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Dossier Georges Canguilhem

The Relationship between History and Epistemology in Georges Canguilhem and Gaston Bachelard

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Abstract:

The article shows the strategic analogies, but also the differences between Bachelard and Canguilhem on the use of the history of science for epistemology. It emphasizes the importance of the ideology for Canguilhem, and the conceptual essence he recognizes in the history of science, which is read in its internal specific differences and in its complex articulations with life and reality. No concept in fact comes from nothing. The link between history and epistemology is not however of subjection, but of mutual influence. Canguilhem radicalizes the thought of Bachelard, and recognizes the historicity of every aspect of scientific knowledge, even of its less valued features and above all of errors. All aspects of Science are historical. The object of the history of science is not the object of the sciences, because it is always a discourse. This is why the history of science is inevitably linked to other forms of history. This opens up a pluralist conception of History and of Time, thinking of the sciences in their real body and no longer ideal or legal. Thus Canguilhem opens the way to the researches of Foucault and Serres.

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Keywords:

Canguilhem; Bachelard; History of science; Epistemology; Philosophy; Truth; Ideology; Foucault; Serres; Life; Error; Norms

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When we speak of “historical epistemology” we immediately think of Georges Canguilhem,² and consequently of Gaston Bachelard, because it would have been the latter to start the particular union between the history of the sciences and epistemology that bears that name. The revolutionary character of Bachelard’s epistemology consisted precisely in the integration of the history of the sciences in the very heart of the epistemological argumentation in order to show not only its intrinsic dynamic and variable character, and

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² Canguilhem was not the founder of what has been called historical epistemology, as several scholars write instead (he was at most one of the representatives, but together with others who came before and after him), see for ex. (Debru 2004), who emphasizes how much Canguilhem has been able to connect epistemology to history much more than Bachelard. The common academic reference is *L'épistémologie historique de Gaston Bachelard* (Lecourt 1969).

therefore the essential opening to innovation and research, which constituted - history was there to prove it – the main feature of scientific knowledge. However, it is good to clarify right away that between the two scholars there are not a few notable differences both on the philosophical and on the historical-epistemological level, even if Canguilhem has repeatedly openly written his intellectual debt towards Bachelard³ since the 50s of the twentieth century.

What I will briefly try to do in these pages is to adhere to some guiding principles of Canguilhem and Bachelard to reveal a conceptual (ideological) context related to the so-called “historical epistemology” (Canguilhem 1977, 22), and more precisely to the strategic (ideological) use of history of the sciences for epistemology and for the philosophy of science. I would also like to show what issues remained in common, while pointing to what has changed in their epistemological-historical approach, without going into the analysis of the specific development of Canguilhem’s thought, nor of its profound evolution.⁴ I will therefore take for granted the knowledge of his thought and his writings, to which I will make numerous implicit references, which I hope everyone will be able to grasp.

Finally, a clarification must be made immediately, because the term “historical epistemology” has taken on a meaning that is somehow different between scholars in the Anglo-Saxon field than in the French (or Italian) world. It is a derivative meaning, of second instance so to speak, that comes from the elaboration of the research of Michel Foucault and from the works of Lorraine Daston, and involves the analysis of the relationship between new forms of experience, emergence of new structures of knowledge and differentiation of reasoning styles.⁵ I. Hacking points out, however, that this “historical epistemology” does not really have much to do with Bachelard’s ideas, because Daston (considered the founder of this epistemology) does not deal with theories of knowledge at all, she doesn’t elaborate them nor promote any of them, limiting herself to discussing (epistemological) concepts as if they were only historical objects – she studies how “whole fields of phenomena [...] [for example dreams, atoms, the self, etc.] have come to existence and have vanished as objects of scientific research” (Daston 2000, 1; Hacking 2002, 19-21).

There is undoubtedly a strategic use of the history of science that Canguilhem inherits directly and explicitly from Bachelard, placing himself (since the end of the 1950s⁶) in a community of intent that makes its historical-epistemological practice perfectly coherent and consequential to that of Bachelard – even if in some respects it will be much more elaborate and articulate, decidedly more critical, open and conscious of its limits (that will open the way to Foucault’s research). This seems to me confirmed by two considerations: 1) when he mentions Bachelard, Canguilhem almost never expresses a criticism against him⁷ both on the epistemology level, and on the role of this in the history of science; 2) when he speaks of Koyré, he tends to emphasize more the epistemological affinity with Bachelard than their

³ It should be noted that between Canguilhem and Bachelard there was no relationship of direct filiation (of the master-pupil type), and that the formation of Canguilhem took place in a rather distant, and sometimes opposite, philosophical and academic context, with respect to the philosophy of Bachelard.

⁴ For example, without taking into account that “before” (in the writings of the 1930s and 1940s) Canguilhem does not mention almost Bachelard, nor epistemology in general, while since the end of the 1950s it does so constantly.

