

*Charles Darwin's Notebooks from the Voyage of the 'Beagle'*. Transcribed, edited and introduced by Gordon Chancellor and John van Wythe. xxxiii + 615 pp. Cambridge, UK: Cambridge University Press. 2009. \$ 150 (cloth).

Until now, it has not been possible to read in book form the immediate notes that Darwin himself had written during his 1832-1836 voyage of H.M.S. *Beagle*. Darwin's *Beagle* records comprised five different kinds: field notebooks, personal diary, geological and zoological diaries, and specimen catalogues. Unlike the many other documents that Darwin created during the voyage, the field notebooks are not confined to any one subject. They contain notes and observations on geology, zoology, botany, ecology, weather notes, barometer and thermometer readings, ethnography, archaeology, and linguistics as well as maps, drawings, financial records, shopping lists, reading notes, and personal entries.

The editors described the notebooks as the most difficult and complex of all of Darwin's manuscripts. They were for the most part written in pencil which was often faint or smeared. They were generally not written while sitting at a desk but held in one hand, on mule or horseback or on the deck of the *Beagle*. Furthermore the lines were very short and much was not written in complete sentences. Added to this, they were full of Darwin's chaotic spelling of foreign names so the handwriting was sometimes very difficult to decipher. Alternative readings were often possible. Darwin did not number the pages of the notebooks, and often wrote in them at different times from opposite ends. Most of the notebook space was devoted to geological descriptions and drawings, a reflection of Darwin's interest in the works of Charles Lyell and his previous fieldwork with Adam Sedgwick.

Darwin wrote 15 notebooks that varied in the number of pages from less than 100 to over 200. In total, he produced 2,070 pages, 116,080 words and 241 sketches. The editors arranged the notebooks in a more or less chronological order, which was difficult because sometimes the text shifted back and forth. Some extracts from the notebooks had previously been published by Darwin's granddaughter Nora Barlow in *Charles Darwin and the Voyage of the Beagle* (Pilot Press Ltd., London, 1945) but the present volume presents the notebooks in their entirety. Each notebook is provided with an individual introduction intended to assist the general reader to understand what Darwin was doing during the parts of the voyage when the notebook was in use. The introductions provide an overview of Darwin's scientific development during the voyage and include some comparative literature pertaining to his observations.

The first notebook in the series bore the title *Cape de Verds* in reference to the Cape Verde Islands. Upon arriving at those islands in January, 1832, Darwin immediately plunged himself into geological theorizing, using the first volume of Charles Lyell's important work *Principles of Geology* (John Murray, London, 1830). The *Beagle* then sailed westward to St Paul's Rocks, Fernando de Noronha Island, Bahia (Brazil), Abrolhos Islets, and Rio de Janeiro. John Henslow received a letter from Darwin written in Rio de Janeiro in May, 1832. Henslow read extracts from this and other Darwin letters to the Cambridge Philosophical Society. These were printed as a pamphlet in December, 1835 and constituted Darwin's first scientific publication. The pamphlet was important in making Darwin known to the scientific community.

The second notebook is entitled *Rio* after Rio de Janeiro. This notebook records Darwin's first excavations of fossil mammals, several of which were later identified as new

species. Consideration of the links between these fossils and living species was one of the three main kinds of evidence that later convinced Darwin that species must change over time. He referred to the lasting impression of encountering fossil bones of extinct mammals that were clearly similar in certain characters, such as bony armor, to living South American species like the armadillo. In July, 1832, Darwin received the new second volume of Lyell's *Principles of Geology* (1832) which he was able to read while the ship made its way down the South American coast.

The *Buenos Ayres* notebook was named for Buenos Aires, Argentina. Included is the account of the visit to Tierra del Fuego and Darwin's description of the natives as being naked with long hair. He also remarked that the natives were surprised at the white men's skin and their habit of washing themselves. The *Beagle* had onboard three Fuegians who had been in England, having been taken there by the *Beagle* on a previous expedition. They were returned to their home land. The *Falkland* notebook was named after the Falkland Islands, 480 km from the coast of Argentina. Darwin's most important discoveries in that location were fossils of brachiopods and crinoids that were later found to be Devonian in age and similar to fossils found in South Africa. This provided some evidence that in the Devonian the Falklands and South Africa were close together and had been separated by continental drift.

The *B. Blanca* notebook refers to the port city of Bahia Blanca, Argentina. In April-June, 1834, Darwin received the third and final volume of Lyell's *Principles of Geology*. This volume consolidated Darwin's commitment to gradualistic geology and clarified a number of confusing issues. He was successful in finding mammalian fossils in three different locations: near the Rio de la Plata, Bahia Blanca and Port St Julian. The scientific

descriptions of the fossils were published later by Richard Owen. The *St. Fe* notebook takes its name from the town of Santa Fe in northeastern Argentina. Near La Plata, Darwin found the tooth of a horse embedded with the remains of other large, extinct mammals. This discovery astonished him for he knew that modern horses had been introduced by the Spaniards. What could have caused the extinction of the early horses?

