**Evolution – First Principles**

**Evolution** -- few ideas are more misunderstood.

Why are Freud, Skinner, & Darwin the most misunderstood individuals from the past 150 years? Is it deliberate?

Darwin – man is not unique; he is animal by nature

Freud – man cannot know himself; he is driven by unconscious forces

Skinner – man cannot control himself, there is no free will

**2 pieces of classical evolution**

*Fact of evolution*: species have changed over past 30,000,000 years. Species which inhabited the earth 30,000,000 years ago no longer inhabit the earth. Today’s creatures did not inhabit the earth millions of years ago. This is the factual evidence obtained from the fossil record—it is the data of evolution; the facts to be explained

*Theory of evolution*: how do we explain those changes? What mechanism(s) account for the changes in species over time? (e.g., intelligent design, Divine intervention, evolution)

**Primer of Evolutionary Theory**

Understand that development is views as phylogenetic (species) rather than ontogenetic (individual)

3 levels & processes of development:

 a. evolution acts on species over many generations

 b. natural selection acts on individuals within their life time

 c. genetic mutations and recombinations act during reproduction (generating new offspring)

**Three Essential Components of Darwinian Evolution**

**Variation** Individuals display natural variation in their appearance (phenotype) that are encoded in their genetic makeup (the

*genotype*). These variations pass to offspring from one

generation to the next.

**Genetic Mutations** The origin of individual variation is genetic mutations (DNA gets

scrambled) and sexual recombinations (gametes from sperm-

 ovum fertilization).

**Natural selection**  Individuals produce more offspring than can survive. Competition

occurs among individuals for essential resources (survival of the

 fittest). Nature “chooses” from the competitors according to their

 phenotypes (speed, intelligence, power, cunning). This process

 weeds out (kills off) poorly adapted individuals & selects in favor

 of (surviving) well adapted individuals. These adaptations (both

 *phenotype* and *underlying* genotype) are passed on to offspring.

 **Outcome**: more members of successive generations display *well adapted phenotype* and its underlying genotype. The process cycles anew with each generation.

Problem with Darwin’s theory: Competition & natural selection. Survivability is NOT the important issue. Producing and preserving offspring are. Hence,

**E. O. Wilson’s TWO Advances on Darwin’s Theory**

1. Natural selection does not occur solely through competition for survival; it occurs

 through *reproductive success*, also called *genetic fitness*.

2. Social qualities and social tendencies are also phenotypes. As such, they are controlled

 by and connected to underlying genotypes. This means that social behaviors and

 societies themselves are also subject to natural selection. But there is no fossil

 evidence for social behaviors.