



1 **Chapter 12**
2 **Was Canguilhem a Biochauvinist?**
3 **Goldstein, Canguilhem and the Project**
4 **of Biophilosophy**

5 **Charles T. Wolfe**

6 *Nous n'avons pas l'outrecuidance de prétendre rénover la*
7 *médecine en lui incorporant une métaphysique*
8 Canguilhem (1972, p. 9).

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10
11 *la vie déconcerte la logique*
12 Canguilhem (1977, p. 1)
13

14 **1 Introduction**

15 In what follows I reflect on the possible contribution of Georges Canguilhem
16 (1904–1995) to a discourse in the philosophy of the life sciences which would not
17 be content to locate itself squarely within either of two classic and enduring
18 orthodoxies: reductionism or holism. Granted, these two extremes often coexist, if
19 not very happily, and the different subdisciplines approach them in a very different
20 way. As Gayon has noted (Gayon 2010), the philosophy of biology as a profes-
21 sional discipline, which primarily focuses on a kind of specialized conceptual
22 analysis aiming at clarifying the implications and consequences of biological claims
23 in mainstream science, has kept a safe distance from what it perceives as “vitalism”
24 throughout its existence as an Anglophone genre. This is less true of the philosophy
25 of medicine, inasmuch as it focuses more on “whole person” analyses, subjectivity,
26 qualitative dimensions of suffering and well-being, and so on (see Giroux (2010)
27 for a useful contrast between Canguilhem and analytic philosophy of medicine).

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28 Canguilhem was a prominent figure in these disciplines, particularly in the rather
29 short-lived intellectual formation known as “biophilosophy” (along with Raymond
30 Ruyer and Gilbert Simondon; Ruyer’s early works are contemporary with
31 Canguilhem’s, in the 1940s, while Simondon shares with Canguilhem a ‘heyday’ in
32 the 1960s). The latter precisely was the project to understand Life, living beings, the
33 concept of organism, and so on, in terms not exclusively dictated either by
34 mechanistic science or by the philosophical fellow-travellers of such science. The
35 question of whether such a project is necessarily “vitalistic” or “biochauvinist” [to
36 use a recent coinage by the biological theorist and embodied-cognition researcher
37 Ezequiel Di Paolo, in Di Paolo (2009)], and of course, what these terms mean in the
38 present context, shall be part of my concern in this essay.

39 Canguilhem sometimes described himself as a vitalist—playfully, but perhaps not
40 ironically (Canguilhem 1965 and 1977, Preface), and one should not forget that in the
41 decades he did so, particularly the 1950s–1960s, it was at the very least provocative
42 (Geroulanos 2009); there was after all no scholarship either on eighteenth-century
43 vitalism (like that of the Montpellier School) or on early nineteenth-century German
44 biology (like Blumenbach’s embryology), nor of course was there such a thing as
45 “theory” and its invocations of vitalism (such as Bennett 2010b). Canguilhem
46 returned to the theme several times, and of course in a broader sense if we reflect on
47 some of the core arguments of his classic, *The Normal and the Pathological*, we find
48 an implicit presupposition that normativity is a power or capacity proper to *living*
49 beings. This may not be full-blown “vitalism” [whatever that is; see Wolfe (2011a, b);
50 Normandin and Wolfe (2013)], but it is an insistence that there is something unique
51 about living entities that makes them creators of a certain world which they inhabit.

52 This should not be taken so much in the sense of classical idealism, for which
53 “nothing whatsoever can have a positive relation to the living being if the latter is
54 not in its own self the possibility of this relation, i.e. if the relation is not determined
55 by the Notion and hence not directly immanent in the subject” (Hegel 1817/1970,
56 § 359R, p. 385); it is closer for instance to von Uexküll’s sense of *Umwelt*,
57 according to which “[e]very subject spins out, like the spider’s threads, its relations
58 to certain qualities of things and weaves them into a solid web, which carries its
59 existence” (von Uexküll 2010, p. 53). But we can also detect in this idea of living
60 beings as creators, some Nietzschean overtones or *arrière-pensées* [and of course
61 Foucault pointed to this aspect in his mentor’s work, emphasizing that “forming
62 concepts is a way of living, not of killing life, of living in complete mobility and not
63 immobilizing life” (Foucault 1985/1989, p. 21)]: the idea that values, norms and
64 other higher-level constructs are in fact products of our vital instincts. For
65 Canguilhem, who was interested in such illustrations of the unpredictability of life
66 as monsters:

67 Man is only truly healthy when he is capable of multiple norms, when he is more than
68 normal. The measure of health is a certain capacity to overcome organic crises in order to



69 establish a new physiological order, different from the initial order. In all seriousness, health
70 is the ability [*le luxe*] to fall ill and then get over it. On the contrary, illness is the reduction
71 of the power to overcome other illnesses.¹

72 Closer to the present topic, we can also recognize in this idea the influence of
73 Kurt Goldstein, who elaborated, in his lengthy and difficult work on “the structure
74 of the organism” (Goldstein 1934/1995), a conception of organisms as interpretive
75 and indeed *meaning-creating* beings; beings for whom being alive, acting, is, aside
76 from other metabolic processes, also a process of the production of meaning. Or, in
77 a more recent restatement of the same core idea: “organisms are subjects having
78 purposes according to values encountered in the making of their living” (Weber and
79 Varela 2002, p. 102). Differently put, the kind of vitalism at work in Goldstein and
80 Canguilhem is explicitly *not* like the vitalism of those people who contemplate little
81 squiggly bundles of life (from Trembley’s polyp to Driesch’s sea urchin blasto-
82 meres, via Réaumur’s frogs which he made to wear little taffetas shorts to catch
83 their sperm) and then assert that they have witnessed the difference between Life
84 and non-Life: “A vitalist, I would suggest, is someone who is led to reflect on the
85 nature of life more because of the contemplation of an egg than because she has
86 handled a hoist or a bellows” (Canguilhem 1965a, p. 88). Rather, it is a vitalism of
87 meaning and projection.

