Complexity and Incompleteness in the 'Interactive' Conception of Knowledge

Roberta Corvi[*]
roberta.corvi@unicatt.it

ABSTRACT

This contribution aims in the first part at identifying the origin of the problem for which an "interactive" view of knowledge is offered as a solution. In the second part, it examines the features of knowledge understood in this way, noting the difficulties inherent in such an idea, which, however, do not invalidate the overall value of our hypotheses and theories. In the third and final part, the paper discusses some explicit or implicit aspects of the "interactive" view, which, as Parrini himself stated in his recent writings, has interesting points of contact with a systemic and transdisciplinary approach.

"Parrini's philosophy of science", as Roberta Lanfredini remarked, "is a philosophy of science always oriented towards, and illuminated by, a profound and thoughtful philosophy of knowledge" (Lanfredini 2020, p. 627). And it was precisely the theory of knowledge that was the field in which my meeting with Parrini took place, and from which grew a discussion that was very useful to me – not least because unexpected convergences emerged, even though the theoretical background against which Parrini's reflection is articulated is quite different from my own.

Indeed, by his explicit admission, Paolo Parrini's epistemological proposal moves from logical positivism "towards an idea of truth and objectivity laden with Kantian components, although this does not entail abandoning the empiricist thesis that all our knowledge is uncertain, partial and revisable"; on the contrary, it seeks to make the most of the strengths of both perspectives (Parrini 1995, p. 43). He structured his third way by building on positivism – albeit a revised and corrected version of positivism – with which, however, he shared the basic idea that "the positive sciences constitute a paradigmatic ex-

[*] Università Cattolica di Milano, Italy.

ample of knowledge" (Parrini 1995, p. 189). My point of departure, by contrast, lies at the intersection of different perspectives, all of which are far removed from positivism or even markedly critical of the logical positivism that developed in Vienna and Berlin in the 1920s and 1930s. My point of view originates from reading Popper, from the theses of post-Popperian epistemology, from von Bertalanffy's general systems theory, and also from paying attention to American pragmatism and, more generally, to authors who have reconsidered Kant's role in contemporary philosophy, such as Cassirer and Strawson. Reference to Kant is standard not only in almost all the authors to whom I have devoted myself and who have influenced my research, but also in Parrini himself, who considered Kant to be the "main source" of his philosophical views (Parrini 2011, p. 155). I therefore suppose it was precisely the reference to Kant, which is in my opinion indispensable for contemporary epistemology, that formed the basis of a dialogue that made it possible to reach – all differences notwithstanding – a singularly close point of arrival: an interactive conception of knowledge, which, as Parrini himself stated in some contributions in recent years, has interesting points of contact with a systemic and – I would add – transdisciplinary approach.

In the first part, my contribution aims at identifying the origin of the problem for which an interactive view of knowledge is offered as a solution. In the second part, it examines the features of knowledge understood in this way, noting the difficulties inherent in such an idea, which, however, do not invalidate the overall value of our hypotheses and theories. In the third and final part, I will discuss some explicit or implicit aspects of the "interactive" view.

1. Knowledge in an interactive view

First, by following a recommendation of the logical positivists, I would like to try to delimit the meaning of the concept of knowledge, at least in the sense in which I will use it in this paper. What do we mean when we speak of knowledge? As Parrini emphasised, knowledge is a fact, not a problem (cf. 1995, p. 177), yet he noted that cognitive activity and its products are complex phenomena (cf. Parrini 2017, p. 250). So, I believe, some clarifications are in order. Knowledge is a fact, both because everyone actually knows something, and because humanity as a whole has at its disposal an impressive amount of information about reality, information that constitutes the totality of the sciences. For sure, there are epistemic difficulties, and specific problems may

arise about method and content, but there is no such problem of knowledge as to call into question the validity of knowledge in general. Knowledge in itself only becomes a problem if it is understood and defined in such a way as to raise expectations that it cannot meet: so I think a few remarks are useful to outline the complex phenomenon we call knowledge.

