

# THE UNCERTAINTY OF THE GLOBAL EARTH IN THE HISTORY OF PROGRESS

David Wootton, *The Invention of Science: A New History of the Scientific Revolution*  
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Is the shape of the Earth really a globe? Reading closely, the author of this voluminous paperback (first published as hardcover in 2015), historian David Wootton, does not take for granted the *fact* that the Earth is round or spherical. However, this does not mean that he is a relativist. And it is interesting to consider why he regards science as progress against any relativist view of the history of science.

On the whole, the book is an extraordinary contribution to the studies of the history of early modern science and philosophy. Through the seventeen chapters with rich notes and illustrations, Wootton elaborates on epistemological problems in observing the heavens and the earth, or how openly and clearly people at the time constructed scientific knowledge. For instance, convincingly, Wootton re-interprets Butterfield's and Kuhn's conceptions of 'scientific revolution' in early modern Europe, and re-examines the idea of '*eureka*', 'discovery', or 'invention' (p. 67) as a necessary precondition for science. For he positively defends the view that the scientific revolution 'has been so astonishingly successful' (p. 571), that the unique fact of science is 'progress' in its history (p. 513). In this progressive sense, he is philosophically neither committed to Kuhn's (and Rorty's) subdued relativism that science evolves within a set of its terms, nor to strong relativism that progress in science is illusory and thus falsifiable. Also, in some longer notes, he explicates why the relativism of a number of historians is undermined (pp. 580–92).

In his criticism of strong relativism, specifically that of Barnes and Bloor's Edinburgh school (Science Studies Unit) under the influence of Wittgenstein, Wootton considers the example of a flat earth. "[I]f I meet someone who claims that the earth is flat, I will seek a psychological and/or a sociological explanation for their peculiar belief; when I meet someone who claims that the Earth is a sphere floating through space and orbiting the sun, I must look for exactly the same sorts of explanation for this belief too" (p. 43). This is because, in strong relativism, one cannot convince people with better evidence of the latter belief rather than the former. Thus for relativists, who often follow Wittgenstein's philosophy, belief in the absolute existence of a global Earth does not amount to certainty.

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In my view, what is most remarkable is that for his own revisionist argument, Wootton examines hypotheses of a non-global or differently shaped Earth, including a flat earth. It seems to me that he successfully argues for the uncertainty of the global Earth in the history of progress, from his Wittgensteinian perspective.

In his own interpretation of Wittgenstein, including the posthumous publication *On Certainty* (1969), Wootton objects to connecting the philosophy of Wittgenstein to any relativism as the new post-Kuhnian view of the history of science (pp. 577–80). While admitting that Wittgenstein's texts are confusing, Wootton's reading of *On Certainty* is essentially that what was true in the past, or 'the old language-game' (OC 617), would cease to be successful if the facts changed. For example, a set of new discoveries by telescope (i.e. early modern new science) replaces the untenable language-game based on Ptolemaic astronomy. From what Wittgenstein actually noted, therefore, Wootton contends against relativism that certain scientific facts are superior to the others, such that science has made progress in its history.

Accordingly, without implicating relativism, he raises a question about the scientific facts of the global Earth in the developments of geography and astronomy. In a chapter entitled 'Planet Earth', Wootton perceptively states:

What shape is 'the earth'? The answer to this question must seem obvious. Surely everyone knew that the earth is round? ... But the fact that everyone (or at least every properly educated person) thought that you could in principle sail around the world (and in 1519–22 Magellan did just that) does not mean that they thought it was round. Columbus, strangely, thought that the old world, known to Ptolemy, was half of a perfect sphere, but the new world, he believed, was shaped like the top half of a pear, or like a breast ... The stalk, or nipple, of this other hemisphere was the location of the terrestrial paradise (p. 111).

Here one can see that Wootton himself does not argue for the necessity that the Earth should be round. Rather, what he does is explain accurately how late medieval to early modern scientists and discoverers, from their experiments and experiences, inferred more successful models of the shape of the Earth/earth than in the past. The progressive scientific facts do not determine the Earth, or the earth (just the agglomerate of earth and water), to be a sphere floating through space. In other words, there is always room for doubting if scientific facts at present may be superseded by future discoveries. Thus, according to Wootton, science makes progress.

In conclusion, Wootton's progressive account of the history of science is excellent, all the more as one can read his scepticism about the global Earth. As he explains in one chapter, entitled 'Facts', the word *fact* is derived from the Latin *factum*, originally meaning a deed/action or crime in Roman to medieval jurisprudence (p. 284). Moreover, as his philosophical or non-relativist backbone, Wootton quotes Wittgenstein in the *Tractatus* that '[t]he world is the totality of facts, not of things' (p. 252). It is true that the modern meaning of 'fact' is not necessarily a criminal action, whereas we still need to consider with care how we have constructed scientific facts.

To this effect, one of the rewards of reading Wootton's *magnum opus* is that one can question whether the treatment of scientific facts, such as taking the spherical Earth at face value, has been innocuous or not. Hence, nowhere is it possible to enjoy a progressive history of science without philosophical questioning.