

Vitalism and the scientific image: an introduction

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Vitalism and the scientific image in post-Enlightenment life science, 1800-2010

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To undertake a history of vitalism at this stage in the development of the ‘biosciences’, theoretical and other, is a stimulating prospect. We have entered the age of ‘synthetic’ life, and our newfound capacities prompt us to consider new levels of analysis and understanding. At the same time, it is possible to detect a growing level of interest in vitalistic and organismic themes, understood in a broadly naturalistic context and approached, not so much from broader cultural concerns as in the early twentieth century, as from scientific interests – or interests lying at the boundaries or liminal spaces of what counts as ‘science’.¹ The challenge of understanding or theorizing vitalism in the era of the synthetic is not unlike that posed by early nineteenth-century successes in chemistry allowing for the synthesis of organic compounds (Wöhler), except that now, whether the motivation is molecular-chemical, embryological or physiological,² we find ourselves asking fundamental questions anew. What is life? How does it differ from non-living matter? What are the fundamental processes that characterize the living? What philosophical and epistemological considerations are raised by our new understandings?³ We are driven to consider, for example, what metaphors we use to describe living processes as our knowledge of them changes, not least since some of the opprobrium surrounding the term ‘vitalism’ is also a matter of language: of which terms one

¹ Gilbert and Sarkar 2000, Laublichler 2000. In the same year, Marc Kirschner and his collaborators published an influential research paper in *Cell* on what they called “molecular vitalism”: the suggestion was that, faced with the limitations of genomics, researchers should investigate what the authors “whimsically” termed the “vitalistic” properties of molecular, cellular, and organismal function. They comment in closing that “the organism has fashioned a very stable physiology and embryology. . . . It is this robustness that suggested ‘vital forces’, and it is this robustness that we wish ultimately to understand in terms of chemistry. We will have such an opportunity in this new century” (Kirschner et al. 2000, 87).

² Respectively, Kirschner et al. 2000, West-Eberhard 2003 (for discussion, Huneman 2010 and Walsh 2010) and Turner 2000.

³ Morange 2006.

uses to describe a phenomenon (embryo growth, homeostasis, phenotypic plasticity, and so on) so that might itself not be such a *repoussoir*.⁴

Strangely, as the development of the life sciences moves far beyond observation-based origins into the realms of the applied and technological, vitalism again comes to the fore, as it does whenever the question of boundaries arises. Not because it is itself a conceptual ‘hybrid’, like the concept of organism, or because it is a perpetual object of conceptual and experimental appropriation from one ‘discursive field’ to another, like mechanism, but because, unlike a univocal ontological vision like materialism, in which there should only be one kind of stuff in the universe (however much it may go through qualitative transformations, and however ‘embodied’ it may be), vitalist approaches “need not claim that every feature of the world is vital . . . ; rather, these categories are ‘inclusive’, used to name accounts in which at least some vital properties . . . are thought to be required.”⁵ Vitalism is thus always on the borderland of thought; a term that when invoked reminds us of our ignorance or skepticism. In fact, vitalism nominally implies acceptance of the unknown as a central fact of life. With vitalism, even the known is always in flux. Moreover, its very meaning has changed and evolved over time. Vitalism, then, has its own vitality.⁶

When thinking about vitalism historically, we are often drawn towards the liminal – the spaces in between. This sense of ‘between-ness’, what was often termed the *juste milieu* e.g. in nineteenth-century France, reminds us that life, history and science are all, in essence, subject to change. That is to say that change is a fundamental element, even the defining element, of all three. Change, dynamism, transformation, transmutation, and the constant mutable growth of the living – these are all themes that often lead us to rely on vitalist and emergentist explanations (which are neither identical nor necessarily connected, as discussed in Part II of this volume).

It is with these inconstant constants that we propose a collection of essays on the history and philosophy of vitalism: a moving target, an explanatory and/or metaphysical construct which appears, depending on the context, as a form of overt supernaturalism or as a

⁴ Oyama 2010. Gilbert and Sarkar 2000 are explicit in their intention to discard a ‘bad word’ (‘vitalism’) for a good thing (the family of systemic, non-genocentric approaches to development in current life science), and find a more usable one (‘organicism’). In his recent discussion of von Uexküll as a thinker of ‘biosemiotics’, Emmeche makes almost exactly the same terminological distinction, between a (bad) “vitalism” and a (good, naturalistically specifiable) “qualitative organicism” (Emmeche 2001, 653).

⁵ Berryman 2003, 346. A 1940 review of Wheeler’s history of vitalism actually makes much the same point, although it is phrased in the then-current language of different “temperaments”: “The mechanist is the kind of person who feels that everything important is known already, in principle at least, and that only minor details remain to be discovered. The vitalist feels that existing knowledge is only of minor details, and everything of importance is undiscovered” (Ritchie 1940, 7).

⁶ Canguilhem 1952/2008, Greco 2005.

useful heuristic for biomedical research and theorizing. Of course, there are still landmarks in this shifting sand, and though the lines on the map may move, new cultures and hybridities spring up in this borderland. There is an idea of the new here that occurs in two senses – in the truly novel (vitalism as an avant-garde, including in the farcical sense described in Juan Rigoli’s essay here [Chapter 3], in which the fascination with new dimensions of life science – notably, physiology – can be no more than a “roman de la médecine”) and in new interpretations of old tropes and ideas (as in the way the Montpellier vitalists in the eighteenth century reappropriated and reconstructed Hippocratism as a new yet deliberately archaic posture over and against the ‘mechanism’ of the New Science⁷). Thus we seek to be generative and re-generative. This mutable territory is our scope; a history of attempts to chart the vagaries of life and of souls is conceptually unlimited. But there are shapes and outlines in this broader mindscape, and the works here presented share a harmony in all seeking to puzzle together the patterns of vitalism.