Everyone is familiar with the distinction between direct knowledge or knowledge *by acquaintance*, on the one hand, *know how* or expertise on the other, and, finally, *know that*, or propositional knowledge. On this occasion, I do not wish to dwell on the first two, but only on propositional knowledge. Even if we limit our discourse to this form of knowledge, we must admit that there is a great variety of propositional knowledge that differs not only in type – everyday knowledge is certainly different from scientific knowledge, within which there are sciences that differ both in terms of the objects they deal with and the methods they use – but also in the different processes of justification that underpin the different forms of knowledge. However, we speak of knowledge as if it were a single body, since it is believed that the various fragments resulting from cognitive activity ultimately compose a general and somehow unitary picture of the world. And here arises the first problem concerning how to understand knowledge in its totality: is knowledge a mere reflection of a given reality, or does it require an active intervention of the knowing subject?

For a long time, knowledge was understood in the first sense, as if to know was equivalent to the faithful representation of a given universe, intelligible to every rational being. Beginning with early modern times (with Galileo), the idea that intelligibility refers to the quantifiable and measurable aspects of reality has taken hold. Galileo recognised the need to master a specific instrument – mathematics – in order to investigate nature: mathematics is a formidable tool that, once possessed, allows us to grasp reality for what it is: the object of knowledge, "the book of nature" is not hidden from our eyes, but lays open in front of us, provided that we are able to read the characters of the mathematical language in which it is written.

The picture changed only with Kant, who transforms the previous view, which Cassirer would later qualify as naïve. The *Critique of Pure Reason* turns the classical point of view upside down, operating, as is well known, a Copernican revolution in philosophy. For sure, Kant's revolution in epistemology cannot be compared to Copernicus' revolution in astronomy – in fact, in a sense, it is antithetical to it. For, whereas in the Copernican theory man

loses the centrality he had enjoyed since antiquity, in Kant's view man acquires centrality and autonomy with respect to the reality that is the object of knowledge.[1] However, it is undeniable that Kant, with his theory, overturned the relationship between subject and object, just as Copernicus overturned the relationship between the earth and the sun. For Kant, the epistemological relationship between the knowing subject and the world is no longer described as a relationship in which the subject has to adapt to the object, by mirroring it; on the contrary, it is the object – the phenomenon – that adapts to the *a priori* forms with which the subject is endowed. Knowledge, then, can no longer be understood as a faithful mirroring of reality, but merely as a representation of what in this reality we are able to cut out and filter by way of our human abilities.

That is why, like Parrini, in the epistemological sphere I prefer to speak of empirical phenomena, rather than reality, since such expression "keeps closer to what seems to be the starting point of knowledge, namely, the plane of experience, of empirical data" (Parrini 2017, p. 240). Accordingly, in the wake of this recommendation, when I speak of reality, I mean the totality of phenomena that we experience and that not infrequently present themselves with all their problematic nature, which makes the naïve view of knowledge inadequate, and points towards a critical view, such as that originally re-advanced by Cassirer, who often reiterated that knowledge is not a passive reproduction of reality.

A fine connoisseur of the sciences of his time, in his essay on the theory of relativity Cassirer pointed out that "the properties of the objects of nature do not signify, in spite of their name, anything proper to the particular objects in and for themselves, but always a relation to a second object (including our sense organs)" (cf. Cassirer 1920, p. 388). Modern science, in his view, grasped this aspect, too, and thus it "assumes the reduction of what is taken in the naïve view of the world as fixed and absolute 'property' of things to a system of mere relations' (Cassirer 1920, p. 388). This idea bears some analogy with the interactive view, according to which we are always dealing with an epistemically conditioned object (cf. Parrini 2018, p. 807), which is conditioned pre-

[1] I owe this remark to Stefano Gattei, whom I also thank for other comments, which helped me to improve on a previous draft of the text.

cisely by point of view, which cannot disregard the tools – biological as well as cultural – we have at our disposal.

According to the naïve or popular view, knowledge reproduces a reality that exists in itself, articulated and ordered, so that knowledge merely has the function of fully representing a stable reality with which it does not interact from an epistemic point of view. According to the critical conception, by contrast, knowledge is an elaboration and transformation of matter that is offered to the knowing subject from the outside. By advocating this view, Cassirer intended to emphasise the active role of knowledge, in that knowledge interprets and processes sense data, which, being multiple and sometimes discordant, require to be organised into a structure of meaning. If knowledge is to be understood as the critical processing and ordering of our perceptions, then

> the basic concepts of natural science no longer appear as mere copies and reproductions of immediate material data; rather, they are represented as constructive projects of physical thinking – and the only condition of their theoretical validity and significance is that their logical consequences must always accord with the observable data (Cassirer 1929, p. 20).

