

to view phenomenology as fundamentally opposed to constructive methodologies, one can only agree that earlier Husserlian texts can give this impression, while later texts suggesting otherwise remained largely unknown to Weyl. That aside, this deeply rewarding book is, and will remain, absolutely fundamental reading to anyone interested in Weyl's philosophical and scientific thought. The good news for those who do not read German is that Sieroka has published many excellent papers in English covering most of the topics of the book.

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Staffan Müller-Wille and Hans-Jörg Rheinberger. *A Cultural History of Heredity*. Chicago: University of Chicago Press, 2012. Pp. xiii+218. \$45.00 (cloth).

Heredity is a peculiar biological concept. Despite the fact that contemporary biology has been saturated with talk of genetics and hereditary transmission, this has not always been the case—"a strictly *naturalistic* concept of heredity," Staffan Müller-Wille and Hans-Jörg Rheinberger write, "is a relatively recent product of science" (2), dating at best to the first half of the nineteenth century. Further, as the authors compellingly argue, "heredity and the gene may very well have seen their day as research objects at the forefront of bio-scientific inquiry" (xi). The beginnings and the future of the idea of heredity are both, therefore, undeniably murky—and these fuzzy temporal boundaries are complemented by equally fuzzy conceptual boundaries, where concepts of heredity can be found not just in biology but in plant and animal breeding, eugenics, medicine, and even law.

This makes heredity a perfect case for the deployment of methods that have come to be known as "historical epistemology"—a research tradition deriving from the work of (predominantly French) historians and philosophers such as Meyerson, Bachelard, Canguilhem, and Foucault, which Rheinberger has elsewhere described as the effort "to understand the sciences and their development as a fundamentally historical and cultural phenomenon" (*An Epistemology of the Concrete: Twentieth-Century Histories of Life* [Durham, NC: Duke University Press, 2010], 11). In the particular context of heredity, Müller-Wille and Rheinberger write that they intend to move beyond intellectual histories of particular theories or concepts within biology to describe "the synchronic political, medical, and technological contexts in which

knowledge of heredity was both generated and applied. What we will study is therefore less the history of a particular science or research program than the history of a “knowledge regime” (x). The breadth implied by this approach—covering everything from the juridical context of the inheritance of property in the twelfth century to the impact of DNA microarrays in the mid-1990s—provides an understanding of heredity much more expansive and contextualized than that of narrower histories of population genetics, the New Synthesis, or arguably even Rheinberger’s own prior work on the concept of the gene (*Epistemology of the Concrete*, chap. 8; Peter Beurton, Raphael Falk, and Hans-Jörg Rheinberger, eds., *The Concept of the Gene in Development and Evolution: Historical and Epistemological Perspectives* [Cambridge: Cambridge University Press, 2000]).

The book emerges from a long research project into the “cultural history of heredity” (recently concluded), which was located at the Max Planck Institute for History of Science in Berlin and the Economic and Social Research Council’s Research Centre for Genomics in Society at Exeter. This project included five large-scale conferences, which have thus far produced four preprint volumes (Staffan Müller-Wille, ed., *A Cultural History of Heredity I: 17th and 18th Centuries* [Berlin: Max-Planck-Institut für Wissenschaftsgeschichte, 2002]; Hans-Jörg Rheinberger and Staffan Müller-Wille, eds., *A Cultural History of Heredity II: 18th and 19th Centuries* [Berlin: Max-Planck-Institut für Wissenschaftsgeschichte, 2003]; Staffan Müller-Wille and Hans-Jörg Rheinberger, eds., *A Cultural History of Heredity III: 19th and Early 20th Centuries* [Berlin: Max-Planck-Institut für Wissenschaftsgeschichte, 2005]; Staffan Müller-Wille, Hans-Jörg Rheinberger, and John Dupré, eds., *A Cultural History of Heredity IV: Heredity in the Century of the Gene* [Berlin: Max-Planck-Institut für Wissenschaftsgeschichte, 2008]), one published edited volume (Staffan Müller-Wille and Hans-Jörg Rheinberger, eds., *Heredity Produced: At the Crossroads of Biology, Politics, and Culture, 1500–1870* [Cambridge, MA: MIT Press, 2007]), and a further edited volume in preparation (Staffan Müller-Wille and Christina Brandt, eds., *Heredity Explored: Between Public Domain and Experimental Science, 1850–1930*). This book, then, is the authors’ own narrative synthesis, as project directors, of the results of this long and extremely fruitful international scholarly collaboration.

The work begins with an introductory chapter that presents the authors’ broad scope by reference to the writings of Francis Galton, whose metaphors of heredity as a “post office” and a “parliament”—in which the hereditary materials are packed and shipped in mailbags before competing for a limited number of “places” in the developed character of an individual—immediately situate that work in a broader sociocultural context. The remainder of the book takes up, in turn, a variety of perspectives and time periods as lenses

for understanding the extensive changes in heredity from premodern times to the present. The second chapter, running roughly from the seventeenth century to Darwin, details the role of heredity in theories of the generation of individual organisms, the creation of species, and finally species transmutation and evolution. The third chapter considers the roots of the nineteenth-century “solidification” of heredity, which extend back centuries in law (the inheritance of landed property), in medicine (the recognition of the existence of heritable diseases), and in breeding (of plants, animals, and people).

Chapter 4 discusses the works of Darwin, Galton, and others in the late nineteenth century (including Nägeli, de Vries, and Weissmann), which offer the first sustained attempts to tie together the disparate knowledge of heredity into theories of the transmission of characters over time—theories all united, the authors argue, by their breadth and speculative nature. The fifth chapter draws out the importance of race and eugenics for the evolving discourse of heredity—and, admirably, complicates the standard narrative that the application of the science of heredity to the human condition led directly and inexorably to racism and “racial purity.”

