

David A. West. *Fritz Müller: A Naturalist in Brazil*. Blacksburg: Pocahontas Press, 2003. viii + 376 pp. \$25.00 (paper), ISBN 978-0-936015-92-7.

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The Evolution of Evolution: Fritz Müller and Darwinism

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Environmental historians of Latin America have recently devoted their attention to, among other themes, the importance of natural history in the late-nineteenth and early-twentieth centuries. This research has demonstrated how naturalists shaped people's views of the environment and, at the same time, contributed to nation-building projects and Western imperialism.[1] David West's new biography of Fritz Muller (1822-1897) adds another dimension to this body of literature by focusing on the history of science and the development of natural selection and evolution theories (Darwinism) in the late-nineteenth century. The book succeeds very well on two levels, first by depicting the fascinating life of the modest yet indefatigable scientist, Fritz Muller, and second by illuminating the lively debates and correspondence among some of the late-nineteenth-century's most prominent scientists. Although Muller lived and conducted his scientific fieldwork in Brazil, this book will appeal to readers across geographical boundaries who are interested in the history of Darwinism.

West devotes the first third of *Fritz Muller: A Naturalist in Brazil* to Muller's early life and schooling in Germany and his initial years in Brazil, where he moved in 1852 and then spent the remainder of his life. Muller benefited from positive family and educational experiences during his formative years. His parents provided a healthy, stable environment in which to grow up, while the rigorous professors at the University of Berlin and

his active zoology friends at Greifswald University stimulated diverse intellectual development. As a medical student at Greifswald, Muller began questioning religion, and in 1846 he joined the Free Congregation. This transformation proved pivotal to his life: he refused to sign the oath of medical doctors because of the phrase "so help me God and his sacred gospel" (p. 49). Muller's disgust with the university's oath—and his vanished hopes when the 1848 Prussian revolution did not shift university policy—led him to Brazil, where he believed he went as an exiled Free Congregationist. At Blumenau Colony in Brazil's Santa Catarina Province, Muller cleared forest and established his home in the Itajai river valley. Except for a few years in the provincial capital of Desterro as a teacher, Muller and his family lived in Itajai, where Muller could both farm and conduct his scientific research until his death in 1897.

As if homesteading in tropical forest, raising six daughters, working as a civil servant for the provincial government, learning several languages, and teaching mathematics at a nearby Jesuit college were not enough, Fritz Muller found time to become one of the most important advocates of Darwinism in the latter part of the nineteenth century. The second two thirds of David West's book reveal Muller's scientific accomplishments. Frustrated with what he called mere "species describers," Muller sought to understand the natural world more broadly. He apologized to his colleagues in Germany, Britain, and the United States for being "a peasant in the wilderness" (p. 170) and for thus "falling far behind the rapid onrush of science" because of having "access

only to the scantiest fragments of the literature” (p. 196). But Muller nonetheless made tremendous contributions to natural history, both through his published work and through his decades of correspondence with Charles Darwin, Hermann Muller, Alexander Agassiz, Ernst Krause, and Ernst Haeckel, among many others. With instruments that often consisted only of a magnifying glass, pocket knife, and pencil, Muller worked from 1874 to 1891 as a “traveling naturalist” for the Brazilian National Museum; the salary offered a safety net from home-steading, provided funds to acquire equipment, books, and journals like *Nature*, and allowed him to buy his cigars.

Muller first presented arguments for evolution in his 1864 book *Fur Darwin* (translated to English in 1869 with the title *Facts and Arguments for Darwin*). Here Muller explained the development of Crustacea and showed how living forms diverged from ancestral ones; he also described aerial respiration, larvae morphology, sexual dimorphism, and polymorphism in order to prove natural selection. His incisive view of the Brazilian environment propelled Muller to investigate an impressive range of topics: for example, he cleared up many scientists’ misconceptions about termites; he conducted experiments on self-sterility and natural selection in orchids; he explained how an ostracod (*Elpidium*), that lives only in bromeliad pools, moves from one pool to another by attaching itself to the body of mayflies, water beetles, frogs, or other visitors; he observed how plants shake off drops of water from their leaves; and by observing butterfly mimicry and demonstrating that birds “learn” (so it is not instinctive) which butterflies are palatable, he outlined his most important contribution to evolutionary biology, what is today called Mullerian mimicry. In short, Muller offered important field experiments and observations to support Darwinian theories. Interestingly, many of his principal contributions to science came, not through his published results, but rather through the hundreds of letters he wrote, which stimulated colleagues to rethink or expand their own work.

