Ian Hacking's metahistory of science

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Abstract: In this paper we attempt a critical appraisal of the relation between history of science and philosophy of science in Ian Hacking's styles of scientific reasoning project. In our analysis, we employ a distinction between "historical *philosophy* of science" and "philosophical *history* of science": the former aims at addressing philosophical issues, while the latter aims at telling stories about the scientific past that are informed by philosophical considerations. We argue that Hacking practices historical *philosophy* of science; discuss how his approach is differentiated from the so-called confrontation model; and show that he opts for a strong integration between history and philosophy of science. Finally, we discuss the historiographical implications of his approach and suggest that his aim to maintain a middle position, on the one hand, between contingency and inevitabilism, and, on the other, between internalism and externalism in the explanation of the stability of scientific knowledge, is compromised by his philosophical commitments.

Keywords: Ian Hacking; styles of scientific reasoning; history and philosophy of science; contingency/inevitability; internalism/externalism

1. *Introduction*

This paper aims at a critical appraisal of the relation between history of science and philosophy of science in Ian Hacking's work. Specifically, we focus on the series of essays that comprise his *styles of scientific reasoning project* and examine his theoretical reflections on that relation. In these essays, Hacking provides us with elaborate metahistorical reflections: theoretical reflections on the relation between philosophy and history, and on his own philosophical and historical practice, that is, on his own way of practicing philosophy and history, or, better, philosophy *cum* history.

Our approach to these reflections is guided by three closely interrelated issues. First, we focus on Hacking's theoretical stance on the relation between history of science and philosophy of science. This question takes the form of an inquiry concerning whether Hacking's approach constitutes a 'historical *philosophy* of science' or 'a philosophical *history* of science'. The former aims at

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elucidating or taking a stance on philosophical issues by drawing upon historical material, while the latter aims at telling stories about the scientific past that are informed by conceptual and philosophical considerations.[1] In discussing this question, providing textual evidence and interpretative justification, we argue that Hacking self-reflectively practices 'historical *philosophy* of science'; that is, he articulates a philosophical stance in response to philosophical issues and he argues for it historically.[2]

Second, we argue that Hacking's approach is differentiated from the so-called *confrontation* model in history and philosophy of science (HPS), and we sketch the alternative integrated approach he suggests. As we discuss in the next section, after the critique of logical positivism in the 1960s and 1970s, the resulting turn to a naturalized philosophy of science involved a specific idea of combining history and philosophy of science. According to that idea, history becomes an *ancilla philosophiae*, providing empirical data for the (dis)confirmation of philosophical theories about the nature of science.[3]

Third, given that Hacking's approach is more the one of a philosopher employing a historical method, than that of a philosophically sensitive historian, we discuss the historiographical implications of Hacking's approach, which aims at maintaining a middle position concerning fundamental historiographical issues, such as contingency and inevitabilism, and internalist and externalist explanations of the stability of scientific theories. We show that his approach compromises the middle position he intends to adopt.

To that effect, our argument is developed in three sections. In the next, second section, we present the framework within which our three issues are approached. In the first part of the third section (3.1), we present the historiographical structure of Hacking's styles approach, that is, we present a schema that illustrates the way he uses history. This schema shows that Hacking's styles project constitutes a historical *philosophy* of science, and that he adopts a strong integrated approach concerning the relation between history and philosophy of science. In the second part of the third section (3.2), we focus on the question of stabilization of styles. Here, we substantiate in a concrete manner the way Hacking uses history in order to argue for his philosophical claims, and we critically discuss the historiographical implications of his approach.

[1] See Arabatzis 2017.

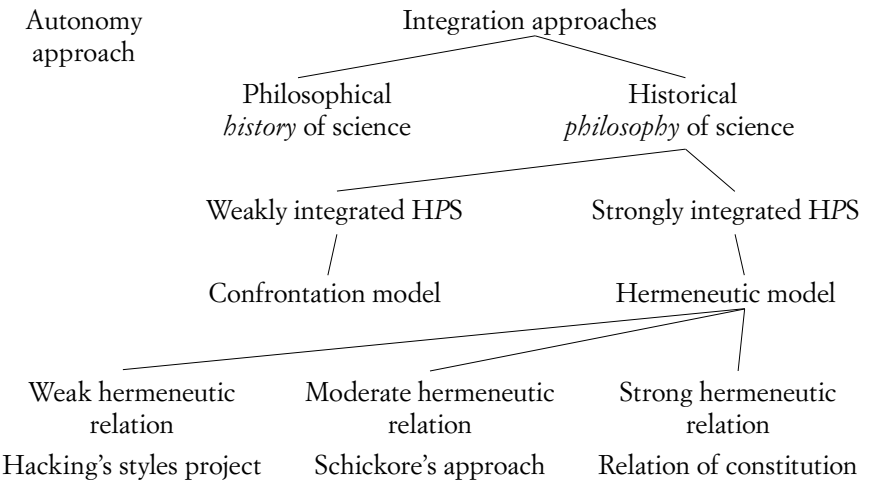
[2] For a different perspective on how Hacking understands the relation between history and philosophy, see Kindi 2014.

[3] See Schickore 2011: 466, 477, and *passim*.