88 Yet Canguilhem (unlike, say, Hans Jonas) is genuinely concerned with the
89 nature of *biological* life, not with some secret way of defending human uniqueness
90 over and against the rest of the physical universe. In his major collection of essays
91 on the topic, *The Phenomenon of Life*, Jonas opposes the world of conscious
92 organisms to the “dead” world of mechanical Nature and insists that “the point of
93 life itself” is “its self-centered individuality,” which he insists must be an “onto-
94 logical concept” (Jonas 1966, p. 79); from the outset, he explains that he is inter-
95 ested in biological processes such as metabolism in as much as they are ultimately
96 indicative of “freedom” (3; see also Kass 1995).² Indeed, vitalism has often served
97 as a mask or indicator of humanism, itself often with theological foundations. That
98 is, claims of an oppositional or differential sort, in which “Life,” “organism,” “the
99 animal” or “the living body” are opposed, often in foundation a list ontological
100 terms, to “physical nature,” “mechanical nature,” “mechanistic materialism,” “the
101 world as machine” and so on, like Carolyn Merchant’s *Death of Nature* (Merchant
102 (1980); see Sutton and Tribble (2011) for an inspiring critique) often in the end
103 have an anthropocentric motivation such as defending freedom, as in Jonas’ case
104 above, or those thinkers for whom materialism and scientific analysis are suitable

¹“*Le normal et le pathologique*,” (Canguilhem 1965b, p. 167). See also Canguilhem (1972, pp. 77, 155).

²I am not suggesting that Jonas was a panpsychist, but rather that what interests him is not Nature per se, but conscious, self-maintaining organisms as such—and then, by extension, a system which enables such organisms to exist (thanks to Darian Meacham for demanding this clarification). A philosopher familiar with Hegel might recognize here a form of the philosophy of nature in which organisms are relevant inasmuch as they are (weak, or provisional) forms of subjectivity, and ultimately of Spirit. It does not seem as if Jonas would have appreciated this similarity, but such concerns lie outside the remit of the present essay.

105 for “the material universe” but “yield disastrous results when applied to the inner,
106 subjective world of human nature, human thought, and human emotions” (Hill
107 1968, p. 90). In contrast, Canguilhem was a *naturalist*, to use a term of art popular
108 from the last decades: he approvingly quotes Spinoza asserting that we are *parts of*
109 *Nature* and nothing more: we, as humans, or rational agents, or possessors of a
110 pineal gland, do not form an *imperium in imperio* (Canguilhem 1965a, p. 95).

111 But my question here is, in what way does Canguilhem argue, biochauvinistically,
112 for living bodies being special? One of the curious features of Goldstein’s account we
113 find again in Canguilhem’s unique way of engaging with “organisms” and the
114 question of their uniqueness: the way in which he wavers or moves back and forth
115 between a cautious, *epistemological* position (reminiscent of the Kantian regulative
116 ideal in the third *Critique*) in which organisms are real and special *because of the way*
117 *we cognitively constitute them*, and a bold, *ontological* position in which organisms
118 are real because of basic, intrinsic features which are just there. I shall not go into the
119 details of Goldstein’s account, which sounds more Heideggerian than anything else
120—for example, the claim in his “Concluding Remarks” that “the organism is a being
121 enduring in time,” curiously enough “in eternal time, for it does not commence with
122 procreation, certainly not with birth, and does not end with death”—although to be
123 fair these “existential” motifs crop up in Canguilhem too (Goldstein 1934/1995,
124 p. 387).³ But if we set that aside, Goldstein definitely contributed a new kind of
125 approach which was, of course, holistic and organismic while nevertheless operating
126 at a primarily heuristic, non-ontological level. As he says, “*The Organism* consists
127 mainly of a detailed description of the new method, the so-called holistic, organismic
128 approach. [...] We were confronted then with a difficult problem of epistemology.
129 The primary aim of my book is to describe this methodological procedure in detail,
130 by means of numerous observations” (Goldstein 1934/1995, p. 18).

131 However, this convenient distinction between the epistemological (projective,
132 constitutive) vision of biological entities and the ontological vision (strong vitalist,
133 “rational metaphysics” as Kant might have said), is somewhat muddled when
134 Canguilhem introduces a further vitalist twist: that it might be an objective
135 (“ontological”) feature of living beings (i) that they are interpretive beings, à la
136 Goldstein, and especially (ii) that they need to consider *other* entities as themselves
137 organismic, purposive, vital (Canguilhem 1965a). There is also an existentialist
138 *parfum* in Canguilhem’s reflections (a further twist on the ontological dimension in
139 [i]), when he describes this interpretive stance as essentially a kind of fundamental
140 existential attitude.⁴ One finds the properly biological or biomedical version of this
141 “existentialism” in *The Normal and the Pathological*, with statements such as “the

³Interestingly, in one of his last papers, Goldstein pointed to the differences between his point of view and that of existential psychiatry: “I agree with the existentialist concept insofar as I also deny that biological phenomena, particularly human existence, can be understood by application of the method of natural science. But I differ as to the meaning of the term ‘existence’. It means for me an epistemological concept based on phenomenological observations, which enables us to describe normal and pathological behavior and to give a definite orientation for therapy. It is a kind of philosophical anthropology” (Goldstein 1959, pp. 11–12).

142 life of a living being [...] only recognizes the categories of health and illness on the
143 level of experience, which is first of all an *épreuve* in the affective sense of the term
144 —not on the level of science” (Canguilhem 1972, p. 131). We should notice here
145 the appeal to a founding, subjective, dimension, although it is not clear if this
146 should be treated as an ontologically specific region or not. That is, Canguilhem is
147 neither listing “objective features” of living beings, like homeostasis, and claiming
148 that they are “definitory,” nor, conversely, is he opting for a fully subjectivist
149 position, where “to live” is understood on the model of, or as interrelated with, “to
150 know” as the property of a knowing subject. Is he closer to a Hegelian perspective,
151 in which the organism is already a form of subjectivity? Again, this is not the place
152 to decide such matters.

153 If we try to understand Canguilhem in relation to recent theoretical biology
154 (including the “organizational” theories of A. Moreno et al., see Bechtel (2007),
155 Mossio and Moreno (2010), Moreno and Mossio, 2015), using as a guiding question,
156 “are organisms unique in the physical world? If so, why?”, we arrive at a curious
157 situation, in which he seems to be both more and less committed to the *uniqueness* of
158 embodied, biomedical entities than other theoreticians. On the one hand, Canguilhem
159 appears more cautious, and less crypto-dualistic than some prominent recent figures
160 like Varela, who tend to fall into the category mistake of seeking to prove the
161 uniqueness of the biological by providing some empirical criteria—a “laundry list,”
162 as it were, which frequently invokes Bernard’s *milieu intérieur*, Cannon’s notion of
163 homeostasis, and more recently the work of Ganti, Luisi et al. on self-organization
164 and autocatalytic processes (and organizational closure).⁵ This is particularly odd
165 when some of these figures invoke the authority of Kant in the Third *Critique* [as has
166 become very common in this strand of theoretical biology, e.g. Weber and Varela
167 (2002); Perret (2012); Simeonov et al. (2012)]. To put it bluntly, to provide an
168 empirical set of criteria for why living beings are special and to claim that this fits in a
169 Kantian framework, is not a good idea if this framework explicitly rejects the idea of
170 giving empirical definitions of organism, inasmuch as Kant’s organism concept is
171 explicitly built around his notion of regulative ideal (Kant 1790/1987, § 73, 276;
172 Wolfe 2010). For Kant, organism is a “reflective” construct rather than a “consti-
173 tutive” feature of reality, and reflective judgments are “incapable of justifying any
174 objective assertions” (Kant 1790/1987, § 67, 259; § 73, 277).

