**Realism Without Limits**

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**1. Introduction**

This is a sequel to my paper, ‘What is Scientific Realism?’, which appeared in an earlier issue of this journal (Sankey, 2000a). A number of papers by other authors on topics relating to scientific realism have followed in subsequent issues. In this paper I will revisit some of the themes developed in my earlier paper in the light of these later papers. I will begin by restating the key ideas of the earlier paper. Next, I will mention a number of afterthoughts which I have had since the appearance of the paper. I will then offer some comments on three of these subsequent papers. I hope these comments will advance the discussion by clarifying and developing a number of key points.

 In ‘What is Scientific Realism?’, I sought to provide a general characterization of scientific realism. My aim in that paper was not to present scientific realism in the specific form espoused by any particular advocate of the position. Nor was it to present my own favoured version of the position. I attempted instead to identify the distinctive features of scientific realism in a manner that allows for variation on points of detail between alternative versions of the doctrine. In the present paper, I will for the most part continue to approach the position of realism in this same broad-minded spirit. My aim is not to defend a specific version of scientific realism but to contribute to a general discussion of the prospects for scientific realism.

 In section 2 I will restate a number of the key themes of ‘What is Scientific Realism?’, and in section 3 mention some refinements which I introduce as afterthoughts. In section 4, I comment on the supposed limitations of realism identified by Michele Marsonet in his paper, ‘The Limits of Realism’ (Marsonet, 2001). Section 5 considers the connection between scientific realism and Cartesian dualism in response to the discussion of these matters in Michael Bushev’s paper, ‘Is Science Going to Lose its Cartesian Paradise and What Will Supervene?’ (Bushev, 2002). In section 6, I comment on the abstract nature of the debate in reply to Constantin Yanakiev’s ‘Abstract Realism’ (Yanakiev, 2003). Finally, in section 7, I summarize the situation as I see it.

**2. What is scientific realism?**

In ‘What is Scientific Realism?’ I remarked that scientific realism does not lend itself to simple formulation by means of a single statement. There are a number of alternative versions of scientific realism, and various authors prefer different formulations of the doctrine. It is therefore best to formulate the position as a number of distinct, but interconnected doctrines, some of which are more central than the others.

 I will now state the five doctrines which I characterized in ‘What is Scientific Realism? as the “core doctrines” of scientific realism:

1. *Axiological realism:* the aim of science is to discover the truth about the world, and scientific progress consists in advance toward that aim.
2. *Theoretical entity realism:* the unobservable theoretical entities postulated by scientific theories are to be conceived as real, genuinely existing entities.
3. *Metaphysical realism:* the world investigated by science is an objective reality that exists independently of human thought.
4. *Correspondence theory of truth:* truth consists in correspondence between a claim about the world and the way the world is.
5. *Objectivity of truth:* theories or claims about the world are made true (or false) by the way things are in the mind-independent, objective reality investigated by science.

My aim in presenting these five principles as the “core” tenets of scientific realism was to capture the most distinctive elements of the scientific realist position. If I am right, the five principles provide a satisfactory specification of the position of scientific realism in the sense that standard cases of scientific realism are ruled in and standard anti-realist positions are ruled out.[[1]](#footnote-1)

 The first principle reflects the basic realist conception of the nature and goal of scientific inquiry. The realist conceives of science as an enterprise the fundamental purpose of which is the progressive discovery of truth about the world. Where such realism differs from instrumentalist or positivist alternatives which may share with realism the aim of truth is in relation to realist commitment to theoretical entities. Rather than ‘convenient fictions’, realists think of such entities as real things about which scientists develop hypotheses in order to explain observable phenomena. But since both axiological realism and theoretical entity realism might be open to non-realist interpretation, it remains to specify the features of scientific realism which make it a distinctively *realist* position. What is distinctively realist about scientific realism is its metaphysical realist commitment to a mind-independent, objective reality, as well as a non-epistemic correspondence conception of truth.

 Apart from core principles, I also mentioned two “important non-core doctrines”. The first, epistemic realism, states that it is possible to have genuine knowledge of the objective, mind-independent world investigated by science. This principle separates scientific realism from contemporary empiricist positions which deny that we are able to have knowledge of unobservable states of affairs. It is a key realist principle which, as we shall see in the next section, I now take to be a core doctrine. The second is the semantic realist conception of the meaning of statements in terms of truth conditions rather than verification or use conditions. There is, no doubt, a strong tendency for realists to understand meaning in terms of truth conditions, but rejection of semantic realism need not entail rejection of scientific realism. I also noted two “optional doctrines”. The first is a realist view of causation and laws of nature as grounded in natural necessity rather than Humean regularity. The second is the essentialist view that the world is populated by natural kinds of things. But while natural necessity and natural kinds play an important role in robust forms of realism, they should be regarded as optional rather than core commitments of scientific realism.

 In order to forestall an objection which may lie behind some resistance to scientific realism, I argued that scientific realism is to be carefully distinguished from scientism. According to scientism, science is the sole legitimate source of genuine knowledge about the world. But, while no doubt consistent with scientism, scientific realism is not a form of scientism. For one thing, no commitment to scientism is built into the principles of scientific realism that I have outlined. For another thing, there is no need for the scientific realist, as such, to deny that ordinary commonsense experience or research in non-scientific academic disciplines (e.g., philosophy, history) give rise to genuine knowledge.

