

CHAPTER 15

A black box in Cambridge



DOV OSPOVAT, a Harvard scholar, was curious to see how Darwin had reacted to the important changes that had occurred in natural history during the years he was devising his theory. In 1974, he was directed towards a black box in the Darwin archives at the University Library in Cambridge. He found that it held a miscellaneous collection of papers and notes that stretched across the whole of Darwin's life. Ospovat was struck by the vast quantity of material that remained, almost entirely ignored by Darwin scholars, from the period 1838–1859: 'The significance of this material became apparent as I arranged my transcriptions of it in chronological order and examined it in conjunction with Darwin's transmutation notebooks and his two essays written in the 1840s.'¹

On his first visit, in the mid-1970s, Ospovat read only a few of the notes in the black box. He returned in the autumn of 1977, however, with more time at his disposal, and within a relatively short space of time (his book was published only three years later) he made the most sensational discovery. 'Natural selection', as Darwin had first used it in his essay of 1844, was an entirely different idea to 'survival of the fittest', which brought him fame after its use in *On the Origin of Species*. As far as Ospovat could tell, they bore no relation to each other.

For those who had always been taught that the Darwinian concept of natural selection as described in the *Origin* had been known to him – and had formed the central idea around which he had built his theory – since 1837, it was a devastating insight. Despite what Ospovat and millions of others had been led to believe by historians and Darwin biographers for more than a hundred years, Darwin's claim (made in his pursuit of priority) that he had understood natural selection for almost twenty years before Alfred Russel Wallace was false.²

Ospovat spelled out the difference so that it could not be misunderstood:

In the essay of 1844, natural selection is not, as it would become in the *Origin of Species*, an ongoing process, working constantly at the improvement of organisms. In the essay it operates only as an organic response to changed conditions.

If Darwin had not understood the true nature of natural selection in 1844, then what else had he not understood? The paper trail in the black box brought Ospovat to the realisation that Darwin not only had no convincing idea in his essay of 1844 of how or why species originate, but he also lacked any understanding of divergence with modification – the central driving mechanism of organic change – until sometime in the latter half of 1856, only three years before *On the Origin* was published.³

Ospovat also discovered that until well into the 1850s, Darwin continued to believe that species were perfectly adapted to their environment, and only became extinct or exhibited variations when geological forces changed the world in which they existed.⁴

Until he made this discovery, Ospovat, like most other historians of science, thought that Darwin had moved on from such simplistic ideas much earlier. Certainly, while writing his transmutation notebooks shortly after returning from the *Beagle* voyage, Darwin had believed, as had Lyell, in the idea that the adaptation of organisms to their environment is perfect, that nature is a well-adjusted mechanism, that there is a harmony among organisms and between them, and that the laws of nature were established by God to achieve His ends. In constructing theories of transmutation in the period 1837–1838, Darwin took for granted that variation in nature was extremely rare, except when organisms were isolated in newly formed geological areas and needed to accommodate to environmental change.⁵

For Ospovat, the realisation that Darwin had held onto such ideas until well into the mid-1850s was totally unexpected. Such assumptions, deeply embedded in the traditional view, ‘gave [his] theory of natural selection a particular structure, the structure of a mechanism of adjustment to change, a means by which the balance of nature is preserved’.⁶

There was also compelling evidence to indicate that Darwin had not changed his mind after reading Malthus in 1838, when he claimed the idea of natural selection had first occurred to him. If Malthus had influenced him, why were his theoretical ideas still based on Lyell’s theory of perfect adaptation until well after he returned to the species question in the mid-1850s?⁷

Ospovat began to realise that Darwin’s theoretical position had undergone an unrecorded change at some point between 1844 and 1859, and

concluded that the proof of the idea of relative adaptation to changing environmental conditions rather than perfect adaptation was a product of the 1850s, and was not to be found in the notebooks, the sketch, or the essay of 1844.⁸

Aware of what he was implying, Ospovat chose his words carefully:

I do not go so far as to say that Darwin adopted a wholly new theory after 1844, but entertaining that possibility is a useful aid in gaining an appreciation of the magnitude of the changes that occurred in his ideas about evolution and natural selection.⁹

Ospovat was convinced that in 1844, the structure of Darwin's theory was to a large extent determined by assumptions that Darwin had held since before opening his first transmutation notebook. The transformation of the theory that occurred sometime in the 1850s eliminated some of these assumptions, and at the same time introduced some of the most characteristic ideas that are today associated with the theory of natural selection. The idea of perfect adaptation played no role in this new conception of his theory, and instead of a mechanism of adjustment to external change, in order to preserve balance and harmony, natural selection became a force that led inevitably to the progressive development of life.

Somehow, Darwin's understanding of the importance of natural selection had changed. This set Ospovat thinking. If Darwin's theory had changed so drastically, when did Darwin first come near to understanding that there might be some force other than natural selection that caused organisms to continually move away from the original type? When did Darwin first realise that divergence was a crucial element of the evolutionary process?

The question went to the heart of how Darwin became confident enough to write *On the Origin of Species*, and when Ospovat found a note in the Cambridge archive indicating that Darwin had suddenly recognised a system for the division of labour in the animal world, he was convinced it was the moment that elements of Darwin's theory had begun to fall into place after years of thought.

The date of that note seemingly meant nothing to Ospovat, but it should have done. It was written only three weeks after the publication of Wallace's paper on the classification of birds, and the concepts on which it drew belonged to Alfred Russel Wallace.