This volume follows in a tradition of other collected close readings of vitalism. One of us recently produced a volume of this nature, but focused on the Enlightenment period.⁸ There are numerous other examples of philosophical and literary treatments of vitalism, looking at its presence in science, thought, art and the general culture.⁹ More focused book-length work is also present, dealing with various contexts, from the very specific *milieu* of the Montpellier medical school¹⁰ or the vitalist sympathies of the *Encyclopédie*¹¹ to the broader question of vitalism in the Enlightenment.¹² When we turn to shorter article-length pieces, the list grows dramatically, not least because the term starts to be used in all sorts of ways, extending beyond the context of philosophical, natural-historical and biomedical reflections on the nature of living beings to designate political (or ‘biopolitical’) positions. To be clear, this is a volume dealing with the former, in the period running from the end of the Enlightenment (starting with Lamarck, in Giglioni’s essay, Chapter 1) to the present day (with the essays by Turner, Sonnenschein, Soto et al., Dupré and O’Malley, and Bechtel, in Part III, Chapters 10-13).

What emerges more generally from this historiography are a series of themes, the bulk of which will also be explored in our fresh offerings. These include: the non-scientific dimensions of medicine (and conversely, the essential tensions but also interrelations between

⁷ Rey 1992, Williams 1994 (chapter 1), Boury 2004, and the essays in Wolfe ed., 2008.

⁸ Wolfe ed., 2008.

⁹ Burwick and Douglass, eds. 1992; Duchesneau and Cimino, eds. 1997; Lofthouse 2005.

¹⁰ Williams 2003.

¹¹ Rey 1987/2000.

¹² Reill 2005.

medicine and ‘science’, opening on to considerations on the very nature of a ‘life science’, both historically and in the contemporary context; the origins of vitalist thought; vitalism in relation to forms of mechanism (mechanistic explanations but also mechanistic ontologies¹³), and the transmutation, in the nineteenth century, of vitalism into fields like evolution, embryology, psychology, and many other areas of the life sciences.

Our focus, however, is post-Enlightenment, which also helpfully brackets off past eras for which historians are sometimes too eager to use the label ‘vitalist’ to describe figures that would have found this confusing at best.¹⁴ Starting in the first years of the nineteenth century, we see a revival of vitalist themes in the early nineteenth century in Romanticism and the rise of *Naturphilosophie* (discussed here in Chapter 2, Steigerwald’s essay on ‘organic vitality’ in nineteenth-century German biology). The nineteenth century also brings with it the very complex of ideas that is biology, and as classic treatments of the period suggest, vitalism is central to the negotiation of this new terrain.¹⁵

The nineteenth century begins in this context with the relationship between Romanticism and vitalism but goes on to be shaped by vitalist debates in England during the Regency, by new ‘alternative’ medical ideas (mesmerism, homeopathy, phrenology, etc.), new developments in the laboratory (which give rise to a mid-century materialist-spiritualist debate), new notions of evolution (Darwin) and regenerated ideas about life (spontaneous generation) and finally, a real neo-vitalism post-Claude Bernard, born of philosophy (Bergson), psychology, morphogenesis and embryology (Driesch). That Bernard himself is a complex figure who both criticizes forms of what he calls ‘vitalism’, and at the same articulates new models in which the uniqueness of organisms is justified, is another chapter of the story, still to be told (although see some suggestive remarks in Turner’s and Bechtel’s essays in this volume, Chapters 10 and 13). Many of the contributions to this volume touch, at least tangentially, on all these important developments.

¹³ Wolfe 2012; Wolfe forthcoming a.

¹⁴ In a particularly imprecise way, Walter Pagel was able to describe both Aristotle and William Harvey as vitalists (Pagel 1944, e.g. 147), which is like the historical mirror image of the emptiness of the concept when it is just used to mean the view held by “cranks” throughout the history of biology (as in Francis Crick’s rather arrogant pronouncement: “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”; Crick 1966, 99). In the former case, if we treat Aristotle, Harvey, Montpellier vitalists, Blumenbach, Bernard, Driesch, Bergson and Canguilhem as instances of one view, then ‘vitalism’ seems to be an *auberge espagnole*, a halfway-house or rumpus room with any possible content; in the latter case, the view from ‘mainstream’ genetics that ‘vitalism’ is simply an archaic remainder destined for the rubbish heap, neglects, not just historical context but scientific pluralism.

¹⁵ Benton 1974; Coleman 1971/1977; Allen 2005; Gayon 2010/2011; Wolfe 2011.

