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Disunity in the philosophy of science: for and against

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Abstract. Relatively few scholars have explicitly denied the advisability, or even the necessity of a close synergy or cooperation between scientists and philosophers, but if this is to go beyond a simple statement without philosophical justification, it is necessary to highlight the logical-epistemological roots of the complementarity of science and philosophy. Elsewhere, starting from a particular conception of the Kantian *a priori*, I have argued for a new position that draws a distinction between philosophy and the sciences in a way that relates them to one another such that they not only can, but must, cooperate. In this paper I shall explore the implications of this position for the *disunity* of science.

In spite of some fundamental points of agreement between the disunity approach and the position sketched here, there is at least one fundamental difference concerning the relationship between philosophy and the sciences. By removing all material content (even any contingent material content) from the Kantian concept of *a priori*, the main idea of the disunity thesis is coherently defensible. My conception of the Kantian *a priori* explains philosophy's unlimited openness to any subject-matter, while placing both scientific and philosophical discourse in an inter- and intra-disciplinary dialogue: the unlimited openness of philosophy goes beyond the limits of any scientific discipline or any particular philosophical discourse, and may serve as a universal medium for the attainment of a common agreement that must be assumed as possible in principle. From this point of view, it is possible both to accept, in a qualified sense, the positivist demand for unity tacitly expressed by many objections against the disunity thesis and, at the same time, the legitimacy of an opponent who denies the central thesis of the disunity approach.

1 Introduction

Looking back, the claim that science is disunified was already present in such works as Thomas S. Kuhn's *The Structure of Scientific Revolutions* (especially in the postscript to the second edition, 1970) and Paul Feyerabend's

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Against Method (1970). It is expressed much more explicitly in Jerry Fodor's paper "Special Sciences (Or: The Disunity of Science As a Working Hypothesis)" (1974), Patrick Suppes's paper "Plurality of Science" (1978), Ian Hacking's *Representing and Intervening* (1983), and Nancy Cartwright's *How the Laws of Physics Lie* (1983). The position has since been fully developed in works representative of this trend such as John Dupré's *The Disorder of Things* (1993), the essays collected in Peter Galison and David Stump's *The Disunity of Science* (1996), and Nancy Cartwright's *The Dappled World* (1999).

For our purposes, we may define "the disunity thesis" as the combination of two theses listed by Kellert, Longino, and Waters (cf. 2006, p. vii): (1) natural or cultural phenomena cannot be fully investigated and/or explained by a single theory or a single approach; (2) irreducible pluralism and disunity are not only to be found within science but also at the metalinguistic level, in the philosophies of science: scientific standpoints, methods and practices are too different to permit to suppose they may be explained by only one theory of science.

This article aims to assess the strengths and weaknesses of the disunity thesis. The critical literature has highlighted, albeit not entirely clearly and convincingly, some weaknesses of this position (see e.g., Davies 1996, Fuller 2002, Kellert et al. (eds) 2006; Ruphy 2016; Breitenbach and Yoon Choi 2017). It is important to clarify the scope and limitations of these objections, as they continue to hold the strengths of the disunity thesis hostage.

It is clear that the concept of disunity falls within the scope of philosophy of science, whether or not we accept a qualitative distinction between philosophy and science. This only apparently trivial fact implies, among other things, that the epistemological and methodological status of the concept of disunity cannot be fully understood unless the epistemological and methodological status of the philosophy of science is clarified first. If this concept is a concept of the philosophy of science, the clarification of its epistemological status presupposes, as a necessary condition, the more general clarification of the status of the discipline of which it is a particular exemplification. This clarification, in turn, depends on the relation between the two concepts that constitute "philosophy of science" as a particular philosophical discipline. For this reason, it is necessary to examine the concept of disunity in a much broader context than has done so far. As we shall see, the concept of disunity can be coherently defended only to the extent that we have first clarified the relationship between philosophy and science.

Few authors have explicitly denied the fruitfulness or even the necessity of a close cooperation between science and philosophy. The overwhelming majority of authors have in fact implicitly accepted Sellars's statement that

we should not confound “the sound idea that philosophy is not science with the mistaken idea that philosophy is independent of science” (Sellars 1956, p. 301). If this is not to remain a mere statement without evidence, it is necessary to provide a justification for both the distinction and the need for cooperation between science and philosophy.

Elsewhere, starting from a conception of the Kantian *a priori* as purely functional (not material, though universal and necessary), I have tried to defend a position according to which there is a distinction between philosophy and the sciences that relates them to one another in such a way that they not only can, but must, cooperate. This reconciles the thesis of a principled difference between science and philosophy with a methodological naturalism according to which, to use Kant’s words, “everything in natural science must be explained naturally” (AA, VIII, pp. 155–184: 178, lines 11–13).¹ The first part of §2 will briefly describe this position: on the one side, concerning its form, philosophy reverses the usual direction and attitude of empirical knowledge; on the other, and concerning its content, philosophy cannot arise from the void of pure analysis; it depends entirely for its content on considerations ‘from the outside’—that is, from the empirical sciences and common sense. The minimal epistemological universality and normativity of philosophy required here can avoid both the illusion that philosophy possesses concepts with determined content independently of special disciplines and common sense, and the scientific natural attitude to believe that the concepts of philosophy have a broader applicability than they actually have.

