

BOOK REVIEW

Gregory Radick, *Disputed Inheritance: The Battle over Mendel and the Future of Biology*

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Radick's central claim is as simple as it is provocative: the ways the world talks about genes – as straightforward determiners of traits – has nothing to do with the reality of genes; it is the result of William Bateson having out-talked Walter Raphael Weldon. His case is supported by exhaustive detail. The first-two thirds of this substantial book are taken up with a detailed chronology of the Weldon–Bateson debate, of which every nuance is explained with admirable clarity. Those who have paid any attention to the history of this dispute will find that many of their preconceptions need amending.

Weldon's key objection was to Bateson's conception of dominance, which he regarded as fatally oversimplified. The canonical examples of Mendelian dominance, such as brown eye colour being dominant over blue, are simply untrue. Eye colour comes in numerous shades that blur into one another, few – if any – of which result from a simple pair of dominant/recessive alleles. These exceptions multiplied in the early decades of the twentieth century and have been proliferating ever since, to the point where it is widely recognized that cases exemplifying 'classic' Mendelian simplicity are very much the exception. Yet genetics is still taught as if complexity (multifactorial inheritance, variability, partial dominance and so on), is rare and it is thus only taught to advanced students. This is because Bateson's view triumphed, creating what Radick regards as the key problem with popular understandings of genetics, from the early twentieth century until today. Most of the public knows only what Radick calls Bateson's 'cut-to-the-chase simplicity' – that genes determine characters.

Weldon, by contrast, emphasized context – the array of genetic, ancestral and environmental factors that led to him to stress that genes explain the variable differences between traits, and thus organisms. Radick provides detailed analysis of Weldon's unfinished unpublished book, which would have offered a comprehensive account of his ideas, arguing that many Weldonian ideas are now widely accepted by the genetics community. The history of genetics came so close to turning out differently: Radick argues that Weldon had Bateson on the ropes by 1905. Weldon's untimely death from pneumonia left Bateson in a position to shape genetics in his own image – with disastrous consequences. Radick does not blame Bateson for the evils that have flowed from genetic determinism, but he argues that without Bateson's triumph these evils might have at least been mitigated.

One of the book's most imaginative aspects is the attempt to use counterfactual history to establish that Weldon's version of genetics could have triumphed. Radick taught an undergraduate genetics course written as if Weldon had won the argument. Evaluations

showed that those who did the 'Weldonian' course were noticeably less deterministic about genes than those who did the university's standard course. However, when he returns to this topic towards the end of the book, he acknowledges that the students who took the Weldonian course were mostly philosophers whereas the controls were first-year biology students. And the biology students took an accredited course, whereas the experimental group took a voluntary, extracurricular course. These differences make it all but impossible to draw any conclusions about the impact of Weldonian thinking on either group's attitudes. Although Radick acknowledges 'imperfections of the experimental design' (p. 312) and is careful not to overclaim, this feels like a missed opportunity to explore the pedagogical power of counterfactual history.

Radick defines the 'success' of Mendelism in 'institutional and intellectual' terms: university posts, specialist journals, a statue of Mendel in Brno and a growing vocabulary of specialist terms. These offer indisputable evidence of a science having arrived, at least within specialist communities. But Radick's evident concern with the public understanding of genetics suggests an interest in the wider social, cultural and (in the broadest sense) political impacts of a science. That would require a rather broader focus than Radick's unapologetic history of scientists. Despite bemoaning the impact of genetics education on public attitudes, the public are largely absent from most of the book.

The tension between Radick's focus on the inner workings of the scientific community and his wider interests may explain why much of his tenth chapter is spent on rather incoherent arguments about what kinds of explanation might account for the success of Mendelism. Given his internalist focus, he is predictably unimpressed with the socio-cultural explanations that some historians have previously given. However, he summarizes the kinds of views he opposes (without citing specific examples) in ways that seem unduly simplistic and admits that 'what matters is not that anyone would endorse them as stated, but that, when stated this way, they reveal themselves as belonging to a common genre' (p. 270). Or perhaps they simply reveal themselves as rather flimsy straw men?

Radick offers counterfactual history as a more robust alternative, but notes that counterfactuals must be testable if they are to be useful. So the claim that 'Mendelism succeeded because reality/an unequal society/modernity summoned the gene concept into being' is a bad counterfactual, because it is untestable (p. 297). One might reasonably respond that it is not a counterfactual at all (in addition to being a set of claims nobody has ever made). We could certainly try to imagine a perfectly equal society in which the gene concept never arose, but we would be writing science fiction rather than history – and it might be rather interesting science fiction. By contrast, Radick's view that counterfactual claims about the history of science are more robust than other historical counterfactuals because we can actually try the alternative science (as in the case of his 'Weldonian' biology class, p. 308), leaves him on precariously thin ice.

Regardless of whether other readers find Radick's historiographical arguments more persuasive than I did, all readers will agree that this is a major contribution to the history of genetics – comprehensive, beautifully written and rich in detail. It is unlikely that any scholar will ever need to revisit this debate (or the archives on which Radick has built his case) – it is hard to imagine that a more definitive account could be offered.