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David A. West. *Darwin's Man in Brazil: The Evolving Science of Fritz Müller.* Tallahassee: University Press of Florida, 2016. 344 pp. $79.95 (cloth), ISBN 978-0-8130-6260-0.

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David Westâs detailed study on the life and work of Fritz MÃ¼ller, an evolutionary biologist and colleague of Charles Darwin, is the culmination of three decades of inquiry. The depth and scope of research on this singular figure is impressive, spanning five countries and drawing on a startling number of archives, universities, libraries, and other institutions. Although West himself was trained in genetics and ornithology at Cornell University, he became interested in butterflies and began researching in Brazil. West became interested in MÃ¼ller after a butterfly-oriented research trip to Brazil in 1982, undertaken in the midst of his long career teaching biology at Virginia Tech University from 1962 to 1998. Thus inspired, West and his spouse Lindsay embarked on a study of the life and work of Fritz MÃ¼ller, a life that was marked by both scientific accomplishment and personal tragedy. The result is a thorough examination of a human figure and a scientistâs achievements.

Unlike other scientists who conducted natural history in South America, MÃ¼ller is not well known. He didnât write intrepid tales of adventure nor, apparently, did he pen the racist clichÃ©s about living in Brazil that were *de rigueur* during his lifetime. Appealingly, there are no conquest narratives. Rather, MÃ¼ller published papers about butterflies, fertilization of orchids, honeybees, climbing plants, crustacean, termites, and leafcutter ants. One of the things that the reader of this book will quickly note is the detail, care, and precision MÃ¼ller took with his studies. His conclusions and analysis are the result of steady observations sustained over time and seem a striking contrast to the harried and pressured way in which science is often conducted today.

West begins MÃ¼llerâs biography with a chapter on his early life in Germany. MÃ¼ller went to university to become a physician, but because he was a professed atheist, was denied a diploma. In one of his most interesting chapters, West describes how MÃ¼ller refused to pledge a Christian oath that required he say, âso help me God and his sacred Gospelâ (p. 27). Although MÃ¼ller tried to petition out of having to say the phrase, he was refused. Ultimately he finished his medical training but did not receive a degree and so became a private tutor after graduation. Eventually he moved to southern Brazil as part of a new colony established by Hermann Blumenau, a German chemist. Although I would have liked more information about the history of German colonization of Brazil and the impact those colonists had in Brazil, West does say that MÃ¼llerâs desire to relocate was not driven by the lure of Brazil. Rather, MÃ¼ller wanted to escape the unbearable persecution of nonbelievers and nondenominational associations in Germany. Brazil was an avenue toward a life of freedom. MÃ¼ller also saw Brazil as an opportunity to use his medical training in a place where doctors were scarce. While he did use his medical training, he also taught students at the provincial lyceum arithmetic, algebra, geometry, and natural history. Eventually he tired of teaching and proposed to the province that he become a âprovincial naturalist,“ collecting and studying the native and foreign plants of the area and ascertaining how best to cultivate and distribute them, a position he held for many years. Thus, West depicts MÃ¼ller as both a pioneer and man of conviction. Although most of us are aware that evolution was controversial because of its questioning of religious creationism, the chapter communicates the struggle, depth, and impact this tension had for individuals such as MÃ¼ller.

Ultimately, West seeks to situate MÃ¼ller within Darwinâs networks, giving MÃ¼ller the recognition he deserved as one of evolutionâs key interlocutors. He succeeds in showing the ways in which Darwin relied on MÃ¼ller for important field observations and experiments as well as the way in which MÃ¼ller relied on Darwin for inspiration, support, and direction. In MÃ¼llerâs first book *FÃ¼r Darwin* (Facts and Argument for Darwin), MÃ¼ller tests Darwinâs theories through an analysis of crustacea. Rather than rejecting Darwin outright, he conducted experiments in painstaking detail to support the tenets of Darwinism, contributing to the eventual acceptance of evolutionist thinking. West notes that Darwin believed that MÃ¼llerâs book was âperhaps the most important contribution in support of his [Darwinâs] ideasâ (p. 93). This argument is furthered by West's chapter on the scientist's testing of whether butterflies are born knowing exactly which flower had nectar, or if this skill was learned, and his later research on predation in butterflies. MÃ¼llerâs research suggested that butterflies learn by experience which flower head has nectar, something that was confirmed a century later. As well, MÃ¼ller's research into the ways butterflies adopt the warning traits of other butterflies to ward off similar predators, known today as MÃ¼llerian mimicry, was an important means of demonstrating both Darwin and MÃ¼ller's claims that natural selection was a principle for change. Although MÃ¼ller is not well known, West argues that his research was influential in the scientific community and should be recognized.

