

longer playing in Darwin's ballpark. From "natural selection" to "natural theology"—from science to religion. Thus understood, I do not think Darwin and Wallace were competing. Even in religion I do not think Wallace is as good as Darwin in science—or in the *Descent* in religion for that matter. But do not let me end on a negative note. This is a nicely written book with style. Well researched, too. You could do worse than start into Wallace studies here. Do not stop here. Turn then to old fuddy-duddies like me.

MICHAEL RUSE, *Program in the History & Philosophy of Science, Florida State University, Tallahassee, Florida*

ERNST HAECKEL: AUSGEWÄHLTE BRIEFWECHSEL. *Band I: Familienkorrespondenz, Februar 1839–April 1854. Historisch-kritische Ausgabe.*

Edited by Roman Göbel, Gerhard Müller, and Claudia Taszus; with the cooperation of Thomas Bach, Jens Pahnke, and Kathrin Polenz. Stuttgart (Germany): Franz Steiner Verlag. €139.00. lvi + 648 p. + 34 pl.; ill.; Ortsregister, Sachregister, and taxonomisches register. ISBN: 978-3-515-11290-1 (hc); 978-3-515-11292-5 (eb). 2017.

After he returned from his habilitation research in Italy and began preparing his specimens, Ernst Haeckel (1834–1919) had occasion to read the German version of *On the Origin of Species (Über die Entstehung der Arten)*. 1860. Stuttgart (Germany): E. Schweizerhart'sche Verlagshandlung und Druckerei) by the English naturalist Charles Darwin. Haeckel quickly perceived how the author's new theory made sense of relationships among the families, genera, and species of the one-celled radiolarians that he had recovered from the seas off the coasts of Naples and Sicily. On receipt of a presentation copy of the prize-winning *Die Radiolarien* (1862. Berlin (Germany): Druck und Verlag von Georg Reimer), Darwin wrote Haeckel that the volumes were "one of the most magnificent works which I have ever seen, & I am proud to possess a copy from the author" (C. Darwin. 3 March 1864. Letter no. 4419. Cambridge (UK): Darwin Correspondence Project, University of Cambridge).

What particularly attracted Darwin's admiration was the second volume of stunning, copper-etched plates. Haeckel, an accomplished artist, illustrated this and the some 20-or-so other large, research monographs he completed during his lifetime. Undoubtedly the graphic representations of his more popular books created a large readership for the new theory; indeed, his writings far outsold Darwin's own. The great historian of biology, Erik Nordenskiöld, judged that Haeckel's *Natürliche Schöpfungsgeschichte (Natural History of Creation)*. 1868. Berlin (Germany): Verlag von Georg Reimer), which went through 12 editions during his lifetime, was "the chief source of the world's knowledge of Darwinism"

(E. Nordenskiöld. 1936. *The History of Biology: A Survey*. New York: Tudor Publishing Company; p. 515). Haeckel's illustrations, however, would ignite a controversy among professional biologists and religious objectors that smolders even today. His biogenetic law—that ontogeny recapitulates phylogeny—still divides biologists. And if one sought the source of the long-standing enmity between evolutionary thinkers and the religiously orthodox, one need look no further than Haeckel, who incessantly assaulted the preachers with the jawbone of Darwinian theory.

Haeckel's heterodox reputation did not, however, dampen the enthusiasm of his students. He drew to his small university outpost at Jena, in the center of the German lands, some of the best biologists of the next generation, including the brothers Oskar and Richard Hertwig, Wilhelm Roux, and Hans Driesch, all of whom made their marks by the turn of the century.

Shortly after Haeckel's death, his house in Jena was sold to the university and became the repository for an archive of manuscripts, paintings, and his vast correspondence. That archive holds over 44,000 letters, including correspondence with his family, his students, and such scientific luminaries as Charles Darwin (over 50 letters), Thomas Henry Huxley, August Weismann, and Carl Gegenbaur. The files hold, as well, surprising correspondence with other famous individuals, such as the dancer Isadora Duncan and the sexologist Magnus Hirschfeld. From 1921 to recent years, scattered collections of Haeckel's letters have appeared, but often in fragmented form—perhaps 10% of the extant correspondence. In 2012, the German Academy of Sciences, in cooperation with Haeckel-Haus, began a long-term project to publish a print edition of 25 volumes of selected correspondence. The project also intends to publish all of the letters online—a task that if done in print would run to almost 90 volumes. The print volumes will include brief commentaries and will be thematically organized, beginning with six volumes of family correspondence, of which the volume under review is the first.

