



Inevitability, contingency, and epistemic humility



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ARTICLE INFO

Article history:
Available online 29 August 2015

Keywords:
Contingency;
Counterfactual history;
Epistemic humility;
Inevitability;
Hacking

ABSTRACT

This paper offers an epistemological framework for the debate about whether the results of scientific enquiry are inevitable or contingent. I argue in Sections 2 and 3 that inevitabilist stances are doubly guilty of epistemic hubris—a lack of epistemic humility—and that the real question concerns the scope and strength of our contingentism. The latter stages of the paper—Sections 4 and 5—address some epistemological and historiographical worries and sketch some examples of deep contingencies to guide further debate. I conclude by affirming that the concept of epistemic humility can usefully inform critical reflection on the contingency of the sciences and the practice of history of science.

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When citing this paper, please use the full journal title *Studies in History and Philosophy of Science*

1. Introduction

The purpose of this paper is to offer an epistemological analysis of the two broad stances on the question of whether the results of scientific enquiry are inevitable or contingent.¹ My claim is that the answer to that question ought to be broadly contingentist and that our focus should therefore be on the related question of just how strong our contingentism ought to be. Specifically, I argue that ‘inevitalist’ stances implicitly rely upon exaggerated estimations of our epistemic capacities: both in their historical *claims* and their main *criticism* of their contingentist rivals. First, the inevitabilists’ claims about the inevitability of certain scientific results emerge as either trivial or epistemically unwarrantable. In fact, inevitabilism collapses into a form of contingentism. The second criticism is directed at the inevitabilists’ primary criticism of their contingentist rivals, the ‘put up or shut up objection’, as Ian Hacking dubs it, and which I’ll abbreviate to ‘PUSU’. The putative choice reflected in this challenge—to ‘put up’ or ‘shut up’—is, in fact, illusory, for on analysis, it emerges that it only allows the contingentist to ‘shut up’. Since the objection therefore structurally excludes the

possibility of a successful response because it relies upon untenable presuppositions, it ought to be rejected.

Taken together, these two criticisms indicate that the inevitabilist stance lacks *epistemic humility*, and is therefore *hubristic* (a pair of concepts explained in due course). It is partly because contingentism is humble, in a technical sense to be defined later in the paper, that we ought to embrace it. Indeed, it emerges that implicit claims to humility, and charges of hubris, are constant features of debates about the historical contingency of scientific enquiry, and indeed of debates about the sorts of epistemic ambitions to which we could reasonably aspire.² This indicates that a due sense of epistemic humility requires us to adopt some form of contingentist stance, and so the real debate concerns the question of how contingentist we ought to be—and the paper closes, in Section 5, by sketching two stronger forms of contingentism as a spur to further debate.

Let me begin, then, by characterising the ‘inevitalist’ and ‘contingentist’ stances.

2. Inevitalism

My characterisation of the inevitabilist stance will follow that offered by Hacking (1999, 2000). It consists of two claims, the

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¹ An excellent introduction to and survey of this debate is offered by Kinzel (2015).

² See, e.g., Langton (1998) and Moore (1997).

former being taken from his writings, and the latter being my own addition, for reasons to be explained shortly.

(H1) Any result R of scientific investigation that we take to be correct can be described as inevitable if any other properly-resourced and rigorously-conducted investigation of the same subject matter would have contained or implied the same results.

(H2) H1 can be established in a sufficiently warranted manner.

Four points ought to be noted. First, contingency might creep into the inevitabilist position even at this initial stage, since the concepts and standards that define the resources and methods appropriate to scientific enquiry are subject to historical contingencies, a fact noted by Howard Sankey (2008) and David E. Cooper (2002: pp.199–200), among others. Many contemporary historians and sociologists of science have documented the variety of contingent social and cultural factors that shaped early debates about the epistemology and methodology of scientific enquiry, including postlapsarian theologies and shifting conceptions of the requisite moral and intellectual qualities of the natural philosopher.³ Second, inevitabilism is best construed as an implicit commitment, perhaps as a component of a ‘stance’, rather than an explicit conviction. There are few ‘card-carrying’ inevitabilists, with a few honourable exceptions, including the physicists Sheldon Glashow and Steven Weinberg.⁴ Third, the idea that *any* result of scientific investigation is inevitable may occlude the idea that *certain* results become progressively inevitable as certain contingent conditions obtain.⁵ Such emergent inevitabilities complicate our efforts to define both inevitabilist and contingentist stances. Fourth, and most importantly, H2 implicitly incorporates a presupposition that plays a crucial role in debates about our capacity to determine the inevitability or contingency of the results of scientific investigation—call it H2a—namely, that it is possible that the inevitability of certain results could, either in principle or in practice, be both established, and be known to have been established.

