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Rituparna Bose
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Macroevolution in Deep Time



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Macroevolution in Deep Time

With Foreword by Dr. Ashok Sahni



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Foreword

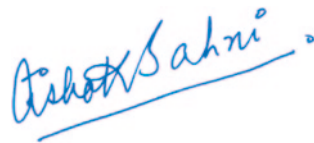
Science thrives on anomalies, controversies, and competing hypotheses. In the nineteenth century, Charles Darwin awakened the interest of the common man by discovering a coherent theory of evolution that included a principle and a plausible explanation and soon faced considerable opposition from people holding traditional viewpoints. He established the principle of descent with modification, and demonstrated that the principle can be accomplished by ‘natural selection’. Darwin believed in gradualism, i.e., new forms of life typically come into being via slow and continuous processes. He believed ‘gradualistic evolution’ to be inherently more rational and scientific than an evolution theory that advocated “saltation”, a process in which species evolve by jumps and starts.

After over a century of Darwin’s findings, scientists Eldredge and Gould published a landmark paper on development of the evolutionary theory on ‘punctuated equilibrium’. Their theory suggested that it is stasis that dominates the history of most fossil species accompanied by rapid change during speciation and extinction. Thereafter, controversies were raised between the two established evolutionary theories—phyletic gradualism and punctuated equilibrium. Researchers, since then, have been testing these theories using both extinct and living species in the past four decades. Rituparna Bose has tested the two theories using well preserved, extinct fossil brachiopod species from the Middle Devonian strata of Michigan Basin.

Bose describes evolutionary mechanisms in extinct brachiopods to understand their response to environmental change. She has applied novel approaches in solving complex hypotheses in popular aspects of evolutionary biology, such as the theories of phyletic gradualism and punctuated equilibrium. She has statistically determined the extent to which these evolutionary theories are dominant in extinct invertebrates. Such studies have implications in predicting future biodiversity, extinction, ecosystem conservation, and climate change.

I recommend this book to the student community at large and especially to advanced professionals in the field of evolutionary biology, palaeobiology, and

geosciences. A detailed bibliography at the end of the book will allow readers to access the primary literature if required.



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