2. *A metahistorical framework: Mapping the relations between history and philosophy of science*

In this section, we will present a framework within which the three above issues will be discussed. This framework can be represented by the following schema that maps some possible relations between history and philosophy of science, registering a provisional placement of Hacking's approach in it.

Fig. 1 – Some possible relations between history and philosophy of science.



According to the autonomy approach, philosophy and history of science are ontologically and epistemologically distinct and autonomous. They have different subject matters and adopt different methodological approaches, while, more importantly, neither their subject matter nor their methodological approach necessitate an interaction. The underpinning analogy here is between scientific inquiry, say chemistry, and the history of scientific inquiry, that is, the history of chemistry. Thus, philosophy of science is modelled upon science itself. It constitutes a metascientific inquiry, whose subject matter is science itself. In contrast, history of science falls under the *Geisteswissenschaften*. It constitutes an interpretative enterprise of matters past, pertinent to scientific inquiry and practice simpliciter. Philosophy of science is ahistorical; history of science is unphilosophical.[4]

We agree with Schickore that the autonomy approach is conceptually

[4] See Schickore 2011: 461.

flawed. On the one hand, philosophy of science has an inbuilt historical component. The construction of a philosophical theory about science, including its development, requires interpretative work. It involves a reconstruction of at least the recent past of specific scientific fields. In that sense, it cannot be completely ahistorical. On the other hand, the converse holds for history of science. The construction of a narrative account of, say, a specific scientific episode – to take a near uncontroversial, if not always accurate, description of what historians do – involves philosophical presuppositions and philosophically laden categories. The individuation of a historical case as a "scientific episode", its relation with other events within and beyond "science", and its falling under a particular meta-scientific category (e.g., "discovery" or "experiment") are only a few representative ones.[5]

Integration approaches to the relation between history and philosophy of science take into account the preceding critical points. The confrontation model can be considered the most representative and dominant version of what we can call 'weak integration approaches'. It acknowledges the relative autonomy of both fields, yet allows a weak interaction between them. According to the distinction we introduced above, this model constitutes a 'historical *philosophy* of science'. Philosophy of science, according to this model, has an ontological and epistemological primacy over the history of science. Philosophy of science formulates theories or theses on, mainly, scientific change, progress, and rationality, which "had to be *confronted* with historical episodes. The role of history was to provide the data for the evaluation of philosophical theories about science" (Schickore 2011: 464).[6] Thus, history of science assumes a merely ancillary role in philosophical reflection about science, without its being constitutive of the philosophical issues under investigation.

This conception of the relation between historical data and philosophical hypotheses encounters several problems: as philosophical theories that seek to be (dis)confirmed by the available (historical) data seem to be modelled upon scientific theories, they face all the well-known problems associated with the testing of scientific theories. The first problem is the theory-ladenness of the historical (*qua* empirical) data. In the same way that there can be no neutral empirical data for the appraisal of scientific theories, there can be no neutral historical data for the evaluation of philosophical theories. Second, the very method of theory appraisal to be followed has to be specified and justified. For instance, as Lakatos pointed out, in evaluating a philosophical theory of scientific change one can adopt an inductivist approach, or a Popperian falsifi-

[5] Cf. Arabatzis 2006; 2012; 2017.

[6] Emphasis added. Cf. Vagelli 2019.

cationist approach, or finally a Lakatosian metamethodology.[7] Third, the privileged status of *historical* material over other kinds of *empirical* evidence has to be equally justified. According to Schickore, "historical study becomes just one option among many other empirical approaches, such as sociology, cultural studies, cognitive science, ethnography, anthropology, media studies, and so on" (Schickore 2011: 470).[8] Fourth, a final problem is the underdetermination of philosophical (*qua* scientific) theories by historical (*qua* empirical) evidence. Namely, it is possible that the same historical evidence can justify different – or even opposing – theories about science.[9]

The critique of the weakly integrated historical *philosophy* of science and its most representative version, the confrontation model, may lead to a stronger integration between history and philosophy of science. Schickore's account, succinctly summarised in her diagnosis that "[*u*]*nderstanding science results from a hermeneutic procedure*, in which preliminary concepts and frameworks and initial case judgments are *modified* and *adjusted* until a cogent account is obtained," is differentiated from the weakly integrated historical *philosophy* of science in two ways (*ibid*.: 478, emphasis added).

First, as we said earlier, her approach suggests an inextricable relationship between history and philosophy of science. A philosophical apparatus or toolbox of more or less specified "concepts", "frameworks", and "judgments" is suggested, in light of which the historical record is approached. However, this provisional apparatus is open to revision in light of the historical material encountered. This iterative process encapsulates the hermeneutic quality of the approach.

Second, following Hacking following Foucault, Schickore's invoking of the notion of the 'history of the present' as something that "should remain part and parcel of our present efforts to understand the sciences" can be understood in a double way (*ibid*.). First, her approach is differentiated from weak integration approaches in that the historical aspect of the enterprise is not considered a necessary addendum – something to which the advocates of the autonomy approach would eventually concede, realising that their inquiries inevitably involve the reconstruction of, at least, the very recent past instances of their subject matter. Rather, history is seen as an integral part of philosophical understanding. Second, and most important, as we will see in the next sections

[7] See Lakatos 1980.

