Reliability and fallibilism

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Can we reconcile reliability and fallibilism? This problem is closely related to the difficulties concerning realism, which mainly refer to the constructive aspects of scientific entities and to the logical aspects of the hypothetico-deductive method.

It can be safely stated that empirical science searches knowledge and actually reaches it. Whatever may be the interpretation of scientific methods, it is undeniable that science provides us with an extensive knowledge about the composition of matter, the mechanisms of life, and many other features of the real world. All this points out towards the existence of scientific truth. It is not difficult to argue that the method of science presupposes a basic gnoseological realism and that this realism is refined and enlarged by the progress of science, so that scientific truth provides a clue for understanding the intelligibility of science. [1]

We must face an intriguing situation in contemporary epistemology, namely the fact that there is a strong tendency towards relativist and instrumentalist views. Even authors who adopt a realist perspective often argue in favour of a realism of aspiration rather than for a realism of achievement. [2]

Difficulties concerning realism can be summarized in the following chain. First, scientific entities are constructed in the process of theorizing, so that they would not have a mind-independent ontological status. Second, this process of construction would determine the theory-ladeness of any scientific fact; therefore, we could never prove the realist character of our theories. Third, the logical aspects of the hypothetico-deductive method would imply the underdetermination of theories and, as a consequence, the impossibility of assessing the truth of any concrete scientific achievement. Fourth, these features of the scientific method would lead to a fallibilist view that, besides, would be coherent with the provisory character of any scientific construct and would preclude any claim about absolute and definitive truth. And fifth, empirical adequacy could be seen as a sufficient requirement to explain how science works; accordingly, even if positivism is considered as incapable of providing an adequate account of science, it would be not necessary to adopt a realist view in order to do justice to actual scientific practice.

These five difficulties are mutually connected and correspond to real problems. They are grounded on the use of constructions that transcend the realm of experience and include conventions and stipulations. Nevertheless, it is the very use of these stipulations that permits us to formulate intersubjective constructions and proofs that lead to scientific truth. [3]

Indeed, the subject of any scientific discipline is constructed through a method which can be aptly called an objectivation. The scheme of this method can be described in a straighforward way as follows. We cut some pieces of the real world or of hypothetical

unobserved realities in such a way that we have a mental cross-section; thus we consider only some aspects and we construct an ideal system which will be the object of our theories. Besides, we relate some of the theoretical entities of this system to the results of real or possible experiments through a set of basic predicates, and we establish some rules in order to interpret that correspondence. Therefore, each objectivation includes ideal and pragmatic features that are inter-related in a precise way. When we have a well- defined objectivation of this kind, we can proceed through further intersubjective constructions and proofs.

One of the main difficulties in scientific work is to achieve for the first time such an objectivation. Of course, objectivations depend on historical circumstances and evolve with them, and any objectivation includes conventional aspects. Nevertheless, within a concrete objectivation, intersubjectivity is guaranteed provided we proceed with logical rigour. What remains is to ahow how can we pass from this intersubjective validity to stronger claims about realism.

The core of the problem of realism is the notion of truth. Difficulties necessarily arise if we think about truth as a qualification that could only be applied to something totally independent of our abilities to know and of our active intervention; if this were the case, we could never institute a meaningful talk about truth. But we can do it provided we realize that truth primarily is a qualification of our knowledge, and that this knowledge can be called true if what we assert corresponds with the real situation which we intend to reflect. Then, truth is always relative to a particular perspective that includes theoretical and pragmatical features, and this amounts to saying that truth is contextual. However, once we have established a well-defined context, we are no longer free to interpret claims to truth in a subjective way.

Does this mean that we can only achieve a contextual truth? In this case, truth would mean only coherence and there would be no problem about realism. Even the strongest opponents of the idea of scientific truth would admit that we often reach rigorous proofs; nevertheless, they will argue that proofs are rigorous only within a given presuppositional framework and that, therefore, we can only speak of truth as consisting in relations of coherence. What is then at stake is the possibility of passing from a coherence notion of validity to a correspondence notion of truth.

The way of doing this can be summarized as follows. Once we have established the intra-contextual validity of a construct, which includes intersubjective ways of correspondence with empirical situations, if this construct can be successfully applied to solve concrete problems, this will determine its truth value. We should only be aware of the diversity of meanings and proofs, as obviously we do not mean the same thing when we apply the notion of truth to a general principle and to a concrete spatial structure.