 Finally, I sketched the principal argument in favour of scientific realism. This is the success argument that has been propounded in its most influential form in the writings of Hilary Putnam. The argument proceeds on the basis of the assumption that science is a remarkably successful enterprise, as indicated by its predictive accuracy, explanatory power and technological control. Such success would be an inexplicable miracle if the entities postulated by science were not real, or if the theories scientists propose were not by and large true. But the claim of scientific realism that the entities of science are real and scientific theories are by and large true descriptions of those entities provides a compelling explanation of the success of science. For if such entities exist and the theories are by and large true descriptions of those entities, then it is no surprise that science is able to provide accurate predictions, explain a broad range of phenomena and sustain technological applications. Indeed, this is the best explanation of the success of science that there is. We have good reason to accept the best explanation of such success. We should therefore accept scientific realism as true because it is the best explanation of the success of science.

**3. Afterthoughts**

In work subsequent to ‘What is Scientific Realism?’, I have introduced a number of refinements in my characterization of the scientific realist position (Sankey, 2001; forthcoming (a)). I will now briefly present these refinements as a series of afterthoughts to the original article.

 My first afterthought involves a minor terminological adjustment. I now prefer to call the first principle of scientific realism ‘aim realism’, rather than ‘axiological realism’. My use of the word ‘axiology’ unleashed a range of connotations which are unhelpful in the present context. Axiology relates to general questions of value and valuation, including moral and aesthetic value, which are by no means limited to the epistemic arena. But the point of the first principle is to assert a particular realist view about the epistemic aim of science, namely, that it is committed to the pursuit of truth, rather than to raise more general questions of an axiological nature. The phrase ‘aim realism’ seems better suited to this task.[[2]](#footnote-2)

 Second, I no longer characterize the principle of theoretical entity realism directly as a thesis about theoretical entities but as a thesis about the interpretation of discourse about such entities. As I now characterize the position, the scientific realist proposes a literal interpretation of theoretical discourse as discourse which genuinely purports to refer to real, independently existing entities. This way of formulating the issue enables a contrast to be made between the realist’s literal interpretation of scientific discourse and the opposing instrumentalist interpretation which treats talk of theoretical entities as fictional discourse. This characterization more accurately reflects the traditional opposition between realist and instrumentalist (or positivistic) interpretations of theoretical discourse. In addition, the contrast between literal and fictional interpretation of theoretical discourse is less apt to cause confusion than the earlier contrast between conceiving of theoretical entities as real or as fictitious.

 Third, I now regard my characterization of epistemic realism as an optional principle of scientific realism to have been misleading. The core principles which I originally enunciated yield a reasonably clear picture of scientific realism. However, they fail to give explicit expression to the epistemological rationale of the realist view of science. In the eyes of the realist, the fundamental purpose of science is to arrive at genuine knowledge of the objective world. The whole point of the scientific enterprise is epistemological. This lies at the heart of the debate between defenders of scientific realism and sceptical anti-realists who argue that rational theory acceptance is restricted to observational aspects of theories (e.g., van Fraassen, 1980; Laudan, 1996). It is also a key issue that divides scientific realists from neo-Kantian constructivists who deny the possibility of genuine knowledge of a mind-independent reality (cf. Kuhn as interpreted by Devitt, 1991; Hoyningen-Huene, 1993). Given the importance of this aspect of realism, I now consider epistemic realism to be one of the core principles of scientific realism.

 Fourth, the success argument remains the standard argument for scientific realism. However, in my view, it is but one of a number of arguments which have an important role to play in support of the position. This point requires that I depart momentarily from my impartial approach to the characterization of scientific realism to briefly sketch my own favoured approach to defence of the position.

 In my paper, ‘Scientific Realism: An Elaboration and A Defence’ (Sankey, 2001), I have suggested that the success argument requires supplementation by at least three other lines of argument. Of these, the first two provide support for the basic realist position as opposed to constructivist and idealist alternatives. First, I take scientific realism to rest at base on a fundamentally realist outlook. In the eyes of the realist, neither human thought or experience, nor humans themselves, occupy a place of privilege or centrality in the vast reality of which we are a part. We are intelligent, sentient agents, who interact causally with our environment. Our mental activity contributes to our survival by way of practical action. But it has little significance beyond this. Humans inhabit a pre-existing natural world. But we did not create the world, nor did we invent or construct it. Thus, as against an anthropocentric conception of the world, realists adopt a modest view of our place in nature which accords little importance to human thought or experience in the overall scheme of things. Second, against those realists who adopt an eliminative attitude toward common sense, I tend to side with those who adopt a commonsense realist attitude toward ordinary everyday objects, as well as our knowledge of such objects (e.g., Devitt, 1991; Musgrave, 1999). This enables the scientific realist to take the reality of commonsense objects for granted in the context of the argument for the reality of theoretical entities. The point is not that common sense is neutral, certain or incorrigible, but that commonsense beliefs have a strong, *prima facie* justification. They are the default position which should only be renounced in the face of sustained and well-founded opposition. We may therefore adhere to common sense in the face of the sceptical doubts about the external world which lead down the track toward idealism.

