Violence and Mechanism: Georges Canguilhem's Overturning of the Cartesian Legacy
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In a television interview with Alain Badiou broadcast on January 23, 1965, Georges Canguilhem scandalously declared that philosophy could not be judged on the basis of the truth-value of its claims.

**Badiou:** Do you think that there is no philosophical truth? You are going to scandalize us with this!

**Canguilhem:** Oh I don’t think that I will scandalize you personally! But I *would* say, there is no philosophical truth. Philosophy is not a genre of speculation whose value could be measured by the true-or-false.

**Badiou:** In that case, what is philosophy?

**Canguilhem:** Although we cannot call philosophy true, this does not mean that it is a purely verbal or purely gratuitous game. The value of philosophy is a different matter than the value of truth, which value of truth must be expressly reserved for scientific knowledge.¹

Perhaps Canguilhem’s most forcefully anti-Cartesian moment, this exchange reveals a great deal about a philosopher who had clocked nearly twenty years as inspector general of philosophy and as pres-
ident of the French agrégation committee responsible for granting teacher status to philosophy students. In his pedagogy, as in his thought, Canguilhem maintained a conception of the relation of science and philosophy that was fundamentally non- if not anti-Cartesian: philosophy could no longer aspire to truth; it was not science; it did not coincide with science. In the (quite modified) transcript of the interview, Canguilhem continues:

Truth is not the only value to which man could devote himself. This is not to say that philosophy should be understood as inferior to science. Philosophy is science confronted with problems that are foreign to it. For example, aesthetic or moral values. It is this confrontation, with the presumption of a concrete unity at the end, which appears to me to be the object of philosophy. It is difficult for me to say just what legitimizes philosophy; but this is probably not its success, understood not in its popular sense, but as adequation of the project to its result; thus it is not its success that matters, for this adequation is never obtained.²

This confrontation of science with non-scientific norms—and its place in Canguilhem’s philosophy—is the subject of this essay, though I will concern myself with Canguilhem’s thought from a considerably earlier period. In what follows I read a single text acknowledged to epitomize postwar epistemological concerns, Canguilhem’s 1947 lecture “Machine and Organism,” published in Knowledge of Life in 1952.

Canguilhem’s text speaks to three concerns peculiar to postwar French thought. First is the postwar displacement and re-appreciation of Descartes’s thought, which Canguilhem treats in this text as the generally accepted foundation of the place of science and technology in modernity, and which—I will suggest—he came step-by-step to overturn. Second is the critique of epistemological transparency, which he identifies with positivism and idealism, and which he criticizes for all-too-easily explaining away organismic complexity and for failing to understand the place of technical domination.³ By “epistemological transparency” I mean the claim that the mind could have an unimpeded and unmediated encounter with the world, texts, images, and history. Epistemological transparency became a target of philosophers and
scientists as early as the 1930s, and after the war it came to be simply dismissed as a fantasy of scientific positivism and idealism, positions which did not acknowledge that an abyss separates the mind from the world and that obstacles to this access need to be examined. Canguilhem was central to this development, asking and helping others ask how the positivist shortcut could be obviated, improved upon, how obstacles, norms, technologies, and the elusive language underlying science and philosophy could be studied to avoid this fault. Third is the postwar critique of the purity of scientific inquiry, Canguilhem’s emphasis on the historical and conceptual situatedness of the observer. Echoing quite different thinkers such as Marcel Mauss, Lucien Febvre, and Maurice Blondel, and channeling contemporary fears of “human engineering,” Americanization, and atomic destruction, Canguilhem refuses Descartes’s postulate that science is a pure, systematized, abstract knowledge that is only subsequently applied technically. Arguing that the Cartesian cogito leads to the technological domination of nature and other men, Canguilhem counters with a theory of science as a human technique that he associates with the need for a less violent and abstracted control of life.

