

ALISTAIR SPONSEL, *Darwin's Evolving Identity: Adventure, Ambition, and the Sin of Speculation*, Chicago: University of Chicago Press, 2018, x + 358 pp., \$50.00.

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Darwin's Evolving Identity: Adventure, Ambition, and the Sin of Speculation is a subtle, scrupulous, and elegantly written book. While it makes important contributions to Darwin studies, it will also richly repay the attention of other scholars interested in the study of scientific practices.

Sponsel frames his book as an explanation for “Darwin’s Delay.” Darwin had a theory of evolution by natural selection by the early 1840s, but he kept silent about it until 1858. Why did he wait so long to go public? Various answers have been offered: a fear of public opprobrium, solicitude for the religious views of his wife, a decision first to establish his *bona fides* as a naturalist by publishing a comprehensive study of barnacles. Sponsel offers a different answer, pointing to Darwin’s first major theoretical work, an 1837 paper on how coral reefs are formed. On Sponsel’s account, Darwin had allowed himself to be drawn into the “sin of speculation” (p. 215) in his coral reef paper, getting out in front of his data. Darwin was determined not to repeat

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the mistake with his theory of evolution by natural selection, and so he delayed publication while he gathered supporting material.

Sponsel begins his narrative aboard *HMS Beagle*, detailing the technologies and practices Darwin brought to the study of corals and tracing the development of his new coral reef theory. On Darwin's return to England, Charles Lyell choreographed the reading of Darwin's coral reef paper to present Darwin to the scientific community as a newly-credentialed naturalist, and simultaneously, to validate Lyell's approach to geological reasoning. They had planned that Darwin would follow his coming-out with a comprehensive geological treatise in a Lyellian mode. But Darwin never completed this planned work, instead writing a less theoretically ambitious series of geological monographs. Sponsel ends with Darwin's writing of the *Origin*: having once had his "fingers burned" (p. 213), Darwin would write the book in atonement for this earlier "sin of speculation."

There may be no author more intimate with Darwin's coral reef work than Sponsel. His account of Darwin's application of hydrographical techniques to natural history is particularly fine. Hydrography—the systematic surveying and mapping of oceans, coastlines, and ports—was the *Beagle's* primary mission, and her crew were expert in the associated tools and techniques. One such tool was the sounding lead: a lead weight attached to a rope which would be dropped from the side of the ship at intervals so that the exact depth could be measured. Tallow was affixed to the bottom of the weight so that the composition of the sea floor at each sounding could also be determined. Darwin quickly grasped how the sounding lead could be applied to his natural history research, and eagerly exploited it as a collecting device. The tallow on the end of the lead would sample plants, animals, and rocks indiscriminately, but he would know precisely where and at what depth the sample was taken, and the tallow would preserve the precise

relationship among the samples *in situ*. As Sponsel shows, this technology encouraged Darwin to think about the interactions among botanical, zoological, and geological phenomena in a way that would prove pivotal to the development of his theory about how living organisms (corals) create geological structures (reefs). And this is only one of the cases Sponsel examines of Darwin's debts to the hydrographical expertise of his shipmates.

Sponsel also breaks new ground in his account of how and when Darwin developed his coral reef theory. Darwin wrote late in life that he had developed his theory before he had even seen a coral reef, and scholars have generally taken him at his word. Darwin often claimed to have made other observations in a purely inductive spirit, without any theoretical preconceptions. Why would he admit to forming his coral reef theory in advance of his data if it were not true? Sponsel has persuaded at least this reader that it was when Darwin saw the island of Eimeo (now Moorea) from the heights of neighboring Tahiti that he had a "eureka moment" that was central to his coral reef theory. Seeing Eimeo from above, he realized that coral atolls and fringing reefs represent two stages in a single process: an island with a fringing reef becomes an atoll as the ocean floor subsides and the central island gradually sinks beneath the ocean surface, leaving only the reef behind (pp. 68-73). As Sponsel reminds us, subsequent events can give new meanings to our past experiences, changing after the fact how we understand their significance. Earlier, Darwin had concluded that South America had been elevated by a long and gradual process. His later realization on a mountaintop in Tahiti that Pacific islands had been subsiding into the ocean imposed a "retrospective coherence" on his South American observations, convincing him that his earlier theory of continental elevation had always entailed a theory of seafloor subsidence and accompanying coral reef formation that he in fact only came to later (pp. 252-253).