175 Kurt Goldstein and Canguilhem were, I think, on to something when they
176 insisted that rather than say what is unique about the biological, we look to the
177 *observer*: to be an organism is to have a *point of view* on organisms; one which
178 produces intelligibility, which reveals organisms as meaning-producing beings (see,

⁴For more on the young Canguilhem as a humanist existentialist, a reader of Alain, prior to his turn to vitalism, see the precise analysis in Bianco (2013).

⁵For a rare acknowledgment of this problem, see Di Paolo (2009), where he criticizes Varela for “a hazy view of living systems as being defined by a list of properties (growth, reproduction, responsiveness” (p. 14). A nice extension of this point is in Machery (2012) (see especially his critical evaluation of those he calls “life definitionists,” who “have constantly mixed folk intuitions with scientific considerations,” p. 161).

179 Starobinski (1956, p. 5) who comments that “*comprendre nous met en présence*
180 *d’une totalité signifiante*”⁶). Notice that this approach valorizes a *constructivist*
181 dimension in the definition of life and the relevant individual and is not unlike the
182 World Health Organization’s notorious definition of health, which is broad enough
183 to include all senses of well-being: “Health is a state of complete physical, mental
184 and social well-being and not merely the absence of disease or infirmity.”⁷ That is,
185 there may be biological “facts” or “invariants,” but we are makers of our worlds. As
186 to who this “we” might be—humans, higher mammals, all living creatures?—
187 Canguilhem is never very clear how restrictive this concept is: like von Uexküll’s
188 *Umwelt*, could it apply to ticks and woodlice? He sometimes grants that “even for
189 an amoeba, living means preference and exclusion,” using the same phrase later in
190 the book: “the life of a living entity, *even an amoeba*, only acknowledges the
191 categories of health and sickness on the level of experience” (Canguilhem 1972,
192 pp. 84, 131, emphasis mine). But most of the time he is interested in humans as
193 subjective, embodied agents—the objects of medical science, caught between
194 biological and social norms. And this is why I suggest that he can be called a
195 humanist.

196 But on the other hand, this is not the final answer, or the argument-stopper: as I
197 mentioned above, Canguilhem is also *more* biocentric or biochauvinistic than many
198 of his contemporaries. This appears more clearly if we contrast Canguilhem with
199 the fairly “disembodied” character of much of recent theoretical biology: in con-
200 trast, he *wants to be* a kind of vitalist. To be sure, Canguilhem is not the sort of
201 thinker who seeks to discover “organismic laws” (like Elsasser 1961), lays out a
202 laundry list of ontologically unique features, or most crudely, propounds a meta-
203 physics of entelechies, like Hans Driesch, who converted his Chair in biology into
204 one in philosophy in order to reinvent a jejune Aristotelianism based on his earlier
205 experimental work in *Entwicklungsmechanik* (which Erik Peterson has described,
206 fittingly, as ‘bioexceptionalism’ (Peterson 2012, 2013): an empire within an empire
207 or “kingdom within a kingdom,” as it were): a metaphysics of the sea urchin.

208 To be more precise, Driesch, who came out of the school of Wilhelm Roux’s
209 *Entwicklungsmechanik* (or study of the mechanisms of the developmental process),
210 performed successful, and much-discussed experiments with sea urchin eggs,
211 halving the two blastomeres (daughter cells) of the egg and successfully producing
212 two whole embryos and larvae, complete in every respect. This total equality of the
213 halved eggs he termed their “totipotency,” and the cells derived from the egg he
214 termed a harmonious equipotential system (Driesch 1914, p. 209). Faced with the
215 evidence that there was no physical structure we can find in the sea urchin embryo

⁶Starobinski (1956, p. 5); the extent to which this includes non-human animals is open to discussion.

⁷Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19–22 June 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948. The definition has not been amended since 1948.

216 which is responsible for the “regulative” or “equipotential,” force, he felt obliged to
217 posit a vital force, the *entelechy*.⁸ Tellingly, Driesch became so absorbed with this
218 feature that he gave up experimental work to teach philosophy at the University of
219 Leipzig, developing a form of vitalism, as he called it, focusing on the idea that
220 *entelechies* exist in all living organisms. The choice of term was deliberate, for he
221 believed one had to revive a vitalist thinking which had lain dormant since Aristotle
222 (the Montpellier school does not appear in his historical surveys). Canguilhem
223 comments on Driesch’s “shift” from science to metaphysics as follows:

224 The vitalist biologist who turns philosopher of biology thinks he brings a certain capital
225 with him to philosophy, but in reality he brings to it only a land-income [*rentes*], which
226 continually decreases in the market of scientific values – for the simple reason that research,
227 in which he no longer participates, continues to move forward. Such is the case with
228 Driesch’s abandonment of scientific research for philosophical speculation and even
229 teaching. What we have here is an unpremeditated abuse of confidence. The prestige of
230 scientific work stems above all from its internal dynamism. The former scientist sees
231 himself deprived of tills prestige in the eyes of active scientists. He believes he will preserve
232 it among the philosophers. This must not be so. Philosophy, being an autonomous enter-
233 prise of reflection, does not honor any prestige at all, not even that of the scientist, or – even
234 more rightly – that of the ex-scientist (Canguilhem 1965a, p. 94; I have used the translation
235 in Canguilhem 2008a, pp. 68–69).