Against the background of this relationship between science and philosophy, §3 will outline the scope and limitations of the disunity approach. That philosophy does not have an object of its own, and therefore must take it from disciplines that investigate reality from a variety of perspectives and at a variety of levels of organization (not predetermined *a priori*), is indeed in accordance with much recent work done under the banner of “the disunity of science”. A first fundamental point of agreement with work that emphasizes disunity consists in the fact that the unity of the sciences cannot be grounded in the unity of empirical reality, especially because, as was already clear in Weber’s pluralism and perspectivalism, empirical sciences can only explore reality from particular points of view, which select particular aspects of reality, relegating others to the background. A second fundamental point of agreement is that, from the point of view defended in

¹Cf. Buzzoni (2019) and (2021). Kant’s works are cited according to the Academy Edition, though in the case of *The Critique of Pure Reason* I first give the original pagination of the 1787 (B) edition published by Meiner in 1998 and edited by Jens Timmermann. In this last case, quotations are from Kemp Smith’s 1929 translation, if necessary revised in the light of the Paul Guyer and Allen W. Wood’s 1998 Cambridge edition.

this paper, the unity of the sciences cannot consist in one particular method or set of methods.

However, there is at least one fundamental point of divergence which is intimately connected with the relationship between philosophy and science. In order to have a coherent concept of disunity it is necessary to accurately distinguish, and at the same time to relate to each other, two meanings of ‘disunity’ and ‘unity’, one philosophical, the other scientific. The problem lies in the following antinomy. On the one hand, we have to avoid the untenable positivist conception of the unity of science, rightly rejected by the disunity theorists; on the other hand, however, in some sense we need the concept of a universal medium which the logical empiricists used to guarantee the intersubjective value of both the dialogue between the special sciences and that between the sciences and philosophy. As I will try to show, this antinomy can be resolved by rethinking Kant’s definition of philosophy—according to which philosophy is occupied not so much with objects as with the mode of our knowledge of objects in so far as this mode is possible *a priori*—in the light of a complete and consistent rejection of the *material* character of the Kantian *a priori*. In a way, this is nothing new. It was the logical empiricists and all the major exponents of the tradition of the philosophy of science who most strongly expressed this rejection of a material *a priori*, even though they—like today’s advocates of the contingent and relativized *a priori*—did not realize that, unlike a material *a priori*, a truly formal *a priori* is not only compatible with the conceptual changes that had transformed the physics of their time, but, contrary to their demand for a science unified in method and language, requires the necessary limit-*edness* and disunity of the various empirical discourses aimed at exploring what we call empirical reality. The concept of empirical reality expresses only the formal or, to use Kant’s term, the transcendental unity of human reason, the possibility in principle of always being able to find an agreement between those who disagree, no matter how different the assumptions from which they begin. Only in this purely formal sense, empty of any particular empirical content, is it possible to affirm without contradiction the qualitatively different status of philosophy, which goes beyond the limits of any particular science and which precisely for this reason stands above all parties, and may serve as a universal medium in a discussion able to reach a principled agreement. This, it seems to me, is the only way in which we can save the element of truth contained in the neo-positivistic idea of a unified science. As I shall try to show, the idea of a purely functional *a priori*, emptied of any material content (even of any contingent material content), is not at all in contrast with the main idea of the disunity approach. On the contrary, it seems to me the only way to make it coherently defensible.

2 Methodological naturalism or transcendental distinction? On the relationship between philosophy and science

It might be useful to distinguish two opposing conceptions of the relationship between science and philosophy. According to one of them, philosophy and science are assumed to be, ultimately, identical. All old and new versions of positivism held in different ways such a position, and today it is maintained by most forms of naturalism and experimental philosophy. In all cases, both the methods and the purposes of philosophy and science are regarded as identical. The only difference usually admitted is that the particular sciences, consisting of truths more or less separated, are not able to operate their integration or, at least, to have an overall view of them. Integrating different scientific worldviews to obtain a more general view is the task of philosophy: philosophy is in a certain sense co-extensive with all fields of scientific knowledge, and for this reason it is in a position to unify and co-ordinate the results of the particular sciences, with the purpose of attaining a very general knowledge or an overall system of classification.

Let us illustrate this position with some concrete examples. According to Herbert Spencer the sciences ignore the knowledge constituted by the “fusion” of “all the contributions into a whole”, which is precisely the task of philosophy to achieve. In all this there is no discontinuity of principle, but an essential continuity between science and philosophy. According to Spencer, philosophy is a “knowledge of the highest degree of generality”, which groups sequences among phenomena into generalizations of a simple or low order, and “rises gradually to higher and more extended generalizations” (cf. Spencer 1888, § 37, pp. 131–132). From this point of view, the method of philosophy is the same as that of the sciences, since philosophy takes as its point of departure the widest scientific generalisations in order to “comprehend and consolidate” them up to “the highest degree of generality” (a very similar conception can obviously be found in Comte, *Cours de philosophie positive*, lect. 2a, § 3). It is interesting to note that, while specifying this concept of philosophy, Spencer also touches on the problem of the unity or disunity of science: “Knowledge of the lowest kind is un-unified knowledge; Science is partially-unified knowledge; Philosophy is completely-unified knowledge.” (Spencer 1888, p. 134) In fact, as we shall see, the two problems, that of the relation between science and philosophy and the theme of the unity or disunity of science, are intimately connected.