 These first two lines of argument secure a place for scientific realism as a form of metaphysical realism committed to the external reality of common sense. It is at this stage in the overall argument for scientific realism that the success argument enters the picture. Appeal may now be made to the success of science as the ground for belief in the truth (or near truth) of well-confirmed theories and the existence of the theoretical entities postulated by such theories. But we should not rest content with such use of the success argument at the level of theories. There is more detailed epistemological work to be done. The realist requires a positive epistemological argument which provides a basis on which to respond to the challenge posed by sceptical anti-realism. It must be shown that the methods of science provide epistemic warrant for belief in the truth of the results and theories of science. To this end, I suggest that the realist must employ the success argument at the level of scientific methodology. Thus, as I have argued elsewhere (Sankey 2000b, 2002), the best explanation of the role played by the rules of method in the production of successful scientific theories is that those rules are themselves a reliable means of discovery of truth about the world. Otherwise, we have no explanation for the success of theories which have been selected under the auspices of the methods of science. Given this, we have good reason to believe a theory that satisfies the constraints of method to be a true (or approximately true) reflection of reality.

 With these last remarks as a brief indication of a somewhat more nuanced position developed elsewhere, I turn to the task at hand, which is to offer comments on the papers of Marsonet, Bushev and Yanakiev.

**4. On ‘The Limits of Realism’**

In his paper, ‘The Limits of Realism’, Michele Marsonet argues that realism is subject to significant limitations. This is primarily due to the role played by conceptual schemes in our cognitive activities:

As [far] as humans are concerned ... the world is characterized by a sort of “ontological opacity” which makes the construction of any absolute ontology very difficult. Our ontology is characterized by the fact that the things of nature are seen by us in terms of a conceptual apparatus that is inevitably influenced by mind-involving elements. (Marsonet, 2001, p. 119)

While Marsonet grants the existence of an independent reality, he asserts that we “have access to ... [mind-independent] things only via [our] conceptual apparatus” (2001, p. 123). The point is not that concepts constitute “natural reality”, but that we “perceive this same reality by having recourse to the filter of a conceptual apparatus” (2001, p. 120). The result is that there is no “clear distinction between ontology and epistemology” (2001, p. 120). Truth is “essentially tied to human interests” (2001, p. 119) and “essentially ‘relative’” (2001, p. 123).

 Marsonet’s paper is a synthesis of a range of arguments against realism that arise from reflection on the role of concepts in our thinking about the world. Marsonet is concerned with realism in general, rather than with scientific realism in particular. But his arguments are of clear relevance to the position of scientific realism as I understand it. Rather than address all of the issues raised by Marsonet’s paper, I will respond to the points that appear to be especially central to his overall line of argument.

 Let me first address the question of whether it is possible to draw a line between ontology and epistemology. This is not the question of whether we can distinguish between two subject areas in philosophy, on the one hand, the area that studies what exists, and, on the other hand, the area that studies the nature of knowledge. Rather, Marsonet’s point is that we cannot specify what exists without using concepts that reflect the contribution of the human mind. As he says, “if our conceptual apparatus is at work even when we try to pave our way towards an unconceptualized reality, our access to it entails anyhow the involvement of the mind” (2001, p. 120). In other words, any attempt to specify the nature of mind-independent existence must inevitably fail to do so, since it requires the use of human concepts which are mental in provenance.

 I will turn to the problems posed by concepts momentarily, but would like first to make two general remarks about the relation between epistemology and ontology. First, by granting that there is an independently existing reality Marsonet has granted all that the realist requires from an ontological point of view. For he grants that reality does not depend on the knowing subject. All that remains at issue is the question of whether the independently existing reality is a knowable reality. Second, while the realist denies that the knowable world depends on the knowing subject, it is not clear that the realist need insist that questions of epistemology are fully independent of questions of ontology. As I have argued elsewhere, the realist must draw upon facts about the way the world is to explain how we manage to arrive at knowledge of the way the world is (Sankey, forthcoming (b)).

 Turning to the problem of conceptual schemes, let me begin with Marsonet’s claim about the mind-involving character of our concepts. As we have just seen, Marsonet takes this to entail that we are only able to represent “unconceptualized reality” by means of concepts which reflect the influence of our minds. Thus, we are strictly unable to represent unconceptualized reality as such. But to conclude from the mind-involving character of concepts that we are unable to form a conceptual representation of a mind-independent reality appears to trade on a fallacious view of the relation between our minds and the content of our concepts. To have a concept one must have a mind. But the fact that having a concept depends on having a mind does not entail that the concepts that we have are concepts of mind-dependent things. Our concepts may be concepts of mind-independent things despite being our concepts. Thus, we may form the concept of a thing that exists independently of the mental, the content of which makes no reference to the mind, even though forming the concept is itself a mental activity and the concept is an object of thought. I can therefore see no basis for the conclusion which Marsonet appears to draw that we are unable to form the concept of a mind-independent reality (or of mind-independent things) because our concepts reflect “the involvement of the mind” (2001, p. 120).