236 Canguilhem is not a metaphysician of entelechies, then; nor is he a quasi-
237 religious defender of the sovereignty of organic life like Hans Jonas or his more
238 simplistic disciple Leon Kass (Kass 1995); nor a defender of philosophical
239 anthropology like Helmuth Plessner (here I refer back to my comment regarding the
240 hidden or overt foundationalism in such forms of vitalism). In some respects,
241 particularly in his 1966 essay “*Le concept et la vie*,” which begins with a long
242 reflection on Aristotle, he seems closer to Marjorie Grene and her attempt to return
243 to Aristotelian teleology [Grene (1968, 1974); Grene herself wrote favorably about
244 Canguilhem, see, Grene (2000)]. Unlike many of these thinkers, as well as phe-
245 nomenologists of embodiment, Canguilhem has no appeal to a Romantic subjec-
246 tivity, e.g. in the sense described (critically) by Jean-Marie Schaeffer: “In
247 phenomenology, the understanding of embodiment (*corporité*) is part of an
248 approach that continues to accept the epistemic privilege of consciousness’s self-
249 investigation as axiomatic” or (affirmatively) by the enactivist theorist Evan
250 Thompson: “Life realizes a kind of interiority, the interiority of selfhood and sense-
251 making.”⁹ In explicit contrast to Varela and most of the above-mentioned thinkers
252 (with the exception of Grene), Canguilhem does not have any problems with
253 Darwinian evolution (Canguilhem 1972, p. 90; Méthot 2013), and indeed is not
254 engaged in the project of “refounding,” “regrounding” or otherwise reinventing a

⁸I note that Bergson (who was sometimes wrongly associated with Driesch under the banner of vitalism in the early twentieth century) attacked this claim of a life-force in all living organisms explicitly. Bergson asked: where is this force? at what level? He expressed doubts that nature could be interpreted strictly in terms of this internal “finality” (Wolsky and Wolsky 1992, p. 156f).

⁹Schaeffer (2007, p. 118), Thompson (2007, p. 238). Thompson often refers to “sense-making” as a distinctive feature of enaction, in autopoietic systems (e.g. p. 139).

255 new program for science. There are occasional, late exceptions which display a
256 more reactive attitude towards the march of science, such as his remarks against
257 some of psychology, cognitive science and cognitive neuroscience in the essay “*Le*
258 *Cerveau et la Pensée*” (Canguilhem 1980/1992), which themselves extend criti-
259 cisms already articulated in (Canguilhem 1958/2002c). But is he still a “biochau-
260 vinist,” claiming that there is a special “biological space and time”?

261 All of this is really quite “dialectical,” in the sense of being slippery, and almost
262 circular—but in a productive sense. Namely, when a prominent figure like Andy
263 Clark, who pushed cognitive science to take embodiment much more seriously in a
264 variety of publications at least since *Being There* (Clark 1997), has to warn about
265 the mysticism of “pressing the flesh” (Clark 2008), he is effectively stepping back
266 from twenty years’ worth of emphasis on what is unique about embodiment. When
267 Di Paolo warns against the naïveté of “biochauvinism,” ten pages later he speaks
268 approvingly of another theorist (Michael Wheeler)’s concept of “vital materiality”
269 (Di Paolo (2009, p. 20), referring to Wheeler (2010), the paper had been available
270 for some years). Wheeler had used this term in opposition to what he calls *im-*
271 *plementational* materiality. *Vital* materiality is meant to convey the sense of the
272 necessarily biological features of certain types of organization.

273 Similarly, just when Canguilhem has finished warning the reader about the
274 intellectual dangers inherent in positing that living beings are like an empire within
275 an empire (*imperium in imperio*, Canguilhem 1965a, p. 95), he will then assert—as
276 he does at length in “*Le concept et la vie*,” that it is *Life itself*—written with a very
277 capital L, that determines living beings to act in these interpretive, purposive,
278 normative, vital ways. Life “disconcerts logic” (Canguilhem 1977, p. 1). In a lecture
279 in the problem of regulations in the organism and society, he says that:

280 An organism is an entirely exceptional mode of being, because there is no real difference,
281 properly speaking, between its existence and the rule or norm of its existence. From the
282 time an organism exists, is alive, that organism is “possible,” i.e., it fulfills the ideal of an
283 organism; the norm or rule of its being [*existence*] is given by its existence itself.
284 (Canguilhem 2002b, pp. 106–107)

285 An “entirely exceptional mode of being” sounds like ontological specificity.

286 He states what I loosely called the dialectical slipperiness of the relation between
287 Life itself and the thinker’s vitalism (a claim about ontology or about stances?)
288 more sharply in *The Normal and the Pathological* itself: “It is life itself, in its
289 differentiation between its propulsive behavior and its repulsive behavior, which
290 introduces the categories of health and illness into human consciousness. These
291 categories are biologically technical and subjective, not biologically scientific and
292 objective” (Canguilhem 1972, p. 150). Notice here the subjectivism—the appeal to
293 a foundational subjectivity—which I had earlier connected to a particularly anti-
294 naturalistic trend in phenomenology, and the more recent theory known as enac-
295 tivism, associated with Varela in particular, which often asserts that life is lived
296 “outside of the physical”: “Life is not physical in the standard materialist sense of
297 purely external structure and function [...] [w]e accordingly need an expanded
298 notion of the physical to account for the organism or living being” (Thompson



299 2007, p. 238). Indeed, Canguilhem himself, sounding less careful than usual, will
300 sometimes say that “[i]n short, it is impossible for the objectivity of medical
301 knowledge to cancel out (*annuler*) the subjectivity of the lived experience of the
302 patient” (Canguilhem 1978/2002a, p. 409; this essay was added to the later edition
303 of this book). Yet the subjectivity at issue is, to be fair, never disembodied, never
304 some pure ego contemplating the reality of the flesh like a sailor in a ship.¹⁰ Where
305 Canguilhem differs sharply from the phenomenology of embodiment is that the
306 latter is permanently tempted by a foundationalist distinction between *Leib* as
307 interiority and *Körper* as exteriority (as Schaeffer notes in the passage cited above).
308 From Merleau-Ponty to Varela and Thompson, such thinkers maintain that the lived
309 body (which really is *the* body in their discourse) exists at least in part “outside of
310 physical space” (Merleau-Ponty 1963, p. 209). Thus the living body—indeed, any
311 organism—“is an individual in a sense which is not that of modern physics” (154).