As already mentioned, many forms of today’s naturalism or experimental philosophy have adhered to a similar view, which was mediated to the current debate in the philosophy of science by Ernst Mach (cf. Mach 1906, pp. vii–viii & 2–3) and main exponents of logical empiricism. These latter made a huge effort to bring together the domains of empirical science and

philosophy that were deemed meaningful, excluding ‘nonsensical’ (*unsinnig*) metaphysical discourse from the realm of authentic knowledge. Philosophy has neither a particular domain of objects of its own, comparable to the subject matters of the various particular sciences, nor a method distinct from that of science: “philosophy—as Carnap famously said—can no longer be accepted as a field of knowledge in its own right, at the same level of, or superior to, the empirical sciences.” (Carnap 1930–1931, p. 12; cf. also Carnap 1931, pp. 239–240)

The current use of the term ‘naturalism’, however, is due especially to Willard van Orman Quine, according to whom “philosophy [...], as an effort to get clearer on things, is not to be distinguished in essential points of purpose and method from good and bad science” (Quine 1960, p. 3). Both the continuity between science and philosophy and the characterisation of philosophy that we found in Spencer are taken up in the following passage from Quine, which is one of the most balanced expressions of his naturalism:

Philosophy [...] is continuous with science. It is a wing of science in which aspects of method are examined more deeply, or in a wider perspective than elsewhere. It is also a wing in which the objectives of a science receive more than average scrutiny, and the significance of the results receives special appreciation. [...] The relation between philosophy and science is not best seen even in terms of give and take. Philosophy, or what appeals to me under that head, is an aspect of science. (Quine 1970, pp. 3–4).

The most recent defence of this viewpoint has come from many exponents of experimental philosophy (cf., e.g., Haug (ed.) 2014, and Fischer and Collins (eds.) 2015a, Sytsma and Buckwalter (eds) 2016, to which I would add at least Thagard 2010, 2014, and Ludwig 2018). Although experimental philosophy is a complex movement, which includes different philosophical currents, Goldman rightly, though *en passant*, noted that experimental philosophers are “a subclass of philosophical naturalists who have raised objections to the epistemic credentials of intuitions” (Goldman 2013, p. 12). In fact, a peculiar contribution to philosophy by experimental (and naturalistic) philosophy lies in having called attention to the fact that the use of intuitions, in science as well as in philosophy, is vulnerable to many kinds of error, and that by conducting and considering laboratory work, we can make progress towards determining the limits and conditions of proper application of our intuitions (cf., e.g., Fischer and Collins (eds.) 2015b, p. 4).

According to another and opposite conception of their relationship, philosophy is qualitatively different from science, since it has not only a domain, but also methods and problems of its own, alien to the particular sciences. Well-known is the Hegelian thesis, clearly expressed at the beginning of the

Phenomenology of Spirit, which ascribes to philosophy alone the capability to construct both its own method and its own object or content (cf. Hegel 1977, § 1), that is, on reflection, the capability to decide issues about experience without resorting to experience. As Hegel says elsewhere, the dialectic, as the law of necessary development of thought and reality, produces and conceives from itself its “positive content and outcome” (Hegel 2008, § 31). There is hardly any author today who would (explicitly) defend such an extreme point of view, and the discussion has rather focused on particular aspects of the status of armchair philosophy, with a particular emphasis on the possibility and limits of intuition and thought experiments in philosophy (some of the most important recent articles on the subject are collected in DePaul and Ramsey 1998 and Booth and Rowbottom (eds) 2014, to which I would add at least Brown 1991[2011], 2007, 2012; BonJour 1998, Williamson 2007, 2009; Chapman et al. 2013).

With respect to the opposition just outlined, we shall attempt to argue in favour of an intermediate position, as follows. On the one hand, there is a transcendental and principled distinction between the sciences and philosophy. This is in clear opposition to the naturalistic programme and experimental philosophy, at least insofar as the latter rejects both the qualitative distinction between philosophy and the sciences and the cognitive value in principle of philosophical discourse, that is, as one might perhaps say, to the extent that they are accompanied by ontological or metaphysical, and not only methodological, considerations.²

On the other hand, the position defended here is in accordance with the naturalistic attitude of experimental philosophy insofar as it rightly insists on the impossibility of disregarding the so-called principle of empiricism, according to which observation and experiment are the only sources of evidence relevant for the acceptance or rejection of empirical statements. This principle is often ascribed to John S. Mill (1863, p. 51) or, more recently, Karl R. Popper (1969, p. 54), but it is not without significance for our purpose that, as we have seen, it was already formulated by Kant. For the purpose of sketching an intermediate position, Kant deserves credit for having attempted to draw a qualitative distinction between philosophy and science that gives us an important hint as to how to relate them to one another in such a way that they not only can, but must, cooperate.

According to Kant, in asking what the nature and conditions of the possibility of knowledge are, philosophy “is occupied not so much with objects as with the mode of our knowledge of objects in so far as this mode of knowledge is to be possible *a priori*” (Kant KrV B 25, AA III, 43, lines 2–4).

²For more details on this point, cf. Stuart 2014 and Buzzoni 2019. For the distinction between metaphysical (or ontological) and methodological naturalism, cf., e.g., Papineau 2016.

Before seeing what consequences derive from this Kantian notion of the relationship between philosophy and science, and therefore, both for philosophy of science and for the concept of disunity, it is first necessary to mention and dissolve, albeit by very brief remarks, an ambiguity in Kant's conception of the *a priori*. This will be done by presenting two developments of Kant's idea: my own Kantian conception of the *a priori*, and the one that dominates almost unchallenged in the epistemological landscape today.³

As already mentioned in the introduction, all the principal exponents of the philosophy of science since the birth of the discipline at the end of the nineteenth century criticized Kant for having subscribed to a view of the *a priori* that, using Schlick's (and Husserl's) expression, was "material" (see Schlick 1932). According to this view, the *a priori* possesses particular contents (such as those expressed by the laws of the conservation of matter, the law of inertia, or the equality of action and reaction) that are unresponsive to critical revision by experience. All the principal exponents of the philosophy of science pointed out that this notion of the *a priori* was confuted by the history of science: relativistic physics, quantum physics, and non-Euclidean geometry had demonstrated that there are no *a priori* principles endowed with particular contents and that are immune from revision by experience or from the adoption of different conventions (see, e.g., Mach 1933, pp. 458–459, Poincaré 1902 [2018], pp. 64–55 [p. 42], Reichenbach 1920, pp. 1–5, Bridgman 1927, pp. 3–9, Lewis 1929, Popper 1935, p. 188, Dewey 1938).