⁵ See (Daston 1994; Daston 2000; Poovey 1998; Davidson 2001; Hacking 2002). For a quite exhaustive examination of the development of this syntagm of “historical epistemology” see (Gingras 2010).

⁶ As also mentioned by C. Limoges in the introduction to *Oeuvres complètes* (Canguilhem 2015). It must be said that the strategy is not only epistemological, but also academic, given the succession of Canguilhem to Bachelard in the direction of the Institute of the History of Sciences and Techniques and the Chair of History and Philosophy of Sciences at the Sorbonne.

⁷ The only criticisms, rather moderate, are found in an essay in *Etudes d’histoire et philosophie des sciences* (Canguilhem 1983 [1968], 200 and 205).

differences, with respect to their reciprocal approach to the history of sciences, which had led to the creation of two rather different research centers, different in their modalities and theoretical foundation, more or less explicitly in competition with each other.⁸

We recall how much Canguilhem has written and repeated constantly, in his long career as a scholar: the concept prevails strategically on the object, just as the theory prevails (axiologically) on the facts. This in the sense that the reality with which the sciences have to do is always and inevitably determined by concepts. And since every conceptual system, or rather any conceptual “order” (since the concept for Canguilhem is a form of the living) belongs to a horizon of historically situated meaning, then we cannot be exempt from considering its ideological affiliation (in the sense that a concept appears within an ideology, and in the sense that a concept helps to found one, as in the case of Spencer’s evolutionism⁹). And for ideology (also scientific ideology) Canguilhem meant the set of forms, concepts, metaphors and value choices in which you have to understand things, and which influences what to consider scientific and truthful in a given science and in a given period. Ideology was in short for Canguilhem, paraphrasing what the German philosopher R. Koselleck defined in the historical context the horizon of expectation, what we can call “horizon of meaning” (close, but not identical, to what Foucault called “episteme” and L. Althusser “implicit philosophy”¹⁰). A horizon of meaning in which one expects to insert everything and which one wants to apply to everything, even if this expectation is sometimes disregarded.

At the same time – and here Canguilhem is truly the son of his time, and especially of the tradition of French and Italian experimental rationalism¹¹ – ideology does not conclusively determine every aspect of life and culture, because its power clashes with the counter-power of the critique of which the sciences¹² and philosophy¹³ are carriers, each with its methods, and of which life itself is interwoven in its inexhaustible transformative and evolutionary variability. Or rather: there is never a single ideology, nor only one episteme (this is what

⁸ B. Bensaude-Vincent explains how there has been some sort of competition, or latent conflict, between the two institutions of reference, the IHST in the rue du Four, directed by Bachelard and then by Canguilhem, connected to the Sorbonne, and the Hotel de Nevers, with his Centre A. Koyré from the EHESS (Bensaude-Vincent 2010). On the difference between Bachelard and Koyré, see (Gattinara 1998, 244-269).

⁹ Every discourse and every study is always and inevitably ideologically oriented, therefore also what we can say today about Canguilhem: it is he himself who has taught it to us, on the condition that we understand what we mean by “ideology” (i. e. practices, ideas, concepts and preconceptions, language, society, the culture of belonging, the choices made, the accepted compromises, the implicit and explicit philosophies [...] in short, an extended notion of what P. Bourdieu called “habitus” and Canguilhem “context”). Too often we rush to the texts and ignore the contexts; but how difficult it is to orient oneself in texts (which are also made of styles, rhetorical levels, chosen metaphors, subterfuges and tricks as well as well ordered contents and propositions), so it is very complex to account for contexts (whose stratification and whose extension is almost inexhaustible, depending on the point of view from which it is dealt with). On Spencer and evolutionism, see (Canguilhem et al. 2003).

¹⁰ Two terms whose references are however different in the two authors (Foucault 1969; Althusser 1974).

¹¹ Experimental rationalism had demonstrated the inevitable dialectic between theory and experience, so that theory never dominates the whole field, nor does it experience, but they influence each other in a spiral movement that conditions them and forces them to vary continuously – see (Gattinara 1998). Which means that not everything is ideological, or at least that there is never a single ideology, but there is one dominant, and others that are opposed, or that coexist even if they are minority.

¹² Science can find something that the ideology had not given to look for, or intended otherwise, as in the case of atomistic physics, where the atom that finds science is not the simple element that sought the scientific ideology of physics, but an extreme complexity. See (Canguilhem 1977, 40): “Scientific ideology is superseded in relation to the site that will come to occupy a science, but it is not only superseded, it is also depleted.” When a science goes to occupy a place that ideology seemed to indicate, it is never in the place where it was expected. When the chemistry and physics of the nineteenth century constituted the scientific knowledge of the atom, the atom did not appear in the place assigned to it by atomistic ideology, i.e., instead of Invisible. What science finds is not what ideology offered to seek [...], so that what the ideology announced as the simple finds its scientific reality in a coherence of complications”.

¹³ For the critical value of philosophy, cf. mostly (Canguilhem 1980, 81-98).