[8] It could be argued that Hacking's invoking of other disciplines such as anthropology, sociology, and cognitive science reinforces Schickore's point. As it will be shown below, though, Hacking does not consider history methodologically replaceable by those disciplines.

[9] Schickore (2011) does not refer to this problem. It derives though from the analogy between philosophical theories and scientific theories in the way described.

(where we discuss Hacking's work), the notion of the history of the present amounts to a philosophical investigation of a contemporary (meta-)scientific entity, such as objectivity. The study of the historical emergence and development of such an entity is constitutive of its philosophical understanding.

Building on Schickore's distinction, we can draw an additional one, elaborating on her schema. The hermeneutic model can appear in three versions: weak, moderate, and strong (see Fig. 1). In the moderate version, the historical material retains an ontological autonomy. The philosophical apparatus orders the historical record and singles out the facts, but it does not constitute them. Moreover, philosophical concepts get revised in light of the historical record. Thus, in this version – which seems to be Schickore's own – the distinction between a 'historical *philosophy* of science' and a 'philosophical *history* of science' seems to break down in favour of a seamless HPS approach.

The strong version is more radical. The relation between the philosophical claims and the historical material is such that historical facts can be identified only within and in virtue of a philosophical perspective.[10] This version brings to the fore the issue of the justification and validity of the hermeneutic approach. The thinkers who adopt it are either indifferent to this issue – embracing thus a strong relativism – , or reduce the justification of their approach to its contingent reception.[11]

Finally, Hacking seems to follow a weak version of the hermeneutic model, by retaining the element of bilateral revisability. Yet, as we will see, he prioritizes an overarching philosophical perspective. This provides the framework within which the hermeneutic interplay between the historical record, on the one hand, and the philosophical ideas, on the other, takes place.

3. *Hacking's styles project*

3.1. Styles as historical philosophy of science

3.1.1. Styles as historical philosophy of science: the structure of the relation

Relations between the history and the philosophy of the sciences are often debated and sometimes contested. My interest here is collaboration. I shall describe a new analytical tool that can be used by historians and by philosophers for different purposes.

[10] This idea is endorsed by two thinkers that Hacking explicitly draws upon, namely, Foucault and Latour.

[11] See, for example, Latour and Woolgar 1986: 257.

It is a specialized, indeed technical, version of an idea often used or abused elsewhere: "style." […] The two uses, by historians and philosophers, are complementary but to some extent asymmetric. The historian may conclude that the philosopher's use of the tool is bunk, irrelevant to understanding the past. But the philosopher needs the history, for if the tool does not provide a coherent and enlightening ordering of the record, then it has no more place in sound philosophy than would any other fantasy (Hacking 2002c: 178).

Hacking's pithy description can be unpacked in a series of points. First, its importance is underscored by the produced rhetorical effect: the above lines introduce his paper. Second, although Hacking assumes the standard distinction between history and philosophy of science, qualifying their relations as 'asymmetric', he explicitly suggests an integrated HPS approach. Third, he refers to the historian's task in terms of philosophical history of science, while, when he turns to the philosopher, he switches to historical philosophy of science. Fourth, and most important, in the latter case, the use of history is essential for the philosophical enterprise. According to Hacking's own telling formulation, without historical input philosophy cannot be sound, where soundness is related to some sort of empirical anchoring. A philosophical claim – let alone theory – that cannot be related to the historical record is excluded: Hacking does not talk about a philosophical error, or about the possibility of corroboration of a philosophical theory at a further point in time. Rather, the very *aim* of philosophy of science is to "provide a *coherent* and *enlightening ordering* of the record" (emphasis added). As such, the difference from the confrontation model is evident. In light of our comments in the previous section, an "ordering of the record" would be at odds with the confrontation model, while Hacking's formulation explicitly envisages the historical record as not coming in the form of a pre-packaged set of claims ready to be compared directly with a theoretical framework.

Hacking's latest remarks on the matter both corroborate and deepen the above interpretative points:

The styles project uses the past as a way to understand the present. Although it has suggested historical research to others, and draws on far more historical data than it cites, in itself it adds no new content to the history of science. The accounts of the past to which it refers are (disconcertingly for many readers) as often folklore as archive-based research. Anthropology, sociology, and cognitive science, especially of the more speculative sort, are also invoked. In short, the project is philosophy attentive to, but not awed by, many neighbouring bodies of knowledge and theorizing. (Hacking 2012: 600)

First, again, Hacking describes explicitly his project as a philosophical one. In fact, to that effect, he corrects his earlier view: "The 1992 title, '"Style"

for historians and philosophers', was a mistake, for the paper addressed philosophy, not history" (*ibid.*: 601). Moreover, the philosophical aspect is further underscored. Hacking is explicit that his philosophical approach – despite its opening a space for historical research – is not in itself a contribution to the history of science.

Second, as we will elaborate further, Hacking's styles are situated within his attempt to address rather traditional philosophical issues: scientific rationality, method and truth. His philosophical agenda is to maintain a critical distance between two poles: on the one hand, a metaphysical and epistemological realism, and, on the other, a relativism amounting to subjective idealism, in which scientific truth and method become a matter of *ad libitum* decisions (Hacking 2002c: 196). However, given his rejection of ahistorical philosophy of science, the use of history becomes necessary. As it will become more apparent below, history acquires a double role: it is needed to justify the critical distance maintained from both of these two poles.