Descartes and the Violence of Mechanism

In “Machine and Organism,” Canguilhem revisited Descartes with the intention of delivering a broad-ranging critique of biological mechanism and rethinking the place and theoretical status of organisms and their parts. Canguilhem, in situating Descartes at the fount of modern thought and science, was entirely typical for his generation. Nor was there great novelty in his effort to see Descartes’s theory of science as central to the modes through which “determinism” had come to pass as the ground of philosophical and scientific knowledge. Descartes’s mechanism (the reduction of organisms to machines) and the alternative it had generated in the late eighteenth century, namely, finalism (the reduction of organic functions to goal-oriented purposes), were widely viewed as the central hermeneutic models in the history of biology. For Canguilhem, the two approaches were central to a series of misguided modern scientific premises: first, the idea that the scientist-observer holds all-powerful, objective status vis-
à-vis matter and establishes theories whose truth is the product of matter’s predictability, determination, and mechanical character; second, that scientific knowledge is prior to technique, uncontaminated by it, whereas technique and technology are mere applications; and third, that living beings can be reduced or devalued to the status of mere matter or mechanical supports for the soul. Canguilhem countered that both mechanism and finalism ignored the fact that particular organisms always experience their milieus differently. As a result of their even having interactions—and of their having singular interactions—they could not be understood merely as organized physico-mechanical systems that were undifferentiated from one another and reducible to their parts. Canguilhem countered with an anti-Cartesian, anti-determinist, vitalistic gesture of refusing what he saw as the violence done by mechanistic biology to the individual organism and interpreting technique as a mediating concept for “life” and “science” that could offer an ethical and non-reductive alternative. For Canguilhem, human knowledge and science could never grasp the totality of life in the transparent manner that the Cartesian cogito promised; continued allegiance to Cartesian mechanistic principles amounted to a false trust in the transparency and inertness of nature and life, in the objectivity and disinterestedness of the observer, and turned a blind eye to the ineluctable violence of mechanism and scientific thought themselves.

In the immediate postwar period, and following a long intellectual debate that had generally identified mechanism with materialism and vitalism with conservative romanticism, mechanism appeared to stand as the general theoretical foundation for the interpretation of organs and organisms in biology. For mechanistic biology, the organism included no level of internal complexity that would not be itself mechanistically formed and deployed. Thanks to mechanism’s prioritization of physics and chemistry over biology, and thanks also to the readiness with which vitalist biologists and Lebensphilosophen like Hans Driesch and Ludwig Klages had sided (however inconclusively) with National Socialism, vitalism was deeply suspect, politically as well as scientifically, when Canguilhem used his credit as a former résistant in attempting its rescue. Nevertheless, this state of affairs was not nearly as resolved at the time as it appears in hindsight: respected
historians of the life sciences like Charles Singer (whom Canguilhem quotes extensively) treated the debate as unresolved,9 and some sub-fields of biology and medicine, especially physiology, endocrinology, and neurology, not to mention medical and psychiatric therapeutics, also sought intermediary rather than strictly mechanistic forms.10 Yet only a year after Canguilhem’s quasi-vitalism in Knowledge of Life (1952), James Watson and Francis Crick would publish their findings on the double-helix structure of DNA in Nature and launch the new mechanistic revolution that would dominate molecular biology over the following thirty years.11 In positing a new genetic paradigm partly inspired by Erwin Schrödinger’s 1944 account of the statistical basis of the physical laws of life, this argument wiped out traditional deterministic mechanism almost as resolutely as it did vitalism.12 DNA, a program underlying protein synthesis and the basic structures of life, provided the apparatus by which molecular biology could be mechanistic without being determined by the classical ideological issues and reductiveness associated with its forebears. Where traditional mechanism à la Descartes reduced the body to an agglomerate of machines based on the laws of physics, and treated biology as derivative of such agglomeration, the new approach provided a basic unit, devices of translation, statistical indeterminacy, and so on. Although Canguilhem would long remain skeptical toward the genetic paradigm as an explanation of life, his refusal of any reduction of life to a sum of mechanistic physico-chemical principles belongs to a moment when this biological and philosophical paradigm was itself in flux and profoundly changing, even if, by the 1960s, a new mechanism had triumphed in biology.13

Rethinking biology was only one leg of Canguilhem’s critique of Descartes and Cartesian epistemology; the other was a rethinking of technique and technology. Canguilhem was by no means the only thinker to offer a historically grounded critique of a mechanist and mechanical imagination in the early postwar period; his rejoinder to Cartesian philosophical and scientific mechanism was framed by a widespread reconsideration of technology. Philosophical approaches to technology spanned a spectrum between two positions: the technophobic position, which presented technology as independent of man and capable of overwhelming or destroying humanity; and the
alternative stance, which insisted that “technique,” the invention and use of technical objects, was a natural and universal human activity. On one end of the spectrum, we might place Michel Crozier’s 1951 article, in *Les Temps Modernes*, on “Human Engineering” as an effect of Americanization (published with an introduction by Maurice Merleau-Ponty), which tied technology to capitalist exploitation. More technophobic still was Martin Heidegger’s well-known attack on the effects of a Cartesian understanding of selfhood in his 1938 “Die Zeit des Weltbildes” (“The Age of the World-Picture”), which was published after the war. Similar claims appeared in more public forums as well: a relevant example here is a 1949 essay in *Le Figaro* by academician André Siegfried, whose title already loudly identified Descartes as the originator of the taylorism that had become so reviled in interwar French culture.