312 Now, Canguilhem is in his own way, a thinker of embodiment, which I have
313 noted in contrasting his view with both Driesch’s (neo-)vitalism and Jonas’s
314 metaphysics of organism. But he has no need for these additional commitments to a
315 “non-physical” dimension of Life. Indeed, I don’t think Canguilhem, the medical
316 doctor, would ever go as far as Deleuze and speak of a vitalism of the inorganic, a
317 “powerful non-organic life,”¹¹ or, as contemporary theorists might, of “a vitality
318 intrinsic to materiality as such,” wherein the author recommends “detach[ing]
319 materiality from the figures of passive, mechanistic, or divinely infused substance”
320 (Bennett 2010a, p. xiii). Life is too central for him—not life-forces or entelechies,
321 not cosmic or impersonal life, but the life of embodied agents. Similarly, the
322 particularly *medical* emphasis in his vitalism (manifest in his focus on Bichat and
323 related figures), which can be conveyed in the basic claim that all living beings die
324 and get sick, with the implied, irreducibly *axiological* dimension, distinguishes it
325 from forms of vitalism predicated on embryology and its mysteries: “the patient is a
326 Subject” (with a capital Canguilhem 1978/2002a, p. 409; for more on Canguilhem
327 on values and subjectivity, see Sholl, ms.). That is, a philosophical reflection on
328 health and sickness, on the “normativity” of the organism and its experience
329 (Goldstein-Canguilhem) is at some distance from a reflection on the egg, its
330 potential and the metaphysics one can derive from it. Of course, not all scientific
331 and theoretical reflections on the uniqueness of developmental systems need to
332 appeal to a metaphysical uniqueness of life, even at their most holistic, organismic

¹⁰The image that the (immaterial) soul is in the (material) body like a sailor in a ship is something that Aristotle considers (*De Anima* II, i, 413a5) and that Descartes in the Sixth Meditation rejects, without mentioning Aristotle, and sounding for all the world like a phenomenologist: “Nature ... teaches me, by these sensations of pain, hunger, thirst and so on, that I am not merely present in my body as a sailor is present in a ship, but that I am very closely joined and, as it were, intermingled with it, so that I and the body form a unit” (AT IX, 64 / CSM II, 56).

¹¹See, Deleuze (1993, p. 164): “*La vitalité non-organique est le rapport du corps à des forces ou puissances imperceptibles qui s’en emparent ou dont il s’empare,*” and Deleuze and Guattari (1991, p. 172). In Francis Bacon, *Logique de la sensation*, the phrase “*la vitalité non organique d’un corps sans organe*” is partly credited to Wörringer and opposed to the phenomenological unity of the body (Deleuze 1981/2002, p. 31).

333 moments (Oyama 2010), and similarly, there is nothing inherently false about
334 focusing on the unique features of biological systems, whether of the homeostatic
335 sort (Bernard, Cannon, Luisi, Turner), the developmental (Oyama) or of the eco-
336 logically systemic sort (Odling-Smee).¹²

337 Conversely, and despite their shared affinity for Goldstein, it is more than
338 unlikely that Canguilhem would verse into Catholic mysticism of the flesh, as
339 Merleau-Ponty does in the *Phenomenology of Perception*: “Just as the sacrament
340 not only symbolizes [...] an operation of Grace, but is also the real presence of God
341 [...] in the same way the sensible has not only a motor and vital significance but is a
342 way of being in the world [...] sensation is literally a form of communion.”¹³ I
343 think Canguilhem’s advocating of a core Spinozist tenet (we are all parts of Nature,
344 there is no kingdom within a kingdom), his Nietzschean position with regard to life
345 as the production of value(s), and his Darwinian recognition of the role of chance
346 and evolution, to name three basic features of his thought, put him at odds with the
347 above doctrine. This is so, even if, commenting in fact on Merleau-Ponty in a late
348 lecture on Health, Canguilhem reflects with what I *think* to be a hint of distance,
349 regret or irony on the limitations of a conceptualization of the living body as
350 “inaccessible to others, accessible only to its titular holder” (2008b, p. 476); that is,
351 he has referred to “commentator after commentator” who ascribes superiority to
352 what is given as such, acknowledging the existence of a side of the living body that
353 is “inaccessible to others, accessible only to its titular holder” (476).

354 This sense of privacy, of inaccessible interiority, is a crucial feature of many
355 defenses of what organisms are and how they are different from machines: Leibniz
356 for instance, for whom they differ from ordinary machines in possessing a “deeper
357 source”¹⁴; or perhaps Kant when he stated rather confidently, and influentially, that
358 “there will never be a Newton of a blade of grass” in the third *Critique* of 1790,
359 having already claimed in the so-called “pre-critical” *Universal Natural History
360 and Theory of the Heavens* of 1755 that “we will sooner understand the formation
361 of all celestial bodies, the cause of their motions, in short, the origin of the entire
362 present arrangement of the world-edifice, than we will come to know distinctly or

¹²For some philosophical discussion of these various recent models in biology, see Barberousse et al. (2009) and Normandin and Wolfe (2013).

¹³Merleau-Ponty (1962, p. 212). Novalis already identified the experience and conceptual paradoxes of the sense of touch with “the mystery of transubstantiation” (Novalis 1798/1987, p. 622). This fascination with the flesh as somehow apart from the physical world is present, prior to Merleau-Ponty, in the Husserl of *Ideas II*, and later, in Didier Anzieu and his notion of the “*Moi-Peau*,” and Jean-Luc Nancy, with his “secularized Christian” fascination with embodiment *qua* incarnation. They seem to repeat verbatim the powerful mystical utterances concerning a body beyond this world, of figures such as the twelfth-century nun Hildegard of Bingen and the thirteenth-century Flemish poet and Beguine, Hadewijch (Dailey 2011). Granted, it is possible to derive other positions from Merleau-Ponty, notably in his earlier work *The Structure of Behavior*.

¹⁴Letter to Hoffmann of September 17, 1699, in Hoffmann (1749, I, pp. 49a-b), cf. *De ipsa natura* (1698, § 3, GP IV, p. 505), Leibniz (1969, p. 95).

363 completely the production of a single herb or of a caterpillar from mechanical
364 grounds.”¹⁵ This is what Schaeffer meant in the passage I cited above, when he
365 refers to the understanding of embodiment that holds as foundational the “epistemic
366 privilege” of a self-aware consciousness (Schaeffer 2007, p. 118). Of course, not all
367 claims that organisms are categorically different from machines amount to defining
368 this difference in terms of a deeper interiority or selfhood. But increasingly, from
369 the late eighteenth century onwards, and into twentieth-century phenomenology
370 (and its embodied variants), the emphasis is on the latter, as is also manifest in
371 Varela’s insistence in his last essays on a “first-person science” (Varela and Shear
372 1999). We might say that the extent to which Canguilhem is committed or not, to
373 the presence of a foundational subjectivity either “in the body” or as an irreducible
374 feature “of the body,” is the extent to which he is a phenomenologist.

375 Canguilhem was a self-proclaimed vitalist (although with a degree of irony), a
376 “biochauvinist” in the sense that as a thinker of the normal and the pathological, of
377 a “knowledge of life,” as a disciple of Goldstein, he is one of the main figures of
378 what was known as ‘biophilosophy’ in the mid-twentieth century—a project which
379 differs from present philosophy of biology in a variety of ways (Gayon 2010),
380 notably, that biophilosophy feels that philosophy, sometimes even metaphysics, can
381 dictate its conditions to biology, since living beings have features (value? purpo-
382 siveness? consciousness?) that remain inaccessible to quantitative science. In
383 contrast, the philosophy of biology is very much a project engaged in conceptual
384 clarification of “emerged” science, which it does not challenge. However, even qua
385 biophilosopher, it bears noting that Canguilhem lacks the hostility to evolutionary
386 thought found e.g. in Goldstein and Varela, just as he lacks the potentially reac-
387 tionary appeal to return to a lost Aristotelian world (as in Jonas and Grene).