The concepts we make use of in the sciences, as in any attempt to represent the reality that surrounds us, are intellectual symbols, freely but not arbitrarily created by the human mind, as the logical consequences that derive from them must always be compatible with our experience. In short, as Parrini himself pointed out, in agreement with Cassirer on this issue, "the *object of knowledge* is not the object as it is conceived by the metaphysical realist. An object, that is, completely independent of the epistemic apparatus of the knowing subject" (Parrini 2011, p. 14). Parrini rightly noted that to speak of the experience of things as opposed to things in themselves, as Cassirer did (or to speak of assertions as opposed to existing states of things, as analytic philosophy does), brings out the still unsurpassed difficulty

> of specifying an empirically and/or rationally defensible way of hypothesising or conjecturing the relationship of more or less approximate adequacy between the two poles of the cognitive process (our cognitive claims or assertions on the one hand, and the object of knowledge on the other) when the latter of these poles is conceived as a reality in itself (or as an 'absolute substance', according to Cassirer's expression) (Parrini 2011, pp.148-149).

It seems to me, however, that the real difficulty, certainly still unsolved, lies not so much, or not primarily, in the way we think the object of knowledge, but ra-

ther in the way we understand the relationship between the knowing subject and reality or, to put it differently, between thought and the world.

Precisely in order to overcome this obstacle, Putnam invoked "natural realism", which James spoke of, in order to restore direct link between subject and object (cf. Putnam 1995, p. 284). Putnam intended to take up the pre-Cartesian conception of knowledge, and sought, like Parrini, a third way between metaphysical realism and relativism or, to put it another way, between scientism and scepticism.[2] Natural realism does not deny that our view of the world reflects our interests and values, and therefore excludes the possibility of absolute objectivity, which would require precisely the Eye of God, but states, following Dewey, that there are "objective resolutions to problematic situations", i.e. "objective resolutions to problems which are situated, that is, in a place, at a time, as opposed to an 'absolute' answer to 'perspective-independent' questions" (Putnam 1993, p. 156).

Therefore, also taking Putnam's remarks into account, we may say that the elimination of Kant's dualism between phenomenon and noumenon, between reality in itself and mere appearance, makes it possible to avoid what Parrini calls "metaphysical realism". Such an assumption, however, does not imply renuncing the search for objectivity, but rather indicates the need to identify a notion of objectivity and objective truth that is independent from metaphysical realism, and at the same time is not "relativistic to the point of crushing the truth into a multiplicity of truths each of which is unquestionably such with respect to its epistemic frame of reference" (Parrini 2002, p. 97).

Accordingly, Parrini suggests reconstructing objectivity and truth as regulatory ideals, characterised by transcendence with respect to particular frames of reference and free from any constraint to an alleged correspondence between our cognitive claims and reality in itself. In this case, objectivity and truth are understood, to put it into Husserlian terms, as the unitary and ideal correlate of a potentially infinite series of cognitive processes (Parrini 2002, pp. 98-99). This is also, as Parrini himself acknowledged, the direction taken by Cassirer in *Substance and Function*.

To sum up: if knowledge is not merely passive mirroring, as Parrini often argued in his writings (see, for example, Parrini 1995, p. 189), but a re-

[2] Putnam carried out the search for this third way and recounted it in various publications: see Putnam 1994; Putnam 1999, Part I, ch. I; Putnam 2008.

working of perception, then reality is not something given, an immediate form of objectivity, but is always the result of a complex way of structuring experience and conferring meaning, which seems to rule out the option of realism, or at least of metaphysical realism. Given this approach, it must be recognised that knowledge is a complex phenomenon, because our relationship with reality is complex. When the image of the world typical of common sense, which derives from a naïve view, clashes with the difficulties of cognitive processes, the very notion of knowledge is problematised, hence the idea that knowledge is a problem. This gives rise to two divergent views, one of which emphasises the inadequacy of our cognitive endeavours, resulting in scepticism or radical relativism; while the other engages in an attempt to offer an unassailable foundation to our theories, resulting in foundationalism or, as Parrini put it, in metaphysical realism. I agree that we should avoid scepticism and radical relativism as much as dogmatic foundationalism; this is what Parrini's third way is aiming at, suggesting an "interactive view of knowledge" that, I believe, may avoid foundationalism without denying realism – provided, however, as we shall see later, that we do not superimpose (metaphysical) realism on foundationalism.

