

with humanistic content and standing, and a distributed identity that makes room for craftsman, patron and scholar. The reader may be reluctant to pass over the descriptor for Torriani offered by Charles V himself, ‘the prince among the architects of clocks’ (p. 8), but reads on with the promise that his career can be an exemplary case study for historical characterization in this area.

She is not disappointed: there is much to be learned from this single life, told here in impressive detail. Torriani pursued a successful career in the service of the Habsburg rulers, which took him to many urban centres in the empire and through a wide range of practical disciplines, from the intimacy of mathematical instrument-making to the vast scale of hydraulic engineering. Central to it all were ingenious clocks and planetary machines, prized at court and especially by Charles. The journey also took Torriani through levels of social hierarchy, again traced in this account. It is extraordinary that from all this activity there remains, we are told, a single signed creation – an armillary sphere made in Milan in 1540, now in the city’s Ambrosian Library. This statement, however, is contradicted by illustrations of later cardboard calendric volvelles, made in 1579 in the context of the reform of the calendar, but paper instruments are inclined to be overlooked.

Certainly Zanetti has recovered Torriani for us and added another figure to the ranks of the scholar-craftsman (or Vitruvian artisan). The account itself is rather loosely structured and meandering in places – this is not without its value, in that the author covers more material than he needs for a strict narrative, though it can also be frustrating, since some of the information is already known in the circles where this book will be read and the more focused reader will want to get to the novel information, which is certainly here. Unfortunately the book’s value as a secondary source is reduced by having an index confined only to names. It is a pity also that the text has not been carefully reviewed by an English native speaker and there are awkward constructions and even misunderstandings in the language. Addressing a craftsman as ‘mathematicus’ (p. 45) is said to be ‘shocking’, when it was surely surprising, and in a particularly unfortunate instance we learn that a civil ethic was based on ‘the discipline of the knightly courtesan’ (p. 65) – presumably ‘courtier’ was intended.

Final chapters move from Charles to Philip and from relatively small devices to an enormous hydraulic machine built in Toledo – not, we are told, an exceptional range of scale for an individual in the mechanical world of the period, moving from clockmaker to engineer.

There are many insights here into the courtly functions of practical mathematics and mechanics, while the opportunity for an in-depth study of patronage in sixteenth-century practical mathematics is grasped with dedication by the author. Almost as an afterthought, we are offered a further element in the explanation of Torriani’s later obscurity, despite the contemporary reputation of his machines: in the closed world of the imperial court, the technical content of his work was a valuable and safeguarded secret. Is that not another instance of the received historiography of Catholic Spain, but presumably not one that is ‘biased and deceptive’?

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PATRICK ARMSTRONG, *Alfred Russel Wallace*. London: Reaktion Books, 2019. Pp. 175, ISBN 978-1-7891-4085-9, £11.99 (paperback).  
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Two names stand out in the history of modern evolutionary biology: Charles Darwin and his lesser known confrère, Alfred Russel Wallace. So much has been said of the former that it has become an acknowledged ‘industry’. Wallace’s historiography pales by comparison. Nevertheless, Wallace is playing catch-up with biographies like Peter Raby’s *Alfred Russell Wallace: A Life* (2001), Michael Shermer’s *In Darwin’s Shadow: The Life and Science of Alfred Russel Wallace* (2002), Martin Fichman’s *An Elusive Victorian: The Evolution of Alfred Russel Wallace* (2004), and Ross A. Slotten’s *The Heretic in Darwin’s Court: The Life of Alfred Russel Wallace* (2004), adding

to Amabel Williams-Ellis's classic *Darwin's Moon: A Biography of Alfred Russel Wallace* (1966). Do we really need another? The answer, in this case, is yes.

Unlike the other biographies just mentioned, this one is notable for presenting the life of this complex but fascinating evolutionist in an easily accessible and compact format. Brevity is a daunting task for any writer who would recount the life of a man who spent four years (1848–1852) exploring South America and eight years (1854–1862) traversing the Malay archipelago (today maritime South East Asia); who shocked Darwin on 18 June 1858 with a letter from the island of Ternate outlining a theory of natural selection, prompting the Down House recluse to come out of hiding with his *Origin of Species* seventeen months later; who lived nearly ninety-one years, publishing twenty-two books and more than five hundred scientific papers; and who ventured outspoken opinions on a wide range of social, political and metaphysical topics from socialism to spiritualism. Yet this book rises to the challenge.

In nine succinct, well-organized chapters Armstrong deftly describes a man who surmounted substantial difficulties – a devastating shipwreck, bouts of malaria, the death of his nearly seven-year-old son Bertie, financial hardships, a psychopath's stalking, to name a few – rising to become honoured by every major scientific society of England, including the award of the prestigious Order of Merit by its founder, King Edward VII. The qualities that earned these recognitions were established early. Armstrong observes that Wallace possessed

a zeal for self-education, wide reading, the constant relating of theoretical study to the practical, a questioning approach, and enthusiasm for collecting, naming and classification (to an almost obsessive degree), the giving and attending of lectures at mechanics' halls and elsewhere, and the organisation of his thoughts into sustained writing. (p. 22)

The final chapter, 'Some thoughts on Wallace's mind and character', seeks to explain the psychology of this complicated naturalist, biologist, ecologist, anthropologist, biogeographer and social critic. Taking his cue from Andrew Berry's 'Ardent beetle-hunters' chapter in Charles H. Smith and George Beccaloni's *Natural History & Beyond* (2008), Armstrong proposes the intriguing theory that Wallace may have suffered from Asperger's syndrome. Wallace's eccentricities – his reported social awkwardness, his difficulties with employment, his purported lack of empathy – are explained as those of a "high-functioning" individual who had some of the traits of the syndrome to a certain degree' (p. 154).

