



# R.E.A.D.I.N.G.

明治大学文学部 編著



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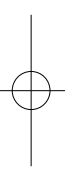


## CHAPTER 16

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# Charles Darwin: Time Traveller

*Graham Jones*

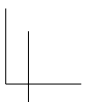
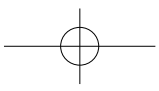



Time. It's a strange thing. So familiar. So mysterious. "What is time?" wrote Saint Augustine, a philosopher, in the 4th century. "If no one asks me, I know. If I try to explain it to someone who asks, I know not."

Science has answered many questions over the past 1,600 years. But we still don't really know what time is. Not only that, but until the 19th century we didn't realise how much time there is.

We understood that the universe was big. The Copernican revolution—which began in 1543 when Nicolaus Copernicus, an astronomer, published *De Revolutionibus Orbium Coelestium (On the Revolutions of the Celestial Spheres)*—had dramatically changed our picture of the size of the universe, and our position in it.

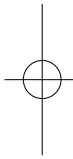
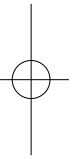
We didn't understand, however, that the universe was old. In 1687 Isaac Newton, a physicist and mathematician, produced a detailed model of how the universe works—from falling apples to the motion of the planets—in his *Philosophiæ Naturalis Principia Mathematica (Mathematical Principles of Natural Philosophy)*. Yet Newton thought the age of the universe was less than 6,000 years.



The first people to suggest that our planet must be much, much older than that were geologists. In 1830 Charles Lyell published *Principles of Geology*, where he argued that mountains are raised and lowered by small amounts over long, long periods of time. But the most dramatic change to our picture of the Earth's age  
5 came from someone who studied plants and animals as well as rocks. The person who did for time what Copernicus did for space was a naturalist and geologist called Charles Darwin.

On the evening of 29th August 1831 Darwin arrived at his home in Shrewsbury, England, after a 3½-week geology trip to Wales. He was 22 years old, and had  
10 recently graduated from Cambridge University. There was a letter waiting for him from his friend John Henslow, a professor of botany at Cambridge.

“I have been asked,” wrote Henslow, “to recommend a naturalist as companion to Captain FitzRoy, employed by the government to survey the southern extremity of America. I have stated that I consider you to be the best qualified person I know  
15 of who is likely to undertake such a situation” (letter 105).



“As far as my own mind is concerned,” replied Darwin, “I should, I think certainly, most gladly have accepted the opportunity which you so kindly have offered me. But my father, although he does not decidedly refuse me, gives such strong advice against going, that I should not be comfortable if I did not follow it”  
20 (letter 107).

Three days later, Darwin wrote again to Henslow. “My father has changed his mind. I trust the place is not given away” (letter 114). On the morning of 27th December Darwin set sail from Plymouth on His Majesty's Ship *Beagle*. He took with him various scientific instruments, two pistols, three Spanish language books,  
25 and Lyell's *Principles of Geology*.

Darwin's journey lasted four years, nine months and five days. It was a journey through some of the most remote regions in the world. It was also a journey through time.

In Valdivia, Chile, Darwin experienced a large earthquake. “The most remarkable

effect of this earthquake,” he noted, “was the permanent elevation of the land. It would probably be far more correct to speak of it as the cause. There can be no doubt that the land round the Bay of Concepcion was upraised two or three feet [60 or 90 centimetres].”

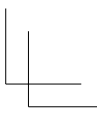
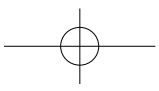
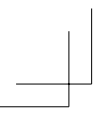
Excitedly, he saw this was strong evidence for Lyell’s ideas about geological change. “At the island of Santa Maria the elevation was greater. On one part, Captain FitzRoy found beds of putrid mussel-shells *still adhering to the rocks*, ten feet above high-water mark: the inhabitants had formerly dived at lower-water spring-tides for these shells.

“The elevation of this province is particularly interesting, from its having been the theatre of several other violent earthquakes, and from the vast numbers of sea-shells scattered over the land, up to a height of 1,000 feet. It is hardly possible to doubt that this great elevation has been effected by successive small uprisings, such as that which accompanied or caused the earthquake of this year, and likewise by an imperceptibly slow rise, which is certainly in progress on some parts of this coast” (The Voyage of the Beagle, 331).

Seven months afterwards, Darwin arrived in the Galapagos Islands. He was immediately curious about the similarities between the birds in Galapagos and those in South America. “The naturalist, looking at the inhabitants of these volcanic islands in the Pacific, distant several hundred miles from the continent, feels that he is standing on American land. Why should this be so?”

That was not all. He was also curious about small differences between birds from different islands. “Each separate island of the Galapagos archipelago is inhabited, and the fact is a marvellous one, by many distinct species. But these species are related to each other in a very much closer manner than to the inhabitants of the American continent, or of any other quarter of the world.

“This is what might have been expected, for islands situated so near to each other would almost necessarily receive immigrants from the same original source, and from each other. But how is it that many of the immigrants have been differently modified, though only in a small degree, in islands situated within sight of each

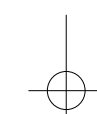

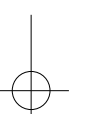


other, having the same geological nature, the same height, climate, etc?'' (On the Origin of Species, chapter 13 (4)).

These questions helped Darwin to develop his theory that new species were created by a process of small, random changes and the power of natural selection.

5 And one more thing. Time. Lots of it. Not thousands, not millions, but thousands of millions of years.

It's almost impossible to imagine. But, somehow, we must. As Darwin wrote in *On the Origin of Species*, which was published in 1859: "He who does not admit how vast have been the past periods of time, may at once close this book" (chapter 10 (2)).



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