

# Darwin's theory of gradual evolution not supported by geological history, scientist concludes

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Charles Darwin's theory of gradual evolution is not supported by geological history, New York University Geologist Michael Rampino concludes in an essay in the journal *Historical Biology*. In fact, Rampino notes that a more accurate theory of gradual evolution, positing that long periods of evolutionary stability are disrupted by catastrophic mass extinctions of life, was put forth by Scottish horticulturalist Patrick Matthew prior to Darwin's published work on the topic.

"Matthew discovered and clearly stated the idea of natural selection, applied it to the origin of species, and placed it in the context of a geologic record marked by catastrophic mass extinctions followed by relatively rapid adaptations," says Rampino, whose research on catastrophic events includes studies on volcano eruptions and asteroid impacts. "In light of the recent acceptance of the importance of catastrophic mass extinctions in the history of life, it may be time to reconsider the evolutionary views of Patrick Matthew as much more in line with present ideas regarding biological evolution than the Darwin view."

Matthew (1790-1874), Rampino notes, published a statement of the law of natural selection in a little-read Appendix to his 1831 book *Naval Timber and Arboriculture*. Even though both Darwin and his colleague Alfred Russel Wallace acknowledged that Matthew was the first to put forth the [theory](#) of natural selection, historians have attributed the

unveiling of the theory to Darwin and Wallace. Darwin's notebooks show that he arrived at the idea in 1838, and he composed an essay on natural selection as early as 1842—years after Matthew's work appeared. Darwin and Wallace's theory was formally presented in 1858 at a science society meeting in London. Darwin's *Origin of Species* appeared a year later.

In the Appendix of *Naval Timber and Arboriculture*, Matthew described the theory of natural selection in a way that Darwin later echoed: "There is a natural law universal in nature, tending to render every reproductive being the best possibly suited to its condition...As the field of existence is limited and pre-occupied, it is only the hardier, more robust, better suited to circumstance individuals, who are able to struggle forward to maturity..."

However, in explaining the forces that influenced this process, Matthew saw catastrophic events as a prime factor, maintaining that mass extinctions were crucial to the process of evolution: "...all living things must have reduced existence so much, that an unoccupied field would be formed for new diverging ramifications of life... these remnants, in the course of time moulding and accommodating ... to the change in circumstances."

When Darwin published his *Origin of Species* nearly three decades later, he explicitly rejected the role of catastrophic change in natural selection: "The old notion of all the inhabitants of the Earth having been swept away by catastrophes at successive periods is very generally given up," he wrote. Instead, Darwin outlined a theory of evolution based on the ongoing struggle for survival among individuals within populations of existing species. This process of natural selection, he argued, should lead to gradual changes in the characteristics of surviving organisms.

However, as Rampino notes, geological history is now commonly

understood to be marked by long periods of stability punctuated by major ecological changes that occur both episodically and rapidly, casting doubt on Darwin's theory that "most evolutionary change was accomplished very gradually by competition between organisms and by becoming better adapted to a relatively stable environment."

"Matthew's contribution was largely ignored at the time, and, with few exceptions, generally merits only a footnote in modern discussions of the discovery of [natural selection](#)," Rampino concludes. "Others have said that Matthew's thesis was published in too obscure a place to be noticed by the scientific community, or that the idea was so far ahead of its time that it could not be connected to generally accepted knowledge. As a result, his discovery was consigned to the dustbin of premature and unappreciated scientific ideas."

Provided by New York University

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