On reflection, what all these authors rejected was just the claim that the Kantian *a priori* is universal and necessary, while they did not reject the material character of the Kantian *a priori*. Strictly speaking, the material character of the *a priori* was accepted, though in a contingent and relativized form, and it is precisely the latter form that is today defended by almost all those who accept the usefulness of some concept of the *a priori* in connection with Kant. This is also behind the idea of Thomas Kuhn being "Kant on wheels" (cf. Lipton 2003), but the most important defender and populariser of this idea, among the recent authors, is Michael Friedman (1992, pp. 4 and 58, and 2013, p. 25; as far as thought experiments are concerned, see Fehige 2012 and 2013).

I have elsewhere argued against this account of the *a priori*, both for reasons of historical-philological accuracy and for reasons to do with what we want from a theory of the *a priori* (see, respectively, Buzzoni 2013 and 2005; on the more general implications of the view of the *a priori* for the concept of thought experiment, see Buzzoni 2018). Here, for reasons of economy, I shall omit this line of argument and confine myself to a few implications

³The rest of this section is largely based on Buzzoni (2019) and (2021).

of this view, which are relevant both for the relationship between science and philosophy and the notion of philosophy of science. It is precisely by rejecting the idea that the *a priori* has any material content at all that I shall understand the Kantian definition of philosophy mentioned above. In this way, to state again the fundamental thesis of the paper, I shall try to reconcile unity and disunity as two apparently opposing, but in fact both necessary, aspects of how knowledge and cultural ideas change over time. On the other hand, the very idea of an *a priori* liberated from all contingent content allows us to admit the irreducible plurality of particular cultural discourses, without denying the unity (in principle) of the discourse that seeks to reconstruct (and de facto reconstructs as far as it can) the many aspects of reality in a cultural unity in constant flux. From this point of view, not only can the unifying role of philosophy be understood in a way that is in perfect accordance with the disunity thesis, but also in a way that makes both of these concepts, the unifying task of philosophy and the disunity thesis, coherently defensible.

Let us start again from the Kantian definition of philosophy, according to which philosophy “is occupied not so much with objects as with the mode of our knowledge of objects in so far as this mode of knowledge is to be possible *a priori*”. Kant’s claim may be expressed by saying that what is distinctive of philosophy is the fact that it reverses the direction or attitude adopted towards reality that is characteristic of scientific inquiry. Here lies the most important qualitative distinction between science and philosophy. Instead of exploring some particular aspects of natural or cultural reality, the philosopher investigates our relation to them, that is, in Kant’s parlance, the conditions of the possibility of the human faculty of knowing (and morally evaluating, an aspect that will not be covered here) natural or cultural reality.

On reflection, it follows from this that each scientific (sub)discipline, since its characteristic concepts are bound to a particular point of view, has no means to answer questions about the nature and conditions of its own kind of knowledge. For this reason, it is not physics that can answer the question of what the nature and conditions of the knowledge in physics is, nor sociology for sociology; on the contrary, philosophy is not only capable of investigating the natural limits and conditions of the possibility of any other cognitive activity, but can summon itself for judgment before its own tribunal and try to clarify its own status: it makes perfect sense to speak of a meta-philosophy understood as a philosophy of philosophy.

In other words, while science is intrinsically constituted by a conscious restriction of the field of research, led by this or that particular point of view, there is nothing that can be excluded from philosophical critique. The unlimited openness of philosophy would only give rise to a futile attempt

to exhaust the universe if it were not for its direction of inquiry, which is the reverse of the empirical-scientific point of view. This reversal is, in the last analysis, the deepest root of the unlimited scope of philosophy *a parte objecti*, that is, of its ability to reflect and question any kind of experience (including philosophical ones).⁴

Now, it is important to emphasise that the condition of possibility of all this can only be a purely functional *a priori*, freed of any particular content. A purely functional *a priori* does not enjoin or forbid any particular content from philosophical reflection. On the contrary, the assumption of a material *a priori* (such as the one that delimits from time to time, in a contingent and historically changing way, the field of investigation of the sciences) cannot explain the unlimited openness of philosophy with regard to its possible objects. A material *a priori* can lead us to investigate only certain contents and not others, functioning as a kind of blinkering device, which allows us to see some things and not others, depending on the cone of light that it projects on a particular area of reality rather than on another.

In order to avoid serious misunderstandings, it is important to point out that, in the perspective assumed here, a material and contingent *a priori* in no way makes knowledge impossible. It is not in contrast with the capacity to learn from experience. On the contrary, it plays a fundamental role in the typical way in which empirical-experimental knowledge proceeds: the continuous interaction between our body (or between our instruments as its extensions) and the reality around us always illuminates (i.e., makes perceptible) new aspects of reality, or, to continue with the metaphor already used, expands the cone of light that the experimental interaction projects onto reality. Empirical sciences explore reality from particular points of view, which select particular contents, and necessarily neglect others: a mechanical phenomenon results from considering reality from a partial point of view, which takes into account only some properties of reality, such as force, mass and certain spatial and temporal relations. However, by reversing the direction or attitude adopted towards reality by scientific inquiry, a purely formal *a priori* allows philosophy to get a mode of inquiry or critical attitude so generalized as to act without special or particular *a priori* limits *a parte objecti*, i.e., with respect to its possible subject-matter. In short, what makes knowledge impossible is not the assumption of a contingent and relativized material *a priori*, but the fact of not admitting at the same time

⁴In order to answer the question (raised by Mike Stuart, whom I thank for this) about the meaning of the expression 'philosophical experiences' in this paper, we have to note that the individual philosopher in the flesh can only practice the unlimited critique proper to philosophical discourse in the first person and from a particular perspective, determined both by our personal history (the conclusions we have come to, the decisions we have made, etc.) and by the more general histories of the social groups that, from a certain moment onwards, have interacted with our personal history.

a purely formal *a priori*, which, unlike the contingent and material *a priori*, enjoys a universality and necessity similar in principle to that which Kant had already attributed to it.