2. Complexity and incompleteness

First of all, it should be emphasised that knowledge is always an attempt to process an image of the world that is consistent with our experience, by appealing to hypotheses and theories that are subjected to empirical scrutiny in an ever selective and sectorial manner, carving our experience in one direction rather than another, without, however, having any guarantee that the "cut" made is correct (cf. Parrini 2017, p. 246). Consequently, our theories, assertions or hypotheses may be always revised and improved in the light of new experiences and even new theoretical perspectives that lead us to make a different cut, or structure the data according to different criteria, even though we cannot assess individual theories or even segments of theory in isolation. Indeed, thanks to the works of authors such as Duhem, Neurath and Quine, contemporary epistemology has become aware that knowledge is not like a machine whose parts can be disassembled and checked in order to detect failure or error. According to Duhem, there are no hypotheses that may be contradicted by experience taken in isolation, since experimental contradiction is always based on a theoretical set, without being able to identify, in that set, which proposition is to be rejected (cf. Duhem 1906, Part II, Ch. VI, § 9).

Neurath, like Duhem, also emphasised the fact that our knowledge constitutes a corpus in which each part has meaning and plays a role only in relation to and in interaction with the others. Science, according to Neurath, is a system of statements and "each new statement is confronted with the totality existing statements that have already been harmonised with each other. *A statement is called correct if it can be incorporated* into this totality. What cannot be incorporated is rejected as incorrect" (Neurath 1931, p. 66). Neurath's holistic position differs from Duhem's, however, in that the former took the totality of existing propositions as the scope of the comparison, whereas the latter referred to a limited set of hypotheses that could be extended to encompass physical science as a whole. The thesis was later taken up by Quine, albeit with some variations due, in Parrini's opinion, to the fact that Quine linked the formulation of holism to the rejection of the two dogmas of empiricism, namely, analyticism and, above all, reductionism (cf. Parrini 2017, p. 241).[3]

However, not even holism escapes the difficulties raised by the tension between two apparently irreconcilable, albeit both plausible, instances: on the one hand, as mentioned above, the idea that epistemology has to do with a totality that cannot be fragmented into portions that enjoy their own autonomy with respect to the whole; and, on the other hand, the fact that empirical checks are not carried out on the totality, but rather on a limited group of assertions or hypotheses. Parrini solved this problem by appealing to an insight of Quine's, in *Two Dogmas in Retrospect*, in which he reaffirmed the correctness of holism, at least "in a legalistic sort of way" (Quine 1991, p. 268).

According to Parrini, Quine intertwined two issues that should remain separate: the assessment of holism from a logical-epistemological point of view, and the assessment of holism from a practical-operational point of view. In the first case, in a legalistic sort of way our statements about the external world "face the tribunal of sense experience not individually but only as a corporate body" (Quine 1951, p. 38); in the second case, by contrast,

> what matters, in fact, is that what is aimed at in the individual, actual research contexts is the empirical assessment of small, homogeneous groups of

[3] This has often been referred to as the Duhem-Quine thesis, as if the American philosopher had simply assumed and completed the thesis of the French physicist. In fact, these are two distinct theses, elaborated in different contexts. On this, cf. Corvi 2010, pp. 184-189.

> hypotheses, in many cases even of hypotheses taken individually, which are often scrutinised in relation to another single hypothesis seen as the only plausible alternative to be kept under observation (Parrini 2017, p. 243).

