

“of the highest service to me” aboard the *Beagle* (p. 77), they find no mention in Darwin’s field notes or his *Beagle* diary at points of geological interest. These sorts of cross-examinations of Darwin’s own recollections are tremendously useful for those trying to sketch the trajectories of influence and caution us against relying exclusively on our subject’s memory, which will be colored by both intervening experiences and by the anticipation of a particular readership.

One of the most interesting moments in Porter and Graham’s forensic reading of the autobiography is their engagement with Darwin’s notorious quietness on the subject of his mother, who died when Charles was eight. Reading his autobiography alone, one could easily dismiss Susannah Darwin from the story of her son’s scientific development. But Porter and Graham have pieced together the evidence to argue that Susannah was heavily involved in Charles’s early botanical education, teaching him the rudiments of the Linnaean system of plant identification.

Porter and Graham are right to claim *Darwin’s Sciences* as “the first biographical treatment to emphasize [Darwin’s] lifelong research in various fields of endeavour, what he did, why he did it, and what its implications were and are for his time and ours” (p. 1). It is particularly fitting that this impressively interdisciplinary biography concludes by focusing on Darwin’s own last publication, *The Formation of Vegetable Mould, through the Action of Worms, with Observations on Their Habits* (Murray, 1881). That work (as Porter and Graham argue) can be read as the culmination of Darwin’s own interdisciplinarity, unifying his interests in phenomena as remote in scale as earthworms and earth history.

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Robert J. Richards; Michael Ruse. *Debating Darwin*. xi + 299 pp., figs., bibl., index. Chicago/London: University of Chicago Press, 2016. \$30 (cloth).

In *Debating Darwin*, Robert J. Richards and Michael Ruse present their perspectives on Charles Darwin’s influences, outlook, and intellectual development. Both admit that they disagree with each other solely on interpretation, not on facts. Additionally, these interpretative differences are not disciplinary, as Ruse is a philosopher and Richards a historian. This is a fair claim as they both skillfully cross and blur disciplinary boundaries. Richards makes the most explicit formulation of their interpretive differences by pointing to Ruse’s training under the Marxist historian Robert Young and placing himself within a neo-Kantian tradition. Whether these perspectives explain their differences is not so obvious, but such frank self-reflection by historians is very welcome.

The overall structure of *Debating Darwin* includes a short coauthored preface, an agreed-upon timeline, separately authored essays and replies, and a coauthored epilogue relating their points of agreement on current discourses on consciousness and religion. The endnotes, while not consistent between the authors regarding Darwin’s notebooks, are easily traced to the text. The presentation style lends itself to a classroom setting, either to initiate seminar discussions or as the textual basis for an introductory lecture on Darwin that addresses the subjectivity of historical perspectives and methods. Ruse’s and Richards’s engaging writing styles, found in the clarity of their narratives and arguments, present opportunities for students to find points of agreement while tracing their divergences.

For Ruse, Darwin is fully British. His argument and narrative, which have something embryological about them, serve as an excellent example of a social constructivist presentation. The Glorious Revolution and Thomas Newcomen’s engine are some of Ruse’s initial conditions that developed into a Victorian periphery surrounding and permeating Darwin’s family. This periphery of aristocratic and theistic Tory conservatism alongside industrialist and deistic Whig liberalism ultimately influenced Darwin more

deeply through his studies in medicine, theology, and his fieldwork on the *Beagle*. All these British influences culminated in the first edition of *On the Origin of Species* (1859). Working through the several revisions of *Origin* and other texts, Darwin gradually gained independence from his cultural background through the force of his own thought as it gradually drew directly from its own implications (a philosopher's ideal). A purely natural explanation of the course of evolution emerged, where appeals to teleology and progress or the presence of divinity became limitations of language that could not grasp the realities of natural selection.

While Ruse constructs a grand narrative around Darwin as a national genius, Richards presents Darwin centered in a textual network with input coming directly and indirectly from German and French authors. Richards is also less ready to allow Darwin to free himself from his past. The most direct continental connection Richards traces is that of Alexander von Humboldt, who, as Darwin described, "like another Sun illumines everything I behold" in an 1832 journal entry upon which he based his published travel accounts (p. 100). Richards found a more indirect route in Darwin's seemingly surreptitiously titled *Old and Useless Notes*. There Darwin commented on John Stuart Mill's essay on Samuel Taylor Coleridge, which Richards describes as containing the "German perspective on morality . . . gently lifted from Kant and Schelling" (p. 145). By pointing out these influences on Darwin, Richards does not seem to be seeking to completely throw out Ruse's narrative, but merely geographically expand and structurally complicate Darwin's intellectual periphery. Ruse's response is that Natural Theology, the role of which Richards does not deny, just as easily explains the apparent presence of German Romanticism in Darwin's thought. To demonstrate that Darwin was not always welcoming toward German science, Ruse points to letters Darwin wrote to Charles Lyell in 1845 and to J. D. Hooker in 1881 in which he was "critical of Humboldt's flowery style (in *Cosmos*) . . . and even more so of the geology" and "rather cool" when assessing Humboldt's scientific achievements (p. 193).

What the argument of each makes clear is that, despite claiming to agree on historical facts, each certainly used different textual facts. For example, Richards draws more heavily on Darwin's private journals and notebooks in his opening argument than Ruse does. While philosophical or methodological perspectives may have been important for selecting which texts to focus on, frameworks of nationalism and internationalism appear to be a more significant factor. Another important factor was which point in Darwin's biography each used to center their arguments, illustrated above with the pitting of letters from 1845 and 1881 against a journal entry from 1832. Perhaps a more productive approach would have been for both participants to coauthor (a practice they excelled at in the prefatory and concluding materials) a narrative followed by shorter explanations and responses detailing where they part company based on that narrative. Each integrating all agreed-upon historical and textual facts into their respective narrative may assist in moving a seemingly intractable debate toward a more constructive dialogue.

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Stephan Paetrow; Wolfgang Wimmer. *Carl Zeiss: Eine Biografie, 1816–1888.* 143 pp., illus. Cologne: Böhlau Verlag, 2016. €20.60 (cloth).

The name Carl Zeiss is often considered synonymous with German precision optics and instrumentation. Written by Stephan Paetrow, an independent corporate historian, and Wolfgang Wimmer, head of the Zeiss archive, this biography places Carl Zeiss and his work in a broader socioeconomic context. In the preface, Wimmer emphasizes that writing a history of Carl Zeiss is not an easy feat. Very little was recorded of the Zeiss workshop before Carl's death. Also, some Zeiss anniversaries that might have led