On the other hand, however, the unlimited character of philosophical reflection, which I have so far placed in contrast to the limited and circumscribed character of the empirical sciences, is only one side of the coin, the other being a limitation. Strictly speaking, to say that there is no limit whatever to the possible objects of philosophy is to say that it has no object at all. This is hardly surprising: the rejection of any material content of the *a priori* leaves philosophy no domain of objects of its own, philosophy must find its object outside itself, that is, in the natural and human sciences (as well as in the humanistic disciplines and in everyday life).

Given the purely functional nature of the *a priori*, philosophy, on the one side, and the other expressions of human culture, on the other side, though distinct in principle, are so to speak designed to cooperate, since they are supplementary and inseparable. Philosophy could not break its connection with the rest of culture without cancelling itself. It is obliged by its very nature to open itself to what is different from itself, that is to say, to what lies outside it, to the different particular fields of human life, from which it draws its (material) contents.

But what about the particular methods? One may be inclined to think that the fact that philosophy reverses the attitude or direction of scientific inquiry entails important methodological differences between philosophy and science. This reversal is indeed intimately connected with the only difference we have to concede between philosophy and the empirical sciences. These latter fulfil the requirement, proper to all rational discourse, to testify as to how things really are, by means of the construction and functioning of what I would call an 'experimental machine' (or perhaps, expressed in the more fashionable terms of today, an "experimental mechanism"), which concretely exemplifies the theoretical content of a claim about nature and its laws.

Now, recourse to experiment is only indirectly possible for philosophy, which can have access to the contents of experience only through the various sciences, common sense, and other disciplines. However, the rejection of the material nature of the *a priori*, if consistently carried out, implies that, except for the opposite direction or attitude towards reality, there is no particular method or form of reasoning that is peculiar or restricted to philosophy.

Any project to find a particular philosophical method that can completely erase this difference between science and philosophy is doomed to failure. It would be tantamount to repeating Kant's mistake of seeking a method that could put philosophy on "the secure path of a science". And

this, upon closer scrutiny, is only another unfortunate consequence, or, better, another residue of a material account of Kant's *a priori*, the same seed, in fact, from which sprouted the myth of a re-foundation of philosophy *de novo* and *ab imis*, from Descartes to Husserl, from Comte to the neo-positivist idea of a "scientific philosophy". If on the one hand the logical empiricists had reduced (genuine) philosophy to science, Husserl reduced the various sciences to philosophy. He pointed out (with approval) that the Cartesian project of a radical grounding of philosophy on absolute foundations implies "a corresponding reformation of all the sciences," which "are only non-self-sufficient members of the one universal science [*unselbständige Glieder der einen universalen Wissenschaft*], that is, of philosophy itself (Husserl 1950, § 1. English transl. slightly modified). The great differences between these philosophers or movements do not detract from the fact that, although the starting point changes, the result is the same: the distinction between philosophy and science is erased, no matter whether the former is absorbed into the latter or the latter into the former.

Apart from the direction of inquiry (and the connected use of experiment), any other difference between science and philosophy can only arise from differences in the subject-matter dealt with, not from particular features that we might decide *a priori*. Thus, there is no particular set of methods that could be called philosophical without fear of being contradicted by someone who could show their use in scientific fields (Kant himself pointed out a remarkable methodical analogy between transcendental argumentation and chemical investigation: cf. KrV, B XX–XXI fn.; AA, III, 14 fn.). Feyerabend's thesis that there is no one method that can be said to have always led to success in the natural sciences, not only applies a fortiori to philosophy, but depends in the last analysis upon a purely functional view of the *a priori*. Philosophers, too, use all the methods they are capable of devising to solve their concrete problems, and they all have only one feature in common, which cannot erase their irreducible diversity and multiplicity: not only that of trying to bring to light the internal contradictions in our discourses (the mere quest to eliminate contradictions would certainly not suffice to circumscribe 'the' philosophical method: even scientists always try to eliminate the internal inconsistencies in their own discourses), but the fact that this is done after reversing the direction of empirical-scientific investigation.⁵

⁵This in no way excludes that, as Stuart (2015) has rightly argued, everyday linguistic interpretation too is experimental in nature. Indeed, everyday linguistic interpretation proceeds by trial and error thanks to the feedback of experience (even if it is the experience of a human science, and not of a natural science).

3 Unity and disunity in science and philosophy

Our thesis that philosophy does not have an object of its own, but must draw its content from disciplines that investigate reality from a variety of perspectives (not predetermined *a priori*), seems to be perfectly congenial to much recent work under the banner of “the disunity of science”. However, in spite of important connections, there is also a relevant difference with respect to the nature of philosophy.

As we have seen, an important aspect of the relationship between philosophy and science lies in the fact that philosophy seems to play the function of relating, coordinating, classifying, bringing together or unifying the knowledge provided by the sciences. So far, I have illustrated this aspect of the relationship between philosophy and science mainly with reference to the positivistic, naturalistic, or experimentalist tendency. However, philosophers of the most different and opposite views have accepted this point: to add only one name to that of Husserl, we should mention Dilthey (Dilthey 1883, p. 146–147, English transl. 165–166). And this makes more pressing the need to properly understand this aspect of the relationship between philosophy and the sciences, which is also the central problem with the disunity thesis.