This diagnosis is interesting but speculative. Armstrong's assertions of Wallace's 'lack of empathy' appear countered by his passion for stronger labour laws to protect the beleaguered Victorian working class and his disdain for the harsh and insensitive treatment of the vulnerable, whether poor farmers in Wales or the indigenous peoples he encountered in Brazil or the South Pacific. Furthermore, the telltale social ineptitude so typical of Asperger's syndrome seems lacking in Wallace. He had long and enduring friendships with colleagues like Charles Lyell, Richard Spruce, St George Mivart and others. At home his surviving children (Violet and Will) describe their father as fun to be around with a clever sense of humor. Awkwardness around the opposite sex seems noticeably absent in the man who in 1866 married Annie Mitten, with whom he remained for the next forty-seven years. Whether in darkened parlors with female mediums and clairvoyants or with outspoken women's rights advocates like Charlotte Perkins Gilman, who stayed at the Wallaces' home during her visit to England in 1896, Wallace enjoyed the company of interesting and intelligent women. Wallace was a close and long-time friend of Lyell's former secretary and science author/editor, Mrs Arabella Fisher (née Buckley). While touring North America, Wallace spent a week being guided up Grays Peak, Colorado by twenty-eight-year-old self-taught botanist Alice Eastwood. The common interests of the young woman with her sexagenarian companion failed to raise even Victorian eyebrows, but it is hard to imagine this from a man suffering from Asperger's syndrome or, for that matter, a young

woman's willingness to endure it. Wallace could be a heterodox contrarian, but different doesn't always mean disorder. Where Armstrong sees pathology others might see a man uninhibited in his distrust of a rigid Victorian class system and dismissive of its strict social conventions.

Armstrong's psychologizing aside, this brief but engaging book offers an excellent introduction to the life and work of a towering figure in Victorian/Edwardian science. An extremely useful 'Chronology' of Wallace's life (pp. 161–163) amply recompenses the reader for a 'Select bibliography' that is perhaps a bit too 'select'. Overall, this nicely illustrated and handsome but economically bound volume should be a welcome addition to any library at home or on campus covering this rich period in the biological sciences.

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MICHAEL WORBOYS, JULIE-MARIE STRANGE and NEIL PEMBERTON, **The Invention of the Modern Dog: Breed and Blood in Victorian Britain**. Baltimore: Johns Hopkins University Press, 2018. Pp. viii + 282. ISBN 978-1-4214-2658-7. \$39.95/£29.50 (hardcover).  
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The book uncovers, in great depth and with much insight, the invention of dog breeds in Victorian Britain. Eschewing futile attempts to locate the origins of dog breeds, the book shows how dog breeds were constructed in Victorian Britain as dog breeders adopted livestock breeders' emphasis on purity, lineage and blood. Rather than simply reflecting pre-existing canine diversity, dog breeders drew out and isolated elements within the existing varied mass of dogs to create distinct breeds of dogs. The authors provide the telling example of how Newfoundlands went from being a physically diverse type of dog to become 'the Newfoundland' distinguished by their black coats and other specific physical attributes. A focus on – some might say obsession with – appearance through the concept of confirmation to breed standards drove dog breeding. Breeders aimed to produce dogs who conformed closely to breed standards and who could clearly be distinguished from other types of dog. These breeds could then be refined and reproduced. Modern dog breeding emerged within the shifting economic, social and cultural history of Victorian Britain, including the rise of consumerism, imperialism and the veneration of 'order and hierarchy' (p. 7). Breeding transformed attitudes towards dogs and canine bodies, and Worboys, Strange and Pemberton argue convincingly that the new breeding ideas and practices made dogs modern. To support their argument, the authors draw on a wide range of primary sources, including the sporting press, breed publications and breed histories.

Building on and expanding the arguments of Harriet Ritvo's *The Animal Estate* (1987), the authors draw out the complexities of dog breeding, and show how its history shifted over the nineteenth century as rural aristocratic breeders gave way to urban middle- and working-class breeders. Like Ritvo, they pay close attention to how cultural values found expression in canine breeds and bodies, and focus on deep empirical research rather on the theoretical debates that animate animal studies. This approach succeeds in bringing out the diversity of dog breeding along regional, class and gender lines. Nonetheless, the authors accord more agency to dogs than Ritvo did, and pay more attention to the materiality of dog breeding, not least its impact on canine bodies.

The book's narrative starts at the beginning of the nineteenth century when dogs were divided into loose groups (shepherd dogs, lapdogs, pointers) bred and promoted by various groups, including aristocratic hunters and working-class men who bred for sport and looks (the 'dog fancy') and who founded breed clubs and held shows, often in public houses. Physical uniformity was not expected within these types and more emphasis was placed on dogs' characters and abilities. Cross-breeding was more than acceptable, and nor did 'cur' and 'mongrel' have the pejorative connotations that they would have by the end of the nineteenth century. A major turning point occurred in the 1860s when the emergence of larger dog shows in northern cities and in London opened up dog breeding to more and more Victorians. The shows brought together