

Misunderstanding *Understanding Scientific Progress*

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In my book *Understanding Scientific Progress* (Maxwell 2017), I argue that fundamental philosophical problems about scientific progress, above all the problem of induction, cannot be solved granted *standard empiricism* (SE), a doctrine which most scientists and philosophers of science take for granted. A key tenet of SE is that *no permanent thesis about the world can be accepted as a part of scientific knowledge independent of evidence*. For a number of reasons, we need to adopt a rather different conception of science which I call *aim-oriented empiricism* (AOE). This holds that we need to construe physics as accepting, as a part of theoretical scientific knowledge, a hierarchy of metaphysical theses about the comprehensibility and knowability of the universe, these theses becoming increasingly insubstantial as we go up the hierarchy. Fundamental philosophical problems about scientific progress, including the problems of induction, theory unity, verisimilitude and scientific discovery, which cannot be solved granted SE, can be solved granted AOE.

In his review of *Understanding Scientific Progress*, Moti Mizrahi makes a number of criticisms, almost all of which are invalid in quite elementary ways (Mizrahi 2018).

Thus Mizrahi argues that I am quite wrong in holding that "most philosophers of science have adopted some version of SE". He quotes me as declaring that SE acknowledges that "[c]onsiderations of simplicity, unity, or explanatory power may legitimately influence choice of theory" and then goes on to argue, astonishingly, that scientific realists (60% of philosophers of science) do not support SE because they hold that both "simplicity and unity count as criteria for selecting the best explanation from competing hypotheses". But this is a key tenet of SE. Mizrahi seems to think that scientific realists, in upholding a key tenet of SE, thereby reveal that they reject SE! I am baffled.

It is true that there is an additional tenet of SE, as I have made clear above (and as I make clear in the book), namely: *no permanent thesis about the world can be accepted as a part of scientific knowledge independent of evidence*. If scientific realists reject this tenet, then they reject SE. But Mizrahi says nothing about the matter. Mizrahi's argument that a majority of philosophers of science reject SE is bafflingly incoherent.

Mizrahi goes on to charge me with upholding scientific reductionism on the grounds that I hold that "all branches of natural science other than physics presuppose parts or aspects of some more fundamental science". But Mizrahi here makes an elementary blunder: in holding that all branches of natural science *presuppose* physics one is very definitely not thereby committed to holding that all these branches can be *reduced* to physics. Indeed, from my very first publications, I have argued for a version of anti-reductionism (Maxwell 1966, 1968).

Mizrahi goes on to acknowledge that I explicitly argue against reductionism in the book under consideration. Mizrahi concludes, absurdly, that I am inconsistent! Actually, there is no inconsistency: I argue, entirely consistently, that branches of natural science presuppose some part of physics but statements about the experiential cannot be reduced to physics.

Mizrahi then highlight what he considers to be another inconsistency in my book. He declares:

On the one hand, [Maxwell] claims that “the scientific community at present takes SE for granted, and tries to ensure that scientific practice conforms to its edicts” (159). His solution to problems [of scientific progress] is to discard SE and implement AOE (161). On the other hand, he also claims that “physics, in accepting the unified theories that it does accept, thereby allows considerations of unity or simplicity to over-ride empirical considerations” (29), so “AOE [has] in fact been put into practice” (114). So which one is it? Is AOE already put into practice or do we have to replace SE with AOE? If “physics [already] puts something like AOE into practice” (142), why insist that “we need to adopt and implement the new scientific paradigm of [AOE]” (161)?

"Maxwell seems to be aware of this inconsistency (74)", Mizrahi continues, "but it is not clear that he manages to resolve it".

On page 75 of my book, any hint of inconsistency is entirely laid to rest. I declare "the physics community implements standard empiricism [SE] in a sufficiently hypocritical fashion to make it possible for what they do to approximately accord with the edicts of AOE". And in a footnote I quote a remark of Einstein: "If you want to find out anything from the theoretical physicist about the methods they use, I advise you to stick closely to one principle: don't listen to their words, fix your attention on their deeds". Einstein had no problem in appreciating what Mizrahi seems incapable of grasping: scientists may well do one thing, and claim they are doing something else. There is such a thing as hypocrisy, conscious or unconscious. We do not always do what we say we are doing. It is entirely possible for scientists to claim they uphold and implement SE when actually, in their scientific actions, what they put into practice is something much closer to AOE. Allegiance to SE is only at best hypocritical. But all this seems to be beyond the comprehension of Mizrahi. And because it is, I am accused of inconsistency. At most, there is an inconsistency between what scientists *say* they do, and what they *actually* do. There should be no problem at all in recognizing this as a possibility. Einstein held it to be true. And if I am correct in holding that the scientific community tends to say one thing, do another, it is not me who is inconsistent, as Mizrahi claims - or Einstein - but if anything the scientific community. I find it astonishing that the very concept of hypocrisy seems beyond Mizrahi's grasp.

Mizrahi goes on to quote me as saying “the purpose of making explicit the metaphysical theses of AOE is to stimulate attempts to develop improved versions of these theses” (146). And Mizrahi comments "it is not clear how making assumptions explicit is supposed to solve" the eight problems the book claims to solve. But I spell out detailed arguments as to how AOE solves the eight problems of the book: all this, the basic content of the book, is just ignored by Mizrahi.

Again, I am quoted as saying that the “whole point of [AOE] is to facilitate the critical assessment of theses low down in the hierarchy in the light of the empirical success and failure of science (104)”. And Mizrahi comments "But critical assessment does not guarantee progress. One might think that philosophers critically assess philosophical theories regularly, and yet there are serious questions about whether philosophy makes progress". Critical assessment does not, of course, guarantee progress, but it may well give us a better hope of progress than any other method. Furthermore, the exploration and critical assessment of possible metaphysical theses for physics, advocated by AOE, proceeds within the hierarchical

framework of AOE. The theses in question are assessed both in terms of their compatibility with theses higher up in the hierarchy, and in terms of the extent to which they are associated with empirically progressive research programmes of physics, or promise to lead to such research programmes. Critical assessment of metaphysical theses, conducted within the framework of AOE, is a part of *science* - or natural philosophy. It is critical assessment that is tightly constrained by being conducted within the framework of AOE, and to that extent differs from the kind of critical assessment that goes on in academic philosophy, to which Mizrahi refers. All this is ignored by Mizrahi.

Mizrahi goes on to say "it is curious that Maxwell does not engage with van Fraassen's Constructive Empiricism, which seems to be the closest view to Maxwell's target of criticism, i.e., SE." Here, once again, Mizrahi reveals that he has not bothered to attend to the content of the book. A key tenet of SE, to repeat, is that *no permanent thesis about the world can be accepted as a part of scientific knowledge independent of evidence*. Logical empiricism, hypothetico-deductivism, inference-to-the-best explanation, scientific realism, the views of Popper, Kuhn, Lakatos, and most contemporary philosophers known to me, accept this tenet, and thus accept SE. Only an elementary misreading of my book could result in the conclusion that SE is all-but equivalent to van Fraassen's constructive empiricism.

Mizrahi's review of my book is a wasted opportunity. It could have provided a serious critical examination of the *arguments* which set out to show that AOE solves major problems in the philosophy of science, AOE thus deserving to be taken seriously as the way we ought to conceive of, and do, science. My proposed solutions to the problems of induction, theory unity, verisimilitude, and scientific discovery - the substance of the book - are all passed over in silence. Instead of discussing any of that, Mizrahi produces a series of criticisms (mostly of peripheral matters), all of which are invalid in quite elementary ways.

References

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