With the groundwork laid, then, the sixth chapter describes heredity’s transition from a highly contextualized, disparate, and speculative knowledge regime to a tightly controlled research program built around a carefully constructed set of epistemic objects—namely, the model organisms of classical genetics, which emerged in the first few decades of the twentieth century. The seventh chapter traces the change from classical genetics to molecular genetics, as biology as a whole becomes both molecularized and tightly connected with industrial, physical, and chemical knowledge. Finally, the book closes with a look forward—to today’s genomics, biotechnology, genetic medicine, and what we might expect from a “postgenomic” future.

Any work this ambitious in scope, of course, is bound to spread itself too thin at points. Many of the transitions between substantially different modes of understanding heredity are made quite quickly—as though the ample context already provided constitutes a sufficient explanation for these shifts. In the premodern context, we move from a concept of “generation” as the one-off creation of individual forms to the “generation” of species with only passing references to Linnaeus, Buffon, and Kant. The crucial turn after Watson and Crick to the concept of heredity as a flow of information is described in a mere two pages. Perhaps most troubling, in the final chapter of the book—once, that is, that the concept of the gene has taken its place among the background assumptions constitutive of contemporary biochemical and biotechnological research—we see, rather than a detailed discussion of the changes in the conception of heredity over this period, a review of the many

and various contemporary technologies and experimental systems that rely on advanced genetics.

Further, this lack of explicitly argued connections between some of the important events in the history of heredity and the sociocultural context that the authors provide makes the relevance of some of their contextualization for the broader argument difficult to discern. The authors are often careful to emphasize the dispersion and independence of the varieties of knowledge that would, in the nineteenth century, crystallize into “heredity” as a discipline, but this simultaneously runs the risk of making this varied knowledge of questionable relevance. For example, in the process of providing a detailed and compelling history of eugenics as a popular, social movement, Müller-Wille and Rheinberger note that “most of the popular eugenics literature did not spell out a particular conception of heredity at all. Nor did it show its colors as far as the assumed mechanism of heredity was concerned” (100). Similar moderating claims are found in their discussions of the legal and medical background to work on heredity.

This, I would hazard, is an instance of a broader worry about the historical epistemology project as a whole. When we endeavor to introduce sociocultural context to this extent—and still draw traditional historical conclusions—we run the risk of obscuring distinctions between the very different purposes for and uses of knowledge that might underlie these elements of context. For example, in introducing the “premodern perspective” on the generation of organisms and their similarity, Müller-Wille and Rheinberger combine natural history, medicine, theoretical philosophy, the encyclopedic tradition, law, and even literature, ranging from Aristotle and Pliny to the eighteenth century. While such a broad spectrum of views is assuredly interesting, it is worth questioning whether it can possibly instantiate a singular perspective on generation and variation.

These are, however, relatively minor issues, and the overall quality and importance of this book should not be understated. I take Müller-Wille and Rheinberger to have convincingly argued that we cannot properly grasp the history and philosophy of the concept of heredity without knowledge of the epistemic space within which heredity developed, its emergence as a unified idea in the nineteenth century, its solidification as a discipline with its own experimental systems and epistemic objects in the early twentieth century, and, arguably, its impending dissolution in the twenty-first. As a single point of synthesis of the many vastly disparate pieces of context that it brings together, this book constitutes an essential resource for those interested in the study of heredity—in any time period or disciplinary tradition, from seventeenth-century studies of generation to contemporary work on the ethics of genetically

modified organisms or human cloning. Müller-Wille and Rheinberger's contribution thus serves as a valuable addition to our existing histories of generation, heredity, and genetics.

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Paul Russell. *The Riddle of Hume's Treatise: Skepticism, Naturalism, and Irreligion*. Oxford: Oxford University Press, 2008. Pp. 424. \$99.00 (cloth); \$34.95 (paper).

Recent Hume scholarship has vacillated between treating Hume either as a so-called naturalist in which Hume is primarily understood as a scientist of the mind (or epistemological naturalist) or as some kind of skeptic (with considerable debate over the nature and extent of this skepticism). In fact, in an earlier (2002) book, *Freedom and Moral Sentiment: Hume's Way of Naturalizing Responsibility*, Paul Russell had offered a naturalistic reading of Hume's account of free will and moral responsibility. The ongoing scholarly inability to reconcile these two strands is the "riddle" that gives Russell's book its title as well as its argumentative focus.

In order to solve the riddle, Russell's book, the well-deserved 2009 Journal of the History of Philosophy Book Prize winner, revives and argues for an old interpretation of Hume's "fundamental" intentions in writing *A Treatise of Human Nature* (hereafter, *Treatise*; 11).¹ Throughout his book, Russell convincingly shows that Hume provides plenty of hints to his readers that the *Treatise* is systematically "irreligious" (11). Russell's primary focus is on the *Treatise*, especially Book I. Russell does draw on many other Humean writings to advance his argument. Only one long chapter (chap. 17) is devoted to the irreligious elements of Hume's moral theory (239–63).

Russell calls attention to a number of religious arguments and theological controversies to which some of Hume's most celebrated arguments can be plausibly taken to be responding. In doing so, Russell situates Hume in several not entirely overlapping, mutually supporting contexts: these include (a) (following Reid's lead) debates over the reception of Hume's debts to Hobbes (e.g., 13, 61–69); (b) the hegemony of Clarke's school, especially as represented in the Scottish context by Andrew Baxter (e.g., 19–22, 99–112, 150–55); (c) Butler's moral defense of revealed religion (e.g., 130–46); (d) the reception of Spinozism and Hume's place among "anti-Newtonians" in the so-called Radical Enlightenment as, say, represented by Toland and Dudgeon (e.g.,