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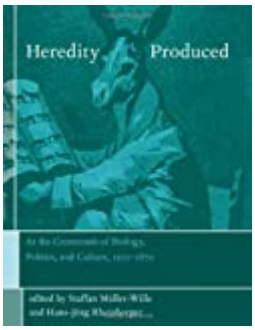

Staffan MÃ¼ller-Wille, Hans-Jörg Rheinberger, eds. *Heredity Produced: At the Crossroads of Biology, Politics, and Culture, 1500-1870.* Cambridge: MIT Press, 2007. x + 496 pp. $50.00 (cloth), ISBN 978-0-262-13476-7.

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Towards a New Cultural History of Heredity

Where did modern conceptions of heredity or the science of genetics come from? Did they spring fully formed from Gregor Mendel in 1865 only to be "rediscovered" in 1900? Was Mendel an isolated genius, so far ahead of his time, intellectually, as to require no historical context? Historians of science no longer think so, but neither do they agree on the proper perspective to put him in or on how to frame the story of heredity. Numerous lines of investigation and argument have explored roles for plant taxonomy, hybridization experiments, practical plant- and animal-breeding, quantitative methods in biogeography and paleontology, statistics, meteorology, evolutionary theory, cell theory, and other sciences in the development of either Mendel's thought, its twentieth-century reception, or the work of other nineteenth-century students of heredity. But much remains that could and should be explored, in the nineteenth century and earlier, in scientific thought and practice, in social, institutional, and disciplinary history, not only in fields now recognizable as being closely related to genetics.

Heredity Produced, the first of a planned series of edited volumes, is an ambitious attempt to break with the traditional historiography of scientific ideas and make a fresh start on a broad-based "cultural history" of heredity that places its subject in a variety of historical and disciplinary contexts. Its coverage of France and the late eighteenth and early nineteenth centuries is particularly strong but the early modern period, German, British, and colonial history, the history of science and medicine, literary history and theory, anthropology, and other fields are well represented. The quality of the papers is quite high. Every one makes a worthwhile contribution, whether a detailed case study or a sweeping diachronic survey. The papers also cross-reference one another and give the impression that the authors had a meaningful, cross-disciplinary exchange of views.

As the title implies, the unifying premise of the volume is that the modern conception of heredity as a distinct process of transmission of characteristics or dispositions did not really exist before the mid-nineteenth century. It had to be "produced," with contributions from many "cultural domains," including jurisprudence, medicine, plant- and animal-breeding, biological theory, and anthropology. Each domain is explored in a separate

section of the book.

In the first section, "Heredity in the Legal Context," David Sabean reveals a late-eighteenth-century shift in legal structures and family strategies for passing on property to offspring. With the rise of capitalism, keeping an estate intact and passing it to a single male heir receded in importance in comparison with diversified investment and forming alliances with other families through marriages and other exchanges. The economic shift had consequences, Sabean argues, for conceptions of heredity and kinship and for the organization of families. Along the same lines, a paper by Ulrike Vedder traces the decline of the patrilineal system through its negative depictions in literary works of the period. A third paper in this section, by Silvia De Renzi, reveals a different connection between biology and the law, using early modern paternity cases. When in doubt, courts preferred to err on the side of keeping families together. It would not do to let the head of a household reject a child just because it did not resemble him. Consequently, they were reluctant to embrace the generalization that like always begat like, but favored alternative theories of generation.

Under "Heredity and Medicine," Carlos LÃ³pez-BeltrÃ¡n traces the origin of modern hereditary thought to late-eighteenth-century French efforts to identify and treat hereditary diseases or dispositions to disease. Philip K. Wilson discusses Erasmus Darwin's efforts to sort out and evaluate the possible causes of gout, among them family, social class, lifestyle, and alcohol consumption, and to seek opportunities for medical intervention. Laure Cartron argues that French physiologists and physicians did not clearly distinguish hereditary from environmental causes of disease until after the Napoleonic Wars, by which time social and professional pressures demanded more rigorous diagnoses and explanations, and new statistical research methods were coming into use, especially at mental institutions.

