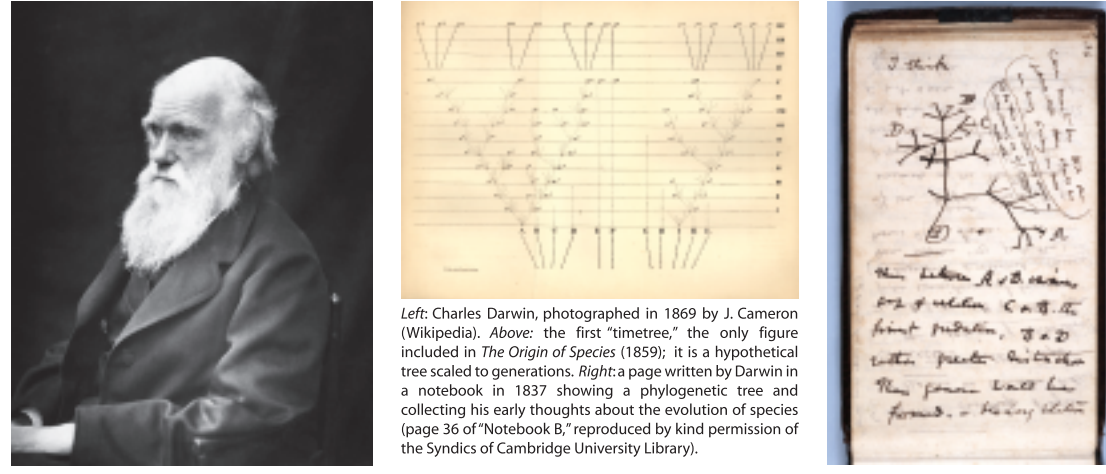


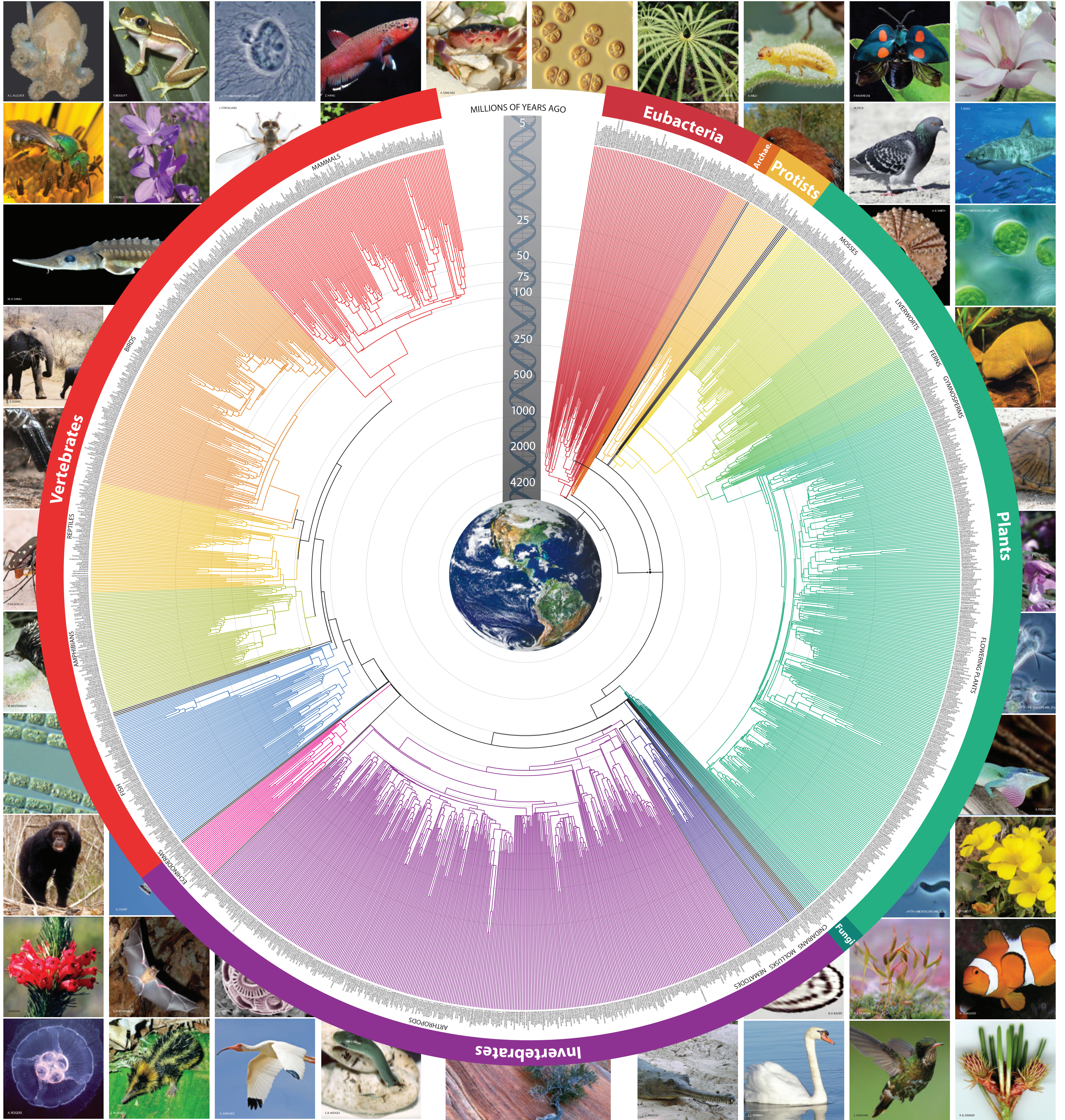
# The Timetree of Life

This year marks the 200th anniversary of the birth of Charles Darwin, the author of the most influential book in the history of science: *On the Origin of Species by Means of Natural Selection* (1859). Darwin's work, which provided a mechanism for evolution, transcended science and had great impact on society. A key concept for Darwin was the evolutionary tree, which he first sketched in a notebook in 1837, at age 28. Later, Darwin added the dimension of time and produced the first timetree—an evolutionary tree scaled to time—as the only figure in his book. Darwin referred to the "great tree of life... With its everbranching and beautiful ramifications," and he predicted in a letter to his friend Thomas Huxley, "The time will come I believe, though I shall not live to see it, when we shall have fairly true genealogical trees of each great kingdom of nature."



Left: Charles Darwin, photographed in 1869 by J. Cameron (Wikipedia). Above: the first "timetree," the only figure included in *The Origin of Species* (1859); it is a hypothetical tree scaled to generations. Right: a page written by Darwin in a notebook in 1837 showing a phylogenetic tree and collecting his early thoughts about the evolution of species (page 36 of "Notebook B," reproduced by kind permission of the Syndics of Cambridge University Library).

The study of the morphology of living and extinct species has since helped to build those evolutionary trees. However, it wasn't until recent decades—with the advent of technology for sequencing genes and genomes and methods for analyzing those data—that Darwin's vision of a great tree of life began to emerge in a comprehensive way. Molecules now provide information on both dimensions (branching order and times of divergence) for thousands of species and higher taxa. The timetree of all species is far from complete, but the general patterns largely have been discovered and Darwin's vision is becoming reality. The large circular timetree of 1,610 families shown here is from *The Timetree of Life* (S. Blair Hedges & Sudhir Kumar, editors, Oxford University Press, 2009). It summarizes the current knowledge down to the taxonomic level of family.



*The Timetree of Life* (2009), edited by S. Blair Hedges and Sudhir Kumar with Foreword by James D. Watson

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