

From substantival to functional vitalism and beyond, or from Stahlian animas to Canguilhemian attitudes

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I distinguish between what I call 'substantival' and 'functional' forms of vitalism in the eighteenth century. Substantival vitalism presupposes the existence of something like a (substantive) vital force which either plays a causal role in the natural world as studied by scientific means, or remains a kind of hovering, extra-causal entity. Functional vitalism tends to operate 'post facto', from the existence of living bodies to the desire to find explanatory models that will do justice to their uniquely 'vital' properties in a way that fully mechanistic (Cartesian, Boerhaavian etc.) models cannot. I discuss some representative figures of the Montpellier school (Bordeu, Ménéuret, Fouquet) as being functional rather than substantival vitalists. Time allowing, I will make an additional point regarding the reprisal of vitalism(s) in 'late modernity', as some call it; from Hans Driesch to Georges Canguilhem. I suggest that in addition to the substantival and functional varieties, we then encounter a third species of vitalism, which I term 'attitudinal', as it argues for vitalism as a kind of attitude.

I shall not speak here of 'organicism' proper but rather of vitalism; yet the main aspects of the doctrine or rather set of doctrines I shall discuss under the heading 'vitalism' will be their understanding of organic order, of what distinguishes organisms from inanimate beings, and so forth. Vitalism has suffered from its nineteenth-century reinterpretations in terms of 'vital forces' and 'entelechies', notably at the hands of Hans Driesch (Driesch 1914). It continues to be presented as a very extreme, almost mystical view in current biological and philosophical discourse: in a recent review essay on the

status of theoretical biology, we are told that “in vitalism, 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”¹; the authors prefer, precisely, the term ‘organicism’ for the family of theories they wish to defend. But when we consider the body of writings produced by the ‘Montpellier vitalists’, that is, the physicians associated with the Faculty of Medicine at the University of Montpellier in the second half of the eighteenth century (the school considered in doctrinal terms was extended into the early nineteenth century by figures such as Jacques Lordat, but on increasingly dogmatic, non-clinical bases), notably Théophile de Bordeu, Louis de La Caze, Henri Fouquet, Jean-Joseph Ménéret de Chambaud and, best-known, Paul-Joseph Barthez, we find no traces of such metaphysically laden vital forces – or hardly any traces, for Barthez flirts with the idea in the first edition of his *Nouveaux éléments de la science de l’homme* (1778; revised 1806) but gives up it subsequently.² Hence one can interpret this ‘Enlightenment’ form of vitalism as *functional* rather than *substantive*, as I have argued recently (Wolfe 2008, 2009b): it is more of an attempt to ‘model’ or ‘describe’ organic life without reducing it to fully mechanical models or processes, than an overt metaphysics of Life.

But perhaps we should not be too quick to dismiss the metaphysical commitments of vitalism and happily proclaim that it is a more ‘modern’, egalitarian vision of embodiment free from some of the aporias of the ‘dialectic of Enlightenment’ (as suggested recently by Elizabeth Williams, or in a quite different way by Peter Hans Reill; see Williams 2003, Reill 2005). That is, maybe it is impossible to have a viable concept of vitalism without also having some degree of a metaphysical commitment

¹ Gilbert and Sarkar (2000), p. 1.

² Barthez had initially asserted the existence of an independent vital force, but withdrew this and added a chapter to the second edition of his book entitled “Skeptical considerations on the nature of the vital principle” (Barthez [1858], III, p. 96f.; all translations are mine unless otherwise indicated). He warned that one should follow an “invincible skepticism” (p. 32) or a “reasonable Pyrrhonism” (p. 274) when it comes to the vital principle. He only “personified” the vital principle, he explains, for ease of argument (p. 126). What does it mean to investigate the nature of life skeptically? Contrary to what one might expect, it does not mean to approach vital phenomena with a demystifying, deflationary attitude, but rather, that Barthez only wants to attribute properties to the vital principle “that result immediately from experience” (*ibid.*).

towards either (a) the uniqueness of living beings within the physical universe (this is the classic version, that of Georg-Ernest Stahl and, differently, of Driesch's 'neo-vitalism') or (b) the idea that the act of understanding what is unique about living beings requires a certain kind of *attitude* (this is the modern version, articulated by Georges Canguilhem, who went so far as to proclaim himself a vitalist; see Canguilhem 1955, 1965).

In this paper I want to return to the relation between the Montpelliérain model of organism (organized bodies, organization, animal economy) and more metaphysically committed forms of vitalism such as Stahl's 'animism', focusing in particular on Stahl's *Theoria medica vera*, Bordeu's *Recherches anatomiques sur la position des glandes* (Stahl 1730/1860, Bordeu 1751), and Ménuret's articles in the *Encyclopédie*. I will suggest that the Newtonian-influenced, organizational, functional models of life developed by the Montpellier vitalists open onto an 'attitudinal' vitalism which can survive the various counter-arguments mounted over the course of the twentieth century, from the Vienna Circle onwards. But this attitudinal vitalism may still require (or 'be') a metaphysics.

1. Substantival versus functional vitalism

We are familiar, I think, with vitalism as a strong, ontologically laden commitment to the existence of certain entities or 'forces', over and above the system of causal relations studied and modeled by mechanical or mechanistic science, which itself seeks to express these entities or the relations between them in mathematical terms.³ This is a common, indeed dominant view of the subject, whether it is presented in positive terms, as a kind of commendable backlash against the de-humanizing, alienating trend inaugurated by the Scientific Revolution, which seeks to 'revitalize the world' (and one can hear echoes here of 'reenchantment'⁴) or in negative terms, as a

³ That this picture of 'mechanism' is itself quite caricatural or simplistic is not a topic for the present paper; I discuss the complexity of various forms of 17th and 18th century mechanism faced with Life in Wolfe (forthcoming 2010).

