Animaux*, 2 vols. Paris: Didot l’aîné, 1786, 2.

41. Which it cannot be, since vitalism is by definition a post-iatromechanistic project which integrates the latter’s critique of humoralism, as noted by Huneman, “‘Animal Economy,’” 265. One could expand on this point and say that real vitalism – not the vague ideas attributed under that name to Aristotle, or Leibniz, or Harvey, or Spinoza – is a post-Cartesian reaction, in a world in which the soul can no longer be appealed to as an ontological and/or explanatory ground.

42. Machiavelli wrote to Vettori of his communing with the Ancients (in order to ‘found’ modern political thought): “When evening comes, I return to my house and go into my study. At the door, I take off my clothes of the day, covered with mud and mire, and I put on regal and courtly garments; and decently re-clothed, I enter the courts of ancient men, where, received by them lovingly, I feed

on the food that alone is mine and that I was born for. There I am not ashamed to speak with them and to ask them the reason for their actions; and they in their humanity reply to me. And for the space of four hours I feel no boredom, I forget every pain, I do not fear poverty, death does not frighten me. I deliver myself entirely to them” (Letter dated Dec. 10, 1513, in Machiavelli, *The Prince*, New York: Norton, 1992, 128). In 1940, Walter Benjamin wrote, echoing Marx’s 18th Brumaire, in his 14th thesis on the concept of history, about how ancient Rome functioned as a *Jetzt-zeit*, a ‘now-time’ for revolutionaries such as Robespierre: “To Robespierre ancient Rome was a past charged with now-time, a past which he blasted out of the continuum of history. The French Revolution viewed itself as Rome reincarnate. It cited ancient Rome the way a fashion cites a bygone mode of dress. Fashion has a nose for the topical, no matter where it stirs in the thickets of long ago; it is the tiger’s leap into the past” (Benjamin, *Selected Writings*, eds. M. Bullock & M.W. Jennings. Cambridge, Mass.: Belknap Press of Harvard University Press, 1996, vol. 4, 395).

43. “Observation,” *Enc. XI*, 316b, emphasis mine.

44. Diderot, *Pensées sur l’interprétation de la nature*, § 4, in *Œuvres complètes*, vol. IX, 30-31. On this passage see Charles T. Wolfe, “‘Cabinet d’Histoire Naturelle’, or: The Interplay of Nature and Artifice in Diderot’s Naturalism,” *Perspectives on Science* 17(1) (2009): 58-77.

45. D’Alembert, “Discours préliminaire,” *Enc. I*, xxiv; “Expérimental,” *Enc. VI*, 298. I thank an anonymous reviewer for this reference.

46. Ernst Mayr, *This is Biology: The Science of the Living World*. Cambridge, Mass.: Harvard University Press, 1997, 9. In a more historically sophisticated way, Raphaële Andrault also notes that there can be greater proximity between a mechanist and a vitalist in one timeframe, than between two purported ‘vitalists’ of different periods (“Définir le vitalisme”). As to the claim that vitalism is disqualified *qua* metaphysics, one would love to see a debate between Mayr and Connell, who writes: “Vitalism is a metaphysical rather than a scientific hypothesis since it is unfalsifiable. Although out of fashion, vitalism is not an entirely implausible position to maintain, particularly in developmental embryology” (*Aristotle on Female Animals*, 233, n. 154).

47. Barthez, *Nouveaux éléments*, vol. 1, 63-64.

48. Thierry Lavabre-Bertrand, *La philosophie médicale de l’école de Montpellier au XIX^e siècle*. Thèse de doctorat. Paris: École Pratique des Hautes Études, IV^e Section, 1992, 197-198, 201.

49. On Lordat, see Lavabre-Bertrand (*op. cit.*) and Dominique Raynaud, “La controverse entre organicisme et vitalisme. Étude de sociologie des sciences,” *Revue française de Sociologie* 39:4 (1998): 721-750.

50. Brooke Holmes, “Canguilhem and the Greeks.”

51. Jackie Pigeaud, *Aux portes de la psychiatrie: Pinel, l’Ancien et le Moderne*. Paris: Aubier, 2001, 242.

52. Canguilhem, “Le concept et la vie,” in *Études d’histoire et de philosophie des sciences*. Paris: Vrin, 1968, 352.

53. Canguilhem, “Aspects du vitalisme,” 86.

54. C. Bernard, “Histoire de l’expérimentation physiologique – l’art d’expérimenter sur les êtres

- vivants.” *Revue des cours scientifiques de la France et de l'étranger*, 6^e année, Paris: Germer Baillière, 1869, 194.
55. Bergson, “La philosophie de Claude Bernard,” in *La pensée et le mouvant*, Paris: PUF, 1998, 232-233
56. See Tano Posteraro, in this issue.
57. Bergson, *L'évolution créatrice*, *op. cit.*, 41 / *Creative Evolution*, *op. cit.*, 48; a similar point is in Bergson's letter to Floris Delettre, “Samuel Butler et le bergsonisme. Avec deux lettres inédites d'Henri Bergson.” *Revue anglo-américaine*. 8:5 (1936): 385-405 (thanks to Tano Posterano for this reference).
58. Keith Ansell-Pearson, “Bergson's Encounter with Biology,” 61.
59. *Creative Evolution*, 37 ; *L'évolution créatrice*, 31.
60. Xavier Roth, “Le jeune Canguilhem, lecteur de Bergson (1927–1939).” *Dialogue* 52 (2013): 625-647; Charles T. Wolfe and Andy Wong, “The Return of Vitalism: Canguilhem, Bergson and the Project of Biophilosophy.” In *The Care of Life: Transdisciplinary Perspectives in Bioethics and Biopolitics*. Eds. G. Bianco, M. de Beistegui & M. Gracieuse, Lanham, MD: Rowman & Littlefield International, 2014, 63-75.