The bulk of the *St. Fe* notebook is devoted to geological observations during Darwin's great traverse of the Andes between Santiago, Chile and Mendoza, Argentina via the Portillo Pass. He then returned back across the mountains by the more northerly Uspallata Pass. On this trip, he discovered the petrified forest at Agua del Zorro which he reported in a letter to Henslow on April 18, 1835. The age of the trees is now known to be late Triassic. The *Banda Oriental* notebook was named for the east bank of the Rio de la Plata, now a part of Uruguay. More fossils were found and Darwin took part in an expedition up the Santa Cruz River.

The *Port Desire* notebook is named after Puerto Deseado, Argentina. It includes more fossil mammal discoveries and additional visits to Tierra del Fuego and the Falklands. There is also an account of the coast of Chile from Chiloé Island north to Valparaíso. The *Valparaíso* notebook is devoted to the local area and the Aconcagua Valley. The *Santiago* notebook is named for the city of the same name. It has become famous due to a passage confirming that Darwin had thought out his coral reef theory before having seen a coral island. In Valdivia on February 20, 1835, Darwin felt a massive earthquake and spent the following two or three weeks examining the aftermath and the ensuing tsunamis. The earthquake was estimated to have a magnitude of 8.5 on the Richter scale.

The *Galapagos* notebook has attracted great interest because Darwin, evolution, and the Galapagos have been closely associated in the popular and scientific literature. To put the Galapagos in perspective, it may be useful to note that Darwin in his *Autobiography* (N. Barlow, Collins, London, 1958, p. 118) listed the kinds of evidence that first convinced him of evolution: “During the voyage of the *Beagle* I had been deeply impressed by discovering in the Pampean formation great fossil animals covered with armour like that on the existing armadillos; secondly, by the manner in which closely allied animals replace one another in proceeding southwards over the Continent; and thirdly, by the South American character of most of the productions of the Galapagos archipelago, and more especially by the manner in which they differ slightly on each island of the group; none of the islands appearing to be very ancient in a geological sense. It was evident that such facts as these, as well as many others, could only be explained on the supposition that species gradually become modified; and the subject haunted me.”

When I wrote an article on Darwin’s biogeography (J.C. Briggs, *Journal of Biogeography*, 36: 1011-1017, 2009), I quoted his significant notebook passage: “The zoology of archipelagoes will be well worth examining, for such facts would undermine the stability of species” and referred to its having been written at the Galapagos in September, 1835. However, upon reviewing this book, I find that I was mistaken in using the reference to Barlow (1958) and the notebook passage was written by Darwin when he was at St. Helena in July, 1836. This means that the first written indication that Darwin had begun to ponder the problem of species modification took place at St. Helena, almost a year after his visit to the Galapagos.

While at the Galapagos, Darwin noted that the thenca (mockingbirds) were very tame and curious . He also noted the presence of `gross-beakes` (finches ) and large lizards (iguanas). On September, 1835, he met Vice Governor Nicholas Lawson who said he could tell from which island a tortoise came by the shape of its shell. In his zoology notes, written after leaving the Galapagos, Darwin reflected on his notebook entries and mentioned that the thenca was closely related to the thenca of Chile and that they existed as varieties or distinct species on the different islands. He also noted that this was a parallel fact to the information he had about the tortoises.

The *Beagle* left the Galapagos on October 20, 1835, and passed by the Tuamotu Archipelago where Darwin was able to see his first coral reefs. The next stop was Tahiti where the ship stayed for 10 days and Darwin had a chance to explore and collect a variety of specimens. After the end of the Galapagos notebook, Darwin's use of the succeeding notebooks tailed off and the number of daily entries declined. The *Coquimbo* and the *Copiapo* notebooks were once again devoted to Chile. These were followed by the *Despoblado* notebook that began in Chile and Peru, and then documented visits to Madagascar, Mauritius and South Africa.

While in Capetown, Darwin paid a visit to Sir John Herschel whose clear exposition of the methods of scientific investigation had influenced Darwin when he was at Cambridge. It was known that Herschel's philosophy of science was influential to the way that Darwin developed his theoretical positions, both in regard to his coral reef theory and that of evolution by natural selection. Darwin also had discussions with Andrew Smith, the famous South African zoologist. The *Beagle* then proceeded to the mid-Atlantic islands of

St. Helena and Ascension; then westward to Bahia and Pernambuco, Brazil. Finally, it sailed back across the Atlantic to arrive at the Cape Verde Islands in September, 1836.

The *Sydney* notebook, named after Sydney, Australia, is the last in the series. It is unique in being the only one not used in South America. It regresses back in time to the Mauritius visit. From there, the *Beagle* went to the Bay of Islands, New Zealand and stayed for nine days. This notebook contains geological descriptions but otherwise few scientific comments. The next leg was to Hobart, Tasmania and from there to Sydney. While in Australia, Darwin seems to have been rather despondent at the prospect of so many more months before returning to England. The next port of call was Mauritius once again. While there, Darwin rode an elephant to see a flat plain covered with coral. The next notebook was the *Despoblado* (already discussed) that saw Darwin on his way back home.

Before completing their book, the editors made their transcriptions available to the comprehensive online project *The Complete Work of Charles Darwin Online* (<http://darwin-online.org.uk/>). Therefore, the text may also be read on the computer screen but somehow it seems more satisfactory to have the book in hand. The volume, complete with excellent maps and figures, is an impressive accomplishment. It is essential reading for Darwin scholars and of value to many others, especially those interested in evolutionary biology.

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