Another perspective that has not been dealt with all that extensively is vitalism in the twentieth century, inasmuch as there is an ‘x’ which traverses all these modifications and heterogeneous contexts. There is work on Bergson and Driesch, true,¹⁶ but the broader texture of vitalism in medicine, philosophy and the life sciences in the twentieth century has been largely ignored, especially in its relation to the topic of emergence in the philosophy of mind, which is the object of detailed analysis here in the essays by Garrett and Malaterre (Chapters 5 and 6), for emergentism was one of neo-vitalism’s central offshoots¹⁷; a very different vitalist trajectory is sketched out by Dyde in his contribution (Chapter 4), on how the unresolved tensions in the scientific attempts to provide account a physiological account of the mind in the nineteenth century (from phrenology to the study of reflex action) unwittingly produced vitalistic concepts of mind, appetite and behaviour; as Dyde puts it, “methodologies begot ontologies.”

This, along with contemporary debates regarding biological theory and the philosophy of biology, will be one of our central foci, and as such represents a new and exciting direction in scholarship on this subject. We have work within the pages of this volume on theories of emergence, complexity, biological theory (organicism), systems theory, homeostasis, holism, and beyond. Further, much of the prior interpretive discussion of vitalism has been either overly enthusiastic, or overly negative: either it is *the* theory which will make (life, meaning, embodiment, purposiveness, etc.) survive attempts at demystification or deflation in a context of ‘physicalism’, or it is *the* theory fit for cranks, scientific marginal and so on (see Normandin’s essay on Reich for this kind of case). Few interpreters have reflected on either its *meanings* or its *uses* (see Oyama 2010 and this volume, inter alia, for an attempt to do just this).

We are struck by the idea that vitalism continues to re-emerge in the life sciences in all sorts of fascinating, complex, dynamic, even heretical ways over the period from the Enlightenment to today, and are in accord with the idea that, like its counterpart, mechanism, vitalism is a kind of “meta-theoretical commitment.”¹⁸ And yet, at the same time, we are prompted by a methodological heterogeneity (partly the result of the diversity of voices in our chorus) to maintain a level of ‘free-play’ and anarchism in our theories of knowledge,¹⁹ giving no particular ontological priority to any one epistemological framework: some authors privilege a historicist approach over a naturalistic one (contrast the discussion of Canguilhem

¹⁶ On Bergson and vitalism, see Burwick and Douglass, eds. 1992; on Driesch, see Freyhofer 1982, Weber 1999.

¹⁷ McLaughlin 2003.

¹⁸ Hein 1968/1969/1972; compare Berryman 2003 and Wolfe 2012 on mechanism and Life.

¹⁹ Feyerabend 1975.

in Bianco's essay with that of Goldstein in Ferrario and Corsi's essay, respectively Chapters 9 and 8). Perhaps this is an inherently vitalist strategy, but we prefer to think of it as a sage intellectual choice.

Vitalism: Origin, History, and Transformation

Arguably, all understandings of life in antiquity implied a kind of vitalism. Charting the course of vitalism's history brings us from the classical age (where, on the question of souls and *animas*, we might still gesture towards Aristotle,²⁰ including the way in which his *De anima* was taken up in early modernity) through the core mechanizing forces of modern science (and, in our story, those malcontents on the periphery who criticized this trend²¹) to more contemporary manifestations of 'neo-vitalism' in continental philosophy. While the term 'vitalism' does not come into actual use until the late eighteenth century, many of the ideas and concepts embodied in the word are as old as medical and biological thought. From the *animas* and *pneumas* of Hippocrates, Aristotle and Galen to the ethical inducements towards vitalism found in the French tradition in thinkers like Georges Canguilhem,²² the idea has a long, multi-faceted history.

Certainly, questions of body (*soma*) and soul (*psyche*) can carry us across broad swaths of space and time.²³ One interesting early history is L. Richmond Wheeler's *Vitalism: Its History and Validity*.²⁴ Wheeler boldly attempts a panoramic survey of vitalism's rich landscape from the time of Aristotle to the early twentieth century, reminding us that even during ostensibly mechanistic ages, there are vitalist undercurrents. The contrast between Harvey and Descartes' attitudes towards the movement of the heart (in relation to 'life' and to the functioning of the 'body-machine', respectively), has been discussed in various ways, whether to praise Harvey or Descartes – or to call Harvey a vitalist, as Pagel does. The picture looks different if it is not considered from a strictly internalist angle, as for instance here:

It is interesting to consider . . . the claim often made in the anthropological and philosophical literature about the 'Cartesian' split between body and mind, dominating Western ethnopsychology and ethnophilosophy as a whole. Dualism is, no doubt, a characteristic feature of traditional 'Western' folk philosophy

²⁰ Ross 1961/1999.

²¹ For ways in which 'marginal' or 'heterodox' figures (who are often viewed as vitalists of a sort) can, should (or should not) be incorporated into a canonical version of the history of the life sciences, see Giglioni 2008 (for the case of Francis Glisson), Chang 2004 (for the case of Georg-Ernest Stahl), and Normandin (this volume, for the case of Wilhelm Reich).

²² Canguilhem 1952/2008; Delaporte ed., 1994.

²³ Wright and Potter, eds., 2000.

²⁴ Wheeler 1939.

insofar as Western culture has been, traditionally, a Christian culture. But this traditional dualism has to do with the distinction between body and soul, not between body and mind. . . . Descartes opposed body, *corps*, to *âme*, and the concept of ‘*âme*’ as used by Descartes was no doubt derived from the folk concept encoded in the French word *âme*, as it was used in the seventeenth-century French. It was certainly different from that encoded in the modern English word *mind*.²⁵

This diversion into anthropology is an illustration of the unconventional approach we hope to bring to bear on this subject, pushing beyond the established confines of history and philosophy of science. We want to transcend disciplinary boundaries, or better yet, produce new disciplinary hybrids, a vitalist act if there ever was one; we are in search of that flickering oasis in the borderland of ideas, where new notions can coalesce.

