**NOTES ON DARWIN**

**Darwin's *The Origin of Species* (1859) is the most important book of the past 200 years. In it, Darwin changed the way human beings see themselves and their place in the universe. Before him, the biblical story of Adam and Eve was accepted as a scientific statement of the origin of the human race. Darwin demonstrated that humans were not created a separate species but evolved gradually from the apes, and that evolutionary development is the cornerstone of all biology.**

**Darwin was influenced by two previous writers, Thomas Malthus and Charles Lyell. Malthus, in his *Essay on Population* (1798), argued that that the human race goes through cycles of prosperity and deprivation. This is because humans have a geometrical ratio of increase (2-4-8-16-32-64-etc) while food increases arithmetically (1-2-3-4-5-6-7-etc). Thus, the number of humans is bound to outstrip the amount of food available. As a result, humans start to have far fewer children until a balance is restored, but then they go back to their old habits and the cycle repeats itself. Malthus, in his *Principles of Geology* (1830-33), demonstrated that the geological face of the planet is undergoing very slow, constant change. Over a very long period of time, mountains become valleys, continents merge or break away, the sea recedes or covers mountaintops, etc. He found fossil remains of fish on mountaintops, thus proving that they once were covered by the sea. Darwin took the ideas of Lyell and Malthus and applied them to all living species.**

**<u>CHAPTER THREE: STRUGGLE FOR EXISTENCE.</u> In our selection, Darwin stresses the struggle for existence. One has to remember, he says, that life feeds on life, that the pretty birds singing on trees, for instance, feed on insects or seeds and are themselves eaten by other birds or cats. The reason is the geometrical ratio of increase (see from middle of p. 4-top of p. 5). He gives the example of the elephant, which lives for approximately 100 years and has 6 offspring in the interval. In around 750 years, two elephants would multiply into 19,000,000, and this is true of all other species. The world simply cannot hold all those living things, so a severe struggle for existence ensues. (NOTE: In 1950 there were around 2.5 billion humans on the planet. Today there are around 7.8 billion. Where are we headed?)**

**<u>CHAPER FOUR: NATURAL SELECTION; OR THE SURVIVAL OF THE FITTEST.</u> Within each species, Darwin observes, there is a geometrical ratio of increase and also slight individual variances. The members of any given species are not carbon copies of each other—slight differences exist. These slight differences or individual variances for the most part have no importance whatsoever, but sometimes they are important in the struggle for existence. "The preservation of favorable individual differences and variations, and the destruction of those**

**which are injurious, I have called natural selection, or the survival of the fittest" (p. 7). He gives the example of wolves. In a cold, snowy environment where the wolf has to catch and eat deer to survive, thin wolves with longer legs are swifter and have an advantage over bulkier, short legged wolves. Over a period of several generations, the short-legged variety of wolf will disappear and all wolves in that particular environment will be thin and long legged. In a different, warm environment where the wolf can eat chickens or sheep, the bulky, short legged variety will survive and flourish. Thus, out of a single species you get two different subspecies. If this process continues over many centuries, new species will evolve out of an initial species.**

**CHAPTER FIVE: LAWS OF VARIATION. Darwin stresses that the nature of a particular environment, plus the nature of the organism, are the two deciding factors in evolution. The same organism in two different environments will evolve differently.**

**CHAPTER SIX: DIFFICULTIES OF THE THEORY. Darwin pinpoints a few cases—neuter insects, the electric organs of fishes—that he is unable to explain through evolution. He also stresses—wrongly, as modern biology has shown—that all evolution occurs very slowly and that sudden mutations are not possible.**

**CHAPTER SEVEN: MISCELLANEOUS OBJECTIONS TO THE THEORY OF NATURAL SELECTION. Darwin selects the giraffe as a good example of natural selection. Some giraffes have a longer neck than others, so when winter comes and food is scarce, the giraffes with a longer neck can reach higher for the leaves of trees and will thus survive. Their offspring will generally have longer necks. This process will repeat itself until only very long-necked giraffes survive. Thus, the giraffe developed its long neck by natural selection.**

**To this idea Mr. Mivart brings forth two objections. The first is that the long-necked, bigger giraffe will require more food. The second is that, if a long neck is so advantageous, other species would have developed one too. Darwin refutes both objections.**

**CHAPTER FIFTEEN: RECAPITULATION AND CONCLUSION. Darwin stresses the geometrical ratio of increase of all species, which necessitates a huge struggle for existence. He observes that the struggle is at its most intense within the same species (humans against each other, for instance) and within species remote in the scale of nature (humans against viruses).**

**pp. 16-17 ("It can hardly be supposed" until "the action of His laws."): Darwin is very aware that his theory will deal a blow to religious belief. In his day, the story of Adam and Eve was accepted as a scientific statement on the origin of the human race. He tries to defend himself, but in fact his theory changed the way human beings regard themselves.**

**p. 19 ("How Far the Theory of Natural Selection may be Extended"): Darwin argues by ANALOGY—i.e., the resemblance of structures which depends upon similarity of function—to show that all living things, plants and animals, are descended from a single prototype. All living things have much in common, he shows, from cellular structure to laws of growth to need for water, and so on, which argues that they have a common origin.**

**p. 22, the final paragraph: This is a famous paragraph, in which Darwin tries to present natural selection as positively as possible. (QUESTION: It has been argued that God used natural selection to produce the human race, and that the important thing is that souls have been produced which will continue to develop in unimaginably wonderful ways after death. It has also been argued that this is a horrible and cruel way of producing humans and that it shows, if anything, that we are simply accidental products of evolution in a Godless universe. This is a huge and vital question. What do you think?)**