 As for the question of the extent to which our knowledge of the world is undermined by our need to use concepts, let me start by quoting at greater length from a previously cited passage:

No one denies that it would be good to transcend our conceptual machinery in order to glimpse at how the world really is, independently of any view we can hold about it. This, however, cannot be done because of the very way we are made. Unlike some forms of classical idealism, we can recognize the presence of things that are real in the sense of being mind-independent but, on the other hand, a specification is needed to the effect that human beings have access to those things only via their conceptual apparatus. (2001, pp. 122-3)

In this passage, I take Marsonet to suggest that it is impossible for us to have direct epistemic access to the world independent of conceptual scheme. We are unable to adopt a standpoint devoid of concepts from which to gain conceptually unmediated access to the world. Instead, we must view the world through the filter of some conceptual scheme. Thus, Marsonet appears to conclude, or at least strongly suggest, we cannot know the world as it really is, in its own right, separate from our conceptual contribution.

 But no such sceptical conclusion about our inability to have knowledge of reality follows from the fact that we must think about the world in terms of some set of concepts or another. The mere fact that we must think in terms of concepts does not entail a sceptical conclusion about our inability to have epistemic access to the world independent of concepts. This would only follow if all of our concepts were necessarily mistaken representations of the world. But the mere fact that we must use concepts does not entail that our concepts are mistaken. They might, in fact, be correct representations of the world. And so we could, in principle, know the way the world really is, despite the fact that we must represent the world to ourselves using our conceptual representations of the world.

 Of course, it might be replied that, given our inability to step outside all of our concepts, we can never know whether our concepts do provide an accurate depiction of reality. But this reply is surely specious. There is no reason, short of adopting an extreme form of scepticism, to assert that all of our concepts fail to represent reality. To suppose, for example, that our ordinary everyday concepts fail to correspond to anything real leaves us without a viable explanation of the success of our practical interactions with the world. And it renders mysterious our apparent ability to engage in communicative exchange with other human beings. In short, it is not clear that extreme scepticism about conceptual representation is even an intelligible hypothesis. It is therefore safe to assume that, at least in large part, our basic conceptual apparatus is a reasonably accurate representation of reality.

 But there is no need to rest content with a brusque dismissal of extreme scepticism. For it is possible to provide a positive rationale for a robust realist view of conceptual representation. It can, for example, be argued, as it has been by Hilary Kornblith, that the best explanation of the success of science is that our natural kind concepts are by and large accurate representations of the real natural kind structure of the world (see Kornblith, 1993, pp. 40-7, 74-8, 105-6). This accounts, not only for the success of science, but for the reliability of our inductive reasoning in both ordinary and scientific contexts. Kornblith’s application of the success argument to our conceptual apparatus can be used to turn the issue back on Marsonet. For if Marsonet wishes to deny that our concepts are more or less accurate portrayals of a mind-independent reality, the question arises of how humans are able to engage in systematically successful action in both everyday and scientific affairs, if indeed all of our concepts fail to represent the world. Surely, such success would be an inexplicable miracle if our conceptual schemes are systematically mistaken.

 The problem of conceptual schemes does not, therefore, pose a genuine threat to realism. It remains to pass brief comment on Marsonet’s apparent acceptance of a relativist view of truth. Marsonet is struck by the fact that both our commonsense and scientific beliefs about the world are subject to ongoing variation. Thus, he suggests, truth is “essentially ‘relative’ and bound to evolve with the passing of time” (2001, p. 123); “relativism and fallibilism are not ghosts to be afraid of, but just inevitable factors of our relationship with the surrounding environment” (2001, p. 130). While I agree wholeheartedly with the point about fallibilism, it is a mistake to infer relativism about truth from the fact that our beliefs about the world are subject to variation. This is to conflate what is *accepted* as true with what *is* true. While the former may well vary, the latter need not. What varies from time to time are the beliefs that humans happen to hold with regard to the world. But nothing about such variation of belief entails that the truth of such beliefs is relative to context. Given the independence of the reality that makes our beliefs true, a great many of our past beliefs about the world should simply be regarded as having been false, rather than to have been true in some sense relative to historical context. Thus, fallibilism, not relativism, is the lesson to be drawn from variation of belief.

**5. Realism and the Cartesian Paradise**

In his paper, ‘Is Science Going to Lose its Cartesian Paradise and What Will Supervene?’, Michael Bushev contrasts the holism and mysticism of Oriental thought with the Cartesian dualism and rationalism which, he claims, gave rise to Western science. According to Bushev, Descartes’s separation between subject and object played a pivotal role in the rise and subsequent development of Western scientific thought (Bushev, 2002, pp. 131, 136-7). But the advance of science, and in particular the emergence of quantum physics, has rendered the subject-object dualism increasingly untenable (Bushev, 2002, p. 137). Bushev suggests, however, that scientific realism of the kind characterized in my ‘What is Scientific Realism?’ might lead to “solution of the subject-object problem” (Bushev 2002, p. 139). This is an intriguing suggestion. However, I have a number of reservations about the suggestion which I will now indicate.

 Rather than be drawn on the contrast between Oriental and Western modes of thought, or the interpretation of quantum physics, I will focus attention on the relation between Cartesian dualism and scientific realism. Bushev does not provide a precise characterization of Cartesian dualism or of what is meant by the contrast between subject and object. However, it seems to me that there are at least three distinct forms of dualism which are suggested to varying degrees by Bushev’s text. I will discuss each of these forms of dualism as well as their connection with scientific realism in turn. My general point will be that further analysis is needed in order to bring talk of Cartesian dualism into meaningful contact with the discussion of scientific realism.