Canguilhem criticized above all in the book of Foucault *Words and Things*), but different, and always in conflict with each other (with one that is naturally dominant).

The concepts are formed within ideological horizons, but they can also escape, break them, they can be misrepresented, reused or expelled: they have a historical “density” and “viscosity” that never allows them to be completely clear and distinct. The history of scientific concepts, therefore, does not necessarily identify with the history of scientific ideologies just as the object of the history of science does not identify with the object of the sciences, according to the famous statement by Canguilhem (in reality he had learned from the history works of the sciences carried out with philosophical intelligence by Hélène Metzger).

The object of the history of science has nothing in common with the object of science. The scientific object, constituted thanks to the methodical discourse, is second, although not derived, with respect to the initial natural object, and which we would gladly call pre-text, playing on the meaning. The history of sciences is exercised on these second objects, not natural, cultural [...]. The object of historical discourse is in fact the historicity of scientific discourse, insofar as the latter represents the carrying out of an internally normalized project, but traversed by accidents, delayed or diverted by obstacles, interrupted by crisis, that is to say from moments of judgment and truth. (Canguilhem 1983 [1968], 17).

As well as one cannot confuse a concept with an ideology or a theory (it is up to the intelligence and rigor of the historian to try to reconstruct specific differences), so one cannot isolate a concept from its ideological context (and it is always the historian who can recognize its genealogy and its transformations). History is made of different stratifications that fit together, where ideology and society, economics and sociology, psychology and culture, politics and individuality, philosophy, emotions, beliefs, religions and fantasies participate in different measures to make real what happens. No concept arises from nothing or lives in a pure abstract and rational dimension, yet the power of concepts responds to the all-vital capacity of not completely reducing the context in which it is formed (i.e. retains in itself a transformative value rich in potential, which only the actual historical evolution of a discipline can enhance or not¹⁴). For this reason, according to Canguilhem, the same concept can be articulated in different ideologies and epochs: the life of concepts can be reconstructed from a history that is attentive to their transformative particularity, without reducing them to ideas, beliefs or words.

The fact that Canguilhem has always remained (and has claimed for himself the quality of) a “philosopher”, despite having also studied medicine and having done many works of “history of the sciences”¹⁵, is due to this whole epistemological and philosophical approach on value and the role of concepts. The history of science, for him (at least since the late 1950s), is in fact a function of epistemology, or rather it is always and inevitably epistemologically and ideologically conditioned (whether he wants it or not). However, as for Bachelard, history of sciences is not “servant” or “handmaid” of epistemology (for which Canguilhem preferred to speak of “epistemological history” rather than of “historical epistemology”¹⁶).

If for him the history of science is always an epistemological history of the sciences, then another history is not possible, or rather (since some play it) is naive, because it claims to be what it is not and claims to deal with what does not deal – i.e., the scientific object, or the result of scientific discoveries (Canguilhem 1983 [1968], 2).

¹⁴ About the context (Canguilhem 1983 [1968], 235 and 277).

¹⁵ And having become director of the Institut d’Histoire des Sciences et des Techniques.

¹⁶ As Y. Gingras explains in his article (Gingras 2010, 4).

But what does he mean exactly by this way? And above all from where does he say it?

The reference is above all Bachelard, but not only. Studies of epistemology and history of science in France were developed according to coherent perspectives, but not reducible to one another, even by leading scholars such as Alexandre Koyré, Hélène Metzger, Jean Cavaillès. The context (also ideological) of reference in which Canguilhem moves and works is that of experimental rationalism, which in France (and partially in Italy) has had an important development since the beginning of the 20th century, and which Bachelard has then catalyzed in his epistemological work. Canguilhem therefore does not arise alternatively, but in a line of coherence with this tradition (so much so that it takes over from the Bachelard chair at the Sorbonne, and then to the direction of the Institut d'Histoire des Sciences et des Techniques that before Bachelard were state of Abel Rey, also quite consistent with the tendency (we might dare to say ideology) of experimental rationalism, and particularly attentive to the history of science). And of course he brings his personality as a scholar, his originality and his particular point of view, contributing to his transformation (for example the value of concepts and ideology, in some ways absent [ideology] or not so clear [concepts] in Bachelard, and above all the attention to the life sciences, according to a philosophy of life as creation and tension between norms, perfectly coherent with some basic instances of epistemology and experimental rationalism).