Third, more specifically, this middle position can be further understood in terms of the notion of the history of the present: "The history that I want is the history of the present. That is Michel Foucault's phrase, implying that we recognize and distinguish historical objects in order to illumine our own predicaments" (*ibid.*: 182). Thus, Hacking aims at an understanding of the present condition. And given that this condition is the product of historical developments, its understanding cannot but be at the same time a historical one. Moreover, this understanding of the present is philosophical, since styles are the conditions of possibility of our contemporary condition. Styles provide "an account of how conceptions of objective knowledge have come into being", and the link between Kant and the history of the present becomes explicit (*ibid.*: 198).

The previous three points provide the structure of Hacking's general philosophical position. Furthermore, the summarizing extract above raises three new important points concerning the very use of history in the structure just outlined. First, Hacking acknowledges that his philosophical project derives from and is supported by historical data, even if these are not explicitly mentioned. Second, the use of the historical record is not exclusive. Rather, the use of other empirical fields is acknowledged. Moreover, he does not prescribe any kind of hierarchy, according to which a specific field of inquiry and body of data would acquire ontological, epistemic, or explanatory priority. Third, Hacking distinguishes between two types of historical accounts: "folklore" and "archive-based". This distinction does not primarily concern the evaluation, acceptance status, or degree of entrenchment that some historical interpretations have within the community of historians. Rather, we take it more to distinguish between historical data proper and historiographical ideas, which

frame the historical data. "Folklore accounts" refer to the latter. Hacking describes them as "familiar legend[s]" and "popular myths of origin", associated with Galileo, Boyle, and the air pump itself (*ibid.*: 185). They are used as metonymies for the crystalized state of a style (Hacking 2012: 607). As such, they can be understood as middle range historical abstractions around which historical evidence is mustered. They constitute, at the same time, both historical generalizations *qua* facts, and the perspectives from which historical material is approached.

These last three points document Hacking's differentiation from the confrontation model. His account differs from it in both 'horizontal' and 'vertical' terms, that is, concerning both the relation of history to other fields, and the relation between philosophical claims and historical evidence, respectively. As regards the first, in lieu of the prioritization of history and the uncritical bracketing of neighboring discourses that characterize the confrontation model, Hacking adopts a more inclusive approach. As regards the second, as we saw, historical evidence is not conceptualized as a relation of correspondence between factual statements and theoretical claims ready to be confirmed or disputed. Rather, for Hacking, historical evidence seems to come into bundles mined out from the archive – understood in a broad sense – by philosophical claims, historical abstractions, and historiographical considerations.

3.1.2. Styles as historical philosophy of science: a hermeneutic interpretation

This subsection discusses the second point that we would like to make, that is, the dynamic, coherentist, and hermeneutic aspect of Hacking's approach. This aspect can be expressed in three interrelated remarks. First, apart from the fact that Hacking describes his project in philosophical terms, he indicates that the categories he uses are open to modification, and lays out his project in terms of a process (Hacking 2002c: 182). Although the specific content of this process will be described in the next subsection (3.2), we can offer a schematic representation of its structure in terms of the following elements:

a) Hacking's adoption of a middle position, concerning realism and nominalism, inevitabilism and contingency, and internalism and externalism regarding the explanation of scientific stability;
b) his appropriation of Crombie's notion of styles (*ibid.*: 186);
c) his invoking of philosophical and historiographical tools, such as Foucault's notion of *epistemes*, Foucault's and Comte's notion of *positivity*, and conceptions of truth and meaning from analytic philosophy;
d) the application of this philosophically informed apparatus to Crombie's styles, resulting into Hacking's own account of styles (*ibid.*: 198).

Second, although Hacking uses the distinction between history and philosophy of science, and describes his project in philosophical terms and Crombie's in historical ones, in his conclusion the distinction and corresponding division of labor between the historian and the philosopher is almost suspended:

> For all the manifest differences of endeavor between the historian and the philosopher, they have this in common: we share a curiosity about our Western "scientific" vision of objectivity. […] Yet I would not push this division of labor too far. […] however much the historian may abjure philosophical issues, every sound history is imbued with philosophical concepts about human knowledge, nature, and our conception of it. And aside from central shared concerns, there is a more general predicament that the historian and the philosopher experience. Crombie was powerfully aware of the *reflexive* elements of his volumes. He knew that he who describes a certain vision of ourselves and our ecology has that vision himself. (Hacking 2002c: 199, emphasis added)

This is important for the following two reasons: first, a philosophical history of science (that is, Crombie's) suggests a strong interrelation between philosophical ideas and historical material. In other words, Crombie's account and Hacking's appropriation of it do not share the basic structure of the confrontation model. Second, and more important, the presentation of Crombie's styles in these terms indicates that Hacking does not just use a set of historical facts. Hacking's metaphors of 'legends', 'continents', 'waterfronts and piers' constitute the abstractions by means of which Crombie's account is reformulated. In that sense, we cannot talk about a philosophical use of historical data, but of philosophical elaborations of historiographical concepts, metahistorical ideas, narratives, and facts. Furthermore, we cannot talk about a relation between pure philosophical ideas (Hacking) and raw historical facts (Crombie), but rather between historically informed philosophical ideas, on the one hand, and philosophically laden facts, on the other.