Holism thus understood, in a legalistic sort of way, makes it possible, according to Parrini, to circumscribe, albeit imprecisely, what is to be understood by a scientific-cognitive system, which includes those assertions that are hypothetically accepted on the basis of experience and the set of general rules that constitute the set of principles of scientific rationality. Moreover,

> the holistic thesis remains fully valid as a *memento* of the fact that the 'cut' we make, explicitly or not, in order to conduct empirical-experimental research is a cut of a hypothetical character, one that might turn out to be wrong (Parrini 2017, p. 246).

Our epistemic condition is such that, "empirical data alone cannot determine the validity of a set of hypotheses or theories. This means, trivially, that given any set of data, it is always possible to have several hypotheses or theories logically compatible with it" (Parrini 2011, p. 190). This is the principle of the empirical underdetermination of theories, according to which experience cannot guarantee the validity of a theory, as Popper had already observed when criticising the inductive method, and perhaps cannot even definitively disprove a theory, as important exponents of post-Popperian epistemology observed, including Kuhn and Feyerabend, who called attention to the *theory ladenness* of observation. According to it, there is no neutral observational language, and so both theoretical terms and observational terms are implicitly defined by the theory in which they are used. As is well known, Parrini (1995) seriously confronted the latter perspective, noting, however, that in this case "the control seems to be running in circles, and it becomes difficult to understand how our theories can clash with hostile data" (p. 83).

In order to avoid the relativism that follows from the realization of the theory ladenness of observation, Parrini preferred to accept the network model put forth by Mary Hesse, who explicitly referred to Duhem and Quine (cf. Hesse 1974, p. 24). According to Hesse,

> the model interprets scientific theory in terms of a network of concepts related by laws, in which only pragmatic and relative distinctions can be made between the 'observable' and the 'theoretical'. [...] Scientific language is therefore seen as a dynamic system which constantly grows by metaphorical extension of

> natural language, and which also changes with changing theory and with reinterpretation of some of the concepts of the natural language itself. In this way an empirical basis of science is maintened, without the inflexibility of earlier views, where the observation language was assumed to be given and to be stable (Hesse 1974, pp. 4-5).

On the one hand, this model accepts the theoretical character of observations, but on the other holds that in the comparison of alternative theories, points of intersection can emerge that allow for empirical control, even though empirical phenomena are described with different concepts.

> The network concept strips the distinction between theoretical and observational expressions of any absolute values, which may be spelled out by logical or naturalistic criteria, in order to give it an exclusively pragmatic and relative status, similar to that which in my view should be recognised to the dichotomies between the analytical and the synthetic, between the *a priori* and the *a posteriori* (Parrini 1995, pp. 91-92).

The network model also makes it possible to uphold the principle of the theoretical overdetermination of experience, according to which,

> given any set of assertions, hypotheses and theories, it is always logically possible for a set of experience data to arise such that not all combinations of assertions, hypotheses or theories are empirically adequate. Some of these combinations will have to be discarded as empirically inadmissible (Parrini 2011, p. 191).

It must be recognised that the combination of the principle of the empirical underdetermination of theories with the principle of the theoretical overdetermination of experience causes a tension that gives rise to what Parrini labelled "Duhem's Pascalian dilemma" (2011, p. 194). Taking up one of Pascal's thoughts, Duhem noted that while we are unable to prove the validity of physical laws, "an act of faith" assures us that it is not an artificial system, but a natural classification.

However, this "inability to prove, which cannot be overcome by all dogmatism", as Pascal warned, lays bare the structural incompleteness of human knowledge, even though our theories always exceed experience. Indeed, according to Parrini,

> scientific theories [...] surpass the contents of experience both in the sense – already indicated by Kant at the opening of the *Introduction* to the *Critique of Pure Reason* – of not being integrally derivable from experience itself, and in

> the even broader sense indicated by Einstein, when he defined them as 'free creations of the human mind' (Parrini 2018, p. 804).

This happens because reality is complex and the empirical phenomena under investigation are cut out, as mentioned above, from the flow of experience in a way that may turn out to be inaccurate later on, highlighting a structural feature of our knowledge, namely incompleteness, i.e. the impossibility of having in mind and taking into account all the elements that make up a phenomenon. Hence, as Parrini (2017, p. 245) pointed out, the "hypothetical, revisable character, that cannot be grounded in an absolute way (neither in a logical nor in a naturalistic sense), of any of our statements".