This can be explained in other words. The intersubjective validity of a theoretical construction can be contextually fixed within a concrete objectivation. If we succeed when we submit it to empirical control, then we can apply it for solving factual problems, and we can establish its pragmatical value. Then, if contextual and pragmatical validity are well established, the correspondence with reality will be automatically established. Indeed, constructions which are valid under some theoretical and practical conditions, will correspond to reality in the precise sense indicated by these conditions.

Therefore we can speak about a scientific truth which is contextual and therefore is also partial and approximative. And this implies that it is perfectible; that it must be conceived as having a somewhat different value according to the different modalities of constructions and proofs; and that it has a historical dimension, because any context is defined by using constructions that depend on historical conditions.

This explanation of truth combines the contextual, the semantic and the pragmatical features, which correspond to the theories of truth as coherence, as correspondence and as praxis. We will find unsolvable problems if we separate these features. [4] This would happen, for instance, if we try to establish truth as a correspondence conceived as complete independence of theoretical construction and pragmatical intervention. An interpretation of this kind would amount to an illegitimate absolutization of truth, because the value of our knowledge would be considered as if it were independent of our concepts, of their references and of the real problems which we try to solve. Instead, our explanation of truth takes into account these dimensions of our real knowledge.

The relative aspect of truth, such as has been explained, is actually innocuous, and does not involve any relativist consequence such as subjectivism or scepticism. It could be compared with the relative which, in the theory of relativity, has well-defined values in any framework. Obviously, we must be always aware of the framework we use in each particular case but, however difficult this task may be, we are able to achieve it. We will never reach a complete knowledge, but we can at least obtain a general perspective about the particular perspectives we use.

All this can be used to explain the real problems that seem to provide foundations for anti-realist views. Our knowledge is rightly seen by relativism as framework-dependent; by fallibilism as limited and perfectible; and by instrumentalism as connected with pragmatical problems. But these views extrapolate these real features of scientific knowledge, and the result is that they fail to reconcile them with the undeniable fact that we achieve a true knowledge about reality. Instead, the notion of truth can be applied not only as a regulative idea, but also in a concrete way, if we realize that in actual scientific practice the contextual, referential and pragmatical features of truth are inter-related.

For instance, fallibilism sees the method of science as progressive insofar as we can find falsities in our theories, so that considering a theory as true would be anti-progressive dogmatism. Thus, it is hardly understandable how we can achieve positive knowledge. Fallibilism is largely widespread in contemporary epistemology. Even authors who criticize anti-realist views proclaim their adhesion to it. [5] However, the thesis of fallibilism can easily lead to confusions. In its original context, it "arises from a critique of the solutions of epistemological problems offered by the rationalist tradition", and results "from the impossibility of maintaining the fusion of truth and certainty implied by classical rationalism." [6] But then, what should be done is simply to abandon classical rationalism.

Construction and control, such as they are used in empirical science, presuppose a realist perspective. Theoretical constructs refer to real situations and are used to explain them, and methods of empirical control serve to prove the explanatory claims of theories. An anti-realist perspective would fail to account for the real achievements of scientific method and even for its fallibilist aspects.

The realism presupposed by the scientific method is only a basic one that does not involve many specific philosophical consequences. It is centred around the possibility of obtaining a true knowledge about reality. The analysis of the method of science shows that this method basically corresponds to the realist character of ordinary knowledge. Furthermore, it shows how that basic realism can be refined and enlarged.

The refinements refer to the subtleties involved in scientific practice. Indeed, it is easily recognizable that, in actual scientific practice, the empirical and theoretical aspects are intertwined in such a way that both empiricism and rationalism fail to explain how science works. Also, pragmatism fails to account for the results that we obtain. All this suggests that further examination of the scientific method may provide important insights about human knowledge and also about the philosophical problems related to it.

We can also speak of an enrichment of realism. The progress of science implies that our knowledge has been and continues to be enlarged to an astonishing degree. And this refers not only to concrete pieces of information, but also to the exercise of our abilities. The subtleties of the method of science are not established once for all; as science progresses, they are expanded and applied in new ways. Creativity is a substantial part of the scientific method, not only because we construct theories that transcend the available data, but also because the ways of relating ideal constructs with empirical data require the exercise of a most creative way of reasoning. Even the work performed to obtain empirical data usually is a very creative one, as it requires imagination and skill.

All this means that empirical science is a most relevant factor in order to understand how we know, to evaluate our notions of truth and realism, and therefore to examine intelligibility in general. This conclusion is grounded on the existence of scientific truth and on the analysis of the scientific method, which shows how we achieve scientific truth through a very subtle method which combines idealization and experiments.

