

Foreword

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Two centuries after its author's birth and 150 years after its publication, Charles Darwin's *On the Origin of Species* can fairly be ranked as the most important book ever written. Not the most widely read, to be sure. Copies of the *Origin* have not been placed in hotel rooms across America; its verities are not preached from pulpits each Sunday; and no political leader takes an oath of office with a hand on its cover. It is the masterpiece that first addressed the living world and (with *The Descent of Man* following) humanity's place within it, without reference to any religion or ideology and upon massive scientific evidence provided across successive decades. Its arguments have grown continuously in esteem as the best foundation for human self-understanding and the philosophical guide for human action.

So solidly have the fields of biology built upon the Darwinian conception of evolution that it makes sense today to recognize it as one of the two laws (universal principles if you wish) that govern our understanding of life. The first law is that all the elements and processes that define living organisms are ultimately obedient to the laws of physics and chemistry. This formulation has been the driving force of molecular and cellular biology during the past half century. The second law, the foundation and product of evolutionary biology as well as much of organismic and environmental biology, is that all elements and processes defining living organisms have been generated by evolution through natural selection.

The two laws have proven to be fully complementary, a prime requirement for the recognition of scientific laws generally. Further, to an increasing degree they are being combined to achieve seamless analyses of particular biological phenomena. The first law addresses how a phenomenon occurs and the second addresses why it occurs. Mitochondria and other organelles, for example, are built and work thus and so; and they originated in one way and not some other. Each description completes the explanation for the other. Modern biology as a whole has little meaning without the joining of both approaches guided by the two laws.

Even without the impetus of the *Origin* sesquicentennial—fortuitously the same as the Darwin birth bicentennial—2009 is an appropriate time to present

evolutionary biology in its encompassing modern form. I doubt that any single writer, or any ensemble of several writers, could summarize this burgeoning discipline in a comprehensive and authoritative form. The multiplicity of authors in *Evolution: The First Four Billion Years* has gone far toward that goal. Its array of experts provide state of the art for each subject in turn. The science is presented here, but also some of the main practical consequences and inevitably, with fundamental relevance, the consequences of biological evolutionary thought for philosophy and religion. The great questions—"Who are we?" "Where did we come from?" and "Why are we here?"—can be answered only, if ever, in the light of scientifically based evolutionary thought.