Returning to Wheeler’s narrative, we follow a pattern of increase in vitalist thought in the second half of the eighteenth century, after the prominence of mechanism in its first half. Indeed, as Reill shows (Reill 2005), there are important elements of vitalism in the late Enlightenment, which blossom even further in the early nineteenth century (see Steigerwald’s essay in this volume). Of course, one must be careful here with the conflation between vitalism, *Naturphilosophie* and Romanticism: there are important distinctions. When speaking of a Romantic science, however, there seem to be clear elements of vitalism supporting it, whether in its actual manifestations (in a focus on sensibility and the passions in medicine, for example) or its cultural and literary importance (in the discussions of the “vital spark” in works like Shelley’s *Frankenstein*, or in the public philosophical debate about vitalism between Abernathy and Lawrence in England during the Regency period²⁶). Wheeler provides a useful categorization of vitalism in the nineteenth century, suggesting that thinkers of the period can be divided into “naturist” and “chemical” schools, and Ku-ming (Kevin) Chang has quite recently shown the complexity of “alchemical vitalism” in early modern matter theory.²⁷

Indeed, in matters of debate as they relate to the question of life, one sees the development of camps increasingly divided by basic epistemological (and even ontological) differences. In this sense the laboratory and the lecture hall come to be more fully divided, and the questions asked by scientists and philosophers are increasingly remote from one another. There is also, connected to this trend, the question of the epistemological variances

²⁵ Wierzbicka 1989, 46.

²⁶ Jacyna 1983.

²⁷ Wheeler 1939; compare the distinction between physiological and chemical vitalism in Benton 1974, and Chang 2011 on alchemical vitalism.

between medicine and science in the nineteenth century, which only experience a real synthesis in the ‘biomedicine’ of the later century – itself an episode not without its ‘holistic’ twists and turns, as described in Sonnenschein, Soto et al.’s contribution to this volume (Chapter 11).²⁸

When discussing vitalism in the nineteenth century, the development of experimental physiology and the importance of Claude Bernard cannot be overlooked. Bernard marks the end of ‘traditional’ vitalisms that insisted on the universal solvent of a “vital force” and the move towards understandings of physiological relationships of the living that accepted complexity and uniqueness as central characteristics. Of course, if we look closer at the situation of medical vitalism in the late eighteenth century – not the topic of the present volume – we can already witness attempts to move away from “metaphysics” towards a more experimental or at least a more heuristically fruitful form of vitalism.²⁹ In that sense, Bernard and already Bichat who is sometimes his target as an insufficiently experimental vitalist, are part of a process of negotiation of a shifting terrain of vitalism as a focus on the nature of biological, organismic or embodied life, which attempts to do justice to criteria of scientificity which of course are themselves in flux and in a process of definitory crystallization in the period. Less historically, and more sharply put, one can also observe that Bernard (like Alexis Carrel in the early twentieth century, as discussed in Sonnenschein, Soto et al.’s essay, Chapter 11) was a “vitalist who practiced methodological reductionism.”

Post-Bernard, one witnesses a flourishing of new ‘vitalisms’; from the biogenesis of Pasteur and the panspermia of Lord Kelvin to the emergentism of Morgan and the *élan vital* of Bergson. In this regard it is interesting to note an overlooked figure like J.H. Fabre (1823-1915), a French autodidact entomologist who developed a notion of instinct and its indefinability. Fabre was another who emphasized the unique character of organic structure.³⁰ Vitalism, it can be argued, got a boost from new research devoted to understanding the development of that structure.

Moreover, embryological ideas explored by thinkers like Hans Driesch became the basis for new neo-vitalist perspectives. Driesch, in stark contrast to mechanists like Ernst Haeckel (and Driesch’s closer contemporary, Jacques Loeb³¹) was influenced by a more nuanced thinker, Emil Du Bois-Reymond, to investigate blastomeres in relation to

²⁸ Specifically for biomedicine, see the essays collected in Lawrence and Weisz, eds., 1998.

²⁹ It is explicit in the later editions of Paul-Joseph Barthez’s work *Nouveaux éléments de la science de l’homme* (the 1806 edition being the last one he revised): Rey 1987/2000, Wolfe 2011.

³⁰ Fabre 1879-1913.

³¹ Loeb 1912/1964; discussion in Allen 2005.

morphogenesis and embryology.³² He wrote about philosophy and vitalism, but also about the idea of individuality and even the viability of psychical research.³³ Driesch adopted the term *entelechy*, taken from Aristotle, to describe his belief in a teleological nature in living things that challenged the mechanistic synthesis in biology during this period. He prompted biologists to ask questions about the driving force in development, and helped open the door for research into genetics.