Already in his thesis on the normal and the pathological Canguilhem had made history a key element of his interpretation, and he had shown the inevitable conceptual variance of this history. The norms that define the living in its social and individual organization are subject to variation, and of this variation only the historical investigation can account (if one agrees that history is science, or if you want the discipline that studies change over time woven into his human relationships). The concept of physiological normality, and its relative correspondent of “pathology” (relative in the noble sense of the word, because who knows Canguilhem knows that his work has allowed us to avoid understanding the two terms as linked by an opposing binary relationship), are not resolved in their biologization, but change precisely over time (and in their distribution in the geographical, political, social, ethnic and philosophical space). Now, this change is not due to the degree of “scientific” precision achieved by the medical or biological science that deals with it, but rather by a complex of relationships that imply not only the organism-environment relationship (itself in continuous transformation) but also an open set of ideological, anthropological and historical factors. To make history of the norms, even compared to certain characters that seems more constant and less subject to variance – such as respiration rate or glycemic (but also skin color) – is meant to show how their definition itself was variable, so the actual variance that is due to the organism-environment interaction, that is always in permanent mutation (also, but not only, for the human intervention itself¹⁷), is added to the epistemological variance, in the sense that if the conceptual framework changes of reference, then what we mean by “glycemic rate” can become insensitive or insignificant, as it was for “phlogiston” or for ether – Bachelard said that the term, the concept or the whole theoretical apparatus, summed up in the word, was “eliminated forever” (Bachelard 1983 [1937]).

It should be noted, however, that in no case it is ever possible to argue with apodictic certainty that what is condemned to oblivion in a certain period (the prescribed history, i.e. in Bachelardian terms “histoire perimée”) – within a certain episteme and a certain ideology – cannot to re-emerge in another horizon of meaning, conceptual, ideological and epistemic, that is, in another epoch (as in the case of the atom from Democritus to Rutherford and beyond).

¹⁷ See the differences in hypoglycemia between Africans and Europeans, where that rate for the former is normal, for Europeans it would be a pathology (Canguilhem 1972 [1966], 111).



This is why we must keep critical vigilance high and avoid talking about forerunners, as Koyré has taught us, because they would confuse different epochs, epistemes and ideologies.

A forerunner would be a thinker of several times, of his and that or of those assigned to him as continuators, as executors of his unfinished business. The forerunner is therefore a thinker who the historian believes he can extract from his cultural frame to include it in another, which means considering concepts, speeches and speculative or experimental gestures as susceptible to being moved and relocated in an intellectual space where the reversibility of relationships has been obtained thanks to the oblivion of the historical aspect to the object in question. (Canguilhem 1983 [1968], 21)

It is precisely because a concept, and the word that designates it, are part of a set of relationships that give it meaning and contextualize it, that cannot be isolated with impunity by neglecting its horizon of meaning and reality to which it belongs.

What Canguilhem calls “history” has to do with this complex of possible and always ongoing variances. He philosophically reports all this to what he himself calls an objective “a priori” of Life,¹⁸ that is, the “meaning” of life (Canguilhem 1976 [1952], 32). A meaning that is to be intended in its double valence of 1) overall conceptual significance and 2) of direction (and it is always in this sense that Canguilhem intends to speak of evolution and development as transformations that follow a direction, without ever being seduced by the eschatological temptation to indicate an absolute, as teleological reference value towards the Best).¹⁹

In short, for Canguilhem, history is the immanent movement of life, and therefore also of knowledge, insofar as the knowledge of life is part of life itself. If life is immanently normative and at the same time transformative (i.e. constructive / destructive), then so it must also be its knowledge in all its forms. We call this transformative process “historical”

¹⁸ “To define life as a meaning inscribed in matter means to admit the existence of an objective a priori, of a properly material and not merely formal a priori” (Canguilhem 1983 [1968], 362).

¹⁹ Also in this regard, we could make a long reflection on the use of the term “progress” in Canguilhem: it loses, it seems to me, the progressive conception of a tendency towards Better understood as constant improvement, even if discontinuous, for which history would ultimately witness (above all the history of science and knowledge) an undoubted increase and accumulation of truthful contents. Precisely his work on errors, and his reflections on truth and falsehood – in his talk on Hyppolite (Canguilhem 1971), but also see (Sertoli 1983, 90-91 and 156-157) – show that progress is a value that certainly exists, but which is circumstantially limited to be the judgment that a present brings to its past, and not to the past in general, but to the specific past of that specific present. But since the course of historical development is discontinuous, then the judgments about the past are as different as the present ones that emit them, and since a present is never stable, but reformulates and reconfigures always, then every time the judgments change and reformulate history (and in fact it is so, and this also affects the history in general, so every age, every society, each phase rewrites its history, never in continuity with the history written by the predecessors, which at most come used as tools for analysis and research, never as a reference authority). This is what it means that the “sense” is directional: the direction is progressive, like the development of a strange curve, but we do not necessarily know where it will go, because from time to time it can change direction. Progress must therefore be understood as a “going forward”, or better as a proceeding, a not remaining firm, regardless of the directions taken, which are all equal. Moreover, the value judgment on the “best” is always circumstantial, or contextual: it concerns the horizon of expectation that a society has set itself and to which it has arrived, so it can be said that the result achieved is better or worse than the expected one, but the complexity of the horizon of expectation and the space of experience is so high that this is possible only for limited spaces and relatively short times, or for circumscribed values and relatively isolated from their context (I can say that today’s health care it’s better than it was two centuries ago, even if the quality of the food and the air you breathe is definitely worse).

insofar we can judge and compare it, that is, we can relate it to itself by identifying the differentiations, and trying to understand its specific ways, motives and articulations.