⁴ Cf. Elizabeth Williams' comment that Montpellier vitalism "entailed consequences markedly at odds with the universalizing discourse of Encyclopedist materialism, with its insistence on the uniformity of

kind of anti-scientific or ‘para-scientific’ trend which needs to be refuted (an example that comes to mind is Francis Crick’s rather confident pronouncement, sounding very much like someone who feels he has the whole scientific community behind him: “To those of you who may be vitalists, I would make this prophecy: what everyone believed yesterday, and you believe today, only cranks will believe tomorrow”⁵). And there is plenty of historical evidence that such a position existed – even if interpreters have regularly made the mistake of retrospectively projecting the category ‘vitalism’ backwards onto all sorts of disparate figures, from Aristotle to Harvey, from Glisson to Diderot, from Bichat to Bernard.⁶

But there is something wrong with this vision of things; not because we can adduce *one* counter-example (such as when, faced with the claim that all 18th-century materialists were atheists, we can put forth the case of mortalist physicians such as William Coward, for whom the soul is mortal yet is resurrected at the time of the Last Judgment⁷) but because an entire *school* does not fit the description: the so-called ‘Montpellier vitalists’, best known to eighteenth-century scholars because of their relation to Diderot (including his ‘postmodern’ usage of Bordeu as a fictional character in *D’Alembert’s Dream*⁸) and the *Encyclopédie*. And they are the ones for whom the term ‘vitalist’ was coined!

Who are they? Louis de Lacaze, Jean-Joseph Ménéuret de Chambaud, Henri Fouquet, Théophile de Bordeu and perhaps most famously, Paul-Joseph Barthez. **More info.** Barthez expresses a desire not to be equated with other vitalists: “I do not wish to

nature and the universality of physical laws” (2003, p. 177) – despite my appreciation of Williams’ work overall and our past and future shared projects, I disagree with this statement. Further work would have to confront this with Reill’s vision of a ‘vitalized’ Enlightenment in his (2005). The difference is that he thinks the Enlightenment has been misinterpreted precisely in this mechanistic fashion. If we think of figures such as La Mettrie, Buffon and Diderot it seems fair to say that the materialists did not have such strong beliefs in universal laws and most importantly, were ‘embodied’ theorists. I argue the case for La Mettrie in Wolfe (2009c) and for Diderot in Wolfe (2009a).

⁵ Crick (1966), p. 99.

⁶ Walter Pagel is a particular culprit here in the history of medical thought.

⁷ Thomson (2008), ch. 4.

⁸ Dieckmann (1938); Kaitaro (1997), ch. 3; Boury (2003).

be the Leader of the Sect of the Vitalists.”⁹ When Barthez speaks of this ‘sect’ he probably has in mind Charles-Louis Dumas, the author of a vitalist ‘synthesis’ published in 1800-1803 and, starting in 1807, the Dean of the ‘Ecole de Santé’ in Montpellier. “It was Dumas who, to further his ambitions and to defend Montpellier amid the institutional upheavals brought about by the Revolution, first began referring to ‘vitalism’, using this neologism to stress the unity and range of Montpellier teaching” (Williams [2003], p. 276).

The Montpellier medical faculty was one of the oldest in Europe, possibly the oldest, only preceded by the ‘school’ at Salerno in the 11th and 12th centuries AD (the manuscripts of which were kept from then until now at the monastery at nearby Monte Cassino), which was not however incorporated with license to train students. A first document in 1240 states the rules of the School at Montpellier, “by the Prior of Saint-Firmin, Pierre de Conques and the Franciscan Hugues Mans, who had been called in to arbitrate between the instructors and the students”; these regulations are in addition to the rules concerning the organization of the School, set out in 1220 by Cardinal Conrad.¹⁰

Following the groundbreaking work of Rey (1987/2000), Duchesneau et al. (1997), and Williams (2003), who have done much to put it on the map, I have tried to argue that the Montpellier vitalist school expresses a ‘structural-functional’ form of vitalism, with the celebrated image of the *bee-swarm* (found in Maupertuis, Bordeu, Diderot and also Ménuret’s *Encyclopédie* article cited below) expressing the structural relation between one life and many lives (Wolfe and Terada [2008]). The bee-swarm is the single most famous image and, really, conceptual construct of 18th-century vitalism. Here is Bordeu’s version:

How to understand the action of all the parts, their departments, and their periodic motions.

Most physiologists only discuss circulation in general [*en gros*]; they do not notice that it can be quite different in large vessels and in the smaller ones. Couldn’t

⁹ Barthez (1806), p. 98, n. 18.

¹⁰ Vidal (1958), p. 77.

each part even have its own circulation, which might increase or diminish, without the overall (general) circulation being affected? It appears that circulations are more or less prompt, according to the different orders of the vessels, and according to the action and use of the parts. All of these truths may be considered as corollaries of what I have asserted thus far.

Hence there is a general circulation, and many particular circulations, which are, if I may speak thus, like small circles which gradually form a larger one. We have customarily used the term 'circle' to convey that a part, even if it receives blood by means of the general circulation, as occurring in the largest vessels, nevertheless has a particular circulation, depending on whether it is in action or not; the other parts which 'feel' [*qui se ressentent de*] this action, belong to its department, its circle, etc.

Hence the least part should be considered as 'a body apart', so to speak. True, it acts by means of the general circulation, but it is as distinct as the system of blood vessels is distinct from the cheliac vessel system, or as the circulation of the lung and the liver are from what occurs in ordinary large vessels.

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 [*se ramassent en pelotons*], and hang from a tree like a bunch of grapes; I find the image suggested by an ancient author, that one of the lower organs was an *animal in animali*¹¹, to be quite helpful. Each part is, so to speak, not quite an animal, but a kind of independent machine [*machine à part*] which contributes [*concourent*] 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 [*concourent*] in forming a fairly solid body, yet each one has a particular action, apart from the others; if one of them gives way or acts too vigorously, the entire mass will be disturbed: when they all conspire to stick close, to mutually embrace, in the order of required proportions, they will comprise a whole which shall endure until they disturb one another.

The application is easy: the organs of the body are connected to one another; they each have their district and their action; the relations between these actions, the resulting harmony, is what makes health. If this harmony is disturbed, either because one part relaxes, or another wins out over that which is its usual antagonist, if the actions are reversed, if they no longer follow the natural order, these changes will constitute more or less severe illnesses.¹²

¹¹ [This is apparently a very old euphemism for an organ that, as we might say, 'has a life of its own' ... – C.W.]

¹² Bordeu (1751), § CXXV, in Bordeu (1818), vol. 1, p. 187. For more discussion of the different versions of the bee-swarm image in Bordeu, Maupertuis, Ménéuret and Diderot see Wolfe ed. (2008) and Wolfe (2009b).

Similarly, in the *Encyclopédie* 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, following these authors, 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 (*une espèce de tout*), 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*).¹³

In a variety of other places including the important article on the pulse (“Pouls”) Ménuret multiplies the structural, relational, positional approach to what makes living bodies unique.