On the other end of the spectrum, one could identify the positions taken by ethnologists Marcel Mauss and his former student André Leroi-Gourhan, as well as by the historian Lucien Febvre, who insisted that human activity was fundamentally, cross-culturally, technical: for Leroi-Gourhan, the study of technical objects was at the base of every comparative study of human cultures. Somewhere between the two ends came Georges Friedmann’s elaborate and influential critique of industrialization and industrial mechanism. Alexandre Koyré also bridged the two positions when he identified Descartes with the birth of modern technicist civilization and denounced the latter’s failure to balance technological innovation with social reform.

For Canguilhem, the modern Cartesian claim that science is a fundamentally pure interpretive activity while technology should be seen as belonging to the realm of the mere application of science was absurd. As early as December 1944, he insisted on the priority of technique over science, writing, for example, that “it can no longer be contested that not every technical achievement carries a scientific explanation.” Canguilhem cited an array of thinkers (including Friedmann, Mauss, Leroi-Gourhan, and Febvre) in order to insist that scientific analysis postdates and often comes in response to a prior technique. This allowed him to take up both “technophilic” and technophobic positions: while, for him, technique has a decidedly
positive and, as it were, “natural” meaning, technical activity is fundamentally creative activity, a handling of the milieu. And while Canguilhem resisted Heidegger’s nostalgia for a purer world untroubled by Cartesian subjectivity, he also argued that Cartesian mechanism is not altogether free of connotations of an industrial perversion of life, experimental brutality, or eugenicist fantasy. While technique is a component of life and human activity, technique in a Cartesian mode results in a misunderstanding and deformation of life.

Canguilhem’s Long Dance with Descartes

Canguilhem’s engagement with Descartes in “Machine and Organism” dates in part to the 1930s. Although Descartes had figured in Canguilhem’s studies—Canguilhem’s supplementary doctoral thesis was a translation from the Latin of Émile Boutroux’s *Des vérités éternelles chez Descartes,* and his first public engagement with him came with the presentation of his essay “Descartes et la technique” at the 1937 International Conference of Philosophy, which was organized by the French Society of Philosophy and presided over by Henri Bergson and Émile Bréhier, in order to mark the tricentennial of the *Discourse on Method.* In presenting there, Canguilhem joined for the first time two other crucial figures of the new generation in French epistemology, Gaston Bachelard and Alexandre Koyré. In the 1930s, Bachelard moved gradually toward an “applied rationalism” that extended his earlier “non-Cartesian epistemology,” through which he hoped precisely to undermine the rationalism/realism division and to require the practice of rationalism, for example, in limited experimentation, to make up for the division. Bachelard’s explicitly “non-Cartesian” epistemology was central to the evocation of a problem with transparency. Not only did Bachelard doubt epistemological transparency when he claimed, in his *La formation de l’esprit scientifique* (*The Formation of the Scientific Mind* [1938]) that “the knowledge of the real is a light that always casts shadows,” but just as importantly, he refused to accept that perception and scientific knowledge were unmediated or that this medium could be transparent (as Descartes had claimed).

For his part, Alexandre Koyré also played an important role in shifting away from the celebratory treatment of Descartes as the founder
of modern rationalism. His 1922 *Essai sur l’idée de Dieu et les preuves de son existence chez Descartes* is frequently and ironically credited with dismantling the prevalent interpretation of Descartes as the man who singlehandedly overcame scholasticism. In his presentation at the 1937 Descartes conference, Koyré identified Descartes and Galileo as the two figures who replaced the medieval cosmos with the idea of an “infinite universe” that came to define modern science. This line of thinking culminated eventually in *From the Closed World to the Infinite Universe* (1957). Canguilhem’s own effort at this early stage was still largely determined by his neo-Kantian studies under Alain and Leon Brunschvicg, and aimed toward an enlarged Cartesianism, a move that contrasts strongly with the other presentation on Descartes and technique that was to take place at the conference—Heidegger’s original version of “The Age of the World-Picture.” Where Heidegger would have charged Descartes with reducing the world to the picture it offered the subject, Canguilhem instead attended to Descartes’s understanding of invention and construction in order to destabilize from within the sense that technique is a mere application of scientific thought and objective knowledge.