From this point of view, the history of science will not be completely separate from other forms of history nor will it have a status of its own, but while maintaining its own identity due to its specific object, it will have to be integrated with the history of techniques, ideas, social history, political, economic (Canguilhem 1983 [1968], 18; 1977, 105), etc. in its opacity and in its indeterminacy (it is in this sphere that Canguilhem's reflection on ideology falls, and which digs one of the most profound differences with Bachelard, who in the last two pages of his 1938 book, *La formation de l'esprit scientifique*, he hoped for a history of the sciences normalized, purified by every obstacle and by every hesitation (Bachelard 1983 [1937], 251).²⁰ Bachelard had taught, however, that there is a plurality of epistemologies, and that this plurality is necessary for philosophical understanding of scientific knowledge, immediately undermining any theory of unified knowledge, and Canguilhem, fully assuming this lesson, radicalized it by showing how the epistemological multiplicity were also immediately a historical plurality, a plurality of historical times – of which Bachelard too had spoken, and as a consequence of which he had proposed his rhythm analysis (Bachelard 1936, VIII-X and 129-150) – that could go in all directions (and not only, as in Bachelard, only from the value of truth enshrined in the present to the past, as recurring history).²¹

Why then does a question arise in the title of these pages? Because in the French philosophical tradition it was precisely the history of science that was used strategically to undermine the old theories of knowledge and to dynamize reason. In this respect, Bachelard was truly a great innovator, since no one like him has been able to use the history of science not to validate a philosophy or attest to an already consolidated (and normative) epistemology, but to break the chains that bind philosophy and epistemology to a given structure of knowledge (intellect or reason, according to whether we were more or less Kantian), fixed and immobile in its internal organization. This is why Bachelard used the term “dialectic” from his first work of 1927, the *Essai sur la connaissance approchée* (as Canguilhem points out): precisely to indicate not only the internal dynamics of reason itself (as in Fichte, in Hegel, etc.), but also the way of its opening and, provocatively, its articulated disarticulation. The provocation was in fact essential not only to a style of thought that was outside the box (outside all scheme), but also because to think scientifically (and probably think tout court) was always and inevitably “to think against”: it is known to anyone who reads Bachelard how violent he used in a strategically rhetorical way the terms of rupture, infraction, opposition, struggle, denial, inexactitude, etc. without ever renouncing the rational value of scientific knowledge.

²⁰ The position is reiterated by him, but also clarified, in a conference of 1951, then printed in *L'engagement rationaliste* (Bachelard 1972, 137-152), where he declares that “the history of the sciences cannot be completely a history like the others” precisely because of the fact that science evolves in the sense of a manifest progress, of an increase of truth, from which all forms of regression of uncertainty are eliminated. See also the way Canguilhem speaks of this purified history of cumulative and recurring truth in (Canguilhem 1977, 20-23 and 26-27). For the difference between Bachelard and Canguilhem, see (Canguilhem 1977 [1955], 157-158), where he wrote that error has the same historical rights as truth (which it had actually learned from Bachelard himself) and which he takes up again in “Sur la science et la contre-science”.

²¹ Sertoli rightly points out that this is one of the characteristics that distinguish Bachelard from Canguilhem (Sertoli 1983), and points out the difference in these terms: “While Bachelard was moved by a sort of historical impatience that pushed him to wish that the moments of time were transparent from each other, so that their opacity was ascribed to error and stigmatized as an obstacle on the path of truth, Canguilhem is driven by the need to restore precisely this opacity of history, this ‘thickness of time’” (Sertoli 1983, 156), and refers to the temporal plurality and the irreducible richness of the contexts, see also how Canguilhem speaks about it in *Études d'histoire et de philosophie des sciences* (1983 [1968], 277 and 19). I will resume this theme at the end of these pages.



This means that talking about “history of science” is not at all something neutral, something given and consolidated, but it means referring to a history that is made and is configured according to intentions and modalities that are also very different from each other.²² And this Canguilhem understood it perfectly, and has shared it completely, bringing it to its extreme consequences (which have gone beyond the thought of Bachelard himself), that is to say, historicizing the relationship between concepts and reality to such an extent that human reason itself has found itself dispersed in its own real articulations, in its technical manifestations, in its materializations and its ideological inflections, in its institutional configurations and in real conflicts. This kind of relationship has been possible not so much thanks to history as such – the history of science as it was then, very erudite, very anecdotal, apparently neutral – but rather to historicization, that is to say to the dynamizing action of the reason itself in its developments. History therefore was not the picklock, the tool to undermine the fixity of reason, but a force recognized within reason itself, which obviously implied a redefinition of the history. Or at least of “this” history, which loses every sensible origin like any eschatological direction:

Science becomes a specifically intellectual operation that has a history but no origin. It is the Genesis of the Real, but its own genesis could not be told. It can be described as re-initiation, but never caught in its first stammering. It is not the fructification of a pre-knowledge. An archeology of science is a sensible operation, a prehistory of science is an absurdity. (Canguilhem 2015 [1957], 731)

