

Principles, Theories & Precepts of Biology



Theories

Lesson 4

Chapter 1

Section 1

Lessons 1-5

**DARWIN
AND THE
THEORY OF
EVOLUTION**



In Charles Darwin's book, *On the Origin of Species by Means of Natural Selection or the Preservation of Favored Races in The Struggle for Life*, Darwin proposed his theory of **evolution** by **natural selection**. His book caused an ongoing explosive debate in the scientific community.

At the time his work was published in 1859, most scientists adhered to the "catastrophist theory," also known as *creationist theory*. The **tenents** of this theory state that the earth experienced a succession of creations of plant and animal life, as well as mankind, which, centuries later, were largely destroyed by a sudden **catastrophe**.

According to this theory, a world-wide catastrophe called Noah's Flood destroyed all life except two or more of each species taken into a large ship called an **ark**. Since the flood, the remains of life have been visible only in the form of fossils.

Also in the view of catastrophist theory, all

species had been individually created and changed very little, if at all, over time.

Although the theory of evolution had been introduced to the scientific community prior to Darwin's work, his ideas on natural selection sparked heated debates between the catastrophists and the evolutionists.

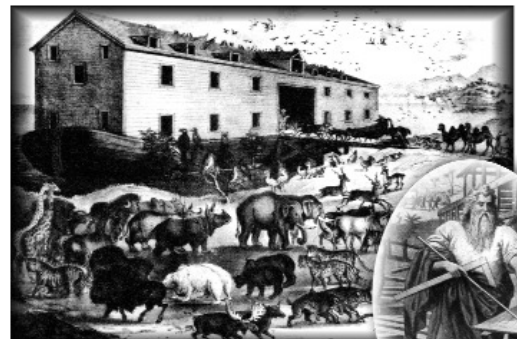
Whether to prove or disprove Darwin's theory, biologists began to search diligently for new information. Darwin's work is responsible for creating a rapid growth in

VOCABULARY

Evolution: the theory that higher forms of life have gradually evolved by chance from inorganic elements and lower life forms into the complex diversity of life that exists today

Natural selection: the process which results in the survival of individuals or groups best suited for their environment

Tenents: beliefs or principles held to be true by a group or organization



According to the catastrophist theory, Noah's Ark held two or more of each species.

biological research. Darwin's book greatly accelerated speculation and research to discover and test new information in the field of biology.

DARWIN'S STORY

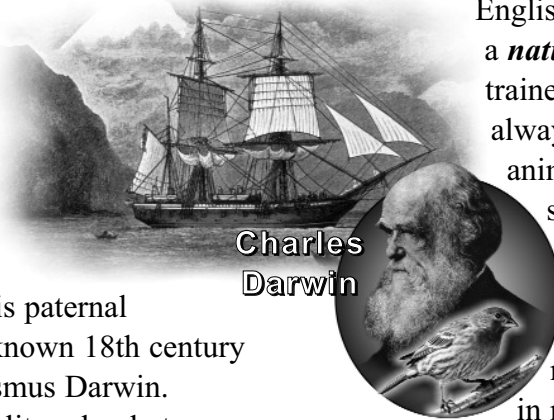
Born in England in 1809, Darwin was the fifth child of a very wealthy and sophisticated family. His maternal grandfather was the successful china and pottery entrepreneur, Josiah Wedgwood, and his paternal grandfather was the well-known 18th century physician and genius, Erasmus Darwin. After graduating from an elite school at Shrewsbury in 1825, young Charles Darwin was sent by his father to the University of Edinburgh in Scotland to study medicine, in

which Darwin had little interest. He dropped out two years later and was sent to Cambridge University in England to prepare for becoming a clergyman, a "last resort" for failures in many rich families of that time.

When Darwin graduated in 1831, he was taken aboard the *HMS Beagle*, an English survey ship, to serve as a **naturalist**. Darwin was not a trained naturalist, but had always been more interested in animal pursuits than in his studies, much to the embarrassment of his family. During the five year voyage, Darwin made many observations in nature, with a special emphasis on a particular type of bird called a *finch*.

After returning to England in 1836, Darwin began to develop his theory of evolution through natural selection. For the next two decades, Darwin refined his theory and worked on other natural history projects. Darwin inherited wealth, thus he had time to pursue development of his theory. In 1839, he married his wealthy first cousin, Emma Wedgwood, and soon after moved to Downe House, a small estate outside of London. There, he and his wife had ten children, three of whom died in infancy.

Darwin's theory was first announced in 1858 in a **paper** presented at the same time as one by Alfred Russel Wallace, a young naturalist who, independently, had also proposed the theory of evolution via natural selection. Both men introduced their theories



Charles Darwin

VOCABULARY

Catastrophe: a sudden, violent change in features of Earth by means of a global flood, upheaval or convulsion of the earth's surface.

Naturalist: a student of nature, specifically plants and animals.