Finally, third, Hacking observes that the philosophical relevance of Crombie's work, that is, of the efficacy of the tool Hacking selects to use, "is not a matter of principle", but is assessed by "the success of the resultant philosophical analysis" (*ibid*.: 186). In turn, this success is not assessed by an external set of criteria, but it depends largely on the success of the tool used in enabling a "coherent ordering and analysis of European scientific practice and vision" (*ibid*.: 198).

3.2. The stabilization of styles: historiographical remarks

We mentioned Hacking's attempt to maintain a critical distance from both poles of metaphysical *cum* epistemological realism and of radical relativism. In

light of what we have argued so far, this middle position can be unpacked as follows. We see deep historical changes in our most systematic, elaborate and sophisticated, collective interactions with the world. At the same time, these interactions are characterised by an irreducible stability. Crombie's notion of styles of scientific thinking, renamed by Hacking, initially, as styles of scientific reasoning, and, later, as styles of scientific thinking and doing, captures this characteristic stability of our systematic collective interactions. This idea is suggested explicitly by Hacking as an intersubjective, historicized, and pluralist version of Kant's conditions of possibility of truth and knowledge (*ibid.*: 181, 198). It is intersubjective *qua* collective, as these conditions of possibility do not refer to the structure of a transcendental subject; it is historicized, as styles are not atemporal but historically and locally specific; and it is pluralist, as styles amount to "disparate ways of thinking" (Hacking 2002b: 170). Thus, styles are conditions of possibility of objectivity, and these conditions of possibility are – roughly put, yet allowed by Hacking's own quips – historically determined nexuses of fundamental methodological practices.

As we saw, the notion of styles enables Hacking to adopt a position of mitigated relativism. Furthermore, it is this very notion that enables him to adopt a position of mitigated contingency, too:

> *There is no deep reason for, or cause of, the appearance* at different times of a few distinct genres of scientific inquiry, often detectable in ancient Greece, and still flourishing. […]. They began to stabilize but also continued to evolve in *an endless cycle of contingencies. This anarchic story is not quite that of a random walk, but there was no foreordained right route.* (Hacking 2012: 600, emphasis added)

Concerning the emergence, transformation, and demise of styles, Hacking holds explicitly a contingentist position (Hacking 2002c: 195). At the same time, he mitigates his position acknowledging constraints on contingency. First, the autonomy of a style of reasoning transcends the historical and social contingencies from which it emerged (*ibid.*: 196; 2012: 600). Second, Hacking's reference to Foucault is telling. Foucault's epistemes as conditions of possibility of the production of scientific statements have been criticized for their holistic, self-enclosed character:

> [R]ecall complaints addressed to Michel Foucault that he never explained why epistemes die out, in particular why his Renaissance episteme of resemblance expired. *I do not believe that one can give purely internal explanations of why we abandon certain practices, but have no confidence in external explanations either. It does not discredit the philosopher's use of styles of reasoning that it leads directly to such historical chestnuts; the contrary, I should imagine.* (Hacking 2002c: 195, emphasis added)

Here, the distinction between internal and external factors acquires a slightly different meaning compared to the standard one. The notion of external does not refer only to social factors – that is, external to scientific practices, traditionally considered –, but also to a kind of input from an extrastylistic reality.[12]

To discuss Hacking's use of history in his account of the techniques for stabilizing styles, we will employ a distinction that we find illuminating, namely, between *endogenous* and *exogenous stability*.[13] These two notions sort factors – as well as their origins – in two kinds: those that are internal to the schema or structure under investigation and those that are external to it.

3.2.1. The endogenous stability of styles

In what follows, we will discuss two aspects of the endogenous stability of styles, which is achieved through stabilization techniques. The first aspect is the coherence amongst statements. The second is the coherence between ideas, materialities, and institutions, all understood in a broad sense. To be sure, these two aspects do not refer to different things. On the contrary, the coherence of statements can be considered part of the coherence among ideas and other things.

3.2.1.1. Statements and (candidacies for) truths

In a previous subsection (3.1.1), we presented a fourfold structure that aspired to depict Hacking's use of history in his styles project. As we saw in the beginning of 3.1.2, the introduction of positivity is Hacking's second step, after his turn to Crombie, towards the substantiation of his philosophical project. His discussion of meaning and truth is indebted to two influences: analytical philosophy of language, on the one hand, and Comte and Foucault, on the other. What interests us here is that Hacking does not just use Foucault and Comte *simpliciter*. His approach to both, and especially to the former, is significantly mediated by analytic philosophy of language. At the same time, Hacking approaches philosophy of language in light of some Foucauldian insights. In other words, when Foucault talks about epistemes, he appears from Hacking's perspective to employ a coherentist theory of truth. More forcefully, his treatment of epistemes can be seen as a coherentist approach to truth substantiated by history. This is how Hacking uses Foucault's *Les mots et les choses* in his styles project. Thus, Foucault is employed as a historical philosopher of science and knowledge. In that sense, Hacking's discussion of truth is not just a philosophical idea; rather, it is a historiographical tool: it explains how

[12] See sections 3.2.2.1 and 3.2.2.2 below.