By 1941, when he taught a course on purposiveness in nature, Canguilhem had begun to set up the image of Descartes that he would present in “Machine and Organism.” Canguilhem’s thought changed considerably during the war, both toward an engagement with the relations between vitalism, mechanism, and finalism and toward a greater acceptance of Bergson. Here, Canguilhem emphasized that Descartes set himself up as an opponent of Aristotle’s finalism and believed himself to have indeed overcome it. The payoff (for Descartes) of overcoming Aristotle was clear to Canguilhem:

> If there is no purposiveness in nature, including among living beings, man can consider all of nature outside himself as means—not as means that are offered to him all ready and opportune by divine providence, but means that he has the obligation to institute as such in order that he may render himself a master and possessor of nature.

Descartes’s thought thus appeared to Canguilhem to be an appeal to man to use thought and science in order to render nature—not only
human but also nonhuman living beings—into his object, possession, and slave.

Finally, it is worth noting that at the time he first prepared “Machine and Organism,” Canguilhem was in the middle of his second attempt at a book on Descartes.29 Having outlined, in the late 1930s, a book expanding on his lecture “Descartes et la technique,” of which all that remains is the outline, Canguilhem accepted an invitation from the publisher Bordas in early 1947 and submitted five chapters (half the manuscript) in March, claiming that he would complete the book in July.30 In this book, Canguilhem offered a rather sympathetic reading of Descartes, emphasizing the latter’s distance and indeed “obscurity” as this appeared from the postwar moment, celebrating his skepticism and even his metaphysics,31 and insisting that the import of the destruction of the old cosmos (a destruction that Descartes had led, Canguilhem argued, following Koyré) could be understood as analogous to the present time: “In the atomic age, amidst a divided humanity, we have the means to imagine what the cosmic revolution was for a no less divided Christianity.” By comparison to this cosmic revolution, he noted, “the Lisbon earthquake, which so shook eighteenth-century thinkers, can pass for a landslide on an anthill.”32 Like the early to mid-sixteenth century, the new postwar was an era in which an approach imbued with Cartesian skepticism was essential.

The book on Descartes would remain unfinished. It survives in Canguilhem’s archive in a folder titled “Descartes interrompu . . . ” Ten days before sending off half the manuscript to the publisher, Canguilhem presented “Machine and Organism” at Jean Wahl’s Collège philosophique as the second of a series of three talks titled “Biology and Philosophy.”33 Here, the dangers of the atomic age superseded all of the proximity to Descartes that Canguilhem foregrounded in the incomplete manuscript, and compelled him to a position at the opposite end from Descartes. Whatever his intellectual or institutional reasons for not finishing that book, Canguilhem had plenty of philosophical reasons. He developed a very different tone in addressing Descartes in the lectures.
“Machine and Organism” and the Transparency of the Cogito

In his reading of Descartes in “Machine and Organism,” Canguilhem makes two fundamental claims concerning the cogito’s sovereignty over nature and the body. The first is that “the theory of animal-machines is inseparable from *Cogito ergo sum*” (83). In other words, Descartes’s *I think therefore I am* applies to the status of the cogito due to man’s possession of soul (or thought), but animals (and bodies in general) are entirely mechanical insofar as they have no thought. This claim allows Descartes to deny animals thought (but not life), to reduce them to breathing machines; for Canguilhem, this same link also establishes the sovereignty of a self-transparent cogito over the realm of the living:

> The theoretical mechanization of life and the technical utilization of the animal are inseparable. Man can make himself master and possessor of nature only if he denies all natural purpose and can consider all of nature, including, apparently, animate nature—except for himself—to be a means. (84)

For the mind, as cogito, to acquire mastery over life, it was essential that organisms be reducible, without remainder, to parts identical or analogous to machines, that is, to things that man *already knows* because he himself has built them as a means for himself. To the cogito which asserted its own plenitude and could understand nature and technology without loss or remainder, these confirmed both its own mastery and its own clarity. We find here a sharpening of the claim that Canguilhem had made in his 1941 course—where Aristotle had seen nature as purposive, Descartes now transplanted this purposiveness into his own mechanism. Descartes’s mechanism no longer overcame Aristotelian finalism and purposiveness; it merely recast it in a way that rendered all of nature—except for the cogito—into a purposive machine for the cogito and that saw all invention and production as a result of this cogito. Just as machines are purposively constructed, nature presents the cogito with problems that can be broken down, their determinable elements available to consciousness for the purpose of creating new machines. As significantly, linking
rather than opposing Descartes to Aristotle allows Canguilhem to establish a distinct relationship between mechanism and politics, thanks to which machines and their analogues are seen as servants of certain men capable of abstract thought, while nevertheless distancing himself from a Marxist account of the emergence of machines and mechanism as a function of capitalism. This part was especially significant for Canguilhem, as it suggested that both a conception of the self that began with the cogito and a Marxist alternative amounted to a mechanization of life and a profoundly problematic politics of mastery and submission.

