Introduction

The theory of evolution has been under intense scrutiny ever since Charles Darwin introduced the theory of evolution over 200 years ago. Even today, despite many convincing examples, there are still countless intense discussions and arguments that try to determine the validity of evolution. As more strong evidence emerges, more and more scientists and believers of the creationism theory are beginning to support evolution on the same grounds that creationism is supported: belief.

Charles Darwin defined evolution in his work, *The Origin of Species*. Upon its release, a boom of controversy formed around the book despite his numerous examples that support his hypothesis. Charles Darwinís hypothesis is this: “That all species of plants and animals developed from earlier forms by hereditary transmission of slight variations in successive generations, and that the forms which survive are those that are best adapted to the environment.” Darwin summarized this hypothesis into two terms that are now widely accepted. These terms are known only as natural selection and survival of the fittest.

Before Darwin left for the Galapagos Islands, he, like everyone else at the time, believed that all existing organisms were unchanging. It wasn’t until Darwin saw the variations of life that existed on the Galapagos Islands that he formed his theory of evolution.

Darwin found the evidence that supports his theory of evolution living on the Galapagos Islands. It was there that Darwin made close observations of the characteristics of the organisms living there. He noticed that while all of the islands were generally inhabited with the same types of wildlife, each species had different physical variations that changed from island to island. An example of this are the tortoises that inhabit many of the islands. When the tortoises of the different islands are first looked at it apparent that they are all the same species of tortoise. Or are they? But upon closer inspection, it is obvious to see that each tortoise has markings so unique that it can be determined which island each tortoise lives on. Darwin determined that all these variations of tortoise evolved from a singular species of tortoise.

Darwin carefully catalogued as many of the organisms that inhabited the Galapagos Islands and compared them in his book, *The Origin of Species*. All of the organism characteristics that Darwin recorded form staggering evidence that makes evolution difficult to refute.

Darwin also looked at fossils, arguably the strongest source of evidence supporting evolution, of long extinct animals to strengthen his theory. Darwin observed the fossil remains of ancient glyptodonts (long extinct mammals that have two-ton skeletal structures) and compared them to the native armadillo in South America. The common armadillo that he compared the glyptodont fossils to were significantly smaller in mass (weighing an average of 10 pounds), yet both of these organisms have many physical similarities. Darwin deducted that the common armadillo evolved from the ancient glyptodont.

Another fossil find that provides extremely strong evidence in favor of evolution is the discovery of Lucy. Lucy is the name that was given to what is believed to be the oldest female hominid skeleton. Lucy was found and excavated by Dr. Donald Johanson in 1974 in Ethiopia. Lucy has many ape-like qualities (height, skull shape, pelvic shape), but also has several humanoid qualities (walked upright, knee joint is similar to humans). Lucy is believed to be a gap between humans and apes because of the mixed traits that Lucy has. However, many creationists do not believe that Lucy is a ‘transition’ species ( HYPERLINK http://www.geocities.com/capecanaveral/lab/8853/meetlucy.html ﾵwww.geocities.com/capecanaveral/lab/8853/meetlucy.htmlﾧ) due to all of the ape like qualities that this specimen contains.

Lucy also strengthens the theory that Archaeopteryx (Greek for ancient wing) is the missing link between birds and reptiles (athena.english.vt.edu/~hagedorn/technicalwriting/archaeoptryx.html). Archaeopteryx was discovered in 1860 and its discovery has appeared to fill in the gap between birds and reptiles. Archaeopteryx is a long extinct species that has both reptilian and bird like qualities. The reptilian features include teeth lining the beak, a tail and dinosaur like hands at the wing tips. The bird like qualities include a wishbone, wings and traces of feathers. It was heavily argued that evolution is what made this creature what it was. This creature was clearly in the intermediate stages between birds and reptiles. The discovery of the archaeopteryx and Lucy has nearly eliminated any doubt that surrounds the fossil record and evolutionary process for that matter.

Bone structure between many different creatures is also similar as well. For example, species ranging from humans, to bats, to horses all have the same identifiable bone structure in the forelimbs. This suggests that at some point in the evolutionary history of animals, all creatures were closely related at one point in time.

Like bone structure, early embryological development is very similar between unlike organisms. Organisms like the frog, chicken and human (basically all organisms in the phylum Chordata) all look exactly alike until they develop a spinal chord. This similarity in development suggests that all organisms from the phylum Chordata originated from a parent specie.

In order for evolution to take place, a mutation must occur. A mutation occurs when there is a change in the genetic code of an organism. These changes in genetic code come about either by chance or an outside force coerces it (ex. radiation). This new trait that results from the mutation will only be passed on to future organisms if the new mutation proves to be beneficial to the organism (ex. camouflage, defense, etc.), supporting Darwin’s theory of survival of the fittest. If the trait is beneficial then it is passed on through the population and evolution has taken place. However, this singular mutation will not create a new species altogether. The Archaeopteryx fossil demonstrates how evolution is a gradual process that takes many generations before noticeable differences appear.

It is obvious that mutations occur naturally in nature, however, mutations can also be sped up and forced to occur. The various sub-species of dogs that exist today are an example of forced mutation caused by human interference. This species has evolved so much that some of its sub-species are unable to breed with each other (ex. the Chihuahua and the Great Dane). Dairy cattle used by farming industries have evolved the common cow into a mass milk-producing machine.

What interested me in doing a project on evolution was an article that I read in Newsweek several years ago. The article discussed how the over prescriptions of penicillin have caused a major problem; super viruses immune to penicillin have emerged and have made some people seriously ill. It is sad to think that these super viruses would not be in existence now if the doctors in the past had not prescribed penicillin to cure everything from the hacking cough to the everyday sniffle. I was amazed at how quickly a common virus adapted to modern medicine and I began to wonder if other areas of nature are this fast in evolution. At the time of the publication of the article, DDT had been banned for a year or two and crop industries said they were doing fine using other pesticides to regulate bug populations in their crops. I wondered if insects would be able to eventually be able to develop an immunity to pesticides like some viruses have to penicillin. Bugs have not yet been able to develop a complete resistance to pesticides, but I feel that I can prove that they will in this project. I plan to expose Drosophila flies to small increments of pesticide. I chose Drosophila because of their short life spans and large breeding numbers. Fortunately, due to time restrictions, I will not be able to create a new species of super bugs. However, I should be able to alter the genetic code of bugs enough to show that over time, through natural selection, Drosophila can mutate and evolve to develop a gradual resistance to pesticides. Hopefully, by using the scientific method, I will be able to answer my thoughts and questions on this matter.

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