

PREFACE

An understanding of evolution, by which is meant the gradual development of complex organisms from their primeval beginnings, has been gradually advancing only from the early nineteenth century. Before that time, the doctrine of special creation, based on the first two chapters of the book of Genesis, held that the world and all the organisms in it were created by God in 4305 BC. Not until 1801 when Lamarck proposed an inheritance of acquired characters was 'descent with modification' commonly accepted. But the full mechanism remained unknown even though Darwin and Wallace provided evidence in 1858 that evolution occurs by the natural selection of inherited variations. In the modern theory of neo-Darwinism, natural selection is combined with Mendelian genetics with emphasis on the random nature of mutation and the importance of isolating mechanisms. However, the theory is still incomplete in that it does not account for the frequently episodic nature of phylogenetic change and the prolonged evolutionary stasis of many groups, and in that it is unable to predict future evolutionary trends.

In this book we will attempt to contribute to a more complete theory by combining molecular, genetical and evolutionary data and reconsidering the evolutionary significance of genetic variation. Accordingly, this book stresses, not unity of process, but evolutionary differences as expressed in the various living phyla and classes. If we examine the variety of mechanisms generating change in organisms, their distinctive levels of complexity and integration, the adaptive nature of their existences and other matters related to the ease and direction of evolution, certain deviations from accepted evolutionary principles become apparent. They seem to show that, depending on the group under examination, evolution may involve different mechanisms of genetic change, take a variety of courses and reach quite diverse end-points.

These conclusions also take into account molecular data on the origins and relationships of genes. However, the molecular information that bears on the mechanisms of evolutionary change is still small in amount and tentative in significance. I hope that the book will be capable of withstanding the expansion or modification, and even the removal of pieces of evidence shown to be false, that future research will undoubtedly necessitate. So, in the writing, I have tried to keep in mind the caveat of the protozoologist Minchin (1912): 'The views put forward by any man but represent the visions conjured up by his imagination, more or less limited, or intuition, more or less fallacious, of an infinite world of natural phenomena'.

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