The whole early twentieth-century period could be described as a kind of “vitalist moment.” While most of the discussions of vitalism in the era closely connect it to biology, medicine and philosophy, this does not reflect the actual early twentieth-century reality. Bergson’s “neo-vitalism” had a wide appeal, extending all the way into the realm of the literary and cultural. There were vitalist themes in modernist art, for example, particularly in the dynamic and motion-based art movements of the futurists and vorticists. Arguably, the whole context of the period was infused with this sentiment:

It requires a concerted act of historical imagination to re-create the vitalist moment, a moment which re-enchanted life in the face of mechanist onslaught, sought a reprieve from the more demoralizing implications of evolutionary inquiry and left open a space for spirit or even God in nature. Yet this view, which naturally bled into neighboring fields such as theological speculation and philosophy, attained for George Bernard Shaw’s generation a special force that endured until the late inter-war years.³⁴

Lofthouse reflects on a notable gap in historiography devoted to vitalism, particularly after 1945. The reasons he gives for this are manifold, not the least of which is the tangential connection between vitalism to fascism. Yet this is an unfortunate and largely unmerited association, one born of specific critiques, particular that of Zeev Sternhell and his discussions of Georges Sorel as a progenitor of fascism.³⁵

As we will see in works dealing with the twentieth century, this is a historiographical oversimplification (as are more recent attempts to identify ‘holism’ in the life science with National Socialism³⁶). Perhaps the more convincing reason for vitalism’s decline is its inherently complex and nebulous meanings. Our works on contemporary biological theory will explore elements of this theoretic dissonance and dissipation. As to the centrality of

³² Waisse-Priven 2009, Normandin 2011.

³³ Driesch 1914a, 1914b, 1933; Wolfram 2009.

³⁴ Lofthouse 2005, 3.

³⁵ Sternhell 1994, e.g. 24, 32. The identification between Fascism and vitalism is made at greater length in Payne 1995, e.g. 14, 26, 208.

³⁶ Harrington 1996 (who studies this ‘identification’ in a series of figures, and then comes to *another* holist of 1920s German life science, Kurt Goldstein, who, she notes, is Jewish . . . and leaves the aporias and/or fruitfulness of sociocultural contextualist history of science unquestioned or unjustified).

malleability and variability in vitalism's variant definitions, there can be little doubt. But this should not dissuade attempts to understand the idea in its broadest terms.

Of course there were other important manifestations of vitalism in the early twentieth century, particularly in the realm of those who studied the *psyche*. Beyond Driesch and Bergson's classic *Creative Evolution* (1907) one is struck by developments in psychology (and, with a figure like Wilhelm Reich, psychiatry, as discussed in Normandin's contribution here). Certainly William McDougall's "hormic theory" was rooted in notions not dissimilar to Bergson's *élan vital* and Jung and Freud's essential fascination with the libido can be seen as the groundwork for vitalism in Reich's "orgone" and "life energy." McDougall was also connected to the philosopher C.D. Broad, and through him and J.B. Rhine, to a larger interest in parapsychology and psychical research, as mentioned above (this was a subject that also drew in Driesch).³⁷ This link between vitalism and the larger metaphysical questions associated with the nature of the living in the early twentieth century is a fascinating one, suggesting a relationship between vitalism and belief in the idea of a life force that somehow transcends the known material world. We are faced here with the realization that maybe not all vitalisms post-Bernard were completely divorced from spiritualist strands on the rise in the early part of the twentieth century.

This idea of vitalism as a kind of spiritual force is, overall, increasingly marginalized in early twentieth-century thought, and the new vitalisms explored herein are multi-faceted examples of this trend – vitalisms of a theoretical or even a material (physical) sort. But we must also come to grips with how vitalism finds occasional expression in the neo-Thomist philosophies associated with Catholicism. Indeed, Catholic philosophy was heavily influenced by Bergson in the early twentieth century, and there is a direct link between Bergson's neo-vitalism and the nascent neo-Thomism of thinkers like Jacques Maritain, which led to various idealist interpretations of biology which labeled themselves 'vitalistic', such as those of Édouard Le Roy (influenced by Teilhard de Chardin).³⁸

Such connections between vitalism and Scholasticism hint at a larger link between vitalism and philosophy. Indeed, in the French tradition, it was the historian and philosopher of the life sciences Georges Canguilhem who really made something of vitalism, both as an object of scholarly attention and more curiously, as a viewpoint he rather provocatively claimed for himself, declaring in the Foreword to his book on the development of the notion of reflex action that "it doesn't matter to me if I am considered to be a vitalist" and presenting

³⁷ Driesch 1933.

³⁸ Brenner 2011.

the book itself as a “defense of vitalist biology.”³⁹ It was due to Canguilhem’s influence that thinkers like Foucault⁴⁰ and Deleuze also dealt with similar themes. Canguilhem initially applied the historical method to the concept of reflex action and uncovered a wealth of material devoted to understanding the complexities of this question – it is here where he finds the sensible, contractible and irritable, essential elements of vitalist discourse (the roots of which Bianco traces carefully in his contribution, Chapter 9). We will see them revisited herein, notably in Giglioni’s study of irritation in Lamarck (Chapter 1).

Canguilhem problematized the categories of the normal and the pathological (inspired by Kurt Goldstein’s *Structure of the Organism* [1934], the topic of Ferrario and Corsi’s essay, Chapter 8), as well as the causal relationships between agents and disease. Here, then, is the source of portrayals of Canguilhem as a vitalist and individualist.⁴¹ Gayon reminds us of Canguilhem’s unique conceptual vision of life. “Life is concept,” Canguilhem says, borrowing from Hegel. More forthrightly, Canguilhem suggests that life is not an on/off, normal/pathological, healthy/sick switch mechanism, but an ever transforming, teleological and, one may say, vitalistic reality. We are reminded here of how Canguilhem, under the influence of Bergson, would often return to the complex relationship between “concept” and “life.” For Canguilhem there was also always a moral imperative in thinking through vitalism.