We would arrive at a different perspective if we did not hold the possibility of achieving concrete true pieces of knowledge. This is why some defences of epistemological realism, although they proclaim that "the quintessentially cognitive aspiration of getting at the truth about the world's ways is the very essence of scientific enterprise", and that "abandoning of the pursuit of truth as a regulative ideal would hamstring from the very outset the scientific project of rational inquiry into nature", do not propose convincing arguments for a realist view that goes beyond merely subjective aims. [7] Then, the intelligibility of science should lead to an image very different from the one that results when we admit the possibility of achieving concrete true knowledge.

For instance, it is not surprising that, according to the fallibilist tradition, the main problem of epistemology should be that of understanding the continuity between human and animal knowledge, in such a way that the doubt sometimes remains about their possible discontinuities. [8] If the method of science is identified with the method of trial and error elimination, and at the same time it is accepted that this method coincides basically with that employed in animal knowledge, further claims about rationality and truth, although they be sincere and correct in themselves, cannot have an adequate foundation. Then, the resulting picture of the intelligibility of science will be full of problems, although it may be accompanied by strong claims about the special characteristics of critical thought.

Once we accept the possibility of speaking about a contextual and partial, but authentical truth, it is not difficult to show how to combine the provisory character of science stressed by fallibilism with its reliability. Indeed, we reach a real knowledge which, due to its contextual character, can be partially superseded by another context, without losing its own validity and truth. Furthermore, insofar as science is a human activity which aims to obtain not only knowledge but also a dominion over nature, there is no difficulty in admitting that scientific constructs can sometimes have an instrumental value which suffices to make them acceptable. Reliability is not a too univocal term. We can speak about the reliability of science as a whole, but, if we desire to determine the reliability of its particular achievements, we must face the variety of circumstances involved in the different contexts, and also we should consider what kind of reliability we are looking for.

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Notes

(1) Larry Laudan concludes that "given the present state of the art, it can only be wish fulfilment that gives rise to the claim that realism, and realism alone, explains why science works": Laudan (1981), p. 48. However, I do not claim that realism explains why science works; I only consider it as a necessary condition. For a defence of methodological realism cf Leplin (1986), where it is argued that "certain realist assumptions are crucial to the rationality of research". Bas van Fraassen argues that empirical adequacy is the only requisite for the acceptance of theories: cf van Fraassen (1980), p. 12 and passim; van Fraassen's views are criticized in Leplin (1986), pp. 33-44.

(2) For a critical examination of several contemporary relativist views, cf Siegel (1987).

(3) For a systematic treatment of the notion of scientific truth, cf Artigas (1989), where I argue for a perspective that basically coincides with the objectualist realism elaborated by Evandro Agazzi. For Agazzi's ideas on this topic, cf Agazzi (1969), (1978), (1986) and (1988). A general outlook on Agazzi's epistemology, its roots and its applications is Rossi (1986). I have compared my views with those of Agazzi in Artigas (1988).

(4) This point is stressed in the 'internal realism' of Hillary Putnam: cf Putnam (1988), pp. 113-116.

(5) This is the case of Siegel and Rescher: cf Siegel (1987), p. 113, and Rescher (1987), p. 33. Siegel's adhesion to fallibilism is significative, because it is asserted as a point of agreement with Harold Brown, in spite of Brown's commitment to a pragmatical notion of truth that was abandoned under the critiques of Siegel: cf Brown (1977), p. 151-153, Siegel (1983) and Brown (1983). Rescher's adhesion to fallibilism also comes in a context in which he argues for realist positions.

(6) Albert (1987), pp. 69-70.

(7) Cf Rescher (1987), p. 33. The reason of these shortcomings can be found in the same place, when it is said that "we must accept a fallibilistic view of science". Whilst a

weak interpretation of fallibilism would only mean that scientific truth is partial and therefore perfectible, the stronger version asserts that we can never obtain true knowledge; then, the task of seriously defending realism becomes a very difficult one.

(8) "The main task of the theory of human knowledge is to understand it as continuous with animal knowledge; and to understand also its discontinuity -if any- from animal knowledge: Popper (1974), p. 117. However, at the end of this essay (p. 120), Popper stresses the unique character of the human ability of critical reasoning as compared with the abilities of animals, and gently complains that this is not explicitly expressed in the essay of Donald Campbell which is the subject of his comments.