Not only is the form of vitalism expressed in the above passages far removed from claims about mysterious vital forces; by extension, this structural-functional approach to life is closer to materialism than is often said. However, there is nothing monolithic about this; by the early nineteenth century the heads of the Montpellier medical school are steering it in a spiritualist (and royalist) direction.¹⁴ Additionally, significant figures such as Bichat are explicitly identifying Barthez’s vital principle with Stahl’s *anima* and Van Helmont’s *archaeus* (Rey [2000], p. 361); Broussais claimed that

¹³ Ménuret, s.v. “Observation,” *Encyclopédie* XI, pp. 318b-319a. (Further discussion might focus on the variety of organismic metaphors in addition to this one, such as the polyp – more than a metaphor! – or the same image of the beeswarm but used differently, such as Jonathan Swift’s description of the brain as a “crowd of little animals,” clinging together “in the contecture we behold . . . like Bees in perpendicular swarm upon a Tree” (Swift, *Mechanical Operation of the Spirit*, 1704, cit. in Smith (2007), p. 18).

¹⁴ See e.g. Lordat’s *Apologie de l’École de Montpellier* which is an attack on the ‘materialism’ of the École de Paris (Lordat 1842). For an interesting discussion of the political undertones (or overtones) of late Montpellier vitalism see Reill (1989), Lavabre-Bertrand (1992), Williams (2003).

Barthez “founded medicine on his readings rather than observations.”¹⁵ Bichat also says that the Montpellier physicians “considered science philosophically; they would have made greater [scientific] progress if they had known more anatomy – Haller only made such great progress for that reason.”¹⁶ In fact each of these figures has to denounce his immediate predecessor as a *vitalist*... Gayon (1994) makes the useful point that we should be careful when using, say, Bernard’s judgments about ‘vitalism’ as historical pieces of evidence, since Barthez, Bernard and ‘us’ all have different conceptions of matter, living matter and the relations between them.¹⁷ One can add that ‘vitalism’ is also a *feu follet*, perpetually reinvented in order that one thinker seeking to articulate a claim for the autonomy of biological entities (like Bichat’s famous “la vie est l’ensemble des fonctions qui résistent à la mort”) can accuse his predecessor of having been the *real* vitalist (Oyama 2010).

If the Montpellier vitalists were not ‘cranks’, who *did* believe the sort of thing Crick makes fun of? Georg-Ernest Stahl, a court physician to Duke Johann Ernst of Saxon-Weimar and subsequently, as of 1694, a Professor of Medicine at the University of Halle.

2. Stahl and Driesch

Stahl bluntly stated a problem about Life in the early 1700s: in all these competing theories of the human body, notably the very successful mechanistic theories, “Life was never mentioned nor defined, and I could find no logical definition provided.”¹⁸ To follow Stahl’s suggestion, we could say that Life is either discussed but immediately

¹⁵ F. Broussais, *Examen des doctrines médicales* (1821), quoted in Lavabre-Bertrand (1992), p. 89.

¹⁶ X. Bichat, *Discours sur l’étude de la physiologie*, included in *Recherches physiologiques sur la vie et sur la mort*.

¹⁷ Gayon (1994), p. 99f. This is not the place to attempt proper discussion of Bernard, not least since he is not part of our eighteenth-century mandate; suffice it to say that he extends a kind of structural model further, as is best-known in his analysis of physiological determinism. On Bernard and vitalism see Normandin (2007).

¹⁸ Stahl (1706b), in Stahl (1859), p. 224.

dissipated into the entities and processes which subserve it, or promoted to the extent that vital spirits, vital heat, animation are so co-extensive to the field of investigation that Life again dissipates into the analysis as a whole. Stahl's answer is a multi-tiered, extremely confusing system with metaphysical and physical levels, with specifically medical, biological, chemical and even physical levels; but he is, notoriously, an *animist* because he considers that the body and its organs are literally mere instruments of the soul, a position sometimes revised so that "organs are not, as the name might suggest, mere instruments," but nevertheless, "it is the soul that makes the lungs breathe, the heart beat, the blood circulate, the stomach digest, the liver secrete."¹⁹

Despite their criticism of mechanistic models for Life – for their inertness, for their inapplicability to living beings, and so forth – the Montpellier vitalists are quite dismissive of this intrusion of a non-medical entity (the soul) into medical explanations. (The missing figure in this story is Haller – there is in fact a kind of triangulation between Montpellier vitalists, Stahlian animism, and Hallerian 'micromechanism'. Haller micromechanist but in a complex dance with vitalism. Cf his 1772 article "Faculté vitale,"²⁰ where he says *faculté vitale* is a *nom d'attente*.)

Here is Ménuret:

Who wouldn't laugh at an animist or Stahlian who would argue that this illness is a gift of Nature or the soul, a kind and farsighted mother who directs all efforts to heal the illness, and even exacerbates them on the pretext of necessity, hoping for benefits that one hopelessly expects from elsewhere?
("Ténesme," *Enc. XVI*, p. 137a).

In a very different way, Bordeu, in his masterpiece the *Recherches anatomiques sur la position et la fonction des glandes* (1751), when discussing the (very philosophical) problem of whether the secretory process of the glands can be reduced to a type of *sensation* or not, makes a gentler, but equally distancing comment on Stahl's notion of *anima*. Bordeu answers his question in the affirmative: each gland, each orifice will possess its own unique "taste" so to speak which will enable it to accept or reject various

¹⁹ Stahl (1706a), § xcvi, in Stahl (1859), p. 347.

²⁰ In *Encyclopédie, ou dictionnaire universel raisonné des connoissances humaines* (1770-1779), vol. XVII, 244b-250a.

substances. And when he calls it a type of sensation he adds a footnote to the word 'sensation', and emphasizes that both this idea of sensation and Stahl's anima are *metaphors*:

(*) This is again one of these metaphors which must be allowed us ; those who consider these questions closely know just how difficult it is to explain oneself, when it comes to speaking of the force which so carefully directs a thousand singular motions in the human body and its parts; what terms should we use to describe them? For instance, certain movements in plants and even certain properties of minerals; some 'physicists' [*physiciens*], struck by these movements, have had recourse to particular causes. We will discuss Stahl's hypothesis elsewhere: he claimed that the soul directed everything in the animal body. Whatever the case may be, we can state that all living parts are directed by a preserving or conservative force [*force conservatrice*] which is ever-vigilant; does this force belong, in certain respects, to the essence of a portion of matter, or is it a necessary attribute of its combinations? Once again, here we can only suggest a way of conceiving things, metaphorical expressions, comparisons...²¹

To say that the Stahlian concept of soul is a metaphor (which Stahl does not say!) is essentially to say that the concept has *functional* value (or not) depending on how well it models phenomena – rather than making a claim about what sorts of things exist. If Bordeu were writing sometime after the 1970s he would quite likely have spoken of such images as 'heuristics'.