And finally, moving away from history entirely, we are excited about the prospect of a number of papers that give vitalism new vitality, that reintroduces (and reinterprets) some of its central concepts into contemporary biological debate, whether in positive terms (Turner on homeostasis, Bechtel on biological organization, in Chapters 10 and 13, respectively), in cautiously favorable terms (Dupré and O’Malley’s reflections on what it means for an entity to be living, and acknowledgment that there may be such a thing as a “vitalism heuristic” in biology, in Chapter 12); or in cautiously critical terms (Sonnenschein, Soto et al., Chapter 11), just as Garrett’s assessment of the concept of emergence and its vitalistic ramifications (Chapter 5) is more philosophically pessimistic than Malaterre’s (Chapter 6), and runs counter to the kind of historical productivity described in studies such as Steigerwald’s or Dyde’s (Chapters 2 and 4). As we have seen with this introduction, this is the very essence of vitalism – an idea that gets invoked as we search for new understandings, metaphors, and meanings in the life sciences; less the statement of an ‘essence’ of life and more the realization that Life consists in a series of changing determinations, as Canguilhem might have put it. In both the

³⁹ Canguilhem 1955, Avant-Propos, 1. For discussion see Wolfe, ms. 2011, Wolfe forthcoming b, and Bianco (this volume) for a different perspective.

⁴⁰ Ransom 1997.

⁴¹ Gayon 1998.

historical and contemporary sense, then, we hope this collection revitalizes notions of vitalism for the modern academy and, perhaps, even spurs on new debate and discussion.

Final Thoughts

You hold in your hands a collected volume on the history and philosophy of vitalism in its relation to the ‘scientific image’ – the image of what science is but also, *pace* Sellars, the scientific image of the world as opposed to our experiential picture – that moves from historical accounts of the nineteenth century (dealing with, for example, the Lamarckian biology of irritability and its connection to ideas of life and death) and twentieth century (in, for example, reflections on the concept of emergence in the early century) that transitions in later articles towards more contemporary philosophical and theoretical reflections on everything from vitalism and post-modernism to vitalism as “dynamic mechanism.”

We are, however, not engaged in unnecessarily convoluted metaphysical considerations. We seek to avoid making programmatic statements about vitalism and its role; this is a practical volume of historical and theoretical texts that take the idea of vitalism as a “meta-theoretical commitment” worthy of consideration, but that also realizes the idea has a rich and sometimes even overwhelming complex of meanings. This volume seeks to clarify rather than obfuscate, but we realize that there are also details and complexities that cannot be ignored. Again, we are aiming for a balanced perspective – something not all vitalists would necessarily agree with.

In the final analysis, we return to the idea of change, and how new images and perspectives on what constitutes ‘science’ prompt us to reconsider an idea that many too easily dismiss as outdated or merely idle spiritualism and mysticism. Alas, there are elements in this history of vitalism that cannot be divorced from this association. But this misses a key role vitalism has always played in scientific imagining – between the spiritual and the material, the digital and the analog, reductionism and holism, order and chaos, the inert and the animated, the constraining and the liberating, the dead and the living, the closed and the open, the rigid and the dynamic, the structured and the spontaneous, and even, at points, as in the case of our rich collection, the old and new.

References

Allen, Garland E. 2005. Mechanism, Vitalism and Organicism in late nineteenth- and twentieth-century biology: The Importance of Historical Context. *Stud. Hist. Phil. Biol. & Biomed. Sci.* 36: 261–83.

Aristotle. 1961 [1999]. *De Anima*, ed. David Ross. Oxford: Oxford University Press.

Barthez, Paul-Joseph. 1806. *Nouveaux éléments de la science de l'homme*, 2nd edition, 2 vols. Paris: Goujon & Brunot.

Benton, E. 1974. Vitalism in Nineteenth-Century Thought: A Typology and Reassessment. *Studies in History and Philosophy of Science* 5: 17-48

Berryman, Silvia. 2003. Ancient Automata and Mechanical Explanation. *Phronesis* 48(4): 344-369

Boury, Dominique. 2004. *La philosophie médicale de Théophile de Bordeu (1722–1776)*. Paris: Honoré Champion.

Brenner, Anastasios. 2011. Le vitalisme d'Édouard Le Roy entre mathématiques et religion. In *Repenser le vitalisme – Histoire et philosophie du vitalisme*, ed. Pascal Nouvel, 181-190. Paris: PUF.

Burwick, Frederick and Paul Douglass, eds. 1992. *The Crisis in Modernism: Bergson and the Vitalist Controversy*, Cambridge: Cambridge University Press.

Canguilhem, Georges. 1977. *La formation du concept de réflexe aux XVII^e et XVIII^e siècles*, 2nd revised edition. Paris: Vrin. (First published 1955).

Canguilhem, Georges. 2008. Aspects of vitalism. In Canguilhem, *Knowledge of Life*, translated by Stefanos Geroulanos and Daniela Ginsburg, 59-74. New York: Fordham University Press. (First published 1952)

Chang, Ku-Ming (Kevin). 2004. Motus Tonicus: Ernst Stahl's Formulation of Tonic Motion and Early Modern Medical Thought. *Bulletin of the History of Medicine* 78: 767-803.

