WHY IS IT RATIONAL TO BELIEVE SCIENTIFIC THEORIES ARE TRUE?

1. INTRODUCTION

Alan Musgrave is one of the foremost contemporary defenders of scientific realism. He is also one of the leading exponents of Karl Popper’s critical rationalist philosophy. In this paper, my main focus will be on Musgrave’s realism. However, I will emphasize epistemological aspects of realism. This will lead me to address aspects of his critical rationalism as well.

Musgrave is both a scientific realist and a commonsense realist. ‘Scientific realism,’ he says, ‘is a form of realism’ (1999, p. 132). And realism is committed to the commonsense realist belief ‘that there is a real world outside of us and largely independent of us’ (1999, p. 132). ‘There is,’ Musgrave adds, ‘a continuity between common sense and science’ (1999, p. 132). But while science may lead to occasional revision and refinement of common sense, ‘it does not show that it is root-and-branch mistaken’ (1999, p. 133; cf. 1996, p. 23). The real world postulated by common sense is the reality that science seeks to explain. This world does not depend on human belief or experience. Nor is it relative to conceptual scheme, theoretical background or mode of description (1999, pp. 52, 173, 180 ff).

For Musgrave, though, realism is not just a thesis about reality. It is also a thesis about truth. Musgrave takes the aim of science to be truth. He ‘subscribe[s] to the old-fashioned idea that scientific realism ... says that the aim of a scientific inquiry is to discover the truth about the matter inquired into’ (1996, p. 19; cf. 1999, p. 52). Scientific theories are taken at face-value as genuine assertions about the world, the truth or falsity of which depends on the way the world really is (1996, p. 26). Musgrave understands truth in the classic correspondence sense that he takes to have been defined by Tarski. A theory or statement is true just in case the world is the
way it is said to be (1993, ch. 14; 1996, p. 24; 1999, p. 165). This is a ‘non-epistemic conception of truth’ (1996, p. 28; cf. 1999, p. 186). Given the emphasis on correspondence between theory and reality, Musgrave’s realism diverges from the tendency among some scientific realists to adopt ontological rather than truth-orientated versions of the doctrine. Musgrave dismisses such ‘entity-realism’ as incoherent (1996, p. 20).1

Musgrave’s realism has an epistemological dimension as well. For Musgrave, methodological considerations play a prominent role in the appraisal and acceptance of scientific theories. While a variety of methodological norms figures in Musgrave’s writings, there is some tendency on his part to emphasize the testing and falsification of theories.2 The attempt to falsify theories is the basis of the critical method in science. And criticism is the heart of rationality. A critical discussion may provide ‘the best reason there is for believing (tentatively) that a hypothesis is true’ (1999, p. 324). If a theory ‘best withstands criticism then it is reasonable for scientists to believe that theory and to use it in practical applications’ (1999, p. 325). Such belief must remain tentative, however. For Musgrave is a fallibilist who eschews the search for epistemic certainty in science and everyday affairs (cf. 1993, ch. 15; 1999, pp. 194 ff, 341-3).

But matters of method and rationality are separate matters from those of reality and truth. This is especially the case from the perspective of realism. In the first place, to believe that the world is a given way does not mean that the world is that way. Nor does it make the world that way. Reality is not subject to determination by human thought. This remains the case even if the belief that the world is a given way is a belief that is rationally justified. For one may rationally believe what is false. The point applies with equal force to scientific theories certified by the norms of scientific method. A theory that is certified by the norms of method is not thereby

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1. Entity realism is an ontological thesis about the reality of the unobservable (‘theoretical’) entities discovered by science. It contrasts with versions of scientific realism according to which the claims made about such unobservable entities by scientific theories are true or approximately true, or at least candidates for truth or falsity. Musgrave raises the following objection to entity realism: ‘We are to believe in scientific entities ... without thinking true any theory about those entities .... This is incoherent. To believe in an entity, while believing nothing further about that entity, is to believe nothing. I tell you that I believe in hobgoblins (believe that the term ‘hobgoblin’ is a referring term). So, you reply, you think there are little people who creep into houses at night and do the housework. Oh no, say I, I do not believe that hobgoblins do that. Actually, I have no beliefs at all about what hobgoblins do or what they are like. I just believe in them’ (1996, p. 20). Musgrave’s point is that it is not possible to believe in the existence of some entity without having at least some beliefs about the entity. This is a crucial point to be made in relation to entity realism. But it does not entirely dispose of the doctrine. For, as Musgrave notes, entity realists may adopt a less extreme position according to which some low-level theoretical beliefs may be true of the theoretical entities.

2. Since Musgrave often writes within the context of falsificationist philosophy of science, an emphasis on such issues as corroboration, independent testability, ad hocness and predictive novelty is perhaps understandable. However, within the context of scientific realism, Musgrave places special emphasis on the role of novel predictions, arguing that the success argument for scientific realism should be restricted to theories which correctly predict facts not employed in the construction of the theory (cf. Musgrave, 1999, pp. 55-7, 119, ch. 12). Other methodological criteria, such as simplicity or unity, also receive favourable mention (cf. 1999, 111-2, 247ff). Thus, despite the emphasis on falsification, Musgrave allows that the methodology of science consists of a plurality of methodological rules (cf. 1999, pp. 226-7, 250, fn 291).