Stahlian animism and vitalism as articulated in the Montpellier school are thus two distinct models of 'life' – of organic order, of the approach required to understand living beings and the possible basis for construction of a 'science' of such beings. (Neither of these directly flow into the constitution of 'biology' as a science, in the first years of the nineteenth century²²; Stahl is much more concerned with chemistry, even if it is in part what we would call organic chemistry, and the montpelliérains are, tautologically, much more concerned with medicine. **One would have to look to Blumenbach and Wolff for vitalistic biology proper.**) Of course within the Montpellier school there is a spectrum of views, from Sauvages' more animism-friendly work²³ to

²¹ Bordeu (1751), § CVIII, p. 163.

²² Barsanti, Caron, Wolfe forthcoming 2011.

²³ Sauvages praises the "Stahlions" who have both "the support of the ancients and an infinite number of reasons in their favour derived from practice" (Sauvages [1752] in Sauvages [1770], II, p. 12, note (g))..

Fouquet or Ménéuret's materialistic and in fact mechanism-friendly views. Ménéuret after all goes as far as presenting the human body – *la machine humaine*, he says, although we should not make too much out of this choice of terms, since 'machine' was often used to simply mean 'body'²⁴– as a structural ensemble of “springs,” which taken as a whole “all pursue an overall motion”; a kind of “irritability or sensitivity spreads throughout, animates the springs, excites their motions,”²⁵ etc.: good mechanistic language! But the point is that we have a *substantial* form of vitalism (also 'ontological') and a *functional* form. (I can discuss the relation to materialism further if desired: the key point there is less of a change in our picture of vitalism than of materialism – but how? 'Vital materialism' as portrayed by Lenoir? Reill? Belaval?)

The Stahlian belief in 'anima' can be compared to what we now call the 'neo-vitalist' position of the embryologist Hans Driesch in the late nineteenth century.²⁶ Driesch comes out of the school of Wilhelm Roux's *Entwicklungsmechanik* or study of the mechanisms of the developmental process. His experiments with sea urchin eggs involved halving the two blastomeres (daughter cells) of the egg and successfully producing two whole embryos and larvae, complete in every respect. This total equality of the halved eggs is their "totipotency." The cells derived from the egg were termed by him a harmonious equipotential system;²⁷ Driesch became so absorbed with this feature

²⁴ The *Dictionnaire de l'Académie*, in 1694, defines 'machine' as “a set of parts or organs which form a whole, living or not, and produce determinate effects without transmitting a force externally; organism, body” (cit. in Cayrou [1948], s.v. “Machine,” p. 530). Buffon comfortably speaks in the same sentence of 'animal economy' and 'machine', or “la mécanique vivante” and “le mécanisme de l'économie animale” (Buffon (1753), pp. 3-4; article “Histoire naturelle,” *Enc.* VIII, 226b). By the nineteenth century the situation is different, with the *Encyclopédie méthodique* explaining (in 1808) that one should no longer use the expression “machine humaine” ... but that “animal economy” or “organism” are suitable substitutes: “It is preferable to use the synonymous expressions 'living economy', 'vital economy', 'animal economy', 'organism', 'organic mass', 'the entire economy of the human body'. The term 'machine' seems to refer to a system of causes and effects which belongs wholly to the mechanistic theory” (“Machine,” in *Encyclopédie méthodique*, 1808, 310).

²⁵ Ménéuret de Chambaud, art. “Spasme,” *Enc.* XV, 435b.

²⁶ For a different perspective on Stahl's work that seeks to minimize the significance of his metaphysical claims and thereby emphasize the 'practical', 'empirical' side of his work, see K.-M. Chang's recent essays, e.g. Chang (2004).

²⁷ Cf. Driesch (1914), p. 209.

that he gave up experimental work and taught philosophy at the University of Leipzig, developing the idea that *entelechies* exist in all living organisms. The historical background to which he appealed (distinct, then, from our history of vitalism) was primarily that of the physiologist Johann Friedrich Blumenbach and his notion of a *Bildungstrieb* or *nisus formativus* (formative drive) in living organisms, and secondarily that of Caspar Friedrich Wolff, who had developed an early critique of mechanistic reduction of life targeting preformationism and emphasizing the merits of the *epigenetic* account of embryonic development. In Driesch's view, the importance of these figures lay in their renewal of a vitalist thinking which had lain dormant since Aristotle (the Montpellier school does not appear here). More relevant for our purposes, Driesch's appeal to these thinkers shows how embryology becomes the standard-bearer of vitalism within biology itself. Faced with the evidence that there was no physical structure we can find in the sea urchin embryo which is responsible for the "regulative" or "equipotential" force, he felt obliged to posit a vital force, the entelechy.²⁸ Canguilhem comments on Driesch's 'shift' from science to metaphysics:

“Le biologiste vitaliste devenu philosophe de la biologie croit apporter à la philosophie des capitaux et ne lui apporte en réalité que des rentes qui ne cessent de baisser à la bourse des valeurs scientifiques, du fait seul que se poursuit la recherche à laquelle il ne participe plus. Tel est le cas de Driesch abandonnant la recherche scientifique pour la spéculation et même l'enseignement de la philosophie. Il y a là une espèce d'abus de confiance sans préméditation. Le prestige du travail scientifique lui vient d'abord de son dynamisme interne. L'ancien savant se voit privé de ce prestige auprès des savants militants. Il croit qu'il le conserve chez les philosophes. Il n'en doit rien être. La philosophie, étant une entreprise autonome de réflexion, n'admet aucun prestige, pas même celui de savant, à plus forte raison celui d'ex-savant.” (“Aspects du vitalisme”, in *La connaissance de la vie*, 2e éd., Paris, Vrin, 1965, p. 94).

For more on Driesch cf Marcel Weber, “Hans Drieschs Argumente für den Vitalismus,” *Philosophia Naturalis* 36: 265-295 (1999).