Although it is possible to draw fine distinctions within the work of those who espouse the disunity thesis, for our purposes we will focus on the two main theses, given earlier, of Kellert, Longino, and Waters (cf. 2006, p. vii):

- (1) natural or cultural phenomena cannot be fully investigated and/or explained by a single theory or a single approach;
- (2) irreducible pluralism and disunity are not only to be found within science but also at the metalinguistic level, in the philosophies of science: scientific standpoints, methods and practices are too different to permit to suppose they may be explained by only one theory of science.

At least at this general level of comparison, we may note some fundamental points of agreement with the position sketched above. The first of these is to be found in Weber’s pluralism and perspectivalism (see Weber 1904 [1949]), which I have essentially accepted when pointing out that empirical sciences can only explore reality from particular points of view, which select particular aspects of reality, putting others in the background. Viewed from this perspective, the unity of the sciences cannot be grounded in the unity of empirical reality. Each particular inquiry searches for those particular methods that lead to the solution of particular problems. As Suppes (1978) rightly observed, mathematics (not just the empirical sciences) “is made up of many different subdisciplines, each going its own way and each primarily sensitive to the nuances of its own subject matter.” (Suppes 1978, p. 8)

Thus, the sum-total of all scientific activities is not only a plurality, but also an entity that is always *becoming*, whose real existence is largely dependent upon our continuous re-thinking and re-appropriating in the first person the methods or procedures of which past research is made up.

The second fundamental point of agreement is that, in the light of what I have been saying in the preceding section, the unity of the sciences cannot consist in one particular method or set of methods. As already noted, this is a fundamental point in which one should agree with Feyerabend's anarchistic theory of knowledge: there can be no general rule or method which is in all circumstances an infallible guide to knowledge or progress.⁶ In particular, the unity of the sciences cannot consist in their particular experimental methods (see on this point Suppes 1978, p. 8), unless by experimental method one means simply the very general principle of empiricism already mentioned, according to which experience must serve as the ultimate criterion about claims concerning experience.

A third important point of agreement is to be found at the epistemological and methodological level. Disunity and irreducible pluralism affect not only the sciences but also philosophy of science. Just as the different sciences explore different paths to knowledge of the world, in the same way, as historically real activities, specific philosophical views are an irreducible multiplicity. In short, it is a historically undeniable fact that disunity applies both to specific sciences and, *a fortiori*, to the correspondingly specific philosophies.

These points of agreement notwithstanding, there is a point of disagreement which I should like to stress. It can be brought to the fore by discussing some objections against the disunity thesis. For example, Breitenbach and Yoon Choi (2017) write that one cannot give up at least an idea of unity as a regulative ideal, which takes "ongoing scientific inquiry to contribute to a single understanding of the world" and "gives us a standing reason to engage in a range of unifying activities." And even earlier, Davies (1996) had rightly noted that scientists seem act successfully "on the assumption that different branches of science can be jointly harnessed in the attempt to explain a given phenomenon." (Davies 1996, p. 9; the importance of cooperation is also highlighted by Ruphy 2016, e.g., pp. 134–135) These objections might be roughly summarized by saying that, precisely because every science is particular and specialised, the simple fact that each relates to one another and is capable of making their particular findings and (cor-

⁶Yet I need to forestall a possible misunderstanding: contrary to what is sometimes implicitly assumed, this is not the same as Feyerabend's slogan "Anything goes"; or, better, it is the same as Feyerabend's slogan, but only under the condition that we tacitly add: "as far as it goes". No method can be excluded *a priori*, but of course not all are always successful: only those that lead to the desired result may be regarded as good methods.

responding) methods available to each other, seems to presuppose both a single general point of view and, as a correlative element of this point of view, a single world. This seems to call into question at least those versions of the philosophy of disunity that go so far as to reject “that the plurality of accounts should be consistent” (cf. Kellert et al. 2006, p. xiv).

These objections are not entirely convincing, for they do seem to rely on a rather ambiguous notion of unity. Without the clarification of this notion, I think, it is almost inevitable to fall back, implicitly and sometimes even explicitly, either into the untenable positivistic concept of the unity of scientific knowledge or into an irreducible opposition of different points of view, which excludes any possible integration. The regulative ideal towards the overall unity or coherence of our discourses has, as such, two distinct but intimately related aspects: on the one hand, the unification process is directed towards an ideal limit placed outside the actual history of culture; on the other hand, unification will always be only partial and, therefore, disunity (and the possibility of inconsistency) will always be to some extent real and inevitable: we shall never be able to integrate the plurality of approaches or accounts into a single coherent narrative.

Now, these two aspects are equally essential, and it is important to be able to think of them as distinct and united at the same time. If the tension between these two aspects were removed in favour of unity (even if only as unity of method and/or language), we would fall back on the positivist thesis of unified science; if, on the other hand, renouncing the idea of a God’s-eye point of view, the tension were resolved by foregrounding the impossibility of a complete equalisation between the unity assumed as the regulative ideal and the effective and always partial results of unification, we would be committed to the actual, historical incommensurability of different points of view.

The ambiguity that afflicts the notion of unity both in the positivist arguments currently in favour and in those of the theorists of disunity against the unity of science, can be brought to the fore by raising the question of how one should understand the claim that disunity and irreducible pluralism affect not only the sciences but also the philosophy of science. The ambiguity that makes unconvincing the mentioned objections against the disunity approach underlies the relationship, of unity and at the same time of distinction, between the scientific and philosophical level.