 The first form of dualism is the classic mind-body dualism widely attributed to Descartes. Such dualism posits the existence of an immaterial mental substance that is distinct from the physical stuff of which our bodies are made. Given the commitment to two kinds of substance, it is often called “substance dualism”. Such substance dualism gives rise to a host of problems about mind-body interaction which constitute the traditional mind-body problem. The appeal of substance dualism has significantly faded with the advance of modern science. For there is neither evidence for the existence of irreducibly mental substance, nor are wholly non-physical entities required for the legitimate explanatory purposes of the sciences. Most contemporary philosophers of mind reject substance dualism in favour of a materialist or physicalist conception of mental phenomena. However, opinion divides on the exact manner in which the mind might be a physical thing. Some argue for the elimination of mental discourse in favour of physical discourse, others propose the reduction of mental states to the physical states with which they are identical, while many favour one or another form of non-reductive physicalism.

 But while there would appear to be little scope for the revival of traditional substance dualism within the modern scientific outlook, it is not clear that scientific realism, as I have characterized it, need take any particular stance on the issue. As indicated in section 6 of ‘What is Scientific Realism?’, the scientific realist is free to adopt a materialistic metaphysical outlook. However, to adopt such an outlook would represent an extension of the doctrine beyond the key commitments of realism. For no mention of materialism is made in any of the principles of realism. Nor does materialism follow from the principles of realism without the addition of a range of further assumptions. Given this, no inconsistency would arise if the scientific realist were to adopt substance dualism despite the fact that this is a quite unlikely position for a contemporary philosopher of science to adopt. This point may be presented in another way. At an earlier stage in the history of science substance dualism may well have been a viable theory of the mind. Presumably this was the case at the time of Descartes. In that historical context, it might well have been reasonable for the scientific realist to adopt a position of substance dualism as a theory of the relation between mind and body that was in keeping with contemporary scientific thought. Thus, to conclude on this front, it is not immediately clear that scientific realism should be taken to entail the elimination of Cartesian dualism, if such dualism is understood as classic substance dualism. While the realist is certainly free to adopt a materialist theory of the mind, the official stance of the realist *qua* scientific realist should be a neutral one.

 The second form of dualism which may be discerned in Bushev’s text involves the contrast between knowing subject and external world. This contrast is familiar from the sceptical scenarios explored by Descartes in the *Meditations*. Rather than a dualism of mental and physical substance, this is an epistemological dualism between knowing subject and object of knowledge. Descartes’s hypothesis of the evil demon, as well as Putnam’s modern analogue of the brain-in-a-vat, give rise to the problem of radical scepticism about the external world. For if the entirety of our everyday thought and experience is consistent with our being subject to a massive illusion produced by an evil demon, or with our being brains in a vat under the control of a mad scientist, then the basis for our belief that we are in fact embodied agents who inhabit a material world is thrown into question at the most fundamental level. Given the consistency of our conscious experience with such sceptical scenarios, it is not clear that there are any epistemically secure grounds on the basis of which we may rule out the possibility that the external world we seem to inhabit is an unreal illusion.

 Again, as with the previous interpretation of the subject-object dualism, it is not immediately apparent that the scientific realist need take a stance on the issue. Scepticism about the external world is a problem in general epistemology which relates to the entirety of our empirical knowledge, rather than a local problem within the philosophy of science about the basis of scientific knowledge *per se*. The general problem may be assumed to be resolved before attention turns to the epistemology of science. Nevertheless, a great many contemporary scientific realists (myself included) are sympathetic to naturalized approaches to epistemology. As such, they will no doubt reject the problem of radical scepticism as resting on a mistaken paradigm of knowledge which employs inappropriately high (e.g., sceptical) standards for knowledge, or as mistakenly attempting to ground knowledge in the content of first person experience. But, while I suspect a great many scientific realists would adopt such a naturalistic outlook, there is no reason in principle why the scientific realist as such need be committed to the naturalistic standpoint. It would be perfectly coherent for a scientific realist to regard the Cartesian contrast between knowing subject and external world as a legitimate one, and to seek to overcome the resulting problem of radical scepticism by arguing that we have good reason to believe in the existence of an external world on the basis of our sensory experience. Thus, it seems to me that scientific realism, at least as I have characterized it in ‘What is Scientific Realism?’, has little direct bearing on Cartesian dualism in this second sense of the subject-object dichotomy.

 However, there remains a third way to construe the subject-object dualism, which may permit the issue to be joined more directly. This construal of the distinction involves a slight modification of the second interpretation which we have just considered. The difference relates to the way in which the external world which constitutes the object of knowledge is to be understood. Where the second interpretation involves the contrast between knowing subject and known object, the third interpretation construes the object side of the dualism as a mind-independent reality. It is not just that there is an external world, which is the object of our knowledge, but that this world exists independently of human experience, thought or conceptualization. It is an objective reality which in no way depends on the mental activity of the knowing subject. If the subject-object dichotomy is understood in this third sense, then a number of Bushev’s remarks about modern physics may be brought to bear on the question of realism.