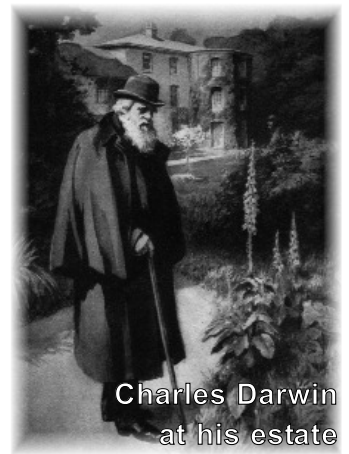
Paper: a formal, written composition often designed for publication

Catalyst: something that prompts a dramatic change

Skeptics: persons having a doubting state of mind, especially concerning religion

Aryan: referring to white, Northern Europeans and a white-supremacy philosophy

Regime: (ray-zheem) a socialist form of government



Charles Darwin at his estate

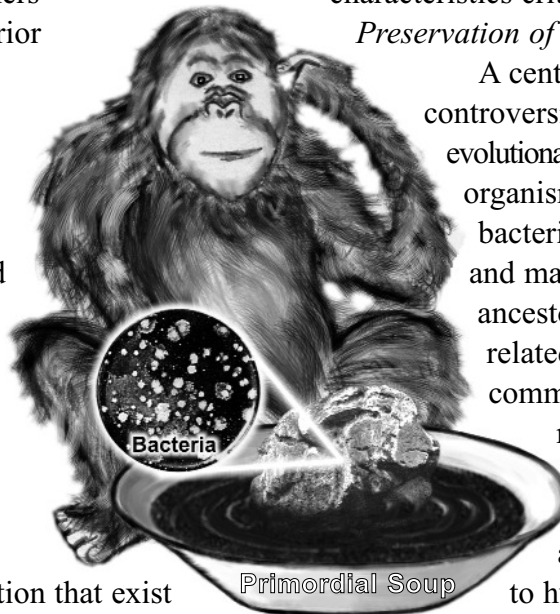
at a time when some European scholars were doubting church leadership. Hence, the theory of evolution offered a *catalyst* for *skeptics* to reject Biblical concepts. Fearful that Wallace would publish his work first, Darwin rushed to publish his own work in 1859: *On The Origin of The Species by Means of Natural Selection or The Preservation of Favored Races in The Struggle for Life*. This book is often referred to as “the book that shook the world.” The title was later referred to only as *The Origin of Species*, partly due to the racial overtones of the full title. This concept not only “shook the world” in Darwin’s time, but would shake it again 60 years later when Adolf Hitler, a proponent of Darwinism and “favored races”, attempted to build an *Aryan* super-race of people by eliminating Jews, Christians, handicapped persons, homosexuals and all others considered to be of inferior quality for Hitler’s Nazi *regime*.

Darwin’s theory consisted of two major parts: the concept of evolutionary change and the concept of natural selection. First, Darwin rejected the catastrophist theory, which holds that living creatures are basically unchanging products of sudden, purposeful creation that exist now very much as they have since their creation. Darwin insisted, on the contrary, that change is the rule, and that organisms

living today have evolved by chance and gradual change from ancient ancestors quite unlike modern beings.

Secondly, Darwin maintained that *natural selection* determines the course of biological change. Life, he believed, is a competitive struggle to survive and often under conditions of limited resources: living things must compete for food and space; they must evade the dangers of predators and disease while dealing with unpredictable shifts in their environment, such as climatic changes. Darwin suggested that within a given population, certain individuals have characteristics that make them more likely to survive and reproduce. Darwin believed that such individuals passed critical, survival characteristics to their offspring; therefore, the population would gradually contain only those individuals with characteristics critical for survival—or *The Preservation of Favored Races*.

A central and historically controversial component of evolutionary theory is that all living organisms, from microscopic bacteria to plants, insects, birds and mammals, share a common ancestor. Species that are closely related ostensibly share a recent common ancestor, while distantly related species supposedly have a common ancestor further in the past. The animal most closely related to humans, for example, might be the chimpanzee. By projecting into the far distant past, evolutionary theory allows humans to have bacteria as a common



ancestor. The theory maintains that bacteria arose from a “primordial soup”, consisting of non-living materials. Therefore, Darwinism claims that humans gradually and mysteriously evolved from non-living materials. Some critics humorously claim that evolution proposes a philosophy of “from goo to you by way of the zoo.”

Darwin’s theory has been periodically modified and updated to reflect new biological and geological discoveries; consequently, many changes have been made to Darwin’s original theory. However, the debates between the evolutionary theorists and catastrophist theorists still rage. Evolutionists insist that their theory must be right and that missing fossil evidence is merely the result of a flawed fossil record; the catastrophists insist that evolutionists have not exercised the scientific method of discovery and therefore have little real scientific evidence to prove their theory.

In a later chapter we will be taking a much closer look at evolution and the scientific evidence that is available. Until we arrive at that lesson, consider the statement of British biologist L. Harrison Matthews in the foreword to the 1971 edition of Darwin’s *The Origin of Species*:

The fact of evolution is the backbone of biology; and biology is thus in the peculiar position of being a science founded on unproved theory—is it then a science or a faith? Belief in the theory of evolution is thus exactly parallel to belief in special creation—both are concepts which believers know to be true but neither, up to the present, has been capable of proof.

In the next lesson, we will examine characteristics that define life.



LIFE PRINCIPLE

“ There is more evidence to suggest an abrupt arrival of man rather than a gradual process of evolving ”

—Richard Leakey,
Leading paleoanthropologist
in a 1990 PBS documentary