[13] This distinction is borrowed from Dries 2010.

scientific statements within a style hang together, and thus, to a certain extent, explains the stability of styles.

A style of reasoning is the condition of possibility of positivity: it puts forward "propositions that are up for grabs as true-or-false" (Hacking 2002b: 164). Furthermore, the meaning of these propositions is determined by the style in which they emerge (160). As such, a style determines both their truth conditions and the method for determining their truth value. In other words, a style determines the kinds of reasons we provide – along with the way we provide them – for justifying a proposition. Thus, the existence of these propositions, their meaning, and the method for verifying their truth are grounded in and depend upon a style of reasoning. In other words, meaning and method are contextually determined, and the context in this case is the style. It follows that the rationality of a style of reasoning depends on nothing else but on the style of reasoning itself; there are no external criteria to be invoked (167). This implies that the truth of style-dependent propositions is better described by a coherentist theory of truth (191). Thus, one of the techniques that make styles stabilize themselves is the formulation of statements that cohere together.[14]

3.2.1.2. Ideas, materialities, and institutions

As we have seen, with his turn to Crombie's notion of styles, Hacking refers to a specific "division of labor":

> Crombie's volumes [the *historian's* work] will, I hope, be read in part as an account of how conceptions of objective knowledge have come into being, while the *philosopher* can describe the techniques which become autonomous of their historical origins, and which enable styles of reasoning to persist at all. *Yet I would not push this division of labor too far.* (Hacking 2002c: 198-199, emphasis added)

The enterprise is philosophical, as the double question of the autonomy and persistence of stabilization techniques brings together three key issues of the philosophy of science: inevitabilism and contingency, realism and nominalism, and the explanation of the stability of scientific theories.

However, Hacking's approach to answering these questions is historical. He looks into Crombie's history and singles out the common elements of all styles that are deemed necessary for their stability. Furthermore, these elements become historiographical tools by means of which relevant data can be mined

[14] "The apparent circularity in the self-authenticating styles is to be welcomed. It helps explain why, although styles may evolve or be abandoned, they are curiously immune to anything akin to refutation. There is no higher standard to which they directly answer. […] [§] I believe that understanding the self-authenticating character of styles of reasoning is a step towards grasping the quasi-stability of science." (Hacking 2002c: 192).

out of the historical record. More importantly, these historiographical ideas guide Hacking himself to examine the historical record when discussing individual styles; and, moreover, this allows an interplay between the historical and the historiographical, or the philosophical and the historiographical. The hermeneutic aspect of Hacking's styles project is retained. This means that in light of new historical and historiographical material modifications can occur. For example, an element that is present in only one style can be dropped out as not being a common, constitutive element of stabilization; another can be introduced, as we come to realize that it names a group of elements common among different styles, and so on. The fact that Hacking presents only the outcome of his research should not obscure its dynamic character; on the contrary, we should keep in mind that that outcome is the result of a hermeneutic process. Finally, this also allows Hacking to make second-order, metahistorical remarks of the following sort: "Each style of reasoning has its own characteristic self-stabilizing techniques. […] [§] Almost the only thing that stabilizing techniques have in common is that they enable a self-authenticating style to persist, to endure" (*ibid.*: 193).

We can now turn to the very elements that Hacking refers to. Although he does not make this distinction, he presents *discursive* and *non-discursive* elements: he refers, on the one hand, to ideas, theories, and "marks (including data and data analysis)", and, on the other, to "material, institutional requirements" (*ibid.*: 194). His main idea can be understood as an extended version of the Duhem-Quine thesis.[15] Following Pickering, Hacking expands Duhem's confirmation holism to include both the set of non-discursive elements and the relation between discursive and non-discursive ones.[16] This expanded holism describes the structure of styles' self-stabilizing techniques; and it is the structure of what we called endogenous stability.

These two aspects of endogenous stability, that is, the coherence among statements and the extended confirmation holism, raise a philosophical issue with historiographical consequences. As we saw, Hacking claimed that although styles emerge from local, historical and social, contingent conditions, they are not reduced to them. The question that arises here is whether these self-stabilization techniques are sufficient for the autonomy of a style. More forcefully put, given those two endogenous stability aspects, the autonomy of a style is based on the autonomy of the corresponding intrastylistic reason. The question raised concerns the ontological status of this reason, and, specifically,

[15] Duhem is both a historical *philosopher* of science and a philosophical *historian* of science. His eponymous thesis appears in one of his primarily philosophical works (1914).

[16] Cf. Hacking 1992.

whether it is grounded into a metaphysical foundation, so as to transcend the contingent conditions from which it emerged. As we will see, the answer to this philosophical question goes hand in hand with a particular historiographical outlook.

