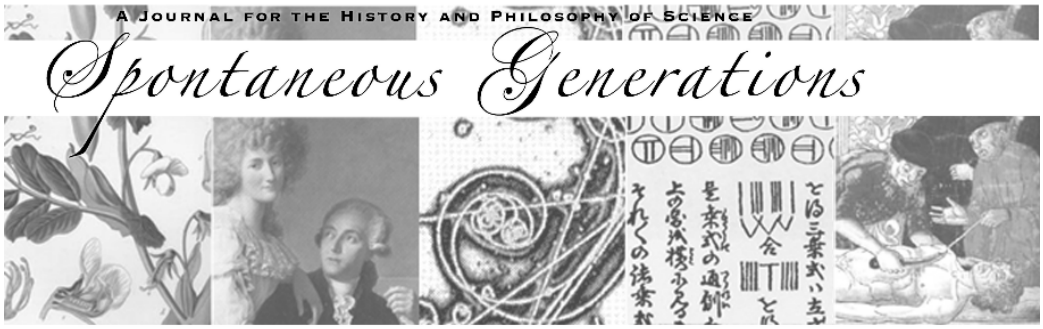

A Fond Farewell to "Approximate Truth"?

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Focused Discussion Invited Paper

A Fond Farewell to "Approximate Truth"?*

P. Kyle Stanford†

Rather than making a prediction for the future of the scientific realism debate, I would like to propose a substantial revision of the way that debate is presently conducted. Most commonly, the scientific realism debate is characterized as dividing those who do and those who do not think that the striking empirical and practical successes of at least our best scientific theories indicate with high probability that those theories are "approximately true." But I want to suggest that this characterization of the debate has far outlived its usefulness. Not only does it obscure the central differences between two profoundly different types of contemporary scientific realists, but even more importantly it serves to disguise the most substantial points of actual disagreement between these two kinds of realists and those who instead think the historical record of scientific inquiry itself reveals that such realism is untenable in either form.

In earlier iterations of the debate, the language of approximate truth played a crucial role in protecting scientific realism from invidious oversimplification. Scientific realists never meant to claim, of course, that even the most successful contemporary scientific theories were correct in every detail or in every assertion they made. The attribution of merely approximate truth recognized that even our best theories are surely wrong in some of their details and that many further surprises, corrections, and unexpected discoveries still remain in store. But those whom I have recently (Stanford 2015) called classical or "Catastrophist" scientific realists insist no less clearly that the most *important, central, and fundamental* claims of our best scientific theories simply describe how things actually stand in otherwise inaccessible domains of nature and that we should therefore expect those claims to be validated by and to persist in some recognizable form throughout the course of all further scientific inquiry. That is, such Catastrophist realists deny that the most successful contemporary scientific theories will ultimately share the same fates as successful predecessors like

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classical mechanics, the caloric theory of heat, phlogistic chemistry, the wave theory of light, and many other examples in which central, important, and/or fundamental claims of successful scientific theories were indeed overturned in the course of further inquiry.

Of course, accumulating historical evidence has made it increasingly difficult to argue that there are any *fundamental or categorical* differences between the sorts of empirical and practical successes achieved by past scientific theories and those of the present day. Accordingly, many latter-day scientific realists have come to reject the Catastrophist realist's exceptionalism concerning contemporary scientific theories, allowing instead that the future of science will be characterized by conceptual revolutions and theoretical transformations just as profound as those that characterize its past, and that many of even the most central and fundamental claims of contemporary theoretical orthodoxy will ultimately be overturned as scientific inquiry continues. But such "Uniformitarian" scientific realists do not see this concession as undermining the claim that those same theories are nonetheless "approximately true. " After all, there are many substantial points of continuity, overlap, structural similarity, and other detailed relationships between successful past scientific theories and those of the present day. Uniformitarian realists suggest that there will be similarly substantive continuity and points of connection between our own theories and their historical successors that reflect *some* systematic connection or relationship between the conceptual apparatus of those theories and how things actually stand in the otherwise inaccessible domains of nature they seek to describe, even if many of their central and fundamental claims are nonetheless ultimately overturned. Indeed, most Uniformitarian realists go on to argue that the historical evidence itself puts us in a position to actually identify the particular parts, claims, or features of our own scientific theories that are responsible for their successes and should therefore be expected to persist throughout the course of further inquiry, whether these are thought to be the theory's claims about the "structure" of nature (Worrall 1989), its "working posits" (Kitcher 1993), its "core causal descriptions" of hypothesized entities (Psillos 1999), or something else altogether.

It would seem, then, that Catastrophist and Uniformitarian scientific realists are united in attributing "approximate truth" to our best scientific theories only because they have sharply diverging substantive conceptions of what such approximate truth requires or involves. To see just how divergent these conceptions of approximate truth really are, notice that Catastrophists *contrast* the approximate truth they attribute to contemporary theories with the fates of past theories like classical mechanics or the caloric theory of heat, while those very same past successful theories serve as paradigmatic *examples* of the much weaker Uniformitarian conception of approximate truth.

Framing the debate as one that concerns the approximate truth of our best scientific theories not only disguises these profound differences between Catastrophist and Uniformitarian realists, but also obscures the most important points of genuine disagreement between such realists and those who believe instead that the historical record shows scientific realism to be untenable in either form. Contemporary historicist critics of scientific realism do not argue that there will be *no* important points of continuity or systematic connections either between contemporary scientific theories and their successors or between those theories and the otherwise inaccessible natural domains they seek to describe. Their claim is simply that we should nonetheless expect many of even the most central and fundamental claims of contemporary scientific theories to be abandoned in the course of further inquiry (just as they were in the case of many successful past theories), and this claim is one that at least Uniformitarian realists seem happy to accept. Such critics diverge from Uniformitarian realists, however, in rejecting the further claim that the available evidence puts us in a position to reliably specify just *which* parts, claims, or features of our best theories accurately describe the world and should therefore be expected to persist in some recognizable form throughout the course of further scientific inquiry. Such historicist critics of scientific realism do not expect us to be any more successful than scientists of the past have turned out to be in predicting which parts, claims, or features of their own theories accurately capture how things actually stand in the otherwise inaccessible domains of nature they seek to describe or the important points of continuity and systematic relationships that will hold between their own theories and those still to come.

My plea, then, is that we simply stop thinking, talking, and writing about the scientific realism debate as being concerned with the approximate truth of our best scientific theories. What actually divides the various parties in today's scientific realism dispute is not whether they embrace the polysemous verbal formula that our best scientific theories are at least approximately true, but instead their competing commitments regarding the *extent, form, and predictability* of the theoretical continuity we should expect between contemporary scientific theories and those that will be embraced by future scientists and scientific communities. Catastrophist scientific realists doubt that the future of science will include further profound theoretical and conceptual revolutions of the sort that characterize much of its past. Uniformitarian realists concede that it will, but insist that we are nonetheless in a position to pick out the particular parts, claims, or features of our own scientific theories that are responsible for their successes and will therefore survive indefinitely throughout such further theoretical and conceptual revolutions. And historicist opponents of scientific realism think not only that the future of science will be characterized by such further

transformations and revolutions, but also that we ourselves are simply not in a position to reliably or justifiably predict which parts, claims, or features of our best scientific theories are responsible for their successes and will therefore be recognizably preserved throughout the course of all further inquiry. *None* of these disagreements seem especially well characterized as concerning whether our most successful contemporary scientific theories are or are not "approximately true."

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