The epistemology of Bachelard, and even more so that of Canguilhem, have not “used” the history in an instrumental way, but have reconfigured history itself to the extent that they have transformed the epistemology: we could speak in this regard of a kind of “double articulation” between history and epistemology, where one is reflected in the other and thanks to this double articulation it is significantly re-articulated. Epistemology knows through history that concepts, categories, errors and truths are values and change constantly, history knows thanks to epistemology that the values of change are impermanent, but that are reflected in its own reconstructions. We know that this has led Foucault, for example, to elaborate that new form of historicization, which he called “archeology” and of which we have just seen the mention made by Canguilhem in a 1957 writing, thus much earlier than the Foucaultian practice.

This, although said so briefly, has the consequence that a history (in particular the history of science) is always strategically valued, and that history as an independent science, with its own epistemological status and its own method, does not exist. “The object of the history of science – Canguilhem writes – cannot be delimited by a decision that assigns its interest and importance to it. And on the other hand, it is always like that, even when this decision only obeys a tradition that is uncritically observed” (Canguilhem 1983 [1968], 18). The term Bachelard has given to this situation is “recurring history” (*récurant*), in the sense of history that reflects (recurs) the values of the present through which it considers the past.²³

However, while Bachelard held this recurrence within the strictly scientific realm – even though his work on the imaginary shows that this was a bit tight (Canguilhem 2015 [1957],

²² One can also think simply of the polemics between internalist history and external history in the 1960s and 1970s, on which Canguilhem himself takes a position in the first, introductory chapter of *Etudes d'histoire et de philosophie des sciences*.

²³ It should be noted the affinity, with regard to the term “decision”, with what the historian M. de Certeau would have sustained a few years later about history in general, in *L'écriture de l'histoire* (1975, 96).



736)²⁴ – he inserted it into a sort of scientific Truth research program, valiantly determined and autonomous,²⁵ Canguilhem has been able to extend it to a more extensive and contextual historicization of human life and action: the values are therefore no longer only those internal to the scientific discourse itself, but also the external ones (although the old distinction internalism / externalism has been questioned by him in his article “L’objet de l’histoire des sciences”).

This is what Canguilhem intends when he writes that the history of science is always “a fully meaningful history” (in the sense of attribution of meaning to the decision that “cuts out” the objects).²⁶ Above all because many terms are overdetermined, i.e., they are used significantly in multiple contexts – for example the term “regulator” has “a history composed of theology, astronomy, technology, medicine and even sociology of knowledge”, so their intellectual existence occurs simultaneously in different times – (Canguilhem 1977, 83).

The history of truth is neither linear nor monotonous. A revolution in cosmology does not necessarily imply a similar revolution in biology. The history of science should make us more attentive to the fact that scientific discoveries, in a certain order of phenomena, for their possible degradation into ideologies, can assume an obstacle to the theoretical work underway in another order. But it also happens that this theoretical work, at its beginnings, and especially in areas where experimental evidence still needs a lot of time to be established, acquires itself the form of an ideology. (Canguilhem 1977, 102-103)

Here then epistemology can “guide” the work of historians, in the sense that it allows them to discriminate between the different overdeterminations and to operate precisely a choice, a decision thanks to certain scientific values (obviously also historically determined, but this time aware of it). And it does so strategically to validate a value system in which it believes, that is to say a decision, a cropping of the reality plan that conforms to the organization of discourse and the conceptual structure of which it is representative, and which helps to constitute. “The object of the history of science cannot be delimited by a decision that assigns its interest and its importance” (Canguilhem 1983 [1968], 18).

In these last two elements is the “dialectical” play (as Bachelard called it) – but it would be better to say “vital” (as Canguilhem calls it) – of scientific knowledge and of its historiography: every knowledge, like every concept and every theory, represents a state of affairs, not only because it is formed within it, but also because it defends it and valorizes it (even the language we speak of is historically already given, before we speak it); but at the same time (to the extent that it is valorized), it is expanded, modified, articulated, contributing to its formation both by consolidating and deepening aspects, and by inventing and creating new theories or knowledge. In this movement the starting situation is transformed, grows, changes and can even be overwhelmed (this is its vital character):²⁷ when one wants to make history of it, then it must be “history of formation, deformation and rectification of scientific concepts” (Canguilhem 1983 [1968], 235) and not a simple, more or less cumulative serial chain.

²⁴ Canguilhem knows very well the connection between the open rationalism and the imagination in Bachelard.

²⁵ As Bachelard says explicitly in the last pages of his *La formation de l’esprit scientifique* (1983 [1937]), but also in his *L’activité rationaliste de la physique contemporaine* (1951).

²⁶ On the meaning of “meaningful history” see (Jones 2007, 57-75).

