Philosophy 101 Introduction to Religious Studies
What is Evolution?
Dr. Gayhart

Darwin is the first of the evolutionary biologists, who first coined the concept of natural selection. It was the year **1859 that witnessed the publication of Darwin's *The Origin of Species*- "a sell out in one day." The debate over Evolution is not so much about the mechanics of biology as about the Direction of biology. Read the following quote from Hannes Alfvén professor of Plasma Physics at the University of Stockhol.**

> **Currently we accept the general idea that biological development can be explained by mutations in combination with natural selection. In its essential parts, therefore, Darwin's theory of development has been accepted. In Darwin's time mutations were not known about; their discovery has led to extensive modifications of his theory, but it has also eliminated the most important objections to it. ...**
> **We are beginning to see that the awesome wonder of the evolution from amoeba to man - for it is without a doubt an awesome wonder - was *not the result of a mighty word from a creator*, but of a combination of small, apparently insignificant processes. The structural change occurring in a molecule within a chromosome, the result of a struggle over food between two animals, the reproduction and feeding of young - such are the simple elements that together, in the course of millions of years, created the great wonder. This is nothing separate from ordinary life. The wonder is in our everyday world, if only we have the ability to see it." (Alfvén's *Atom, Man, and the Universe.* (San Francisco: Freeman, 1969. Large italics are mine BG)**

Darwin's fundamental idea in ***On the Origin of Species*** is that of Natural Selection. He realized, along with fellow naturalist Alfred Wallace, that populations tend to be highly variable. This means that populations tend to grow *exponentially* although food resources only grow *arithmetically*: populations tend to double in size (from 1 to 2 to 4 to 8 to 16 etc) while food resources only grow by addition (from 1 to 2 to 3 to 4 etc).

Darwin concluded that people must continually struggle with one another for the means of existence, and the losers in the struggle are condemned to a poverty from which they cannot escape. When applied to the biological world, this means that every species tends to reproduce more individuals than can possibly survive.

The principles of Natural Selection follow from this insight:

1. Every Organism has the potential to produce more offspring than can survive.
2. There is always variation among individuals in a population; much of this variation is inherited, so that the next generation inherit some of these variable features from their parents.
3. Specific variations may make a individual either more or less likely to survive and reproduce than other individuals with different features.
4. Those variant traits that enhance survival and reproduction will be passed on to offspring and will be found in a increasing fraction of the population in each succeeding generation.

To summarize Darwin's Theory of Evolution;
1. Variation: There is Variation in Every Population.
2. Competition: Organisms Compete for limited resources.
3. Offspring: Organisms produce more Offspring than can survive.
4. Genetics: Organisms pass Genetic traits on to their offspring.
5. Natural Selection: Those organisms with the Most Beneficial Traits are more likely to Survive and Reproduce.

The following web page summarizes Evolution for the purpose of our class **(http://www.darwins-theory-of-evolution.com/)**

Darwin's Theory of Evolution - The Premise
Darwin's Theory of Evolution is the widely held notion that all life is related and has descended from a common ancestor: the birds and the bananas, the fishes and the flowers -- all related. Darwin's general theory presumes the development of life from non-life and stresses a purely naturalistic (undirected) "descent with modification". That is, complex creatures evolve from more simplistic ancestors naturally over time. In a nutshell, as random genetic mutations occur within an organism's genetic code, the beneficial mutations are preserved because they aid survival -- a process known as "natural selection." These beneficial mutations are passed on to the next generation. Over time, beneficial mutations accumulate and the result is an entirely different organism (not just a variation of the original, but an entirely different creature).

Darwin's Theory of Evolution - Natural Selection

While Darwin's Theory of Evolution is a relatively young archetype, the evolutionary worldview itself is as old as antiquity. Ancient Greek philosophers such as Anaximander postulated the development of life from non-life and the evolutionary descent of man from animal. Charles Darwin simply brought something new to the old philosophy -- a plausible mechanism called "natural selection." Natural selection acts to preserve and accumulate minor advantageous genetic mutations. Suppose a member of a species developed a functional advantage (it grew wings and learned to fly). Its offspring would inherit that advantage and pass it on to their offspring.

The inferior (disadvantaged) members of the same species would gradually die out, leaving only the superior (advantaged) members of the species. Natural selection is the preservation of a functional advantage that enables a species to compete better in the wild. Natural selection is the naturalistic equivalent to domestic breeding. Over the centuries, human breeders have produced dramatic changes in domestic animal populations by selecting individuals to breed. Breeders eliminate undesirable traits gradually over time. Similarly, natural selection eliminates inferior species gradually over time.

Darwin's Theory of Evolution - Slowly But Surely...

Darwin's Theory of Evolution is a slow gradual process. Darwin wrote, "...Natural selection acts only by taking advantage of slight successive variations; she can never take a great and sudden leap, but must advance by short and sure, though slow steps." [1] Thus, Darwin conceded that, "If it could be demonstrated that any complex organ existed, which could not possibly have been formed by numerous, successive, slight modifications, my theory would absolutely break down." [2] Such a complex organ would be known as an "irreducibly complex system". An irreducibly complex system is one composed of multiple parts, all of which are necessary for the system to function. If even one part is missing, the entire system will fail to function. Every individual part is integral. [3] Thus, such a system could not have evolved slowly, piece by piece. The common mousetrap is an everyday non-biological example of irreducible complexity. It is composed of five basic parts: a catch (to hold the bait), a powerful spring, a thin rod called "the hammer," a holding bar to secure the hammer in place, and a platform to mount the trap. If any one of these parts is missing, the mechanism will not work. Each individual part is integral. The mousetrap is irreducibly complex.