What Parrini called "Duhem's Pascalian dilemma", therefore, presents itself as a paradox: on the one hand, our theories are incomplete and therefore partial, revisable, uncertain; on the other, they go beyond experience itself. The paradox exists because while on the one hand our knowledge is incomplete, on the other it is even excessive, in the sense that it surpasses what it would be justified to state on the basis of experience itself. Incompleteness is the unavoidable consequence of the complexity of the phenomena we experience, combined with the finiteness that characterises the knowing subject not only when it is taken in its individuality, but also when it is understood in a collective sense, as a scientific community.

I would like to note, however, that this apparent paradox actually represents nothing more than the two sides of the same coin. For, precisely because theories and hypotheses are partial and not completely justified by experience, it is inevitable to try to fill in the gaps, going beyond experience itself, so as to make intelligible and coherent the plurality of phenomena we experience. Therefore, "in a view that no longer understands knowledge as a reflection of reality in itself, knowing actually becomes, ultimately, a work of synthesising the multiplicity of experience by means of hypotheses and theories endowed with an ever-increasing unifying power" (Parrini 2011, p. 157).

3. Interactive knowledge and systemic approach

On the epistemological level, the interactive view involves a consequence that is far from marginal, as it implies an idea of rationality that differs from the mathematical rationality that has been central to modern philosophy, preferring "an open-textured rationality, not exhausted by the demonstrative procedures of logic and mathematics [... which] does not coincide with what some

scholars have concisely called 'logicality'" (Parrini 2019, p. 104). This proposal stems from the observation that not even the sciences base their justification processes solely on deductive and inductive logic, but also resort to other procedures, which are precisely part of an open-textured rationality operating in disciplines such as law or literary and artistic criticism. The conclusions obtained with this type of rationality are not as cogent as those obtained deductively, but still depend on the application of rational principles and rules (cf. Parrini 2018a, pp. 37-38). This view of rationality allows for an innovative look at different forms of knowledge, from which methodological implications also derive, as we shall see below.

Before addressing these issues, however, I would like to dwell on the problem of realism, which is central to Parrini's thought and whose solution is not without consequences on an epistemic and methodological level.

The advocate of the third way acknowledges that the realist, just like his antagonist, can boast arguments in his favour, yet he believes that, as Lanfredini summarised, "not having such strong logical-analytical or coercive instruments to show the untenability of one or the other position at stake, i.e. realism and anti-realism, we run aground in a dead end" (Lanfredini 2020, p. 629). To avoid this *impasse*, he proposed the adoption of empirical realism, rejecting metaphysical realism, according to which there is a reality in itself that knowledge would have the task of mirroring (cf. Parrini 2018, pp. 809-810). Empirical realism is compatible with scientific realism and accepts "a dualistic scheme of organising experience characterised by the existence of subjects and objects in multiple relationships with one another" (Parrini 2002, p. 85). To this purpose, Parrini openly declared that he pursued "an objectivity without foundations", understanding "objectivity and truth as empty regulatory ideals that guide cognitive activity towards conceptual syntheses that are increasingly richer in data, more articulate and more inclusive" (Parrini 2002, p. 84).

Two remarks seem appropriate in this regard. Firstly, Parrini linked metaphysical realism to the idea that there is a reality in itself that knowledge has the task of reflecting. While I agree with the rejection of the naïve view of knowledge, and while I consider the assumption of a reality in itself that offers itself to human consideration to be misleading, it does not seem to me that a denial of a reality that has its own physiognomy and some degree of autonomy follows from these premises. I believe – and this brings me to my second point – that the rejection of the kind of realism Parrini defines as "metaphysical" de-

pends on having conflated two issues that should remain distinct: that relating to ontological foundation and that relating to grounding or epistemological foundation. Parrini correctly stated that "*epistemic justification is not necessarily linked to the idea of foundation and mirroring*" (Parrini 2002, p. 41). Indeed, by accepting holism, it follows that the justification of every single assertion is always circular, since this justification does not derive from a relationship between theories and incontrovertible empirical data. Thus, no foundational assertions may be identified that are basic with respect to others, but there are only less controversial assertions whose revision seems more unlikely – but no assertion can be regarded as guaranteed once and for all.