²⁷ In the entry “life” written by Canguilhem for the *Encyclopédie universelle*, he characterizes life as a work of preferences and exclusions, i. e., decisions, affirmations of norms and therefore of values: “To live is to enhance the circumstances and the objects of one’s own experience, it is preferring or excluding means, solutions, movements. Life is the opposite of a relationship of indifference with the environment” (Canguilhem 1989, 547).

In short, there is a difference between the history of theories and the history of concepts, because there are differences between various types of history in all areas of human life. P. Macheray, commenting on this aspect of Canguilhem's work, explains it: "Canguilhem's aim is to give value to the idea of a history of science, trying to identify, behind the science that hides its own history, the real history that governs and constitutes science. It is therefore a matter of researching history outside of science itself, thus affirming that this history consists in the passage from a "we do not know" to a "we know". It is also the effort to think of science in its real body, the concept, rather than in its ideal legality, constituted by the theory in its complete form" (Macherey 2011, 47).

That is why in the famous intervention of 1966 (which later became the introductory essay of *Etudes d'histoire et de philosophie des sciences*), Canguilhem defines well what the object of history (of science) consists of. Citing Bachelard, Koyré and Metzger (and therefore holding firmly in the field of epistemological history and referring to scholars strongly engaged in philosophy), he claims that the history of science is "composed of discourses on discourses held on nature" of certain objects (such as crystals, in the case of Metzger). Discourses that initially were not "good speeches", but that precisely after their development certain objects (for example crystals) became scientific objects. Making history means making history of objects that are "themselves a history and have a history, while science is the science of an object that is not history and has no history". This is why the object of the history of science cannot be identified with the object of the sciences (Canguilhem 1983 [1968], 16).

"Crystals are a given object", explains Canguilhem, also with respect to the science that takes them as the object of a knowledge to be obtained, and for this reason these objects are independent, so much so that they are called "natural objects". But a natural object is not a scientific object, says Canguilhem, citing implicitly (perhaps without knowing or remembering it) a very important epistemological clarification that Federigo Enriques had already done in 1906 (Enriques 1906, 58-59). Nature, in itself, outside of any discourse held about its objects, has nothing scientific about it. Crystal is nothing but a particular object with a certain form and in a certain space, and that it is not said to be exactly as it will be when it will be scientifically identified. Natural objects are in fact indeterminate (that is, things that are not yet delimited, or whose delimitation belongs to a use of some kind). "It is science that constitutes its own objects", from the moment in which it defines or invents a method to construct a theory that defines the limits within which the concept of the object is valid or not: for example which laws must obey a certain object to be declared a crystal or not: "The crystallography has been constituted starting from the moment in which the crystalline species has been defined by the constancy of the angle of the faces, by the symmetry systems, by the regularity of the truncations at the vertices as a function of the symmetry system" (Canguilhem 1983 [1968], 16-17) – which, for example, implies the problem of those objects called "quasicrystals".

It should be noted here that Foucault would have taken flight starting from these assumptions, coming to question the language itself, within a discipline, because he too disciplined in his vocabulary and in his concepts (which are adapted and made operational for the discipline itself, revealing their intrinsic relationship of power).

This means, to use a Sartrean language, that history is always inevitably "in situation", that is, it never has a beginning in the sense of "arché", of origin. It was mentioned earlier: history does not have a beginning, although it has a history, because it is always a "start-up", a starting point from something already given, already situated. Archeology can be done, not prehistory. In reality it is a deeply Bachelardian principle (it is not by chance that it appears in an intervention dedicated to Bachelard) and is linked to one of Bachelard's axioms (he calls them precisely), which Canguilhem agrees completely and on which he builds his entire philosophy of normal and pathological.

Its epistemological foundation consists in recognizing the primary and inalienable role of errors, their “theoretical primacy”. It is thanks to the fundamentally “critical” function of science, to its strongly “polemical” character against the first intuitions of experience, that science – and therefore its development – comes “after”, that rationalism is a becoming, that abstraction is a goal. This is why the scientific object, normalized according to a precise theoretical-conceptual structure, “is second, though not derived, with respect to the natural object” (Canguilhem 1983 [1968], 17). The natural object is also the object of first intuition, which in Bachelardian language is the first error. Here is indeed what Bachelard said: “Truth acquires its meaning only at the end of a controversy. There can be no truth before. There are only first errors” (Bachelard 1970 [1935], 87). So rationalism “is a philosophy that continues, it is never really a philosophy that begins” (Bachelard 1962, 54), and therefore “for the scientific spirit to clearly outline a frontier is already to overcome it” (Bachelard 1970, 80). But while for Bachelard the error is an obstacle and represents the pre-science, something to overcome and eliminate (or preserve only for the erudite curiosity of a completely useless historiography), for Canguilhem the error is a truth, a different truth, which belonged to a different context, and it is of this difference that history must know how to account. But this difference also testifies to the inexhaustible openness of our scientific knowledge understood as a form of life. The error is conceived as another truth, that is, as an historical experience of circumstantial truth to be recovered and respected (in its historical validity, because nothing is ever completely exceeded, and things, concepts, or at least some terms, can come back ... thanks to their metaphorical-analogical value, to their open evocative power, which is then a poetic and poietic power).