²⁸ This was critiqued early on by Bergson, sometimes wrongly associated with Driesch under the banner of vitalism. 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); Wolsky & Wolsky (1992), p. 156f.

Another version of his 'experimentum crucis' (on sea urchin eggs), as discussed by Cassirer:

The results of experiment had shown that perfectly normal organisms could develop from embryos which had suffered from very severe injury produced by the experiment: thus when the embryo was bisected an entirely normal larva of half size developed, and when embryos were crushed between glass plates so as to disarrange their cells completely, the wholly abnormal positional relationships did not necessarily exclude the formation of a normal, whole organism. No confusion resulted in the system. The embryo with misplaced cells remained an autonomous whole, and followed the usual course of development undisturbed.²⁹ The conclusion drawn was that since the formative power at work is not interfered with by division, separation or displacement, it must be a 'something' without spatial character and to which no definite position in space can be assigned.³⁰

Cassirer adds that Driesch tends to describe this 'something' in psychic terms, although he moves from speaking literally of a soul in earlier writings to speaking of something soul-like, ultimately, an entelechy. An entelechy uses the physicochemical forces of the organism, but is not 'of' them.

The classic refutation of Drieschian vitalism came with the Vienna Circle, notably Moritz Schlick's "Philosophy of Organic Life." The argument relies on a basic fact of physics, the causal closure of the physical (space-time) world, to point out contra Driesch that there cannot be nonspatial causes of organic processes which are themselves necessarily spatial. For Driesch the entelechy is a life-force affected by various physical constraints in the cell. Schlick seizes the opportunity to say: if all the various sub-systems are required as active constraints on this force, but this force is not accessible to us, we can just factor it out! For a non-physical entity to profitably interact with a physical entity, or bring about a physical process, it must at some point itself become physical. Driesch cannot reconcile the action of his non-physical entelechies with the basic (methodological or ontological) determinism of Newtonian physics. A non-spatial force such as the entelechy vanishes, in this case; "if the causes are fully contained in the initial conditions, then there is no reason whatsoever for the

²⁹ Driesch, "Experiments on the Egg of the Sea-Urchin," *The Science and Philosophy of the Organism* I, p. 59f.

³⁰ E. Cassirer, *The Problem of Knowledge*, trans. W. Woglom & C. Hendel (New Haven: Yale Univ. Press, 1950), p. 195.

assumption of a non-spatial intermediary.”³¹ Schlick comes out squarely on the other side: biological laws can and will be reduced to physical laws. This refutation of substantial vitalism is thus also a full-fledged reductionist view of the nature of the biological. What we will see with Canguilhem (himself influenced by Claude Bernard, who himself was interested by Diderot’s late writings on physiology³²) is that one can share the rejection of mysterious vital forces without necessarily adopting such a reductionist approach to the biological.

It is significant to note the absence of Darwin from any of the biological references of the Vienna Circle: it’s all Driesch. Not that this means Darwin confirms vitalism!³³

The ‘functional’ form of vitalism can be explicated further, not least with reference to Claude Bernard (see Normandin, but esp. Bechtel 2007, section 3, for an interesting treatment of 19th c. vitalism or rather the use of the appellation ‘vitalism’).

3. Vitalism as an attitude : Canguilhem

Georges Canguilhem is well known chiefly as the author of *The Normal and the Pathological*, and as Foucault’s teacher and mentor. He was also the author of a variety of influential essays on the history and philosophy of the life sciences, focusing on the period between the seventeenth and nineteenth centuries. Less well known is the fact that Canguilhem often refers to vitalism in his work, going as far as describing himself as one in the Foreword to his *these d’État* on the development of the notion of reflex action: “Il nous importe peu d’être ou tenu pour vitaliste...” and presenting the book itself as a “defense of vitalist biology.”³⁴ Even if he is wearing the hat of the historian of medicine, looking at the construction of a concept (say, the cell theory), Canguilhem the

³¹ Schlick (1953), p. 536.

³² Barral (1900).

³³ As in the recent claim by the theoretical biologist Robert Rosen that “Evolution has come to do for biology today what vitalism did for it previously” (Rosen (1991), p. 255); an assertion of uniqueness and thus unexplainability in terms of inanimate nature). (Then one gets to Canguilhem and Darwin...)

³⁴ Canguilhem (1955), *Avant-Propos*, p. 1.

philosopher asks highly 'motivated' questions of science, in a manner which undoubtedly owes a great deal to Bachelard's historical epistemology. The history of science has to study possible conceptual developments rather than just invalidate the past (the error of 'presentism'). What this entails for vitalism is that it has a specifically *philosophical* place, whether it is scientifically 'validated' or 'refuted', and apart from its status as a scientific 'construction'.

In this sense, Canguilhem suggests, *vitalism is not like geocentrism or phlogiston* (to pick two classic cases of scientific 'errors'): *it is not refutable in quite the same way.*³⁵ (Or Haldane: "Vitalism thus represents no clearly definable working hypothesis," so that he suggests it is not worth "considering further"³⁶).

Vitalism is generally considered to have been 'refuted' twice. First, according to a celebrated scientific tale, with Friedrich Wöhler's synthesis of urea in 1828, which showed that organic substances can be produced out of inorganic compounds, thus rendering the claim that the chemistry of the living body is categorically distinct from that of inanimate bodies, invalid. Second, a century later, this time because of physics, in early twentieth-century Vienna Circle arguments against Hans Driesch and Bergson, in the name of the causal closure of the space-time world.³⁷ The undead character of vitalism shows up in the first case, with Wöhler's synthesis of urea, when people start to describe the purported refutation as a "chemical legend" (including because the synthesis was actually only performed by Berthelot later on), and when chemists like Berzelius continue to speak of vital forces afterwards³⁸; in the second case, substantial

³⁵ Canguilhem (1965), p. 84.

³⁶ Haldane, in Haldane *et al.* (1918), p. 12.

³⁷ See Frank (1998 [1932]), especially chapter 4; Wolsky and Wolsky (1992).