3.2.2. The exogenous stability of styles

The explicitly acknowledged Whiggish character of Hacking's approach frames the discussion of exogenous stability (Hacking 2012: abstract, 599). First, it is not only his tool that is Whiggish. His whole approach is philosophical and as such, according to Hacking, it is Whiggish (602). Second, in his 1992 essay on styles Hacking explicitly associates his approach with a Foucauldian history of the present (Hacking 2002c: 182). However, elsewhere, in an essay not belonging to the styles project, he explicitly describes Foucault's history of the present in terms of contingency, and contradistinguishes it from Whiggism (Hacking 2002a: 24). The contingency indicated can be read as aiming to undo the metaphysical foundation on which inevitabilist narratives are grounded. Still, in the 1992 essay, a paragraph later, Hacking does refer to the presentist aspects of the project (Hacking 2002c: 183), while in his later assessment he takes explicitly some distance from Foucault,[17] a move that we should take at face value.

Finally, the inevitabilist aspects of Hacking's project have specific consequences concerning his use of history for philosophical purposes. The notion of inevitabilism is grounded in a series of metaphysically realist elements that provide the exogenous stability of a style. As we will see, these elements seem to belong either to a quasi-transcendental structure of the subject, or to an equally ahistorical world outside this subject. Hacking's reference to ecological history encapsulates both of these characteristics (Hacking 2012: 607). In what follows, we discuss three of these elements: (i) truth, (ii) objects, and (iii) human nature.

3.2.2.1. Truth and truthfulness

First, truth. According to Hacking, Bernard Williams' *Truth and Truthfulness* "suggests a way to explicate the autonomy of Crombie's styles, in a way that is aligned to discussions of truth by analytical philosophers" (*ibid.*: 605). Hacking parallels his own distinction between truth and being-a-candidate-for-truth with Williams's between truth and truthfulness. Williams's referring to a quadruple relation among "truth, language, meaning and belief" describes

[17] "*One could cloak the styles project in the mantle of a recently trendy phrase used for a short time by Michel Foucault, 'history of the present'. That would be pretentious: the shoe does fit, but it is for dancing only.* A self-conscious use of the past to reflect on the present has all sorts of dangers, but philosophers are in the business of living dangerously." (Hacking 2012: 602, emphasis added).

an ahistorical schema. The content of each category might vary historically – and both Hacking and Williams admit that it actually does – , yet the very interrelation among these categories is fixed and invariable (*ibid.*).

However, this parallel is neither uncontroversial nor innocuous. Hacking, following Williams, admits the existence of an ahistorical structure underpinning styles, which are otherwise historically constituted. Thus, Hacking allows for an ahistorical element to guarantee the stability of a style. In other words, the autonomy of styles is explained in virtue of something external to them.

Hacking, again following Williams, admits that truth cannot be identified with justification, and this idea is underpinned by a metaphysical, extrahistorical commitment. Thus, there is a tension between Hacking's reassurances that styles "do not answer to some other, higher, or deeper, standard of truth and reason than their own [...] to some external canon of truth independent of itself," and the extrahistorical structure of "truth, language, meaning and belief" (*ibid.*). In other words, there is a tension between Hacking's reassurances that crystallization and sedimentation are the reasons for the autonomy of a style and this extrahistorical commitment.

Again, we do not want to score philosophical points. This tension is important for our overall point. Hacking's invoking of Williams has a problematic aspect. Williams's distinctions seem to be used less for the mustering of new material, than for underpinning the stabilization techniques presented. Moreover, although Hacking does not suggest an explicit causal link between this ahistorical structure of truth and the ecological and cognitive structures he refers to, the former can be interpreted as being grounded in the latter. The reference to these aspects is important, as Hacking's historical philosophy of science seems to acquire at the same time a realist, inevitabilist, and internalist orientation.

3.2.2.2. Objects

According to Hacking, "[e]arly on, the styles project maintained that each style of scientific thinking & doing introduces a new class of *objects*" (*ibid.*: 606, emphasis added). Furthermore, he maintained that the realism-antirealism questions, at least concerning some entities, are style specific (*ibid.*). That is, questions concerning the ontological status of entities are a byproduct of the styles within which these entities have been proposed. Hacking, however, strongly qualifies his view: "This *does not mean that objects of the class did not exist* before there was a way to investigate them. *That is nonsense.* Each new style of thinking & doing introduced a new class of objects into discourse" (*ibid.*: 606, emphasis added). Styles introduce, *mainly*, classes of objects and not objects themselves.

Second, as we saw, Hacking does not suggest that styles are a prerequisite for having knowledge. Styles produce knowledge *par excellence*, yet there is knowledge outside styles. Hacking accepts the existence of style-independent observational statements. Traditionally, these are considered to have a relation of correspondence with the facts they describe, and, in this sense, he allows for a different kind of theory of truth and meaning from the one applied in the case of style-dependent propositions.