These sub-claims are reflected in the two of the main components of the inevitabilists stance. The characteristic *claims* of the inevitabilist are, obviously enough, that one can determine, both in principle and in practice, the inevitability of certain scientific results. Otherwise inevitabilism can only gesture to, but never actually assert, the inevitability of whichever scientific results interest them—genes, say, or quarks—and that is a poor sort of inevitabilism. Similarly, the PUSU objection presupposes that it is possible, again in principle and in practice, for a contingentist to make good on their talk of the other ways that the history of scientific enquiry might have gone, by ‘putting up’ those alternative theories and results. Although the role of H2a is less obvious here, there is—as I argue in Section 4—the same overestimation of our epistemic capacities.

Taken together, my two criticisms converge in the charge that inevitabilism lacks epistemic humility, and is, therefore, *hubristic*, in a double sense. First, it is hubristic to suppose that any individual or collective does or could possess the epistemic capacities required to perform the variety of tasks required to warrant claims about the inevitability of a given scientific result. Second, it assumes a hubristic conception of human capacities to suppose that anyone, the contingentist included, could actually produce entire alternative scientific theories and results, given the practical and epistemic

realities of scientific enquiry. Since the inevitabilists stance, in both its claims and its main objection to rival contingentists, relies upon these sets of presuppositions, it is doubly hubristic, and therefore ought to be rejected. It is important to clarify the content of this objection: to say that a belief or doctrine is hubristic is not to say that it is false. Indeed, it may be true. The objection, rather, is that its truth or falsity either way cannot be determined, at least not by human enquirers. Strictly put, a belief or doctrine is hubristic when it is one that ‘only a creature with enhanced cognitive powers—not possessed by the person himself—would be warranted in holding’ (Cooper, 2002, p. 167).

To advert to an example offered by Hacking, it may, in fact, be true to say that a successful science would inevitably ‘arrive at or pass through something roughly equivalent to our present cosmology or cell biology’ (2000, p. 59). The hubris lies, however, in the claim that we could, with sufficient warrant, ever actually determine this to be the case. Such a claim about the inevitability of, say, Big Bang cosmology may be true, or false, or might, instead, be a *complex conditional*, a position suggested by Hacking, Gregory Radick, and Léna Soler, among others.⁶ Though this more qualified form of inevitabilism has its merits, it buys them at the price of triviality—indeed, in making them, one comes ‘close to an empty platitude’ (Hacking, 2000, p. 66).

Once one begins to build in the range of conditions required to justify claims about conditional inevitability, the position rapidly collapses into a form of contingentism. Consider the claim that ‘a quark physics was inevitable, just as long as ...’, where the ellipse stands for the diverse range of requisite conditional factors: the inevitabilist, in making this claim, effectively helps themselves to the inevitability of the questions, assumptions, concepts, methods, practices, disciplinary cultures, institutional structures—and so on—all of which are, of course, subject to their own contingencies. In such cases, then, one has what Paul Feyerabend impishly described as ‘the success of a manoeuvre carried out in a void’ (1993, p. 30)—that is, no success at all in any real sense.

This example helps to illustrate my criticism of claims that one could warrantably assert the inevitability of a certain scientific result. Any given result of scientific enquiry implicitly relies upon a complex range of different conditions—material, social, and intellectual—and these are the products, as Hacking puts it, of a ‘distinctive and historically formed organisation’ (2000, p. 3). There is a vast and worthy body of work in the history of the sciences that documents the complexities and contingencies that attended the emergence of modern scientific enterprises—including, for instance, its cognitive values, investigative technologies, disciplinary structures, interdisciplinary relations, and even its very identity as ‘science’. Those diverse historical stories are, furthermore, shaped and guided by wider contingent intellectual and cultural developments—the Protestant Reformation, romanticism, the Cold War, and so on. The historian, Stephen Gaukroger, for example, is almost halfway through a quintet of studies devoted to ‘the emergence of a scientific culture’, a story whose scope and depth surely reflects its description, not of iron necessities, but of fragile contingencies.⁷

The point is that scientific enquiry is, in Andy Pickering’s words, always situated within a ‘specific material-conceptual-disciplinary-social-etc. space’ that could have been quite different (1995, p. 185). Unless one is a disciple of Hegel, such possibilities cannot be ruled out, for two reasons. The first is the ample documentary evidence

³ See, e.g., Harrison (2007) and Shapin (2008).

⁴ For a discussion and examples, see Soler (2008), §4.

⁵ A colleague of mine suggests that Allied victory was not inevitable in early 1939, but was by late 1944.

⁶ See, e.g., Hacking (2000), p. 59, Radick (2005), p. 24, and Soler (2008), p. 225.

⁷ The two volumes published so far are *The Emergence of a Scientific Culture* and *The Collapse of Mechanism and the Rise of Sensibility*, covering the periods 1210–1685 and 1680–1760, respectively. See Gaukroger (2006, 2010).

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