Linked to this first major claim is a second, inserted in the text a bit on the sly: for Descartes, man himself (and not only his body) may be a machine: “the human body, if not man, is a machine” (“mo,” 84; emphasis added). Only the cogito—Canguilhem specifically distanced the soul from movements and actions of the body—and not man as such, may constitute an escape from the order of machines; only the cogito marks this separation. Canguilhem makes this claim implicitly on the basis of the Sixth Meditation, and explicitly on the basis of the famous discussion of automata at the opening of the Treatise of Man:

I might consider the body of a man equipped with and made up of bones, nerves, muscles, veins, blood and skin in such a way that, even if there were no mind in it, it would still perform all the same movements as it now does in those cases where movement is not under the control of the will or, consequently, of the mind.35

These men will be composed, as we are, of a soul and a body, and I must first separately describe for you the body; then, also separately, the soul; and finally I must show you how these two natures would have to be joined and united to constitute men resembling us. I assume their body to be but a statue, an earthen machine formed intentionally by God to be as much as possible like us. Thus not only does He give it externally the shapes and colors of all the parts of our bodies; He also places inside it all the pieces required to make it walk, eat, breathe, and imitate whichever of our own functions can be imagined to proceed from mere matter and to depend entirely on the arrangement of our organs.36
At stake then are not only animals as machines, nor merely bodies as machines, but man, God, their creativity and capacity for invention, and the cogito. Canguilhem reads the famous passage on automata from the *Treatise of Man* as proposing the priority of the fact of life over the actual machines made by God. He then specifically grants precedence to the living, arguing that the Cartesian theory of divine art as imitation acknowledges and covers up this precedence. This involves what at first seems to be a quite astonishing turn in Canguilhem’s argument, since it had thus far appeared that all life was mere machine. The turn is only apparent, however, for Canguilhem sets out in this direction to identify the cogito, and its articulation of knowledge and science, as bearing the capacity for abstraction and perfection that stands apart from matter. Whereas nature and God nestle into one another, the cogito, in its self-assertion, produces its own separation from nature.

The construction of the living machine implies, if one reads the text well, an obligation to imitate a prior organic given. The construction of a mechanical model presupposes a vital original. . . . The Cartesian God, the *Artifex Maximus*, *works to equal the living itself*. The model for the living machine is the living itself. The idea of the living, which *divine art imitates*, is the living thing. (“mo,” 85, emphasis added)

For God to be *imitating*, to be producing living machines thanks to and on the basis of the living itself, and for man himself to be a machine, offers a precise and substantive gain for Canguilhem. For his Descartes, it is not divine providence but man himself who turns the living into a means, and thus the style and the character of modern mastery over nature and others begin in earnest with Descartes. Aristotle had identified slaves with animate machines, and had interwoven social with technical domination; yet for Aristotle, the soul was the first *motor*. Descartes committed instead to a theory in which the cogito, science, and knowledge combined to render the world technically man’s due. More radical than Koyré, who thought that “the machine had betrayed the hopes placed in it” (“PM,” 281) by the Cartesian dream, and in a manner at times resembling Adorno and Horkheimer’s *Dialectic of Enlightenment*, Canguilhem identified the cruelties against na-
ture and other men, which he saw as endemic to modernity, with this very establishment of the cogito as an all-powerful observer and manipulator of nature, a human technician and “pure” scientist. Mechanism and the glorification of the cogito led directly to the domination of nature and other men, because they reduced nature and other men to an agglomeration of machines and parts that can be studied and experimented on. The transparency enforced upon man and nature by the cogito that understands itself as self-transparent was necessarily, directly linked to domination and violence.