Third, there is another element that links these two ideas – that is, the ontological independence of the objects of a class introduced by a style, and extrastylistic propositional knowledge. Hacking allows the possibility of referring to extrastylistic objects in the context of explaining the problems encountered within a style; and this possibility may substantiate his earlier acknowledgement of the need for external input to explain the demise of a style. In other words, extrastylistic objects and extrastylistic knowledge about them may constitute the external input in question.[18]

Hacking's points raise the following philosophical questions: Is such a clean-cut distinction between style-independent and style-dependent knowledge possible at all? Even if the answer is a positive one, what is the relation between these two kinds of knowledge? Moreover, if objects exist independently of their classes, don't they provide constraints to possible classifications? These questions are interrelated, and their answer harks back to a more fundamental one: the question of the perspective from which Hacking talks. He needs a metaphysical standpoint from which these points can be made. Again, these points do have historiographical consequences. Hacking's acknowledged invoking of external input involves an internalist perspective, while it compromises the contingency he attributes to styles, allowing for inevitabilist accounts.[19]

3.2.2.3. Ecological history, cognitive history, and philosophical anthropology

Hacking raises the question of a kind of ultimate explanation, of the "larger grounds", of the more fundamental conditions of possibility for the presence, stabilization and persistence of styles (Hacking 2012: 600). Moreover, we can trace Hacking's endorsement of an almost ahistorical conception of human nature. According to his earlier 1992 account, these conditions are the subject matter of philosophical anthropology. However, referring mainly to the later Wittgenstein, Hacking characterizes these conditions as "brute". They describe a stock of general platitudes about "human beings and their

[18] This idea is traced in Hacking's critical insight concerning Foucault's epistemes that we discussed in section 3.2 above.

[19] As earlier, the notion of internalism refers to a mode of explanation that does not invoke social or other elements considered external to scientific inquiry.

place in nature", and they are extrastylistic and extrascientific (Hacking 2002c: 196-197). As there is little we can say about them, for earlier Hacking philosophical anthropology is rather thin.

In his later 2012 account, these conditions are spelled out in terms of ecological factors. In the beginning of his paper, in order to retain his middle position on the contingency of styles, Hacking makes an explicit distinction between man's psychophysical setup and the local context within which this setup is at play. The latter is the purely contingent factor, while the former is a more universal one, albeit biologically contingent. However, Hacking's rhetoric mitigates this contingency. The "specific local settings are" described as "*grounded in human capacities* that are presumed to be *universal*" (Hacking 2012: 600, emphasis added). In short, an ultimate, ecological explanation of the presence (*qua* emergence, stabilization, and persistence) of styles is grounded in human nature.

Later in the same paper, this idea becomes more explicit. Philosophical anthropology remains extrastylistic, but now the historian can flesh out the content of human nature. The analysis of the conditions of possibility of styles now becomes the task of the historical philosopher of science, if not of the historian of science (*ibid.*: 608). The earlier platitudinous description of "human beings and their place in nature" becomes now the austere set of "biologically cognitive facts" (607). Furthermore, this cognitive setup constitutes the bedrock in which certain structures within styles are grounded (607). However, this setup should not be conceived as a static structure; it should be understood as the outcome of an evolutionary process and of its interrelation with both natural and technical environment (607, §20).

Thus, Hacking invokes a series of authors – Scott Atran, Philippe Descola and Pierre Hadot – and makes use of their philosophical ideas – "biologically cognitive facts", "innate module[s]", "a long view of the idea of nature" (*ibid.*: 607 and 608), respectively – as metaphysical foundations for the explanation of the stability of styles.

This imagery raises significant philosophical issues that in turn have specific historiographical consequences. First, as we saw at the end of the previous subsection (3.2.1), the question arises whether the self-authentication techniques associated with a style are alone sufficient to justify its independence from the social conditions out of which it emerged. It seems now that Hacking answers this question in the negative: an external aspect is needed – in this case a revamped version of the human mind – to ground the autonomy of intrastylistic reason. In other words, Hacking claims that styles emerge from "local microsocial incidents", yet they are not reduced to them. The autonomy of intrastylistic reason cannot be guaranteed by its self-stabilization

techniques alone. It is predicated upon the existence of universal "human capacities" in which these techniques are grounded.

Hacking's middle position between contingency and inevitabilism is compromised in favor of a more inevitabilist stance. To be sure, human capacities are contingent. Evolutionary development does not entail any predetermination. These very capacities, however, and the foundationalist role that Hacking ascribes to them close down a range of possibilities. The need of invoking extrastylistic factors for the explanation of the development and demise of styles, and the idea that the autonomy of stylistic reason is, ultimately, metaphysically grounded indicate that Hacking is more orientated towards the inevitabilism of the "foreordained right route" he wants to avoid (*ibid.*: 600).

4. *Concluding remarks*

In this paper we have undertaken a critical appraisal of the relation between history of science and philosophy of science in Ian Hacking's styles of scientific reasoning project. Specifically, we argued for three interrelated points. First, we distinguished between historical *philosophy* of science and philosophical *history* of science, and argued that Hacking's project belongs to the former. Second, we discussed the *confrontation* and *hermeneutic* models of HPS, and provided substantive evidence that in his styles project Hacking adopts a version of the latter. Furthermore, we showed that he adopts a strongly integrated approach to HPS, acknowledging, though, the autonomy of the historical material and the independence of historical facts from his philosophical perspective. Finally, we discussed the historiographical implications of his approach. Hacking aims at maintaining a middle position, on the one hand, between contingency and inevitabilism, and, on the other, between internalism and externalism in the explanation of the stability of scientific knowledge. We argued, however, that his philosophical and metahistorical commitments compromise his position towards a more inevitabilist and internalist orientation.

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