Therefore, we recognise that there is no foundation, but from the lack of an epistemological foundation it does not follow that there is no ontological foundation, a conclusion that Parrini seems to have reached in the title of his 2002 volume, *Sapere e interpretare. Per una filosofia e un'oggettività senza fondamenti* (namely, *Knowing and Interpreting: For a Philosophy and Objectivity without Foundations*). His concern was to avoid metaphysical realism and the view of knowledge as mirroring, but to recognise the existence of an ontological foundation – that is, of something we experience – is an assertion of realism that has nothing absolute about it, as what we experience may only be known through the tools we have at our disposal, beginning with our sense organs, but without neglecting cultural categories, scientific theories, and technological instruments. Empirical phenomena are the result of our consideration of what offers itself to it, since there *is* something that offers itself to our perspective, although it is not easy to say exactly what it is.

Even accepting a realism of this kind, which Parrini would have called ontological, the risk of falling back into the ontological as well as gnoseological dualism between noumenon and phenomenon may be avoided if we consider subject and object as parts of a system in which they interact, and not as isolated entities. In such a system, the foundation is constituted not by a reality that is faithfully reproduced by our representations, but rather by the interaction between reality and our cognitive apparatus, which is constituted not only by sensitivity but also by a dimension that Sellars described as logical, which, while not exhausting itself in formal logic, is fundamental in that it expresses the active contribution of the knowing subject: "if there is a logical dimension in which other empirical propositions rest on observational reports, there is another logical dimension in which the latter rest on the former" (Sellars 1956, p. 78). So we have to recognise that "*instead of coming to have a con-*

cept of something because we have noticed that sort of thing, to have the ability to notice a sort of thing is already to have the concept of that sort of thing" (Sellars 1956, p. 87).

Even if we admit that it is impossible to identify an ultimate foundation that supports the whole edifice of knowledge, we can still count on the existence of knowledge that is foundational with respect to others, within a structure in which the different elements are organised coherently. In such a perspective, each part of knowledge is significant and necessary to the balance of the whole, although it may happen that certain parts are revised, corrected or discarded, without this undermining the reliability of the system as a whole, the value of which is not given by the mere sum of its individual parts, but by the whole.[4]

If this perspective is correct, then it must be recognised that the piecemeal approach is not sufficient even in science, but must be complemented by a systemic approach (cf. Parrini 2020, p. 173). The analytical and reductionist method, favoured by classical science, considers the phenomenon as an object that can be broken down into parts (component approach), as if the phenomenon were no more than the sum of its parts. As Ludwig von Bertalanffy noted, this is a model that has been successful in some fields, but has proved inadequate to explain those phenomena in which it is essential to also take into account the relationships that are established between the parts, as is the case in biology. For, complex organisations behave as systems characterised by strong – i.e. non-linear – interactions (cf. von Bertalanffy 1969).[5] This approach does not intend to exclude the *component approach in* favour of the *system approach,* because both are different modes of contributing to the production of knowledge. Rather, it considers the component approach as one level of inquiry that does not complete the whole inquiry, because the analytic method fails to suitably grasp the interactions among the several constituents, thereby running the risk to neglect or even miss the overall complexity.[6]
The piecemeal approach has fostered specialisation in the various disciplines, and no one wants to deny the benefits that have resulted from this, allowing for

[4] On this point, cf. Corvi 2013, particularly pp. 248 ff.

[5] For a more in-depth look at systemic theory and its applications to different subject areas, cf. L. Urbani Ulivi 2010, 2013, 2015.

[6] For a more extensive discussion on these issues, cf. Corvi 2023.

significant progress. But we must not forget that specialisation has given rise to a specialism, which hinders the recomposition of different knowledge into a coherent picture of the world. As Basarab Nicolescu pointed out from his point of view, which is that of a quantum physicist,

> according to the classical viewpoint, disciplines as a whole were conceived of as a pyramid, the base of which was physics. Complexity literally pulverised this pyramid, provoking a veritable disciplinary big bang. The fragmentation of the disciplinary universe is in full swing today. The domain of each discipline is inevitably becoming more and more specific; that which enables communication between disciplines is becoming more and more difficult, even impossible. [...] the disciplinary big bang is the response to the demands of a technoscience without brakes, without values, without any end other than utilitarianism. But this disciplinary big bang also has enormous positive consequences, because it has led to an unprecedented understanding of the knowledge of the exterior universe, as well as contributing new impetus to the establishment of a new worldview (Nicolescu 2014, pp. 99-100; cf. also Nicolescu 2002, ch. V).