At the scientific level, unity and disunity are in a relationship of continuous interaction. On the one hand, as some authors have urged against the disunity thesis, the historical reality of science shows a demand for unification: scientists seem to be driven by the regulative ideal, so to speak, to achieve a complete coherence in their knowledge concerning experience.

On the other hand, again at the scientific level, but this time in accordance with the thesis of disunity, this can only be done provisionally, by incorporating different perspectives into wider, more inclusive perspectives, in an open-ended process. Since every science is particular and specialised, a completed actual unification is impossible, since it would be tantamount to abandoning scientific discourse altogether. Given the specialized character of scientific discourse, the regulative ideal of unification cannot consist in a process in which different theories constitute an actual (and metaphysical) unity, but only in the simple fact – which we have seen expressed by Davies (1996)—that every science can borrow ideas, findings, methods or reasons from every other science.

But things are somewhat different at the meta-level of philosophical discourse (including that of disunity theorists). More precisely, on the one hand, there are no particular differences between scientific and philosophical dynamics as regards the relationship between unity and disunity. It is true both that philosophical development, like scientific development, shows a demand for unification (philosophers too seem to be driven by the regulative ideal to eliminate incoherences) and that this unification can only be achieved provisionally, by incorporating different perspectives into wider, more inclusive perspectives, in an open-ended process.

On the other hand, however, there is at least one principled difference between scientific and philosophical dynamics. At the philosophical level, in contrast to the scientific one, we can, and indeed we should, assume a purely formal unifying function of philosophy (which has not by chance been, in one way or another, recognised by authors of the most diverse tendencies), at least for three reasons.

Firstly, in full accord with one of the fundamental theses of this paper, the unity in principle and the unifying function of philosophy directly follow from its reversing the perspective of scientific inquiry. This directly follows from the unlimited openness of philosophy to all possible objects, which is also a necessary condition of the possibility of a free interdisciplinary discussion. The concept of empirical reality is not an empirical concept. It expresses only the formal or, to use Kant's term, the transcendental unity of human reason, the possibility in principle of always being able to find an agreement between those who disagree, no matter how different their starting assumptions. Only in this purely formal sense, empty of particular empirical content, is it possible, on the one hand, to defend the neo-positivistic idea of a unified science and affirm without contradiction the unifying function of philosophy, which goes beyond the limits of any particular science and which precisely for this reason stands over all parties and may serve as a universal medium in any discussion aimed at a possible agreement. Philosophical openness to all objects is a necessary condition

of the possibility of a free interdisciplinary discussion not only between philosophers belonging to different subdisciplines of philosophy, but also—at least as far as the most general assumptions of their field are concerned—between scientists of different special sciences.

Secondly, the legitimate main demand of the disunity approach to scientific discourse would be denied if it were simply extended to philosophy of science without further caveat, that is, if it were understood in the sense that there is no sense in which we may develop a general philosophical discourse about science, but only specific philosophies of science. The reason is that, on closer inspection, the very multiplicity of particular scientific discourses and philosophical perspectives could not even be conceived without assuming the possibility in principle of a unitary philosophical point of view. In reality, this multiplicity—and what could be called the ‘partiality’ of any knowledge, be it scientific or philosophical—may be conceived only from a unitary point of view, *implicitly* provided by a general philosophical discourse, whose idea cannot be resolved without residue into the various specific philosophies of science.

Third and finally, the thesis of disunity would not be internally consistent if it were unable to assume, even if only hypothetically, the possibility of its own falsity or, which is the same, if it were unable to explain the possibility of a hypothetical opponent (who, to take an extreme example, might deny the disunity claim and regard science as something universal and monolithic). The fundamental thesis of disunity can only be defended if it is able to accommodate without contradiction the possibility of an opponent who denies the very thesis of disunity. The position held by such a hypothetical opponent, in fact, is simply one of the many possible positions that contribute to pluralism and disunity, even if s/he denies the pluralist thesis. For this reason, disunity theorists must be able to admit the possibility of such an opponent without running into any contradiction. But this, in turn, is only possible if disunity is not merely one particular philosophical perspective among many, but is actually *the* attitude proper to philosophy, based on an *a priori* completely devoid of content and, precisely for this reason, capable of a universality and necessity that does not exclude any particular perspectives, including those which contest the truth of the thesis of disunity.

We could make the same point from a different perspective, saying that, in order to understand the relation of unity and disunity in the sciences (and, more generally, in human culture), we need to carefully distinguish two points of view, one reflexive-transcendental, and the other empirical-methodical. As far as the first is concerned, not only in the empirical sciences, but also in all concrete cultural discourses (philosophy included), all discussions are guided by the underlying assumption—which is a purely

formal criterion—that some settlement of different opinions or rival interests is in principle always possible. Because of its pure formality, this criterion can work as an independent criterion for judging what is intersubjectively right.

Of course, we must immediately ask the question of how this criterion can be concretely realised. The answer to this question requires the introduction of the second point of view, the empirical-methodical one. If the assumption that some settlement of different opinions (or rival interests) is in principle always possible, is not to remain devoid of any cognitive (and practical) function, it must be expressed by means of concrete methodical procedures which make it possible to reconstruct, to re-appropriate and to evaluate in the first person the reasons why it should be accepted. Because we have no direct revelation of the truth of a statement, we are forced to find and retrace the ‘paths’ that led to its being accepted or rejected.