 Bushev does not explain in any detail the source of the tension which he sees between modern physics and the subject-object dualism. At one point, he says the following:

... the situation in science changed drastically when physics demonstrated that on practically all its levels of cognition the subject can be an active participant in the processes of [the] outside world ... (2002, p. 132)

A few pages further on, he adds that:

The Cartesian paradise has already become inadequate for contemporary physics. The subject is no more capable of keeping its anonymity, science itself forces it to the stage. The idea of a detached observer is already untenable ... The subject himself turns into an object of the cognition process. (2002, p. 136)

It is difficult to judge on the basis of remarks such as these exactly which aspects of modern physics are supposed to be responsible for the demise of the subject-object dualism. But I suspect the sort of thing Bushev has in mind are problems relating to the role of the observer or the measurement apparatus in the measurement of various quantum mechanical systems, of the sort illustrated by the well-known paradox of Schrodinger’s cat.

 In any event, the general problem seems clear enough. Bushev takes modern physics to show that there is a sense in which the mental states of the knowing subject interfere or interact in some way with states of the external world. At first blush, this appears to conflict with the metaphysical realist component of scientific realism (principle 3), according to which the world investigated by science is an objective reality which exists independently of human thought. But, if this is right, it is not just the case that the advance of modern physics undermines the subject-object dualism. It also appears to undermine scientific realism. Given this, it is unclear why Bushev suggests that scientific realism may lead to the “solution of the subject-object problem” (2002, p. 139). If anything, the developments in modern physics to which Bushev refers suggest the rejection of scientific realism, or at the very least the substantial refinement of the doctrine.[[3]](#footnote-3)

 My remarks in this section have so far reflected the position outlined in ‘What is Scientific Realism?’ However, as mentioned in section 3 above, I have argued in a later paper, ‘Scientific Realism: An Elaboration and a Defence’, that scientific realism must rest upon a more basic realist stance characterized by rejection of anthropomorphism and commitment to a commonsense view of the world. On the basis of this latter approach, it may be seen that there is a more fundamental sense in which scientific realism contrasts with the Cartesian perspective. However, this contrast does not relate so much to dualism in any of the above senses as it does to the attempt by Descartes to establish knowledge of the external world on the basis of our immediate consciousness. In my view, it is a profound mistake to seek to ground knowledge on immediate thought or experience, or in any sense to attempt to reconstruct the world on the basis of mental experience of any kind. Rather, we must take it as a basic given that we are embodied agents who inhabit a real, external world, of which we are capable of acquiring genuine, veridical knowledge. Thus, on my more developed defence of the position, scientific realism is quite radically opposed to the Cartesian project. It rejects it from the outset.

**6. Abstract Realism?**

My attempt to provide a general characterization of scientific realism has not found favour in all quarters. In his paper, ‘Abstract Realism’, Constantin Yanakiev suggests that I am seeking to impose rules of membership for the club of scientific realists (Yanakiev, 2003, p. 130). He complains in pragmatist spirit of the abstract nature of the debate (2003, p. 131). And he proposes that the issue might be better approached along the lines of Ian Hacking’s experimentalism by attending to the details of scientific practice (2003, p. 135). I must confess to a certain level of sympathy with several of Yanakiev’s points, and suspect that we may be somewhat at cross-purposes. Hence, the remarks that follow are meant to clarify rather than defend.

 Let me begin with Yanakiev’s point about rules of membership. One of my guiding rules in philosophy is to focus on problems and theses, rather than on the names of positions. Nothing important rests on who is entitled to the title of ‘realist’. What is important is to evaluate the position characterized by the particular set of principles that I have proposed under the heading of scientific realism. As it happens, I tend to think that the principles I have elaborated comprise an accurate portrayal of the basic position of those contemporary philosophers of science widely regarded as defending the position of scientific realism. It also seems to me to be important to distinguish the position which consists of those principles from alternative positions in the philosophy of science, which share some of the same principles, but which differ from the position by denying others of these principles. As indicated in section 2, the principles I have listed serve this purpose well, since they rule out standard anti-realist positions as anti-realist, while counting standard forms of scientific realism as such.

 Lurking behind Yanakiev’s jibe about club membership is a deeper point. Namely, entity realists who focus on the reality of entities rather than the truth of theories may well reject my principle 5, according to which the truth of empirical claims is objective in the sense that it depends on how matters stand in the mind-independent world. The question arises, therefore, of the extent to which such entity realists might be accepted into the club of realists. The short answer, of course, is that to the extent that entity realism rejects principle 5 (or principle 4, for that matter), it fails to qualify as a form of scientific realism in the sense defined by the five ‘core principles’. Still, there is enough of a likeness (a “family resemblance”) and commonality of purpose shared between entity realism and scientific realism, as so defined, to offer entity realists associate membership in the club. Of course, they might decline the invitation.

 Yanakiev’s principal concern about scientific realism is that it is an abstract position cut off from the rough-and-tumble of real scientific work. Rather than engage with pointlessly abstract questions about whether what science tells us is really true, Yanakiev suggests in pragmatist fashion that there is no need to provide a justification for scientific claims over and above the procedures and practices that scientists themselves employ (2003, p. 130). Since I also hold that science requires no further justification over and above the procedures and practices followed by scientists, and since I take the main rationale for scientific realism to lie in the practical domain, I see a closer relation between realism and pragmatism than Yanakiev does.[[4]](#footnote-4)

 Concern about the abstractness of the debate can, I think, be dispelled by consideration of the role played by the scientific realist. The relation between the scientific realist *qua* philosopher and the scientist *qua* practicing scientist is analogous to the relation between the role of the sports commentator and that of a sports person. The game of Australian rules football is a fast-moving and highly physical sport, though the same cannot ordinarily be said of the task of football commentary. The activities of the person playing the game are not the same as the activities of the person providing running commentary or retrospective analysis of the game. In a similar way, the activities of the philosopher providing an interpretation of the game of science are not the same as the activities of the practicing scientist. Abstract as the former may occasionally be, there need be nothing abstract about the latter.