As a reproduction of much of Fritz Muller’s original published literature and unpublished correspondence, the structure of this book differs from most monographs. Much of this book comes directly from Alfred Moller’s three-volume (1915, 1920, 1921) compilation of Muller’s writings, *Fritz Muller, Werke, Briefe und Leben*. Roughly half of David West’s book consists of direct quotes, which sometimes cover several pages. Readers interested in Muller’s own words or in a precise, elaborate rendition of his correspondence and scientific discoveries will appre-

ciate how this book preserves the original flavor. Anyone interested in studying Fritz Muller’s writings will be grateful not only for the meticulous endnotes, but also for the four pages devoted to “Locations of Fritz Muller’s Correspondence,” which lists by recipient (i.e., Charles Darwin, Alexander Agassiz, etc.) the archives holding Muller’s correspondence. Other readers, however, might wish for more developed chapter arguments, a more interpretive narrative, more analysis of the quotes, and a more explicit identification of the Mullerian legacy in science today. As an accomplished (and now retired) evolutionary biologist from Virginia Tech, David West has the knowledge and vision to insert his own voice into the text more overtly than he has. In fact, the three chapters (of fourteen total) that West wrote himself—and did not base largely on Alfred Moller’s volumes—provide the best analyses of Muller’s life and scientific findings.

While the book stands on sound historical documentation and primary sources, historians may find some surprising aspects. Latin Americanists may note that Brazil is a mere backdrop to this story, a laboratory for Western scientists to exploit. They might also balk at the discussion of Brazilians and indigenous people: Muller’s racist comments about slothful Brazilians or his hope that Germans would “eventually displace the degenerate Latin element” (p. 148) are not qualified, explained, or contextualized by the author. And indigenous residents appear as they do in traditional Western films about the U.S. West—as savage nomads who repeatedly attack innocent white settlers. David West seems to share Muller’s surprise that “the Indians remain everpresent and inhospitable neighbors” (p. 95) without recognizing that, after all, Muller and the other settlers were stealing the native people’s land. Environmental historians may cringe when the author uses the term “virgin forest.” Indigenous people had obviously lived on that land long before Muller arrived, and their thousands of years of hunting, fishing, farming, burning, and plant gathering transformed the forest. Finally, environmental historians may wonder where Muller’s perspectives of nature came from and how his scientific discoveries impacted popular views of the environment, the tropics, and Latin America.

Of course, David West is not an environmental historian, even if subscribers to H-Environment are. His intention is to describe the historical development of Darwinism and the critical role Fritz Muller played in that process. On this level the author makes an important contribution. Historians of science or evolutionary biologists investigating, for example, sexual dimorphism in

caddis flies or mimicry in butterflies will obviously read this book quite differently than will environmental historians. Everyone, though, will appreciate that David West has uncovered not only the life contributions of Fritz Muller, but also the lively dialogue about Darwinism that took place from the 1860s to the 1890s.

Note

[1]. For example, Stuart McCook, *States of Nature: Science, Agriculture, and Environment in the Spanish Caribbean, 1760-1940* (Austin: University of Texas Press, 2002); Mauricio Neto Olarte, *Remedios para el Imperio: Historia Natural y la apropiación del Nuevo Mundo* (Bo-

gota: Instituto Colombiano de Antropología e Historia, 2000); Candace Slater, *Entangled Edens: Visions of the Amazon* (Berkeley: University of California Press, 2002); Nancy Leys Stepan, *Picturing Tropical Nature* (Ithaca: Cornell University Press, 2001); and for worldwide studies, Richard Drayton, *Nature's Government: Science, Imperial Britain, and the "Improvement" of the World* (New Haven: Yale University Press, 2000); Mary Louise Pratt, *Imperial Eyes: Travel Writing and Transculturation* (London: Routledge, 1992); and James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998).

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