On the one hand, a truly universal standard has a regulative value within our dialogues because it does not coincide with any particular point of view and therefore can guarantee that there is always a difference between what we *de facto* believe and what we should believe. It stands as an ideal towards which any effort of believing tends, and keeps constantly before the mind the fact that any particular act of belief is imperfect. On the other hand, this universality, if taken alone, would turn out to be so abstract that it would be incapable of giving any concrete advice about how to evaluate different scientific or philosophical opinions. For this reason, a second condition has to be met: any universal claim, embedded in someone’s beliefs or attitudes, must be translatable into propositions that describe the concrete methodical steps through which those beliefs or attitudes may be reconstructed and appropriated by others.⁷

An important consequence of this transcendental and, at the same time, methodical foundation of disunity and pluralism is that we do not have to abandon our own point of view when we are trying to understand and reconstruct in the first person the reasons for a different point of view. On the contrary, in order to understand that some opinions or practical choices differ from our own, we have to methodically reconstruct both our own reasons (logical and experimental, but also historical, moral, aesthetic, etc.)

⁷We note incidentally that this amounts to a decisive rejection of the separation between the context of discovery and the context of justification. There is no moment after which it is possible to totally disregard the context of discovery. Certainly, Pythagoras’s Theorem can be used in a practical way without recalling the procedural steps that led to its discovery. But if someone challenged the validity of this theorem, we ought to reconsider and retrace in the first person the procedural steps that led (and still lead) to that theorem being asserted. And this is true in any field of human discourse: when we try to convince someone that something is true, good, beautiful, etc., we ought to offer ‘reasons’ which, in principle, can be reproduced and appropriated in the first person even by those who do not share our views.

and the reasons for holding the competing view, and then compare them. To understand other people's opinions, scientific as well as philosophical, we have to reconstruct both our opinions and their opinions. Thus, the possibility of an opponent is not only coherent, but strictly necessary to the coherence of the discourse asserting disunity in science and in the various historically existing discourses of human culture.

The resolution of the conflict between disunity and unity lies in the recognition of the validity of both, which can only be asserted without contradiction in connection with a philosophical discussion to which no definite boundary can be set, and which precisely for this reason can be considered as capable (though only in principle, of course) of resolving any conflict between the particular (scientific as well as philosophical) perspectives. In this sense, the irreducible disunity and the unity both of the specific sciences (and of their corresponding and historically existing philosophies) are correlative concepts, required for the explanation of plurality in science *and* in philosophy. The one would be inexplicable apart from the other, since the one is the reverse of the other, and to sacrifice the one would involve the sacrifice of the other. In this sense, philosophy is a critical reflection without boundaries that allows us to discuss the points of view of specific scientific and philosophical discourses by placing them in relation with each other, in a way that avoids splitting them into coexisting but mutually independent activities. From this point of view, the general (reflexive-transcendental) task of philosophy could be defined as the task, which needs to be continually taken up from the beginning, of relating in a common dialogue not only every science, but also every particular piece of knowledge, with the whole of human culture.

Conclusion

Because the concept of disunity is a concept originating in the philosophy of science, its epistemological and methodological status cannot be fully understood unless the epistemological and methodological status of the philosophy of science is clarified first. This clarification, in turn, is not possible without understanding the relation that exists between the two concepts that constitute philosophy of science as a discipline, that of philosophy and that of science. Elsewhere, starting from a conception of the Kantian *a priori* as purely functional (not material, though universal and necessary), I had argued for a position which draws a distinction between philosophy and the sciences that relates them to one another in such a way that they not only can, but must, cooperate. According to this account, philosophy has no limit whatever as far as its possible objects are concerned because, strictly speaking, it has no object of its own and must find its object outside itself, that is, in the natural and human sciences (as well as, of course, in common sense knowledge, which is their common starting point). On the one hand,

by reversing the usual direction and critical attitude of empirical knowledge and agency, philosophy (and philosophy of science), unlike the empirical sciences, obtains an unlimited openness to all reality. On the other side, however, *concerning their content*, philosophical arguments depend entirely on considerations ‘from outside’—i.e., from the empirical sciences and common sense: philosophy—and not only philosophy of science—cannot arise from the void of pure analysis.

Having summarised and re-proposed this point of view in § 2, § 3 critically examined the scope and limitations of the concept of disunity in science and philosophy of science. There are fundamental points of agreement between the disunity thesis and the position sketched here concerning the relationship between philosophy and the special sciences. One of these is that the unity of the sciences cannot be grounded in the unity of empirical reality, especially because empirical sciences can only explore reality from particular points of view, which select particular aspects of reality and neglect others. Another fundamental point of agreement is that, from the point of view defended in this paper, the unity of the sciences does not consist in one particular method or set of methods.

However, in order to have a coherent concept of disunity, it is worth carefully distinguishing, and at the same time relating to each other, two meanings of ‘disunity’ and ‘unity’, one reflexive-transcendental, the other empirical-methodical. The disunity approach risks becoming incoherent to the extent that it denies the peculiarity of philosophy, which is a critical-transcendental reflection without boundaries that allows us to discuss the points of view of both particular scientific and philosophical discourses by placing them in relation with each other. All this, in turn, can only be asserted without contradiction against the background of a purely functional account of the *a priori*. A purely functional conception of the Kantian *a priori*, which easily explains the unlimited openness of philosophy to any subject-matter, is also able to place both particular scientific and philosophical discourses in an inter- and intra-disciplinary dialogue: the unlimited openness of philosophy goes beyond the limits of any special science or any particular philosophical discourse, it stands over all parties and may serve as a universal medium for the attainment of common agreement. The general (reflexive-transcendental) task of philosophy, which needs to be continually taken up from the beginning, consists in concretely relating in a common dialogue not only every science, but also every particular piece of knowledge, with the whole of human culture. From this point of view, it is possible both to accept, in a qualified sense, the positivist demand for unity tacitly expressed by many objections against disunity and, at the same time, the possibility of an opponent who denies even the central thesis of the disunity approach.

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