GENERAL SCIENCE NOTES

HOMOLOGIES

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There is a wide variety of animals, representing many different types of structures, from one-celled protozoa to the most complex animal — man. There are animals with skeletons inside their bodies and some with skeletons on the outside. Some lay eggs and some bear live young; some are cold-blooded and some are warm-blooded. Within each group there are many species, each a little different from the others. For example, there are about 1200 species of rats and mice in the entire world. Some of those species are so similar that it is difficult to tell them apart, but each one is different in some way, and each species does not normally interbreed with any of the other species. Zoologists arrange these animals in a standard classification scheme, beginning with the simplest one-celled organisms and ending with man. In this classification system each type of organism is placed next to those that are most similar to it.

The study of homologies plays an important part in determining which organisms should be classified close together. When two animals have body parts that are alike in their basic anatomy and develop along the same growth pathways when the animals are embryos, these similar body parts are referred to as homologous parts. Consider the arrangement of the bones in the forelimb of a man, a seal, a bat and a dog. Humans have hands that are very agile for manipulating objects; seals' flippers are useful only for swimming; bats have wings for flying, and dogs' feet are built for fast running. They all look very different, yet they have the same basic arrangement of bones. Only the proportions of the individual bones and the type of fleshy covering are different. A bat's wing bears little resemblance to a human hand, and yet the wing membrane is supported by a skeleton that is equivalent to our second, third, fourth and fifth fingers, but with very elongated finger bones. The creation theory proposes that the vertebrate limb was designed to be an efficient and adaptable structure, and then the same basic design was used for all of the vertebrates. Only minor modifications, mainly in proportions and in the type of fleshy covering, were needed to adapt this skeleton to the needs of each animal.

These different types of limbs are homologous, indicating that seals, bats, dogs and men should be classified in the same group of animals.

However, according to the evolution theory, the fact that these animals all have homologous limbs is considered to be evidence that they have all evolved from common ancestors. It is often believed that they would not have homologous limbs unless they had inherited them from common ancestors. However, these homologies are also what we would expect to see if the vertebrates had all been designed and created according to a common vertebrate body plan. Consequently, homologies in anatomy are not really evidence for or against evolution.

There are also homologies in physiology, biochemistry and embryology. The principles are the same in these fields as for homologies in anatomy. Similarities in physiology or similar developmental pathways in embryos are often considered to be evidence of evolution from a common ancestor, but they are also what we would expect to see if all life was created by a single intelligent Designer. Also in the biochemical structure and functions of cells, there are many features that are virtually the same through the animal and plant kingdoms. For example, all living things, both plants and animals (excluding some viruses), have chromosomes containing DNA. This DNA contains the genetic code that determines the entire structure and physiology of the organism. The basic details of this mechanism are the same in all living things. This is considered by some to be evidence that all living things evolved from a common ancestor, but we can also consider it to be evidence that all living things were designed by one intelligent Designer who used the same exquisitely designed genetic mechanism for all.

The details of the evolution theory of the history of life are based largely on these homologies between organisms. All plants and animals are arranged in the classification system with the simplest ones first, and then more and more complex organisms. Those who accept the evolution theory believe that this arrangement is the order in which the animals evolved, from simple to complex. Organisms with the most similarities, or homologies, are placed closest together in the classification system. From this classification scheme, phylogenetic trees are constructed. Phylogenetic trees are diagrams representing the presumed evolutionary pathways along which organisms have evolved.

If we would compare many different types of wheeled vehicles, we would find that they also have many homologous parts and that they can be arranged in a sequence based on these homologies. For example, they

all use the principle of the wheel. Most of them also use levers in some way, and several use energy produced by the internal combustion of fuel. Using this information, we can construct a "phylogenetic tree" by following the same principles used in making an animal or plant evolutionary tree. Of course no one would say that this means that cars evolved from two-wheeled carts. The different vehicles have homologous parts because they were all designed to operate under the same natural laws. Certain design concepts are used in several different vehicles and adapted to meet the different functional requirements of each one. They can be arranged in a sequence of simple to complex because they all are designed to serve different functions, and thus their structural requirements are quite different. The result is a wide diversity of types, differing in structural complexity, and each well suited to perform its unique function.

When we apply these same principles to living things, we can develop an interpretation that is consistent with both the biological data and the concept of creation. Hence one of the most commonly used arguments for evolution utilizes data that are not especially supportive of the theory, but fit equally well the concept of creation.