Accordingly, it is not a question of opposing specialisation or minimising its merits. On the contrary,

> the challenge we must now face consists in managing to gain all the benefits that specialisation can give – those benefits which made it a factor of progress and then an unstoppable phenomenon – not only limiting the damages it causes, but even transforming it into a new element of strength (Parrini 2019, p. 115).

This indicates the opportunity to open up gaps in between the various disciplines, so as to allow for an interweaving of competences, a sort of contamination between different forms of knowledge, in which each specialisation can make a contribution to composing a unitary picture, one in which phenomena are also understood in terms of their relationships.

Knowledge appears, then, as an open system, in that it interacts with reality, but also with the social and cultural context in which the subjects of knowledge operate. Knowledge thus understood, being a dynamic system, undergoes continuous modifications, required to integrate and harmonise new elements with the baggage already possessed, and to adapt to the purposes, interests and needs that emerge within the community in the various historical phases.

Under these conditions, it is clear that each part of knowledge is related to the others with which it interacts, forming a system in which each element exerts an influence on the whole, and vice versa. This system is both open, also by virtue of its structural incompleteness, and plastic in relation to the complexity of the phenomena that it strives to recompose in a multi-faceted synthesis. This openness does not only concern the dialogue and exchange between the different sciences, but more generally involves different spheres of culture, as Parrini himself acknowledged: "a system, the scientific-cognitive one, that can be said to be *open* because it modifies and develops in continuous and interactive symbiosis with other cultural spheres such as philosophy, literature, artistic creation, religion, ideologies, political orientations" (Parrini 2017, p. 245).

This is a plausible and easily embraceable position, but one that can be interpreted in different ways: is the knowledge system open to other cultural spheres insofar as they also fall within the sphere of knowledge, or is it an openness that is directed at activities outside knowledge? Certainly, Parrini did not intend to exclude philosophy from the field of knowledge, for he recommended as highly favourable "invasions of the pitch", from philosophers and scientists alike (Parrini 2019, p. 102). Also, he considered science as a fundamental interlocutor for philosophy, both because philosophy of science must not lose sight of the connection with general philosophy of knowledge and because philosophy of knowledge cannot ignore the outcomes of sciences, if it wishes to avoid trivial errors.

Parrini also showed a cautious openness with regard to art, when he stated that art cannot be considered entirely unrelated to the possibility of conveying cognitive content. Artistic creations, including those that explicitly aim at the production of beautiful works, cannot be entirely referred to the figuration of an imaginary world that in no way enlightens us about the real world (Parrini 2018a, pp. 50-51).

Rather, he recognised that even in philosophy the typical tools of artistic and literary creation may be useful, as they express "that subjective, value-based and emotional substratum that lies behind every philosophical stance, including those that aim at defending the values of scientificity and objectivity" (Parrini 2018a, p. 53).

For my part, I only wish to add that the cognitive system includes, in addition to science, other forms of knowledge that interact and influence each other, without thereby claiming that a literary work is a form of knowledge

equivalent to a physical theory. Obviously, these are different processes that yield different outcomes, since the aspects of reality to which they refer are different – yet our representation of the world, our configuration of empirical phenomena in their variety makes use not only of science but also of other symbolic forms, to use Cassirer's terminology[7].

To take up Parrini's challenge in relation to the construction of a third way, we have to develop the ability to build a coherent image of reality through the many pieces of information so as to create bridges between different disciplines. To achieve this goal, it is necessary to coordinate the different notions that come from different fields, keeping in mind that reality is an open unity, in which it is difficult to determine what is connected or and what is not connected with something else. Open unity and complex plurality are the two sides of the same coin that constitutes knowledge, which will no longer be understood simply as a sum of disciplines, each of which is enclosed within its own field with no openings that might allow for crossings from one territory to another.

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[7] On the contribution of art to knowledge, cf. Corvi 2023a.

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