A section on "Natural History, Breeding, and Hybridization" opens with a paper by co-editor Staffan MÃ¼ller-Wille that juxtaposes William Harvey's embryology with Linnaeus's ideas about the nature of species and their interrelationships and with Charles Darwin's depictions of descent and divergence. Marc J. Ratcliff shows how academic botanists and practical breeders in late-eighteenth-century France differed in their concepts and categories of intraspecific variation, and how issues of discipline formation and social class played out in taxonomy. And Roger J. Wood points out that British sheep breeders, such as Robert Bakewell, were already focusing on transmission of individual traits in the late eighteenth century, long before Mendel.

Intellectual history and the history of scientific ideas are not neglected under this cultural approach. The section on "Theories of Generation and Evolution" includes an overview, by Mary Terrall, of the influence of experimentation, including experiments on animal breeding, on French Enlightenment thinking about heredity and reproduction. Peter McLaughlin provides an account of Immanuel Kant's conception of heredity and how it emerged from an engagement with questions about human racial differences and why such differences would persist even after people moved to foreign climates. FranÃ§ois Duchesneau traces the development of the cell theory in mid-nineteenth-century Germany and asks how it came only gradually to include an explanation of heredity, while Ohad Parnes surveys social and biological concepts of a "generation" in nineteenth-century Germany.

The "Anthropology" section features an account by Renato Mazzolini of the caste system in the Spanish colonies around the turn of the nineteenth century, along with its implicit assumptions about race and heredity. Paul White discusses nineteenth-century British notions of moral character, how it could be acquired or lost, and how it could shape one's life and body. Nicolas Perthes analyzes the curious cases of "wild" boys, found in the forests of France in the late eighteenth century, who had grown up without human companionship or language. He analyzes how the boys were used to support competing theories about human nature, how much of it was inborn, and how much learned. And Stefan Willer uses biographies of such luminaries as Johann Sebastian Bach to elucidate the concept of hereditary genius in the nineteenth century.

The volume ends with a paper on poetics by Helmut MÃ¼ller-Sievers, which makes connections between changing eighteenth-century German ideas about literary genres, their fixity, variation, and perpetuation, and ideas about the heredity of organic form. For no apparent reason, this last paper is set apart from the others as an epilogue.

Within each of the cultural domains, one can follow interesting, more or less simultaneous trends towards modern versions of heredity. Wood, for example, has a strong story line connecting Bakewell's trait-based methods to Moravian sheep breeders to Mendel and thence to genetics. Sabean and Vedder follow the demise of patrilineal inheritance and the increasing importance of

"horizontal" relations between families. MÃ¼ller-Wille contrives a parallel to this tendency in biology, going from linear successions of embryos in Harvey to relationships between species and lineages in Linnaeus and Charles Darwin. The historians of medicine have their own trends in the interpretation of hereditary diseases, in which physicians gradually come to distinguish the effects of heredity from those of environment. Also at about the same time, problems of classification arising from human race mixing in overseas colonies, or from newly discovered varieties of plants and animals, were providing further stimuli to thinking about the nature of species, variation, and heredity. Surprisingly, the pivotal period in most of the domains appears to have been between the late eighteenth and the early nineteenth centuries–decades ahead of Mendel's laws, Darwin's theory of pangenesis, Galton's eugenics, and other classics of the 1860s that are usually considered seminal, but which are quite peripheral to the discussions in this volume.

Although these domain-specific trends are very striking, it is more difficult to make out what might be happening at their "crossroads," segregated as they are into separate sections of the book. The introductory essay by MÃ¼ller-Wille and Hans-JÃ¶rg Rheinberger argues that by 1870, the end of the period covered, the cultural domains were interacting and merging into the "epistemic space" in which modern heredity and genetics would develop, but that seems to me to reformulate the problem, rather than address it. A conclusion might also have been helpful, to tie things together better and reflect upon the state of heredity in 1870, or else an epilogue that actually pointed ahead to the next volume in the series or connected up with standard histories of genetics.

But perhaps that is too much to demand at this early stage in the production of such a cultural historiography. The editors and contributors have still done a great service to the field, for it is most unusual and thought-provoking to see so many diverse perspectives brought together in a single volume. It will surely inspire further interdisciplinary work on the history of heredity, while also providing useful ideas, methods, and documentation for it.