388 Some biophilosophers stand at a greater distance from mainstream science than
389 others. Goldstein, sounding quite close to the ideas Canguilhem was to make
390 famous in *The Normal and the Pathological*, holds that “an organism that actualizes
391 its essential peculiarities or—which means the same thing—meets its adequate
392 environment and the tasks arising from it, is ‘normal’” (Goldstein 1934/1995,
393 p. 325). Perhaps unconsciously paraphrasing Goldstein, Jonas in a late piece
394 describes organisms as “things whose existence is their own achievement. That
395 means that they only exist because of what they are doing,” which he then explains
396 as “their activity as such is their being” (Jonas 1992, p. 82). While this is not in line
397 with mainstream biology (whether molecular, evolutionary, developmental, etc.), it
398 is not explicitly anti-naturalist; and it is also a weak form of biochauvinism, in that
399 it is less a *substance* (a set of empirical features), and more a *function* or *activity*

¹⁵Kant (1987), § 75, pp. 282–283; Kant (1755), Ak 1, p. 230. For a nice discussion which makes Canguilhem a phenomenologist see Gérard (2010); for an equally compelling reading which seeks to distance Canguilhem from phenomenology, see Sholl (2012) and especially Sholl (ms.). I am closer to Sholl’s interpretation—and Canguilhem’s rather pointed barbs at the expense of Husserl and in favour of Foucault (e.g. in Canguilhem 1967), should be taken into account here—but it must be recognized that there are elements in Canguilhem which lend themselves to Gérard’s reading.

400 which is being invoked as uniquely organismic. In contrast, Raymond Ruyer's
401 insistence on how the organism transcends the spatial realm, maintaining itself
402 through time due to its "potential," which does not itself belong to the space-time
403 world, is more of a revisionary metaphysics. For Ruyer, organisms possess a unity
404 beyond spatial categories; they are fundamentally historical in character (Ruyer
405 1946, pp. 8, 14, 27, 58, 94). Ruyer appears to be afraid of a universe composed of
406 inanimate matter, with shocks and displacements explainable exhaustively by the
407 laws of mechanics—a universe in which the organism is no longer anything more
408 than a machine: "If you are shocked by what amounts to a generalized 'theory of
409 organism' [...] you had better see clearly that the choice is between this theory and
410 that of a 'generalized molecule'" (Ruyer 1952, p. 166).

411 I have tried to distinguish between a series of views, not identical with one
412 another, in which a valuative term variously called "the organism," "the (lived)
413 body," "Life" and so on is presented as special in different ways, and usually
414 opposed to the rest of physical nature. While Canguilhem shares the intuition that
415 an organism is always "actualizing a potential," in a dynamic relation between a
416 plurality of norms and an environment which is made "one's own" (an *Umwelt*), he
417 does not oppose modern biology, and is certainly not seeking to "reintroduce the
418 subject into biology," unlike Varela (Weber and Varela 2002, p. 117). He is arguing
419 from properties of existing biological entities—sometimes cells, sometimes mon-
420 sters or environments, but most often persons, whether considered as agents or as
421 patients. As he says in the Introduction to the *Normal and the Pathological*, he is
422 not so presumptuous as to claim that he could renew medicine by incorporating a
423 metaphysics into it (Canguilhem 1972, p. 9). I have not tried here to articulate a
424 "Canguilhemian philosophy of medicine" (some have: Trnka 2003); doubtless it
425 would resemble in some important ways, reflection on the importance of a "patient-
426 centred" medicine, and would pay close attention to the Goldsteinian and
427 Canguilhemian focus on how the organism (or person, or patient) is a creator of
428 norms (of stability, of health, of survival and so on), in a partly constructivist sense.
429 Yet if we wish to take Canguilhem seriously, some of the metaphysics, the bio-
430 chauvinism, the existential dimension in his thought take us beyond the practical
431 concerns of an empirically focused philosophy of medicine.

432 Perhaps we should distinguish between three basic claims: *strong vitalism*, with
433 a metaphysical foundation; *biochauvinism*, which is more of a "spontaneous sci-
434 entific form" of vitalism, stripped of all or most of its metaphysical commitments
435 but definitely tending towards a holistic, organismic perspective; and *Canguilhem's*
436 *view*, which of course he never names, enjoying as he does the play of aporias and
437 the mask of the scholar. We could speak of a non-metaphysical vitalism, or a
438 "naturalized vitalism"¹⁶—but then we run into difficulties in accounting for the
439 passages where he speaks of an irreducible, experiential dimension of life; we could
440 say that to the biochauvinistic claims of theoretical biology, he adds an *existential*

¹⁶Thanks to Pierre-Olivier Méthot for this suggestion. For a related idea of a "functional vitalism" (as opposed to the metaphysical variety) see Wolfe (2011a).

441 dimension. Yet Canguilhem doesn't seem to succumb to the temptation of a bot-
442 tomless interiority, inwardness or privacy and its concomitant transcendence.
443 Somewhere in between the cold appeal of the inorganic, and the (hot?) mesmerism
444 of transubstantiation—at some distance then from the fascination with a kind of
445 transcendence of the flesh found in Merleau-Ponty, Varela or Thompson, where
446 biochauvinism verges on the mystery of transubstantiation—Canguilhem's vitalism,
447 *his* biochauvinism, his quirky appeals to the “truth of my body” (2008b, p. 475) if not
448 his residual existentialism may hold some lessons for present-day thinking about
449 embodiment, neither obsessively reductionist, nor whimsically holist.