³⁸ McKie (1954). See also Schiller (1967) (on Berzelius and von Liebig); Ramberg (2000). For the classic, 'heroic' view of Wöhler see Jacques (1950). Raymond Ruyer conversely asserts the link between chemistry and vitalism, declaring that it was "lack of chemical knowledge" that made seventeenth-century Cartesian biologists be mechanists (Ruyer [1958], p. 51). If we look back at Stahl, he insists on the importance of chemistry for conceptualizing what is unique in organic beings (their characteristic *mixtio* rather than mere aggregates) but, somewhat dialectically, he adds that once that reaches the level of a *theoria medica vera*, then one can dispense with the chemical analysis of bodies, like the ladder we leave behind after having climbed up it (not his image!). Stahl (1706b) in Stahl (1859), vol. 2, p. 224.

vitalism is refuted, not what we might call *explanatory* or *heuristic* vitalism – which are derivative forms of what I’ve earlier called *functional* vitalism.

So not only is vitalism a unique kind of historical object; much more metaphysically, Canguilhem suggests that it is *Life itself* which dictates a certain kind of attitude on the part of the inquirer. There is something about Life that places the knower in a special relation to it. Indeed Canguilhem frequently makes an overtly metaphysical, ahistorical claim that the living animal is necessarily a knower, so that conversely, the nature of Life itself forces the knower to approach it in a certain way (the echoes of the first sentence of Aristotle’s *Metaphysics*, “All men by nature desire to know,” are probably deliberate).

The idea is that vitalism is a fundamental existential *attitude* – not just one historical episode amongst others:

Vitalism expresses a permanent requirement or demand [*exigence*] of life in living beings, the self-identity of life which is immanent in living beings. This explains why mechanistic biologists and rationalist philosophers criticize vitalism for being nebulous and vague. It is normal, if vitalism is primarily a ‘demand’, that it is difficult to formulate it in a series of determinations.³⁹

Vitalism expresses a permanent “requirement” or “demand” of life as present in living beings; the self-identity of Life immanent within living beings. What exactly is this “requirement”? Something teleological? Purposive? Foucault (??), seeking to give a charitable interpretation of the place of vitalism in Canguilhem’s thought as what we might call a heuristic concept, quotes another passage from this article in which Canguilhem uses the word *exigence* again (he uses it 7 times in all): vitalism is “more a requirement than a method, an ethics rather than a theory.”⁴⁰ Now, it may be a requirement rather than a theory, but it is, I suggest, a big requirement: that Life itself, symmetrically to the inquirer’s attitude, is understood as self-positing, spontaneous activity (I don’t discuss ethics here but one observation would be that as this is a

³⁹ Canguilhem, “Aspects du vitalisme,” in Canguilhem (1965), p. 86.

⁴⁰ *Ibid.*, p. 88. Although the image of the egg sounds more like Driesch (except it’s also Harvey and the Oxford physiologists) than like Bordeu or Ménuret.

specifically medical vitalism, that comes with an ethics, as the Hippocratic motif in Montpellier vitalism also indicates):

It is certain that the vitalists view generation as the basic biological phenomenon, for the images it generates and the problems it raises impact all other biological phenomena. A vitalist, I would suggest, is someone who is led to reflect on the nature of life more because of the contemplation of an egg than because of s/he has handled a hoist or a bellows.⁴¹

Notice how the above passage moves imperceptibly from the historical (a description of “the vitalists”) to the assertive (“a vitalist is...”), and even to the prescriptive (in his best-known writings on the ‘normal and the pathological’, which stress the way in which an organism is its own norm of existence).

Vitalism then has two dimensions in Canguilhem’s thought: on the one hand it is *heuristic*, a claim that living phenomena need to be approached in a certain way in order to be understood; on the other hand, it also possesses a more *ontological* dimension. Consider the example Canguilhem gives in “Aspects du vitalisme”: vitalism is not like (the theory of) phlogiston or geocentrism. Now, faced with this ‘fact’ that vitalism is not like phlogiston, there are two possible responses:

- it’s not like phlogiston because it’s *true* and thus one’s ontology needs to include it (like Driesch’s entelechies);
- it’s not like phlogiston because it has this *heuristic value*, or explanatory power.

In fact, it’s not entirely clear where Canguilhem falls in this divide. However, his comments on vitalism as an “orientation” (what I have called an attitude) tend towards the latter interpretation. Indeed, it is clear that both *philosophically* and as a *historian* of science (to reintroduce this naïve distinction) he is careful to distinguish his claims from the more inflated ones of substantial vitalism.

Canguilhem is careful to distinguish strong metaphysical vitalism from the views (and practices) of the eighteenth-century vitalists, in contradistinction to people like Driesch. This is the theme of ‘biological Newtonianism’ (referring to the popularity of Newtonian analogies amongst the vitalists in the eighteenth century, among others):

⁴¹ *Ibid.*

Eighteenth-century vitalists are . . . not impenitent metaphysicians but rather prudent positivists, which is to say, in that period, Newtonians. Vitalism is first of all the rejection of all metaphysical theories of the essence of life. This why most of the vitalists referred to Newton as the model of a scientist concerned with observation and experiment. . . . Vitalism ultimately means the recognition of life as an original set or realm [*ordre*] of phenomena, and thus the recognition of the specificity of biological knowledge.⁴²

A medical vitalist in the eighteenth century is not a substantial, metaphysical vitalist of the late nineteenth or early twentieth century. Indeed, Canguilhem goes as far as to say that eighteenth-century vitalists are anti-metaphysicians opposed to the strong metaphysics of animism or mechanism.⁴³ As Karen Detlefsen has suggested in a different context, ontological reduction does not have to affect the ‘scientific’ pertinence of the distinction between the living and the non-living.⁴⁴

The importance of the Newtonian motif is that, by means of an analogy with Newton’s method in positing an unknown entity (such as gravity) from which he can then derive a series of mathematical equations with real tangible value – for instance in linking together phases of the moon and tides – the vitalists can say (I’m paraphrasing Barthez notably): let me posit this unknown called ‘life’ and derive from it various other phenomena, from digestion to sensation, to the functioning of the glands: these suddenly appear as interconnected, goal-oriented processes which do not exist either in an inanimate mechanism or (a frequent opposition) in the same body but in the state of a corpse. But significantly I (or rather the vitalist, here, Barthez) will make no ontological claims about the nature of this vital principle, or even attempt to make causal connections between such a principle and observable phenomena: “I am as indifferent as could be regarding *Ontology* considered as the science of entities.”⁴⁵

⁴² Canguilhem (1955), p. 113.

⁴³ Canguilhem, “Le normal et le pathologique,” in Canguilhem (1965), p. 156.

⁴⁴ Detlefsen (2007). An excellent historical example of someone who rejects mechanistic explanations of generation *at the scientific level* without being a metaphysical antimechanist, is Claude Perrault; see Perrault (1680-1688), and the discussion of Azouvi (1982, 1985).