This book commences with a letter from Haeckel's aunt wishing a happy birthday to the five-year-old boy in Merseburg, where his father Karl served the Prussian Court as minister for schools and ecclesiastical affairs. Upon graduation from the Dom-Gymnasium, Haeckel entered medical school at Berlin; but in the fall term of 1852, after one semester of being disappointed by the lectures in botany—his first scientific enthusiasm—he matriculated at the medical school in Würzburg. Well over half the 231 letters of this initial volume consist of communications during Haeckel's time at Würzburg, the most important medical school in the Germanies during this period. In these letters, Haeckel left vivid im-

pressions—and often sketches—of the distinguished faculty, such individuals as Albert von Kölliker, Franz Leydig, and Rudolf Virchow, each contributing to the new discipline of histology. Haeckel immersed himself in the microscopy of cells but continually hinted to his parents that medicine was not in his purview, rather his love was research. In 1877, he would have a famous dispute with his former teacher Virchow, who contended that evolutionary theory led to socialism and communism, while Haeckel argued that it was politically neutral.

The book's introduction, commentaries, and illustrations are of the highest caliber. The print volumes will provide an unparalleled view of the development of biology and scientific culture in Germany during the last half of the 19th century.

ROBERT J. RICHARDS, *Fishbein Center for History of Science & Medicine, University of Chicago, Chicago, Illinois*

THE GESTATION OF GERMAN BIOLOGY: PHILOSOPHY AND PHYSIOLOGY FROM STAHL TO SCHELLING.

By John H. Zammito. *Chicago (Illinois): University of Chicago Press.* \$45.00. viii + 523 p.; indexes of names and subjects. ISBN: 978-0-226-52079-7 (hc); 978-0-226-52082-7 (eb). 2018.

The author has produced another excellent work with *The Gestation of German Biology*. In this monograph, he looks at the many 18th-century sources—both German and French—that made possible the emergence of biology as a special science in the 19th century. His narrative begins with the ideas of Georg Ernst Stahl, with particular emphasis on Stahl's treatment of the concept of the organism and at the animistic themes that arose from this discourse and which prefigure later biological notions of life forces and drives. From here Zammito moves deftly through an array of figures, from the Dutch physiologist Herman Boerhaave and his students Albrecht von Haller and Julien Offray de La Mettrie to Pierre-Louis Maupertuis, Denis Diderot, and Georges-Louis Leclerc, Comte de Buffon, from whose work arises a naturalized French vital materialism according to which nature is a self-organizing whole. These French ideas then get picked back up, the author argues, by German thinkers such as Johann Gottfried Herder and Johann Friedrich Blumenbach, Carl Friedrich Kielmeyer and, finally, through to Goethe, Schelling, and the *Naturphilosophie* movement generally.

Zammito's discussion of this diverse cast of thinkers is expansive and multifaceted, and offers much for those interested in the history of biology. But the overarching narrative arc centers on 18th-century questions about whether the study of life was a purely historical and descriptive endeavor or was necessarily explanatory, and whether living things

could be explained in purely mechanical terms or whether they required new forms of explanation. By showing how these questions were taken up from Stahl to Schelling, the author shows how biological explanation, predicated on the idea that purposeful organization underlied life itself, became possible. One of the most interesting fruits of this endeavor is Zammito's rebuttal of the still-dominant characterization of *Naturphilosophie* as metaphysically fanciful pseudoscience, instead of an important driving force in the development of biology as a serious, empirical science. The author calls for a revision of our conception of the *Naturphilosophie* movement, which he claims made possible the emergence of biological science as a distinct discipline by showing just how life could be explained through natural principles.

This book is long and dense, and can be slow-going at times, but it constantly rewards a close reading. It is cogently and compellingly argued, and has much to offer anyone interested in German idealism, romanticism, and the history of biology generally.

JEFF O'CONNELL, *Program in the History & Philosophy of Science, Florida State University, Tallahassee, Florida*

FROM REASON TO PRACTICE IN BIOETHICS: AN ANTHOLOGY DEDICATED TO THE WORKS OF JOHN HARRIS. *Contemporary Issues in Bioethics, Law and Medical Humanities.*

Edited by John Coggon, Sarah Chan, Søren Holm, and Thomasine Kushner. *Manchester (United Kingdom): Manchester University Press.* \$105.00. xx + 244 p.; index. ISBN: 978-0-7190-9623-5. 2015.

This Festschrift honors the substantial contributions of John Harris to the fields of bioethics, ethics, and philosophy during the course of his long and prodigious career. This publication represents the first volume in the Contemporary Issues in Bioethics, Law and Medical Humanities series. The introduction by the series editors makes it clear why Harris was selected as the honoree as they elucidate the personal impact Harris has had on them. It is obvious the great respect that all of the contributors have for Harris' work even if they disagree with the specifics of his assertions.

The collection begins with a series introduction and contributor biographies followed by introductory essays by the volume editors as well as Harris. Sixteen contributed essays cover a broad selection of topics by researchers in bioethics, philosophy, law, and medical ethics. The papers are separated into two parts: Grounding Moral Arguments and From Ethics to Policy and Practice. Although series editors Rebecca Bennett and Simona Giordano, volume