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454 References

- 455 Barberousse, A., Morange, M., & Pradeu, T. (Eds.). (2009). *Mapping the future of biology:*
456 *Evolving concepts and theories*. Dordrecht: Springer.
- 457 Bechtel, W. (2007). Biological mechanisms: Organized to maintain autonomy. In F. Boogerd, F.
458 J. Bruggeman, J.-H. S. Hofmeyr & H. V. Westerhoff (Eds.). *Systems biology: Philosophical*
459 *foundations* (pp. 269–302). Amsterdam: Elsevier.
- 460 Bennett, J. (2010a). *Vibrant matter: A political ecology of things*. Durham: Duke University Press.
- 461 Bennett, J. (2010b). A vitalist stopover on the way to a new materialism. In D. Coole & S. Frost
462 (Eds.), *New materialisms: Ontology, agency, and politics* (pp. 47–69). Durham: Duke
463 University Press.
- 464 Bianco, G. (2013). At the origins of Georges Canguilhem's 'Vitalism.' Against the Anthropology
465 of Irritation. In S. Normandin & C. T. Wolfe (Eds.), *Vitalism and the scientific image in post-*
466 *enlightenment life science, 1800–2010* (pp. 243–267). Dordrecht: Springer.
- 467 Canguilhem, G. (1965a). Aspects du vitalisme [1946–1947]. In *La connaissance de la vie*, revised
468 edition (pp. 83–100). Paris: Vrin. (First published 1952).
- 469 Canguilhem, G. (1965b). *La connaissance de la vie*, revised edition. Paris: Vrin. (First published
470 1952).
- 471 Canguilhem, G. (1967). Mort de l'homme ou épuisement du Cogito? *Critique*, 242, 599–618.
- 472 Canguilhem, G. (1972). *Le Normal et le pathologique* (3rd ed.). Paris: PUF. (First published
473 1943).
- 474 Canguilhem, G. (1977). *La formation du concept de réflexe aux XVIIe et XVIIIe siècles* (2nd ed.).
475 Paris: Vrin. (First published 1955).
- 476 Canguilhem, G. (1992). *Le Cerveau et la Pensée* (1980). In E. Balibar, D. Lecourt, et al. (Eds.),
477 *Canguilhem, philosophe, historien des sciences* (pp. 11–33). Paris: Albin Michel.
- 478 Canguilhem, G. (2002a). Puissance et limites de la rationalité en médecine (1978). *Études*
479 *d'histoire et de philosophie des sciences concernant les vivants et la vie* (pp. 392–411). Paris:
480 Vrin.
- 481 Canguilhem, G. (2002b). Le problème des régulations dans l'organisme et la société. In É.
482 Canguilhem (Ed.), *sur la médecine* (pp. 101–125). Paris: Éditions du Seuil.
- 483 Canguilhem, G. (2002c). Qu'est-ce que la psychologie? (1958). In É. Canguilhem (Ed.),
484 *d'Histoire et de Philosophie des Sciences* (pp. 365–381). Paris: Vrin.
- 485 Canguilhem, G. (2008a). *Knowledge of Life* (P. Marrati & T. Meyers, Eds., S. Geroulanos & D.
486 Ginsburg, Trans.). New York: Fordham University Press.



- 487 Canguilhem, G. (2008b). Health: Crude concept and philosophical question (T. Meyers & S.
488 Geroulanos, La santé, concept vulgaire et question philosophique (1988), Trans.), *Public*
489 *Culture*, 20(3), 467–477.
- 490 Clark, A. (1997). *Being there*. Cambridge, MA: MIT Press.
- 491 Clark, A. (2008). Pressing the flesh: A tension in the study of the embodied embedded mind?
492 *Philosophy and Phenomenological Research*, 76(1), 37–59.
- 493 Dailey, P. (2011). Children of promise: The bodies of Hadewijch of Brabant. *Journal of Medieval*
494 *and Early Modern Studies*, 41(2), 317–343.
- 495 de Issekutz Wolsky, M., & Wolsky, A. A. (1992). Bergson's vitalism in the light of modern
496 biology. In F. Burwick & P. Douglass (Eds.), *The crisis in modernism. Bergson and the vitalist*
497 *controversy* (pp. 153–170). Cambridge: Cambridge University Press.
- 498 Deleuze, G. (1981). *Francis Bacon. Logique de la sensation*. Paris: Éditions de la différence,
499 réédition, Seuil, 2002.
- 500 Deleuze, G. (1993). *Critique et clinique*. Paris: Minuit.
- 501 Deleuze, G., & Guattari, F. (1991). *Qu'est-ce que la philosophie?*. Paris: Minuit.
- 502 Di Paolo, E. (2009). Extended life. *Topoi*, 28, 9–21.
- 503 Driesch, H. (1914). *The History and theory of vitalism* (C. K. Ogden, Trans.). London: Macmillan.
- 504 Elsasser, W. (1961). Quanta and the concept of organismic law. *Journal of Theoretical Biology*,
505 1(1), 27–58.
- 506 Foucault, M. (1989). Introduction (1985). In Canguilhem, The Normal and the Pathological
507 (C. Fawcett, Trans.). New York: Zone Books.
- 508 Gayon, J. (2010). Vitalisme et philosophie de la biologie. *Répha*, 2, 7–18. Reprinted in P. Nouvel
509 (Ed.), *Repenser le vitalisme - Histoire et philosophie du vitalisme* (2011). Paris: PUF.
- 510 Gérard, M. (2010). Canguilhem, Erwin Straus et la phénoménologie: La question de l'organisme
511 vivant. *Bulletin d'analyse phénoménologique*, VI(2), 118–145. <http://popups.ulg.ac.be/bap.htm>.
- 512 Geroulanos, S. (2009). Beyond the normal and the pathological: Recent literature on Georges
513 Canguilhem. *Gesnerus*, 66(2), 288–306.
- 514 Giroux, E. (2010). *Après Canguilhem: définir la santé et la maladie*. Paris: PUF.
- 515 Goldstein, K. (1939/1995). *The Organism: A holistic approach to biology derived from*
516 *pathological data in man* (A translation of *Der Aufbau des Organismus*, 1934). New York:
517 American Book Company/Zone Books.
- 518 Goldstein, K. (1959). Notes on the development of my concepts. *Journal of Individual*
519 *Psychology*, 15, 5–14.
- 520 Grene, M. (1968). *Approaches to a philosophy of biology*. New York: Basic Books.
- 521 Grene, M. (1974). *The understanding of nature: Essays in philosophy of biology*. Dordrecht:
522 Reidel.
- 523 Grene, M. (2000). The philosophy of science of Georges Canguilhem: A transatlantic view. *Revue*
524 *d'histoire des sciences*, 53(1), 47–63.
- 525 Hegel, G. W. F. (1970). *Encyclopedia of the philosophical sciences in outline* (1817), vol. 2
526 (A. V. Miller, *Philosophy of Nature*, Trans.). Oxford: Oxford University Press.
- 527 Hill, E. (1968). Materialism and monsters in the Rêve de D'Alembert. *Diderot Studies*, 10, 67–93.
- 528 Hoffmann, F. (1749). *Opusculum omnium physico-medicorum supplementum primum*. Geneva:
529 Fratres De Tournes.
- 530 Jonas, H. (1966). *The phenomenon of life. Towards a philosophical biology*. New York: Harper &
531 Row/Dell.
- 532 Jonas, H. (1992). *Philosophische Untersuchungen und metaphysische Vermutungen*. Frankfurt am
533 Main: Insel.
- 534 Kant, I. (1755). *Allgemeine Naturgeschichte und Theorie des Himmels*. English edition: Kant, I.
535 (1755). *Universal Natural History and Theory of the Heavens*. Cambridge: Cambridge
536 University Press.
- 537 Kant, I. (1987). *Critique of Judgment* (1790) (W. Pluhar, Trans.). Indianapolis: Hackett.
- 538 Käss, L. R. (1995). Appreciating the phenomenon of life. *Hastings Center Report*, 25(7), 3–12.
- 539 Leibniz, G. W. (1969). *Opusculum philosophiques choisis* (P. Schrecker, Trans.). Paris: Vrin.