Parenthetically, it is worth speculating at this point as to why Canguilhem could not complete his *Descartes* book of 1948, and wrote no more after sending the first five chapters just days after this talk: whereas in the outline of that book the Cold War Manichaeism had served as the basis for identifying with Descartes’s doubt, in “Machine and Organism” Descartes was no longer the skeptic but the founder. He was no longer the figure who managed an escape from Protestant-Catholic debates by doubting and beginning anew, inaugurating a philosophy to be contrasted to them. He was the philosopher who had at once turned the entire physical, biological, and human world into a means and asserted the transcendence of the cogito, its transparency vis-à-vis its knowledge and science, and its structurally violent mastery of the world.

We thus come to a point where the Cartesian cogito serves Canguilhem as the foundation of modernity and the reason of its violence. Canguilhem patiently articulates his alternative on life and technique by making two moves whose purposes are at times quite difficult to discern. First, he argues that philosophers concerned with the status of technique since the late nineteenth century have, in a Kantian vein, gradually come to see the machine not as the structural basis of organisms but as the result of a specifically human technical activity. In other words, as opposed to the Cartesian approach which took the existence of machines for granted, and without reference to their making introduced them into the organism, philosophers had come to study human technical activity and distanced technology from biological mechanism. In the closing pages of “Machine and Organism,” Canguilhem finds inspiration in Kant’s theory of technique; yet this inspiration comes together with his forceful if
delicate rejection of Kantian intellectualism that would contribute to the sidelining of Kant as a formative influence on contemporary thought. Tracking recent philosophical and anthropological theorizations, Canguilhem distinguishes the purposive element in machines and in the building of machines from the non-purposive and non-preprogrammed existence of living beings. Following Friedmann, he imagines technique as offering an expansion of life that by way of “the development of a technique for adapting machines to the human organism” would lead to “an ineluctable revolution” (“MO,” 96). As they had been in early humanity, technological inventions now appeared, he argued, not as reductive models for nature but as tending to inscribe “the technical within the organic” (“MO,” 96); if historical, sociological, and anthropological studies had moved toward such an understanding of technique, taking a stand against Descartes pointed in the same direction.

Second, Canguilhem explicitly argues against the placement of science, knowledge, and consciousness at the foundation of life—be it human life or life more generally. Life is not reducible, he argues: “Life . . . is experience, that is to say, improvisation, the utilization of occurrences; it is an attempt in all directions” (“MO,” 96). Moreover, he claims against Descartes that the prioritization of science and of the cogito over life distorts not only life (by considering it reducible to the way this cogito interprets and crafts it) but also the relationship between life, technique, and science.

Science and Technique must be considered not as two types of activity, one of which is grafted onto the other, but as two types of activity, each of which borrows from the other, sometimes its solutions, sometimes its problems. The rationalization of techniques makes one forget the irrational origin of machines. And it seems that in this area, as in any other, one must know how to cede a place to the irrational, even and especially when one wants to defend rationalism. (“MO,” 85)

Most striking in this approach is the fluidity between science and technique, as well as the claim that rationalism has to be separated from the tradition that cast it in its strictness. Technique for Canguilhem now had to be understood as the use and invention of means
for relating to one’s world, an activity that characterizes not only man but living species in general. Knowledge and science are specific and often derivative forms of human technique. They rely on abstraction and formalization but do not, for all that, ground technique itself. Descartes may have sought to argue that they confirm the cogito’s sovereignty and offer it a deterministic dismantling of life into mechanical substructures. But if science were seen instead as a specific form of the human engagement with the world, then not only would the priority of the cogito dissipate, but determinism would cease to present the world as belonging to man. Philosophy, moving beyond Cartesian subjectivism, might come to rethink knowledge, technique, and “life” in terms that might generate continuity and perhaps even harmony between them.

We have proposed that, in spite of initial appearances, a mechanist conception of the organism is no less anthropomorphic than a teleological conception of the physical world. The solution we have tried to defend has the advantage of showing man in continuity with life through technique prior to insisting on the rupture for which he assumes responsibility through science. (“mo,” 97)

If the cogito is a modern, anthropomorphic, and hence humanist invention that appropriates the entirety of life for itself and generates a domination of nature and other men, then a recognition of the originality of life and the derivative status of man can offer the chance of salvaging technology from its immediate association with the violence of this humanism. At the same time, this gesture toward life struggles against the Cartesian (and Husserlian) conception of a self-transparency of the cogito—the sense in which the cogito, in being separate from, transcendent vis-à-vis the body, also remains clear to itself. The two gestures are one and the same: ending this conception of a mind that is transparent to itself works against the technological domination of nature and others, which the cogito dissimulated in its claim to truth and self-sufficiency. Conversely, conceiving of life in terms that nestle technique within it rather than articulating an abstract science specific to mind and imposed on objects helps dissolve the conception of mind as a powerful and self-sufficient unit.