Amongst the ample documentation of MÃ¼llerâs individual experiments and research papers is a noteworthy subplot about the way in which scientific knowledge functioned and circulated in the mid-to-late 1800s. MÃ¼llerâs observations were precise and time-consuming. For example, he watched the pollination of the lantana plant to claim, rightly, that old flower heads were kept to remain conspicuous to pollinators. What becomes evident throughout Westâs treatment of MÃ¼llerâs detailed and honed observation was that science was as much a human network as it was an intimate relationship with the natural world. His teachers in Germany, for example, were professors who had been influenced by Alexander von Humboldt and his collections from South America. As the only Darwinist in Brazil, MÃ¼ller relied on a global network of scholars, mostly located in Europe and the United States, to advance scientific understanding of evolutionary theory. Papers were circulated through colleagues and correspondence, sometimes taking years to come full circle.

The majority of the text focuses on the science of MÃ¼ller. Consequently, the main audience will be those interested in a history of evolutionary biology. Although nonscientists are not precluded from enjoying the book, for those without an interest in this area, the discussion of MÃ¼llerâs experiments and his findings would be enhanced by a general knowledge of evolution and even the ways in which evolutionary biology is understood today. As a non-STEM reader, I often found myself wondering about the present-day implications of MÃ¼llerâs observations and experiments. Although West does a good job in pointing out how MÃ¼llerâs studies and conclusions figure today, the amount of information can be blurring for those without a specialization in the field. In this sense, there is a missed opportunity of bringing MÃ¼llerâs contribution to a wider audience in that, with the exception of the butterfly chapter, the work is perhaps too dense to be of interest to a broader or more casual audience. My sense after reading the book was that Westâs intention was to be a serious and thorough examination of a not well-known scientist, a scientistâs scientist if you will, and in that he succeeded.

All that said, I would have liked more information about the politics surrounding MÃ¼ller and the German colony in Brazil. A deeper contextualization of the ways in which MÃ¼ller and the colony were received in Brazil at the time is particularly deserved since West discusses the way in which, although MÃ¼ller was located in Brazil, he was still very much in a European world of science. Many of the colonists did not want to lose their German identity, language, or habits and become too Brazilian in either language or behavior. This piqued my curiosity and I wanted to understand more about the politics and history around the colony and how other scientists in Brazil impacted MÃ¼llerâs work. I wondered about settler colonialism and the way in which scientific pursuits, even if they contributed to our understanding of evolution, have a wider reach. Were foreigners better received than locals? Was their scientific study treated differently? Why was a German doctor chosen as the provincial naturalist? Was the knowledge MÃ¼ller gained by being in Brazil known by indigenous groups who lived in the area? Who did he have contact with? In one sense, MÃ¼ller was similar to Humboldt in the quantity of collecting and observation he acquired. In another sense he was vastly different, conducting fieldwork for life in a growing colony. These connections might have been made clearer and would have supported Westâs argument about the unique qualities of MÃ¼ller as a scientist as well as the exceptional qualities of his contribu-

tions and research. Finally, I wanted more information about whether or not MÃ¼llerâs work impacted the collective understanding of, and study of, race at the time. West mentions his correspondence with Alexander Agassiz, son of the famous polygenist Louis Agassiz, and a discussion of the ways his research did or did not impact understandings about race would have been welcomed.

Still, the extensive research about MÃ¼ller is impressive and I hope this book will do what it intended–spur thinking and further research into the life of MÃ¼ller, providing his contributions with the recognition they deserve. This is not inconsequential.

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