Chang, Ku-ming (Kevin). 2011. Alchemy as Studies of Life and Matter: Reconsidering the Place of Vitalism in Early Modern Chymistry. *Isis* 102(2): 322-329

Coleman, William. 1977 [1971]. *Biology in the Nineteenth Century: Problems of Form, Function, and Transformation*. Cambridge: Cambridge University Press.

Crick, Francis. 1966. *Of Molecules and Men*. Seattle: University of Washington Press.

Delaporte, François, ed. 1994. *A Vital Rationalist: Selected Writings from Georges Canguilhem*, trans. Arthur Goldhammer. New York: Zone Books.

Driesch, Hans. 1914a. *The History and Theory of Vitalism*. London: Macmillan.

Driesch, Hans. 1914b. *The Problem of Individuality: A Course of Four Lectures Delivered Before the University of London in October 1913*. London: Macmillan.

Driesch, Hans. 1933. *Psychical Research: The Science of the Super-Normal*, trans. Theodore Besterman. London: G. Bell and Sons.

Duchesneau, François and Cimino, Guido, eds. 1997. *Vitalisms from Haller to cell theory: Proceedings of the Zaragoza Symposium, XIXth International Congress of the History of Science*. Firenze: L.S. Olschki.

Emmeche, Claus. 2001. Does a robot have an Umwelt? Reflections on the qualitative biosemiotics of Jakob von Uexküll. *Semiotica* 134 (1/4): 653-693

Fabre, Jean-Henri. 1879-1913. *Souvenirs entomologiques*, 11 vols. Paris: Delagrave.

Feyerabend, Paul. 1975. *Against Method: Outline of an Anarchistic Theory of Knowledge*. London: New Left Books.

Freyhofer, Horst H. 1982. *The Vitalism of Hans Driesch*. Frankfurt: Peter Lang.

Gayon, Jean. 1998. The Concept of Individuality in Canguilhem's Philosophy of Biology. *Jour. Hist. Bio.* 31: 305-325

Gayon, Jean. 2010. Vitalisme et philosophie de la biologie. *Répha* 2: 7-18. (Reprinted in *Repenser le vitalisme – Histoire et philosophie du vitalisme*, ed. Pascal Nouvel, 15-32. Paris: PUF, 2011)

Giglioni, Guido. 2008. What Ever Happened to Francis Glisson? Albrecht Haller and the Fate of Eighteenth-Century Irritability. *Science in Context* 21: 465-493

Gilbert, Scott F. and Sahotra Sarkar. 2000. Embracing complexity: organicism for the 21st century. *Developmental Dynamics* 219: 1-9

Greco, Monica. 2005. On the Vitality of Vitalism. *Theory, Culture & Society* 22: 15-27

Harrington, Anne. 1996. *Reenchanted Science – Holism In German Culture From Wilhelm II To Hitler*. Princeton: Princeton University Press.

Hein, Hilde. 1968. Mechanism and Vitalism as Meta-Theoretical Commitments. *Philosophical Forum* 1: 185-205

Hein, Hilde. 1969. Molecular Biology vs. Organicism: The Enduring Dispute between Mechanism and Vitalism. *Synthese* 20: 238-253

Hein, Hilde. 1972. The Endurance of the Mechanism-Vitalism Controversy. *Journal of the History of Biology* 5:159-88

Huneman, Philippe. 2010. Assessing the Prospects for a Return of Organisms in Evolutionary Biology. *Hist. Phil. Life Sci.* 32(2-3): 341-372

Jacyna, Leon S. 1983. Immanence or Transcendence: Theories of Life and Organization in Britain, 1790-1835. *Isis* 74(3): 311-329

- Kirschner, Marc, Gerhart, John & Mitchison, Tim. 2000. Molecular "Vitalism". *Cell* 100: 79-88
- Laubichler, Manfred. 2000. The Organism is dead. Long live the organism! *Perspectives on Science* 8(3): 286-315
- Lawrence, Christopher, & Weisz, George, eds. 1998. *Greater than the Parts: Holism in Biomedicine, 1920-1950*. Oxford: Oxford University Press.
- Loeb, Jacques. 1964. The mechanistic conception of life (1912), in Loeb, *The Mechanistic Conception of Life*, ed. D. Fleming, 5-34. Cambridge, MA: Harvard University Press.
- Lofthouse, Richard A. 2005. *Vitalism in Modern Art, c. 1900-1950: Otto Dix, Stanley Spencer, Max Beckmann, and Jacob Epstein*. Lewiston, NY: The Edwin Mellen Press.
- McLaughlin, Brian P. 2003. Vitalism and Emergence. In Thomas Baldwin (ed.) *The Cambridge History of Philosophy: 1870-1945*, 631-639. Cambridge: Cambridge University Press.
- Morange, Michel. 2006. Les biologistes moléculaires face au problème de la vie. *Revue des Questions Scientifiques* 177(3-4): 381-394.
- Normandin, Sebastian. 2007. Claude Bernard and *An Introduction to the Study of Experimental Medicine*: 'Physical Vitalism', Dialectic and Epistemology. *Journal of the History of Medicine and Allied Sciences* 62: 495-528
- Normandin, Sebastian. 2011. Review of Silvia Waisse-Priven, *d & D: duplo Dilema: du Bois-Reymond e Driesch, ou a vitalidade do Vitalismo*. *Bulletin of the History of Medicine* 85(2): 307-309
- Oyama, Susan. 2010. Biologists behaving badly: Vitalism and the language of language. *Hist. Phil. Life Sci.* 32(2-3): 401-423
- Pagel, Walter. 1944. William Harvey: Some Neglected Aspects of Medical History. *Journal of the Warburg and Courtauld Institutes* 7: 144-153
- Payne, Stanley. 1995. *A History of Fascism, 1914-1945*. Madison, Wisconsin: The University of Wisconsin Press.
- Ransom, John S. 1997. Forget Vitalism: Foucault and *Lebensphilosophie*. *Philosophy and Social Criticism* 23: 33-47
- Reill, Peter Hanns. 2005. *Vitalizing Nature in the Enlightenment*. Berkeley: University of California Press.
- Rey, Roselyne. 1987. *Naissance et développement du vitalisme en France de la deuxième moitié du dix-huitième siècle à la fin du premier empire*. University of Paris, *thèse d'état*.