- 540 Machery, E. (2012). Why I stopped worrying about the definition of life... and why you should as
541 well. *Synthese*, 185, 145–164.
- 542 Merchant, C. (1980). *The death of nature: Women, ecology, and the scientific revolution*. New
543 York: Harper and Row.
- 544 Merleau-Ponty, M. (1962). *Phenomenology of Perception* (C. Smith, Trans.). London: Routledge
545 Kegan Paul.
- 546 Merleau-Ponty, M. (1963). *The Structure of Behaviour* (A.L. Fisher, Trans.). Boston: Beacon
547 Press.
- 548 Méthot, P.-O. (2013). On the genealogy of concepts and experimental practices: Rethinking
549 Georges Canguilhem's historical epistemology. *Studies in History and Philosophy of Science*,
550 44, 112–123.
- 551 Moreno, A., & Mossio, M. (2015). *Biological autonomy. A philosophical and theoretical enquiry*.
552 Dordrecht: Springer.
- 553 Mossio, M., & Moreno, A. (2010). Organisational closure in biological organisms. *History and
554 Philosophy of the Life Sciences*, 32, 269–288.
- 555 Normandin, S., & Wolfe, C. T. (Eds.). (2013). *Vitalism and the scientific image in post-
556 enlightenment life science, 1800–2010*. Dordrecht: Springer.
- 557 Novalis (1987). *Vorarbeiten* (1798), in *Werke, Tagebücher und Briefe*, ed. H.-J. Mähl and R.
558 Samuel, 3 vols., vol. 2: *Das philosophisch-theoretische Werk*, Munich: Carl Hanser Verlag.
- 559 Oyama, S. (2010). Biologists behaving badly: Vitalism and the language of language. *History and
560 Philosophy of the Life Sciences*, 32, 401–423.
- 561 Perret, N. (2012). A Symmetrical approach to causality in biology. *Philosophia Scientiæ*, 16(3),
562 177–195.
- 563 Peterson, E. L. (2012). 'Neither camp will have me': C. Lloyd Morgan, Joseph Needham,
564 J. H. Woodger, and the early-20th century attempt to devitalize holism. In Presentation at
565 conference on *Hasard, holisme et réductionnisme dans les sciences de la vie*, Paris, ENS,
566 Centre Cavallès (May 2012).
- 567 Peterson, E. L. (2013). The conquest of vitalism or the eclipse of organicism? The 1930s
568 Cambridge organiser project and the social network of mid-twentieth century biology. *British
569 Journal for the History of Science* (forthcoming).
- 570 Ruyer, R. (1946). *Éléments de psycho-biologie*. Paris: PUF.
- 571 Ruyer, R. (1952). *Néo-finalisme*. Paris: PUF.
- 572 Schaeffer, J.-M. (2007). *La fin de l'exception humaine*. Paris: Gallimard.
- 573 Sholl, J. (2012). The knowledge of life in Canguilhem's critical naturalism. *Pli*, 23, 107–127.
- 574 Sholl, J. ms. *Problematizing a Phenomenology of Life: Goldstein, Merleau-Ponty and
575 Canguilhem*.
- 576 Simeonov, P. L., Brezina, E. H., et al. (2012). Stepping beyond the Newtonian paradigm in
577 biology. In P. L. Simeonov, L. S. Smith, & A. C. Ehresmann (Eds.), *Integral biomathics*
578 (pp. 319–418). Dordrecht: Springer.
- 579 Starobinski, J. (1956). *L'idée d'organisme*. Paris: Centre de Documentation Universitaire/Collège
580 philosophique.
- 581 Sutton, J., Tribble, E. B. (2011). Materialists are not merchants of vanishing: Commentary on
582 David Hawkes, 'Against Materialism in Literary Theory'. *Early Modern Culture* 9. [http://emc.
583 eserver.org/1-9/sutton_tribble.html](http://emc.eserver.org/1-9/sutton_tribble.html).
- 584 Thompson, E. (2007). *Mind in life: Biology, phenomenology, and the sciences of mind*.
585 Cambridge, Mass: Harvard University Press.
- 586 Trnka, P. (2003). Subjectivity and values in medicine: The case of Canguilhem. *The Journal of
587 Medicine and Philosophy*, 28(4), 427–446.
- 588 Varela, F., & Shear, J. (Eds.). (1999). *The view from within. First person approaches to the study
589 of consciousness*. Exeter: Imprint Academic.
- 590 von Uexküll, J. (2010). *A Foray into the worlds of animals and humans, with a theory of meaning
591 (1934)* (J. D. O'Neil, Trans.). Minneapolis: University of Minnesota Press.



- 592 Weber, A., & Varela, F. J. (2002). Life after Kant: Natural purposes and the autopoietic
593 foundations of biological individuality. *Phenomenology and the Cognitive Sciences, 1*, 97–125.
- 594 Wheeler, M. (2010). Mind, things and materiality. In L. Malafouris & C. Renfrew (Eds.), *The*
595 *cognitive life of things: Recasting the boundaries of the mind* (pp. 29–37). Cambridge:
596 McDonald Institute for Archaeological Research Publications.
- 597 Wolfe, C. T. (2010). Do organisms have an ontological status? *History and Philosophy of the Life*
598 *Sciences, 32*(2–3), 195–232.
- 599 Wolfe, C. T. (2011a). From substantialist to functional vitalism and beyond, or from Stahlian
600 animas to Canguilhemian attitudes. *Eidos, 14*, 212–235.
- 601 Wolfe, C. T. (2011b). Vitalism. In M. Gargaud, et al. (Eds.), *Encyclopedia of astrobiology*
602 (pp. 1749–1750). Berlin: Springer.

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