⁴⁵ Barthez (1806), p. 96, note 17.

Returning to Canguilhem, there is a long and difficult passage in “Aspects du vitalisme,” in which he rejects Drieschian vitalism (or mysterianism as we would call it today) more clearly than anywhere else:

In sum, the classical vitalist grants that living beings belong to a physical environment, yet asserts that they are an exception to physical laws. This is the inexcusable philosophical mistake, in my view. *There can be no kingdom within a kingdom [empire dans un empire], or else there is no kingdom at all. There can only be one philosophy of empire, that which rejects division and imperialism. . . . One cannot defend the originality of biological phenomena and by extension, of biology, by delimiting a zone of indeterminacy, dissidence or heresy within an overall physicochemical environment of motion and inertia. If we are to affirm the originality of the biological, it must be as a reign over the totality of experience, not over little islands of experience [un règne sur le tout de l'expérience et non pas sur des îlots dans l'expérience]. Ultimately, classical vitalism is (paradoxically) too modest, in its reluctance to universalize its conception of experience.*⁴⁶

‘Classical’ vitalism as described here is what is commonly termed substantival vitalism. And Canguilhem’s diagnosis of an “inexcusable philosophical mistake” is clear enough. But what should we make then of his defense of the “originality of biological phenomena,” i.e. the autonomy of biology, as a “reign over the totality of experience”? What looks at first glance like metaphysical holism might instead be an ‘attitudinal’ conception, that is, a *point of view* on experience. Indeed, even when Canguilhem discusses the uniqueness of organisms he never denies that their ‘holistic’ quality is enabled by various regulatory processes or mechanisms that subserve the whole and preserve its integrity (much like Cannon’s notion of homeostasis, itself explicitly indebted at least in its theoretical form to Bernard’s notion of *milieu intérieur*⁴⁷).

Unlike the “classical vitalist” (who corresponds in our discussion both to Stahl and Driesch, and to vitalists as targeted by philosophers of biology such as Sarkar and Gilbert or earlier Moritz Schlick), Canguilhem insists, using Spinoza’s phrase, that we are *not* a kingdom within a kingdom, an *imperium in imperio*! That is, the laws of the physical world apply in full to all living beings, humans included, without exceptions. So all problems would appear to be solved. Yet this statement creates new problems!

⁴⁶ Canguilhem (1965), p. 95, emphasis mine.

⁴⁷ Cooper (2008).

Granted, to the standard question, how can one be a vitalist and reject any *imperium in imperio*?, we can answer on Canguilhem's behalf that one can be a constructivist or heuristic vitalist; but what do we do then with all the talk of 'Life itself', *le vivant*? Similarly, if we grant in addition that the ontological dimension in his vitalism – the stress on how Life itself creates a certain attitude on the part of the knower – is not to be confused with mysterianism, we are left with the rather opaque invocation in the above quotation of "experience." It doesn't seem to fit with the rest of his views ... except if we recall that he was, after all, significantly influenced by the work of Kurt Goldstein (known for his 'holistic' theory of organism, Goldstein 1934/1995, see also Wolfe 2010), who he greatly contributed to introduce into French discussions. Goldstein and Canguilhem both stress the importance of the relation between the 'subject' (the knower, the philosopher or scientist, etc.) and Life itself.

Indeed, in a very real sense one cannot distinguish between a historical claim and a philosophical claim in Canguilhem's 'history of vitalism' or 'vitalism'. Of course, dialectically enough, Canguilhem's blurring of the divide between being a historian-*épistémologue* focusing on the life sciences, and being a 'metaphysical vitalist' can again be seen in a more positive light, i.e., in more manageable, 'attitudinal' terms: one can argue that (a) the ontological dimension, (b) that of experience, and (c) the existential dimension all cohere with his claim that vitalism is an "attitude" ("une orientation de la pensée biologique") rather than strictly an episode ("une étape de sa démarche").⁴⁸ And if, as present-day historians of science, we point out that he gives a partisan reading of biological thought intended to delegitimize Cartesian mechanism in favor of biological epigenesis – and vitalism, then why shouldn't we also acknowledge that present-day biological thought is, if not fully reversing course, at least arguing in a strongly 'epigenetic' direction and privileging developmental biology over genetics (or at least an essentialist vision of genetic information)?⁴⁹

⁴⁸ "Aspects du vitalisme," in Canguilhem (1965), p. 84.

⁴⁹ See van Speybroeck *et al.* (2002) and the work of Susan Oyama, *passim*.

Nevertheless, even if we can agree that vitalism is unlike geocentrism or phlogiston in the way Canguilhem suggested, and we can see the possible interest in discussing vitalism as an ‘attitude’, we should also recognize that Canguilhem’s revisionist project to put the life sciences at center stage in the history of science overall (which had traditionally been dominated by the hard sciences) is bound up with strong ontological commitments, and a certain conceptual vagueness to boot. Namely, his project must amount to a claim regarding the specificity of its object, but it is not easy to make out exactly which claim he wants to make:

- Life itself as an object is ontologically unique, including in its anomalousness;
- living entities are meaningful and meaning-producing entities and thus have to be understood as such (this covers both the existential and the Goldsteinian aspects of his claim).

Canguilhem’s vagueness appears, e.g., when he denies that vitalism is a metaphysics, and then adds immediately afterwards that it is “the recognition of the originality of the fact of life [*le fait vital*].”⁵⁰

4. Conclusion

I have tried to illustrate the existence of three forms of vitalism: substantial, functional and attitudinal. It is typically the first form which is targeted in critiques of vitalism (such as that dating back to the Vienna Circle); it is represented here by Stahl and Driesch. The second form matches up fairly well with what philosophers of science in contemporary times would call ‘heuristic’ concepts of mechanism or organism, as explanatory structures or models. Historically, this ‘functional’ kind of vitalism is associated with the Montpellier school and with the attempt to articulate a relation between parts and whole in which the parts are construed as little *lives* (recall the image of the bee-swarm, a Life composed of many little lives). **A bit more from Bechtel 2007.** The third form is chiefly articulated by Georges Canguilhem (under the influence of

⁵⁰ Canguilhem, “Le normal et le pathologique,” in Canguilhem (1965), p. 156.