To take stock: it should be clear by now how elaborately Canguil-
hem’s essay participates in major gestures of early postwar epistemology—a critique of intellectualism in favor of an antifoundational realism; a critique of progress; a philosophical suspicion of determinism and pure thought. In Canguilhem’s treatment of Descartes’s mechanism, we begin to glimpse the value of a new kind of non- or anti-humanist skepticism of an “atomic age, amidst a divided humanity,” and the harsh critique of the misunderstanding of human and organic life and ethics that is articulated by way of a critique of the transparent Cartesian cogito and its modern descendant, “transparent and inert intellectualism” or “foggy (at once active and muddled) mysticism” (KL, xvii). Canguilhem’s call for organismic as well as technical complexity thus underscores the impossibility of pure observation and uncontaminated science.

The refusal of epistemological transparency further meant an overcoming of traditional articulations of ethical transparency. Writing in “Machine and Organism” that “there is more purpose in the machine than in the organism, because the purpose of the machine is rigid, univocal, univalent” (“mo,” 89), Canguilhem aimed to argue that as opposed to the singularity of purpose and meaning in the machine, this could not be claimed of life itself: organs and organisms are polyvalent, and to present them otherwise amounted to reducing them to a reason that had lost every pretense to objectivity and had become normative in a normalizing sense.

While Canguilhem held back from making frequent political claims and despised moralism, it is clear that he did not shy away from associating violence with the scientific determinism he saw as the result of the Cartesian mechanistic paradigm and the transparency of the cogito. In The Normal and the Pathological, he had characterized pathological experience as following different, not merely reduced, norms. Canguilhem’s particular critique of Descartes—like Levinas’s contemporary critique—was widespread in the late 1940s and early 1950s and would be radicalized in the two decades to come. Even more emphatic refusals of deterministic conceptions of life and thought followed in the 1950s, notably the lecture “Qu’est-ce que la psychologie?” (1958), where Canguilhem took on the very rationale underlying psychology and ultimately decried it as a police practice. This critique would later form part of his critique of early neu-
roscientific reductions of thought to the brain. No less pronounced was his suspicion of cybernetics, beginning in the early 1950s, and its use in theories of biological and social regulation. Across these texts, Canguilhem’s “vitalism” relied on the reformulation of science as a technique that, rather than appropriate all life for itself, and hence for the cogito, instead pushed back against strict reductionism, in a movement of autonomy. There is no point in avoiding the ethical implications of these claims: without reverting to traditional liberalism, Canguilhem brought forth a claim to the complexity of life and technique, the possibility of difference, and the irreducibility of individuality. Against Marxism’s refusal of even the category of the individual, and against the liberal advocacy of one, Canguilhem argued for an individualism that, though aware of the rule of reason, the normalizing tendencies of norms, and the force of mechanization, still calls for proximity to life and for the priority of life with respect to abstract science. Thus his thought requires a sense of the contingency and limitations of consciousness, and appeals to a world that will not be determined. Against Descartes, and against the politics of the early Cold War, Canguilhem emerged with an epistemological skepticism that doubled as a new proximity to life.


Notes

3. Canguilhem’s contemporary claim that intellectualism aims to be “transparent” is a direct attack on the Neo-Kantianism of his day; more-
over, his critique of Comte’s theory of progress, already in Canguilheim’s dissertation and especially, albeit from a different vein, in *The Normal and the Pathological*, forms a critique of transparency parallel to the attack on reductionism, which is my focus here.

4. In his accounts of tools and of finalism especially, Canguilhem relies at length (and without citation) on Andrée Tétry’s *Les outils chez les êtres vivants* (Paris: Gallimard, 1948). See her analysis of the ambiguous relationship between tools and finalism, as well as her concern with the biologist’s relationship to *le vivant* (the living being), on pp.13–16.


6. Georges Canguilhem, *Knowledge of Life*, trans. Stefanos Geroulanos and Daniela Ginsburg (New York: Fordham University Press, 2009), xvii. Hereafter cited as *kn*. That passage refers to intellectualism; however, in the remainder of *Knowledge of Life*, Canguilhem targets Descartes much more than the French Neo-Kantians, and thus the strategic claim of the introduction can also be read as a directly philosophical opposition here.