The “monsters” in biology testify to it Darwinian. “What are still today many living and well-living forms, if not normalized monsters [...]? Consequently, if life makes sense, it must be admitted that there may be loss of meaning, risk of aberration or illness. [...]”. But then, if life is meaning and concept, how to conceive knowledge? It was mentioned above: for Canguilhem, knowledge is life, it is a form of life. But since knowledge “is the history of errors and the history of victories over error”, then perhaps “must we admit that man has become such by mutation, by a hereditary error? Would life come by mistake to this living being capable of error? In fact, human error is probably one with the errance” (Canguilhem 1983 [1968], 364). The “errance” is the restless human variation that does not find its niche where to live permanently, in the constant search for information that it needs to live. Man moves in search of information thanks to his techniques, thanks to his mistakes and his ability to recognize and overcome them. The philosophy of life presented to us in this way is an erratic philosophy of openness and variance. “Consequently, if the a priori is in things, if the concept is in life, being subjects of knowledge only means being dissatisfied with the sense found. Subjectivity is then only dissatisfaction. But perhaps life itself is there” (Canguilhem 1983 [1968], 364). In the book *La connaissance de la vie* adds: “A living genus [...] will seem vital to us only to the extent that it will prove fruitful, that is, capable of producing novelties, even if at first sight they are imperceptible” (Canguilhem 1976, 205).

In this respect, Canguilhem seems to me to be particularly careful to defend the Bachelardian approach of an open and plural epistemology by the very fact of its irreducible and very vital discursive historicity (therefore technical, not ontological). Not surprisingly, in the last pages of his speech on the subject of the history of science, he explains that it was Bachelard who taught that for this irreducibility “the history of science can only be precarious, called to its own rectification” (Canguilhem 1983 [1968], 20). Like life, in short. So the history not only comes “after”, but also comes “while”, that is, in the decision itself that traces its becoming: its temporality will be dense, opaque, viscous and liquid (Canguilhem 1983 [1968], 19 and 277), multiple and differential, with his inconstant and intertwined rhythms who are internal to the concepts. “A well made history, whatever the history is, is the one that manages to make the opacity of time sensitive, and in some sense its thickness” (Canguilhem 1983 [1968], 277). Nothing more to do with the clear and limpid development of

an idea or a discovery, nor with that Bachelardian history placed under the heel of epistemology and that “discovers in the past the progressive formations of truth”, rationalized, normalized and abstract, which would determine “the absolute positivity of scientific progress” for “an ever-increasing truth” (Bachelard 1951, 38; 1972, 86; Gattinara 1998, 213-217).

If its object is a construction, and it is also history of a history, that is, a history of a discourse that is based on the articulation of words, propositions, concepts, ideas, contexts, relationships, etc., then its field of forces extends beyond the specifically scientific sphere: indeed, speaking in terms of science, already presupposes a historically and ideologically determined position, which Canguilhem takes very much to underline and defend,²⁸ but which today we have learned to critically consider. We must be careful – Canguilhem explains to us anyway – not to let ourselves be taken in haste, or by the ease of a logical reconstruction that pushes us to make the moments of the time transparent and linear. We have to consider the thickness of time itself and its multiplicity, its coexisting and dense rhythms of innovation and survivors, its hesitations, its discards and its jumps. A well-made history of science “heals us” from this very ideological impatience (Canguilhem 1977).

But then, when Foucault, or Michel Serres, began to escape from the history of science, mixing it with concepts, ideas, practices of exclusion or inclusion, policies and poetics, the forms of knowledge-powers and policies and practices of the truths have done nothing but draw the consequences from this approach of the discourse on the history of the sciences and on history in general, contributing to a revision of the “making history” itself. Canguilhem, as we know, has not always appreciated it (especially towards Serres²⁹): but this was the implication of an open epistemology, with which we still know and must deal with today.

Both Foucault and Serres, each in his own way, have in fact questioned what Canguilhem never wanted to discuss: science itself as a discursive formation, as a separate discourse from other knowledge, as plural sciences that recognize a status that unites them in a specific form of knowledge called “scientific”. And only for this epistemology as a study of the constituents of a claim to scientific claim, and history as a study of the formation and affirmation – or of the domination and imposition – of these constituents, could help the scholar. In short, it is a task that is still open to us.³⁰

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²⁸ He also defends Bachelard, of which he underlines the “double” history of the sciences: the epistemologically valued one, *sancionnée*, and the passed one, *périmée*, in (Canguilhem 1977, 32-33 and 55).

²⁹ See his strong criticism of the positions of Serres, judged arrogant and unable to fully understand Bachelard, in (Canguilhem 1977, 28-29).

³⁰ An old task, in fact, since P. Macherey asked for it in 1964, see (Macherey 2011, 69).



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