 This relates to Yanakiev’s suggestion that the scientific realist must adopt a view of science as an abstract intellectual game without practical foundation (cf. 2003, pp. 123-4, 133). That this is not the case may be seen by a moment’s reflection on the standard success argument for the realist interpretation of science. By “the success of science”, the realist typically has in mind sustained predictive accuracy and reliability, explanatory power and breadth, as well as an enhanced capacity to exercise technological control over the environment (not that this last is necessarily a good thing). Such success is a practical achievement. There is nothing abstract about it. It is precisely the practical success of the scientific enterprise which, according to the realist, can only be satisfactorily explained on the basis of a realist interpretation of science. For this reason, it is not immediately apparent just why Dewey’s case of the soapsuds experiment is meant to serve as a counterexample to realism (2003, p. 125). The case cries out for realist analysis.

 The stark contrast that Yanakiev draws between the allegedly abstract nature of realist philosophy of science and the practical character of science seems to me to rest on a basic misunderstanding of the realist position. This is apparent from Yanakiev’s treatment of the realist principle of the objectivity of truth (principle 5). He has this to say about the relation between truth and the objective reality investigated by science:

[The] intention [of principle 5] has been to preserve the club for members that find the source of scientific truth in something extra-*human*. And when driven into a corner I would have to confess that I do not find any sense in discussing a reality independent of all human tasks and our efforts to accomplish them. (2003, p. 130-1)

I have already commented above on the issue of club membership. Apart from this, Yanakiev attempts to make two points. First, the realist takes scientific truth to rest on extra-human states of affairs. And, second, there is no sense talking about a reality independent of human activity. I shall respond to these points by clarifying the relevant aspects of the realist position.

 In the first place, the scientific realist wishes to establish a particular thesis about the relationship between certain sorts of scientific claims and the states of affairs in the world which those scientific claims report. In particular, the realist asserts that such scientific claims are made true by the way things stand in the world, rather than by anything that we think or do. It is important to bear in mind that the sorts of claims in question are claims about entities, facts and laws in the extra-human world (e.g., ‘Electrons have negative charge’). The realist denies that such claims depend for their truth on any opinions which we may form about the matter, or on procedures of confirmation which might be satisfied by the claims. To be true, such claims about the extra-human world must get the facts about the extra-human world right. That is the kind of claims that they are. The point of this aspect of realism is not, therefore, to divorce truth from anything human. It is, rather, to insist that the truth of claims about extra-human states of affairs depends on those very states of affairs, rather than on thoughts or experiences which we might have in relation to those states of affairs.

 It is interesting to note that Yanakiev chooses to formulate the point in terms of the extra-human, as well as human tasks and efforts. This was not how I framed the issue. Instead, I expressed principle 5 in terms of objectivity and mind-independence. I certainly do not wish to deny that there may be truths about humans, e.g., about our mental states. So, I would not argue that all truths require extra-human truth-makers. In any event, I did not seek to formulate scientific realism in a form suitable for application to the human sciences. I was thinking instead of the natural sciences, which is the usual context for discussion of scientific realism. The point of framing the discussion in terms of objectivity and mind-independence derives from the scientific realist commitment to a mind-independent reality and the objective character of truth. For the realist is opposed to idealist views according to which the world or truth about the world is either fundamentally mental or mind-dependent, or which assert that the world that is knowable by us must be a mind-dependent construction made out of our concepts and experiences. It is not clear that the human/extra-human contrast is the relevant contrast here.

 As for the second point, a number of threads are run together which I will attempt to disentangle. Yanakiev suggests that there is no sense talking about a reality that is independent of human activity. And yet so much of science deals with matters independent of human activity (e.g., earthquakes, sun spots, planetary motion) that it is difficult to see what sense is to be made of this suggestion. Perhaps Yanakiev is concerned that, on the realist conception of reality, reality radically transcends human knowledge and activity. But there is no reason to suppose that the objective, mind-independent reality to which the realist is committed is a reality that is either divorced from human activity or is cognitively inaccessible to us. What the realist wishes to assert is simply that the so-called external world is a reality that does not depend for its existence, structure or properties on human experience or cognitive activity. But even though the external world does not depend on us in any way, we are very much a part of it since it is the world that we inhabit and with which we must interact causally on an ongoing basis. Perhaps, finally, Yanakiev is concerned that the notion of truth is unable to be understood outside the context of human practical activity. Admittedly, our application of the truth-predicate to assertions does typically depend upon our test procedures and criteria of confirmation. But, to the extent that the assertions to which truth is ascribed are claims about the world beyond those criteria and procedures, our notion of truth has legitimate application to assertions about the world independent of human activity.