Kurt Goldstein's philosophy of organism); we might also call it 'projectivist' or 'constructivist', since it stresses that there is something about Life that leads us to adopt a certain *standpoint* towards it in order to understand it properly (in its totality, directedness, etc.). Of course, Canguilhem also plays on an ontological set of associations since he claims that it is Life itself which affects both the scientific theories we formulate in relation to it, and our experience in general. It is possible to see a kind of development or gradual evolution in these three forms of vitalism, although one can also approach them as separate and parallel to one another.

A few questions then arise:

- The question of the posterity of the Montpellier form of vitalism is difficult to address, partly because of the general difficulties in tying Enlightenment natural philosophy or medicine to developments beginning in the nineteenth century ('positive science'). I mentioned earlier the fact that the words 'vitalism' and 'biology' are coined at about the same time, and believe this is worth investigating. Just because an episode such as Montpellier vitalism does not get to be part of the history of medicine the way John Snow's discovery of cholera does, does not mean we have to go along with Francis Crick's pronouncement quoted above, or with similar scientific views that vitalism is a kind of verbiage quickly dispelled by molecularized life science.⁵¹ For one thing, there is Canguilhem's point about the difference between vitalism and phlogiston or geocentrism. For another, we have this intriguing possibility that vitalism in the form presented here – not a theory of 'wonder tissue' or 'vital forces' – is a source of intellectual support to current movements in biological thought such as epigenetics, developmental systems theory, evolutionary developmental biology (evo-devo), and so forth. After all, Driesch did claim that "All believers in epigenesis are Vitalists"⁵²! But this

⁵¹ Bosc (1913).

⁵² Driesch (1914), p. 39.

kind of connection, in terms of some of the oppositions that have structured the history and philosophy of biology (here, epigenesis versus preformation in the eighteenth century and epigenesis versus genetic reductionism in the twentieth and twenty-first centuries) is quite different from the valuative, polemical tone of those who claim that 'vitalism' is a kind of suprahistorical, almost messianic entity that can come back to save us in times of need, such as: "The affirmation . . . of 'vitalism' as an intellectual requirement which aims to acknowledge the originality of Life, is just as significant today when the conjunction of a biochemical materialism and a mathematical formalism tend to negate [this originality], the better to 'neuralize' thought."⁵³ (this from the former student of Althusser, Dominique Lecourt !)

- There is also the related issue of how closely we can link, or correlate, 'ontological shifts' with the emergence of a science. In this particular case, there is the very broad question 'does vitalism impact the history of science' and the slightly more specific one 'does vitalism lead to a science such as biology?'⁵⁴ One version of this is to emphasize how, faced with mechanism and animism at opposite extremes, vitalism avoided "the worst of both systems" and developed the best parts, notably their explanatory richness and a kind of synthetic experimental protocol. Roger French suggests that out of this "What emerged was the idea of biological properties, that is, qualities (principally of sensation and motion) that were unique to living systems and

⁵³ Lecourt (1993), p. 269.

⁵⁴ I remember once reading something which suggested that each time biology takes a 'step forward', it is a vitalistic moment, even if this is subsequently 'refuted' or ontologically eliminated, but cannot find the source of this idea anymore (I thought it was Depew and Grene's *Philosophy of Biology: An Episodic History* but it does not seem to be in there). Prima facie this seems obviously wrong (the discovery of DNA is not a very vitalistic moment) but there is something to the idea that each time one has pushed back the boundaries of 'pure physicalism'. Philosophers of biology following David Hull and then Alex Rosenberg would then argue about 'ontological autonomy' versus 'explanatory autonomy' with respect to biology.

See Hilde Hein's papers (Hein 1968, 1969). The first paper discusses 'Mechanism and Vitalism as Meta-theoretical Commitments'; in the second one she tries to show how the debate between molecular biology and organicism manifests the same kind of tension as the old debate between mechanism and vitalism. In both cases more of ad hominem issue depending on prior commitments, than general experimental opposition at level of data.

not to be derived from a mechanical model.”⁵⁵ I am not sure this actually happened in the way he presents it. For one thing, the figure who much more closely matches this story is Haller, whose relation to vitalism is complicated to say the least (also for reasons like the rivalry between him and Bordeu). It is sometimes suggested that vitalism is primarily a vision developed by *physicians*, not biologists, which is why it is not so surprising that it has vanished from the philosophy of biology. This specifically *medical* dimension can be conveyed in the basic claim that all living beings die and get sick – hence there is a necessary *axiological* element (that is, an element of values or norms). This appears specifically in Canguilhem’s focus on, and interest in Bichat.⁵⁶

- It seems plausible that this story about vitalism should impact debates going back to Foucault about the status of ‘Life’ in the eighteenth century, the existence of which he curiously denied.⁵⁷ Indeed a key difference between the seventeenth and eighteenth centuries in this context seems to be the ‘biologization’ of various issues: case in point, Diderot’s short and provocative *Encyclopédie* entry “Spinosistes”, which describes “modern Spinozists” essentially as people who theorize biological epigenesis (see Wolfe [2009a]). La Mettrie makes a similar distinction between ancient and modern Epicureans (i.e. in each case the ‘modern’ variant of the theory is explicitly tied to new biological and/or medical ideas).
- But in none of these cases (Stahl, the Montpellier vitalists, Canguilhem, etc.) does it appear to me to be straightforwardly the case that a vitalist ‘theory’ or

⁵⁵ French (1981), p. 130.

⁵⁶ Thanks to Jean Gayon for pointing this out to me.

⁵⁷ As is well known, Foucault declared – controversially – in *Les mots et les choses* (1966, pp. 139, 173-174) that ‘Life’ did not exist before the emergence of biology as a science bearing that name, in the nineteenth century. In contrast, Canguilhem, despite being a discontinuist in the history of science, holds that something called ‘Life’ determines the emergence of various theoretical enterprises, and exerts a kind of traction on the knower / theorist / scientist. Further analyses could extend this distinction to discussions of vitalism in contemporary thought (Deleuze and beyond – Roberto Esposito, *Bios*).

'claim' or 'metaphor' gets naturalized or formalized or quantified and turned into mainstream science – with the exception of Blumenbach *et al.* However, there is a distinctive 'form of life' that emerges in the reflections of the Montpellier School and the various related projects, whether antecedent (Glisson, Willis, Stahl), contemporary and congenial (Diderot), contemporary and competitive (Haller), or posterior (Cabanis, Bichat, Bernard). In that sense I hope to have called attention to a different 'face' of vitalism than the one usually seen.

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