Sponsel is also particularly strong in his examination of how, on Darwin's return to London, Lyell orchestrated Darwin's debut as a naturalist with the public dissemination of his coral reef theory. Darwin had already established himself as a traveler and collector of specimens, but he aspired to be accepted by the 'men of science' as one of their number, licensed to make theoretical interventions. Lyell had taken a paternal interest in the young man, and wanted to see him make his mark, but he also had another horse in the race. Having learned that Darwin was proposing a theory of how coral reefs are formed that challenged Lyell's earlier-published account of the same phenomenon, Lyell saw an opportunity. He would concede that Darwin's account was correct, but they would present it so as to validate Lyell's broader theoretical structure. They would characterize Darwin's theory, in short, as even more 'Lyellian' than Lyell's own. It is a good story, and Sponsel tells it well. But it is also more than just a good story. Sponsel begins his investigation into Darwin's scientific practices with hydrography. But scientific practices encompass more than observing, collecting, and experimenting. Fashioning a scientific persona is a scientific practice. So too is writing and publishing a paper. By attending as much to these aspects of Darwin's practice as to his use of the sounding lead as a collecting tool, Sponsel paints a richer portrait.

I differ with Sponsel on one critical point. He argues that in the years following the 1837 paper in which he first presented his coral reef theory, Darwin grew "haunted" and "sickened" by what he came to believe had been speculative excesses in that paper (p. 176). Sponsel believes that Darwin responded to this revulsion with a turn away from speculation and "toward empiricism and the ideal of comprehensiveness" (p. 170), which reached its apotheosis in the *Origin*. True, the content and style of the reasoning in Darwin's 1837 coral reef paper does differ significantly from that employed in the *Origin* some 20 years later. This is not the place to make

an affirmative case for how to account for those differences, but I am not in the end convinced by Sponsel's explanation.

In the first place, Darwin's coral reef theory was an unalloyed triumph, and Darwin always perceived it as such. As Sponsel notes (pp. 140-41), immediately upon its initial presentation, Darwin's theory was enthusiastically accepted in British geological circles. When the Geological Society of London later awarded him its highest honor, the Wollaston Medal, the Society's President not only put Darwin's coral reef theory at the center of the award citation, but lavished special praise on Darwin's "grand speculation" that his theory implies geographically extended bands of crustal elevation and subsidence (p. 239). And in an autobiography that he wrote at the end of his life, Darwin identified his coral reef theory as a source of "high satisfaction" and described it as the only theory he had ever conceived that he had never once had to abandon or modify. (Nora Barlow (ed.), *The Autobiography of Charles Darwin*, London: Collins, 1958, pp. 80, 141.)

Moreover, Darwin did not renounce speculation in his later years. He positively reveled in it. The *Origin* teems with stories about how certain traits or lineages might have evolved. Darwin speculated on how the vertebrate eye might have evolved from a light-sensitive membrane. He speculated on how ants that capture the young of other ant colonies to raise as slaves might have evolved from earlier ants that raided other colonies so that they could eat the captured young. He speculated on how whales might have evolved from bears that swam in the water with their mouths open so as to catch insects. In the *Descent of Man*, he speculated on how the belief in a single, omnipotent God might have evolved from the belief among members of "less civilised races" that unseen beings are responsible for natural phenomena like wind and thunder. In none of these cases did Darwin believe that he had good evidence that these

evolutionary histories had followed the particular paths he had laid out. But he had no hesitation in speculating that they might well have happened that way, and he believed that these speculations were genuinely explanatory of the operation of evolutionary processes.

But these are differences of interpretation of the historical record. Such disputations aside, Sponsel has written a careful, original, and valuable book that should be of interest among students of Darwin and beyond. *Darwin's Evolving Identity* is a good book to think with.