9. This ambiguity of the time is articulated clearly in Charles Singer’s *A History of Biology*, which saw the divide between mechanism and vitalism as very much current and central for biological research. *A History of Biology to About the Year 1900: A General Introduction to the Study of Living Things* (New York: Abelard-Schuman, 1931), viii.

10. See, e.g., the debates over internal regulation in British and American physiology, including the work of Walter B. Cannon, John Scott Haldane, Lawrence J. Henderson, and others, which refused classical mechanism and wrestled with what alternatives might take its place.


13. Notably, Canguilhem’s attitude toward DNA as a kind of mechanism changed over time, and later in his career he left his seminal essay “Aspects of Vitalism” (in *Knowledge of Life*) behind as dated. Braunstein notes this in his essay “Deux philosophies de la médecine” in *Philosophie


19. Already in CAPHES GC II.3.4, “Technique et science, déc. 1944–janv. 1945,” Canguilhem cites Mauss (t, 9), Charles Blondel and Febvre’s *La terre et l’évolution humaine* (9), and André Lalande’s “Technique et science” (1941) and “Le travail et les techniques” (in *Journal de Psychologie*, Janvier–Mars 1948). In “Machine and Organism” he repeats some of these references and further cites André Leroi-Gourhan’s *Milieu et techniques* (Paris: Albin Michel, 1945) and Georges Friedmann’s *Problèmes du machinisme industriel* (Paris: Gallimard, 1946). Other references in this direction include the philosopher of science Julien Pacotte and the classicist Pierre-Maxime Shuhl.


24. Heidegger was also scheduled to present at the conference an essay that he would soon revise into “Die Zeit des Weltbildes” (“The Age of the World-Picture,” 1938/1952), which specifically targeted Descartes as instituting a triad of subjectivity and technology that would be definitive of modernity. Heidegger sought (and failed) to become the leader of the German delegation, deeming the conference “a conscious attack coming from the dominant liberal-democratic concept of science,” but this picture of French thought (which was also pursued by the eventual leader of the German delegation) relied on a rather dated, propagandaladen, and francophobic understanding of what was to take place. See Rüdiger Safranski, *Martin Heidegger between Good and Evil* (Cambridge: Harvard University Press, 1998), 324.

25. *CAPHES GC II.1, “Cours sur la finalité . . . 1941.”*


28. See the lecture “Organisme et totalité” in “Cours sur la finalité,” *CAPHES GC II.1, 21–32,* quotation from p. II. It is worth noting that Canguilhem did not at this point suggest, as he would in *Knowledge of Life,* that Des-
cartes’s attempted overcoming of finalism fails—that Descartes’s mechanism reintegrates and redeployes purposiveness through his mechanism (κz, 86–87).


31. Chapters 1 and 3 of the typescript focus on Descartes’s doubt—in the former, as a foundation of the scientific method, in the latter, as such. See also Canguilhem’s appreciation of Ferdinand Alquié, which he follows up on with a critique of the mistrust of Cartesian metaphysics in Caphes gc 28.1.5, “Descartes Interrompu . . . 1948,” 29.


34. “Descartes effaces teleology from life, but he does so only in appearance, for he reassembles it, in its entirety, at his point of departure. Anatomical form substitutes for dynamic formation, but as this form is a technical product, all possible teleology is contained within the technique of production. In truth, one cannot, it seems, oppose mechanism and finalism, one cannot oppose mechanism and anthropomorphism, for if the functioning of a machine is explained by relations of pure causality, the construction of a machine can be understood neither without purpose nor without man” (“κο,” 86; see also “κο,” 89).


37. It is worth noting that this is not a position that Canguilhem holds consistently throughout the essay. He suggests elsewhere that God is the builder who has set the living machine in movement, a position somewhat at odds with this one. Similarly, for man to be a machine, to be modeled on a machine, seems at first sight to be undermining his
point that man needs to erase finalism and mechanize life in order to present himself as its master. Only at first sight, however, for the point here is that man’s dominion is premised on the cogito and its prioritization of science over life.

38. Significantly, Canguilhem discusses the relationships between thought and society at some length in “Machine and Organism,” focusing on Aristotle’s famous discussion of slavery and machines. In the above-cited passage, Koyré emphasized the Cartesian dream as liberation from nature—a sense altogether absent in Canguilhem, whose reading of Descartes proceeds to many of the modern problems and cruelties against nature and other men as deriving precisely from this establishment of the cogito as observer and manipulator.