Rey, Roselyne. 1992. Anamorphoses d'Hippocrate au XVIII^e siècle. In *Maladie et maladies, histoire et conceptualisation. Mélanges en l'honneur de Mirko Grmek*, ed. Danielle Gourevitch, 257-276. Geneva: Droz.

Rey, Roselyne. 2000. *Naissance et développement du vitalisme en France de la deuxième moitié du dix-huitième siècle à la fin du premier empire*. Oxford: Voltaire Foundation. (Abridged version of Rey 1987.)

Ritchie, A. D. 1940. Vitalism: Its History and Validity. *Nature* 145: 6-7.

Roll-Hansen, Nils. 1976. Critical Teleology: Immanuel Kant and Claude Bernard on the Limitations of Experimental Biology. *Jour. Hist. Bio.* 9: 59-91

Sternhell, Zeev, with Sznajder, Mario, Asheri, Maia. 1994. *The Birth of Fascist Ideology: From Cultural Rebellion to Political Revolution*. Princeton: Princeton University Press.

Turner J. Scott. 2000. *The Extended Organism: The Physiology of Animal-Built Structures*. Cambridge, Mass.: Harvard University Press

Waisse-Priven, Silvia. 2009. *d & D: duplo Dilema: du Bois-Reymond e Driesch, ou a vitalidade do Vitalismo*. São Paulo: EDUC-Editora.

Walsh, Denis M. 2010. Two Neo-Darwinisms. *Hist. Phil. Life Sci.* 32(2-3): 317-340

Weber, Marcel. 1999. Hans Drieschs Argumente für den Vitalismus. *Philosophia Naturalis* 36: 265-295

West-Eberhard, Mary Jane. 2003. *Developmental Plasticity and Evolution*. Oxford: Oxford University Press.

West-Eberhard, Mary Jane. 2005. Phenotypic accommodation: Adaptive innovation due to developmental plasticity. *Journal of Experimental Zoology (Molecular and Developmental Evolution)* 304B: 610-618

Wheeler, Leonard Richmond. 1939. *Vitalism: Its History and Validity*. London: N.F.G. Witherby.

Williams, Elizabeth A. 1994. *The Physical and The Moral: Anthropology, Physiology and Philosophical Medicine in France 1750-1850*. Cambridge: Cambridge University Press.

Williams, Elizabeth A. 2003. *A Cultural History of Medical Vitalism in Enlightenment Montpellier*. Aldershot: Ashgate.

Wierzbicka, Anna. 1989. Soul and Mind: Linguistic Evidence for Ethnopsychology and Cultural History. *American Anthropologist* 91: 41-58

Wolfe, Charles T. 2011. From substantival to functional vitalism and beyond, or from Stahlian animas to Canguilhemian attitudes. *Eidos* 14: 212-235.

Wolfe, Charles T. 2012. Le mécanique face au vivant. In *L'automate : modèle, machine, merveille*, eds. Bernard Roukhomovsky, Sophie Roux, Aurélie Gaillard and Jean-Yves Goffi, 115-138. Bordeaux: Presses Universitaires de Bordeaux.

Wolfe, Charles T. forthcoming a. Teleomechanism redux? Functional physiology and hybrid models of Life in early modern natural philosophy. *Gesnerus – Revue Suisse d'Histoire de la Médecine et des Sciences*, special issue : *Entre mécanisme et téléologie : Anatomie, physiologie et philosophie des fonctions (16^e–18^e siècles)*.

Wolfe, Charles T. forthcoming b. Was Canguilhem a biochauvinist? Goldstein, Canguilhem and the status of 'embodiment'. In Darian Meacham, ed., *Medicine and Society, New Continental Perspectives*. Dordrecht: Springer, Philosophy and Medicine Series.

Wolfe, Charles T., ed. 2008. *Vitalism Without Metaphysics? Medical Vitalism in the Enlightenment, Science in Context* 21:4.

Wolfe, Charles T. ms., 2011. The Return of Vitalism: Canguilhem and French Biophilosophy in the 1960s.

Wolffram, Heather. 2009. *The stepchildren of science: Psychological research and parapsychology in Germany, c. 1870–1939*. Amsterdam, New York: Rodopi.

Wright, John P. and Paul Potter, eds. 2000. *Psyche and Soma: Physicians and Metaphysicians on the Mind-Body Problem from Antiquity to Enlightenment*. Oxford: Oxford University Press.