In this paper I contrast the very modest view of the main ‘consideration’ supporting scientific realism taken by Poincaré and others with the much more ambitious argument developed by Stathis Psillos using some ideas of Hilary Putnam’s and of Richard Boyd’s. I argue that the attempt to produce a more ambitious argument not only fails, but was always bound to fail.

1. The No Miracles Intuition

Most of us tend toward scientific realism because of the amazing predictive successes enjoyed by theories in (mature) science. To take a well-worn example: the classical wave theory of light is, at root, a series of claims about an unobservable medium, the ‘luminiferous aether’, and about unobservable periodic disturbances travelling through it; yet it turns out to follow deductively from this theory (together of course with accepted auxiliary assumptions) that, for instance, the ‘shadow’ of a small opaque disc held in light diverging from a point source will have an illuminated spot at its centre—a claim that can be directly empirically checked and turns out to be true.1 ‘How on earth’, it seems unavoidable to ask, ‘could a theory score a dramatic predictive success like that unless its claims about the reality ‘underlying’ the phenomena (in this case, about the unobservable luminiferous aether) are at least approximately in tune with the real underlying structure of the universe?’ To assume that it could score such successes, while not itself even being approximately true would be, in Poincaré’s words, “to attribute an inadmissible role to chance”2.

Of course in this and similar cases, predictive success is the icing on a cake that must already be substantial. If scientists threw out enough theories simply at random, eventually one would score some predictive success ‘by chance’. But other conditions are implicitly presupposed: for example, that the predictive success

1 For the historical details of this case, which are at odds with the usual philosophical presentation, see John Worrall, “Fresnel, Poisson and the white spot: the role of successful predictions in the acceptance of scientific theories”, in: D. Gooding, T. Pinch and S. Shaffer (Eds.), The Uses of Experiment. Cambridge: Cambridge University Press, 1989, pp. 135-157.
is genuine and not brought about by some *ad hoc* accommodation of the relevant phenomenon within the theory at issue; also that the theory accounts for all the empirical success of its rivals, and so in particular for the success of its predecessor; and finally that the theory has a certain ‘simplicity’ or ‘unity’. But provided that these conditions are met then the realist-leaning force of predictive successes like that of the white spot seems difficult to resist. As Duhem put it:

The highest test … of our holding a classification as a natural one is to ask it to indicate in advance things which the future alone will reveal. And when the experiment is made and confirms the predictions obtained from our theory, we feel strengthened in our conviction that the relations established by our reason among abstract notions truly correspond to relations among things.

Let’s call the “conviction” highlighted by Duhem ‘the no miracles intuition’. Notice that it is local: it applies to particular theories and their particular predictive successes. A general case for scientific realism can based on it only in a piecemeal, conjunctive way—it is reasonable to think that the general theory of relativity is approximately true because of its predictive success with, for example, the motion of Mercury, and it is reasonable to think that the photon theory of light is approximately true because of its predictive success with the photoelectric effect, and … This conjunction will not be over ‘the whole of science’ (whatever that is supposed to be). After all, some parts of science are frankly speculative, others highly problematic. Instead the conjunction will be over only those particular theories that have scored genuine particular predictive successes and hence elicit the no miracles intuition. No sensible scientific realist should ever have been realist about every theory in science, nor even about any theory that is (currently) the ‘best’ in its field. (It may after all, as has often been pointed out, be only ‘the best of a bad lot’.) She should be realist only about theories that have scored proper predictive success, since only such success elicits the no miracles intuition and only that intuition underwrites realism.

Of course scientific realism faces many well-rehearsed problems—notably the challenge based on the history of theory change: presumably it was reasonable to think that, for example, the elastic solid ether theory of light was approximately true because of its predictive success (see above). Is this compatible with the current realist view that the still more impressively predictive photon theory of light is approximately true, given that the two theories are logically incompatible? However I lay these problems aside here.

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