**Chapter 2: Why is Evolution Important to Anthropologists?**

Evolutionary theory is a testable, unified, and fruitful scientific theory. Charles Darwin and Alfred Russel Wallace laid its foundations with their theory of natural selection in 1859, but since then evolutionary theory has expanded far beyond those foundations. Before Darwin, European thinkers divided living things into natural kinds, each of which was thought to have its own unchanging essence. The Great Chain of Being was understood as God’s creation, naturally harmonious and without gaps, and it inspired Linnaeus’s important eighteenth-century taxonomy of living organisms. In the nineteenth century, catastrophism and uniformitarianism undermined the Great Chain of Being. Catastrophism was based on the ideas of Georges Cuvier, who argued that some species had become extinct in massive natural disasters, after which new species were introduced from elsewhere. Uniformitarianism was promoted by geologist Charles Lyell, who argued that the same processes of erosion and uplift that can be observed to change the earth’s surface today had been at work in the past. Uniformitarianism implied that changes in life forms were as gradual and reversible as changes in the earth’s surface.

Lamarck argued that individual members of a species are all able to transform themselves in the same way when facing the same environmental pressures. Lamarckian transformational evolution has been rejected by contemporary evolutionary researchers. In contrast, Darwin and Wallace concluded that the similarities shared by distinct living species could be explained if all such species had descended from a single parental species that had lived in the past. In addition, Darwin proposed that such “descent with modification” could occur as a result of the straightforward, mechanistic process of natural selection.

Darwin’s theory of evolution by natural selection (or variational evolution) was based on the principle of variation, the principle of heredity, and the principle of natural selection. Variational evolution was driven by what Darwin called the “struggle for existence” between individuals of the same species to survive and reproduce. Today, evolutionists recognize four evolutionary processes, including natural selection, that can determine which variant individuals in a population will leave greater numbers of offspring than others.

Evolutionary theorists use the concept of adaptation to refer both to a process of mutual adjustment between organisms and their environments and to the phenotypic features of organisms that are produced by this process. Darwin did not know why offspring tend to resemble their parents, nor did he understand how variation was introduced into populations. Answers to these questions were developed in the field of genetics. Gene interaction helps explain how continuous traits, such as skin color or hair color, are the result of unchanging inheritance. Different genotypes may produce the same phenotype, and the same genotype may produce different phenotypes, depending on the kinds of environments in which organisms possessing these genotypes live and grow. That is, each genotype has its own norm of reaction.

Modern biologists agree that life on earth has evolved, but they have different views about how evolutionary processes work. Many evolutionary thinkers are increasingly convinced that a phenomenon as complex as biological evolution requires theoretical pluralism. Current advances in evolutionary theory incorporate developmental processes, niche construction, and multiple inheritance systems in addition to genes. These advances have led many theoretical biologists to propose expanding the modern evolutionary synthesis of the 1930s and 1940s.