 I will conclude this section with a brief word of caution about Yanakiev’s appeal to Hacking’s “new experimentalist” approach to entity realism proposed in his *Representing and Intervening* (Hacking, 1983). Hacking argues for realism about the theoretical entities which scientists manipulate in the course of scientific experiment. He says that such entities are experimental rather than hypothetical entities (1983, p. 262). And he proposes an ‘experimental argument’ for the reality of experimental entities employed by scientists in experiment (1983, p. 265). The argument is that experimental entities are shown to be real by scientists’ ability to manipulate them in the course of experimentation on other entities (“if you can spray them then they are real”, 1983, p. 23). But while Hacking seeks to distance the experimental argument from the success argument for realism (1983, p. 271), it is doubtful that he succeeds. Hacking’s “direct proof” for the reality of experimental entities, as he at one point calls it (1983, p. 274), may very plausibly be construed as a success argument in disguise (see Resnik, 1994). Namely, it is because the best explanation of the success of experimental practice is the reality of the experimental entities that underlie that practice that such entities should be taken to be real. In sum, it is not clear that Hacking’s argument for entity realism based on an appeal to experimental practice possesses any force over and above that of the standard success argument for realism. If this is so, then a further point of difference alleged by Yanakiev to obtain between scientific realism and pragmatism may be seen to collapse.

**7. Conclusion**

In this paper, I have sought to continue in the ecumenical spirit that I adopted in ‘What is Scientific Realism?’, though I have at times taken a more partisan stance. I have reiterated, and, where necessary, attempted to clarify, the central tenets of the position of scientific realism as that doctrine figures in the debate between realism and anti-realism in the philosophy of science. I have also indicated a number of ways in which my original characterization of scientific realism requires modification. And I have made reference to more detailed treatments of a number of issues that I have presented elsewhere.

 With respect to the papers on which I have commented here, I have responded to objections raised against scientific realism, and clarified points of apparent misunderstanding or confusion. I have argued that the problem of conceptual schemes does not, *pace* Michele Marsonet, give rise to any fundamental limitation on realism. In response to Michael Bushev, I have attempted to find a suitable analysis of the Cartesian subject-object dualism on the basis of which to assess his claim about the relation between dualism and scientific realism. However, I am not prepared to venture a definitive judgement on this topic, other than to note that the situation appears more complex than Bushev’s own discussion of the matter suggests. Finally, I have addressed Constantin Yanakiev’s concerns about the abstract nature of realism by attempting to clarify a number of features of realism in the philosophy of science. In particular, I have pointed to aspects of the scientific realist position which cohere with the pragmatists’ emphasis on human activity and practice.

 I do not, in sum, regard the objections raised in the papers under consideration as posing any particular obstacle to scientific realism. However, a number of interesting issues have emerged in these papers which it has been important to address in further elaboration of the doctrine that goes beyond the scope of my original paper. This has been a welcome opportunity to address these issues which has enabled me to expand upon my original presentation of the scientific realist position. If I have succeeded in my attempt to promote discussion of the topic of scientific realism, then I can look forward to further fruitful exchanges on the topic that will take place in the future.

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1. To see that the five core principles serve the purposes of excluding standard cases of anti-realism, note that instrumentalism is ruled out by principle 2, internal realism is ruled out by principle 4 and perhaps 3, while constructive empiricism may be excluded on the basis of principle 1. The one troublesome case about which I have some concern is that of entity realism. Entity realists are realists about the unobservable theoretical entities discovered by science (though they might contest the term ‘theoretical’). But some entity realists reject commitment to the truth of theories, some advocate an epistemic conception of truth, and others merely insist that realism be distinguished from any doctrine about truth. My own inclination is to regard entity realism as a variant of scientific realism which differs from the standard version of the position solely with regard to the question of truth. But at the same time I grant that entity realism may be interpreted as a metaphysical realist position that is, strictly speaking, opposed to scientific realism as defined here due to its denial of a crucial role to the realist notion of truth in formulation of the doctrine. I will briefly touch on this issue again in section 6. [↑](#footnote-ref-1)
2. My initial decision to employ the term ‘axiological’ in my characterization of the realist aim of science was influenced by Larry Laudan’s use of the term in Science and Values (1984). But Laudan’s concern in that book does bear on the general question of epistemic valuation in science, whereas I am concerned to emphasize the importance of the key constitutive goal of science, namely, the goal of truth. My use of the term was inappropriate given that the general question of value was not my main concern. [↑](#footnote-ref-2)
3. It is important to enter a major caveat here. In order to show that the problems of measurement in quantum theory have any implications with respect to the independence dimension of realism, it must be shown that observer-dependence of measurement is incompatible with the realist claim of mind-independence. But no conclusions may be drawn on this front without significant further analysis of the various dependence and independence relations in question. [↑](#footnote-ref-3)
4. It might well be asked what role is served by a philosophical account of the epistemic warrant of the rules of scientific method, if science stands in no need of philosophical justification. In my view, the role of a philosophical theory of epistemic warrant is precisely to articulate a theory of the nature of that warrant, rather than to supply the warrant. If the rules of method are warranted, then scientists who use those rules are already warranted in accepting the results and theories on the basis of those rules in advance of philosophical analysis of the nature of their warrant. It is one thing to be warranted in a belief, quite another to provide a theory of the nature of that warrant. I should add that this view of the philosopher’s task is quite consistent with the possibility that the philosopher might discover that, unbeknownst to scientists, a given methodological rule either possesses or fails to possess a warrant, so that the philosopher might also contribute directly to the justification of scientific practice. [↑](#footnote-ref-4)