

his approach to quantum electrodynamics from the late 1940s, Feynman took up an idea of positrons as electrons moving backward in time—an idea he had developed with Wheeler while working on his thesis. Feynman then developed an intuitively understandable approach to quantum electrodynamics by using diagrams, called “Feynman diagrams,” that contrasted with the mathematical abstract operator formalism used by his competitor, Julian Schwinger. It is a weakness of the book that the diagram technique is merely described; not a single diagram is shown. Although the collaboration between Feynman and Wheeler lasted only for three years, until Feynman entered the Manhattan Project, the biographies of the two serve as the connecting thread that runs through the book up to their deaths. Wheeler’s later students and the collaborators in his work on general relativity are sufficiently treated. Hans Bethe, however, who became Feynman’s close friend during the Manhattan Project and the postwar period, is described far too briefly. This is disappointing, because Bethe was a crucial mentor for Feynman until his formulation of QED was accepted by the community.

The Quantum Labyrinth is a popular book. There are no footnotes or endnotes. References for quotations are found in the “Notes” at the end of the book, organized by chapter and page numbers. A few more references would have been helpful. For example, Halpern discusses Schwinger’s presentation of his approach to QED at the Rochester conference, one of the most important postwar conferences. He then refers to more than forty pages of notes that Wheeler took on Schwinger’s talk (p. 145). But where are these notes stored? How did Halpern hear about them? No references regarding these notes can be found in the book. And so we will never know—or we have to ask the author. This is just one of several instances where I was curious about the provenance of a discussion but could not find any relevant information. In any case, this book is very successful as a popular work; it includes a detailed index, as well as directions to a Web page and even Twitter updates. As long as one does not expect new historical questions and details, the reader will very much enjoy the book.

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Rebecca J. H. Woods. *The Herds Shot Round the World: Native Breeds and the British Empire, 1800–1900.* 233 pp., illus., notes, bibl., index. Chapel Hill: University of North Carolina Press, 2017. ISBN 9781469634654.

Rare breeds survival trusts often advocate for their cause by pointing to the loss of genetic capital inherent in the ongoing replacement of “native” breeds by a small number of highly bred, highly productive livestock varieties. Their objectives are laudable; yet, ironically, it was the very creation of those native breeds in the nineteenth century that started the narrowing down of genetic variability in what had until then been a mostly nondescript hodgepodge of farm animals whose principal characteristic was their diversity. Breeds are characterized by a certain degree of “purity,” meaning that variability is undesirable and should be vigorously selected against.

This book shows that the notion of a native breed is in any case ambiguous. According to the British rare breeds trust, the “pure original types” of Hereford cattle were the animals whose pedigrees were recorded in the volumes of the Hereford herdbook that was begun in the mid-nineteenth century. Yet these animals had already been altered considerably by selection and were much more uniform than the traditional “native” herds of early nineteenth-century Hereford County. Moreover, the aboriginal status of the Hereford had been contested from the moment its “improvement” began. Was it really an ancient type, or was it a mix of several varieties? Or should its originally unimproved status and variability be seen as proof

of its authenticity? *The Herds Shot Round the World* focuses on the ambiguities of the notion of nativeness in British stockbreeding, and it demonstrates how debates on the topic fanned out to include cultural, economic, and political issues related to notions of nation and empire.

Britain in the nineteenth century presented itself as a country of meat eaters. Britishness, with its connotation of superiority, was bolstered, physiologically speaking, by the consumption of beef and mutton, in quantities far surpassing the intake in other countries. The rapid growth of the population soon led to a perceived meat shortage, which could be alleviated only by importation on a grand scale. Considering that, presumably, no country could compete with the British in terms of breed improvement and the resultant quality of the animals produced, the importation of meat was as problematic as it was deemed unavoidable. The best option was to import meat from superior British breeds that had been translocated to other countries of the empire, such as Australia and New Zealand. But would such animals still qualify as “native” after they had lived in a different environment for generations? To what extent was a breed defined by heredity, and to what extent by its environment? Many considered the failed early nineteenth-century experiments with imported Merinos—they seemed to “degenerate” in a few generations—to have proved the overriding importance of the environment. Homebred meat therefore continued to be preferred to imported meat, especially by the affluent classes.

The Merino, however, adapted more easily than British breeds to circumstances in Australia and some parts of New Zealand, and thus the challenge arose of turning this typical wool sheep into a dual-purpose breed that produced good meat as well. What had proved impossible in the metropole was successfully accomplished in New Zealand: by crossing the Merino with the British Lincoln, the Corriedale was created, supplying the English market with both excellent wool and meat. Its worldwide success, made possible by the invention and refinement of frozen meat technology, gave the Corriedale—with yet another twist of the term—the status of a “native” breed of the empire. In similar fashion, the highly adaptable Hereford became an icon of Britain’s global domination as the principal beef breed worldwide. Then again, the Hereford’s adaptability having been crucial to achieving this status, this quality was the very reason that the rare breeds trust denied “colonial” Herefords the status of nativeness a century later. Thus nativeness effortlessly served the purposes of national, colonial, and imperial interests in flatly contradictory ways.

Rebecca Woods’s book is elegantly written and a pleasure to read—a lavish sprinkling of quotations from primary sources contributes in no small measure to the enjoyment. It does a marvelous job in bringing the aporias in the cultural and political uses of nativeness to light. While the author repeatedly emphasizes that nineteenth-century breeders wrestled to balance the influences of heredity, environment, and human artifice, I was a bit disappointed that we learn little that is new about the actual methods they used to change or create breeds: Woods explains the problems they encountered in modern terms. Also, the voices of agriculturalists, enunciating their ideas about heredity and the practical implications that followed from them, are hardly heard in the book. We remain in the dark, for instance, about why British breeders failed to acclimatize and “improve” the Merino, whereas breeders in Saxony had successfully accomplished the task several decades earlier, as Roger Woods and Vítězslav Orel have shown. And why was it that British breeders began to lose their leading position at the century’s turn? Was it something about their methods, or was it the dialectics of lead—the handicap of a head start—that induced them to continue to prefer British breeds over the highly productive foreign varieties that appeared on the scene after 1900? Admittedly, however, the breeders’ methods might easily be the subject of another book. Pre-1900 plant breeding practices are beginning to draw more attention from historians; animal breeding practices still present us with many questions that await investigation.

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