

2

Evolution

(Dr Pam)

The ability to produce new living individuals is a characteristic feature of all living organisms and is known as reproduction. Reproduction is the only means by which life is maintained. Every living thing whether it be a plant or animal, strives to exist forever but this is not possible as each living form has only a certain life span. Therefore, living organisms have resorted to reproduction of new individuals resembling themselves so that their species can go on existing.

Each plant and animal usually give rise to several new individuals each time it reproduces. If this went on indefinitely, the number of individuals of each kind would increase greatly and there would hardly be any space for Man himself to live. However, such a problem has never occurred. This is because the older organisms die and in so doing, make room for the younger ones. At the same time, not all the newly-produced young ones survive. When there are large number of a particular plant or animal in any one place, competition occurs among the individuals and only the stronger ones manage to survive. The weak ones die off sooner or later. Thus, of the total number of organisms produced, there will always be only a few that survive. These in turn will produce new ones to keep the species going. The formation of new types of plant and animals from old types is known as evolution. Several biologists have attempted to explain how evolutionary changes take place. For example, Lamarck, a Frenchman who lived in the nineteenth century postulated that new organs or characteristics arose in an animal when there was need for them. Organs which were not needed were discarded. He later postulated that these changed or acquired characteristics were passed on to the next generation. Lamarck and his colleagues sited evidence of evolution in certain anatomical features of vertebrates. According to these biologists, there is a progressive evolutionary change in the anatomy of the heart in the various classes of vertebrates. Fishes have a simple heart with one auricle and one ventricle, amphibians have two auricles and one ventricle, reptiles have

two auricles and a partially divided ventricle, and birds and mammals have two auricles and two ventricles. In the course of these changes, the circulation of blood also changes from a “single” to a perfected “double” circulation. Other evolutionary changes in anatomy can be traced in the progressive development of the brain, sense organs like ears, and the limbs. They explained that the limbs of various vertebrates have been modified for a number of functions. For example the pentadactyl fore limb is modified into

1. Wings for flying in birds and bats.
2. Flippers for swimming in whales.
3. Legs for walking and running in horses and
4. Arms for grasping and holding in human beings and other bipeds.

The fact that these various types of limbs have the same basic pentadactyl structure indicates that all these animals must have come from a common ancestor. They further posited that the presence of a vestigial organs is readily, explained by the theory of evolution. The muscles of the ear for example are usually mere vestiges in man unlike those which are found, say, in the horse. The reason for this is, should a noise come from one side, man is able to turn his mobile neck quickly, on the other hand, the horse cannot turn its neck so easily and instead, twists back its ears to catch the sound. In some men, however, the muscles that “twitch” the ears remain quite well-developed and they can move their ears in much the same way as the horse, though possibly not so extensively. Another interesting human rudiment is the body’s hair which is very poor when compared with the fur of cats, foxes and other animals. In spite of this, each hair is fitted with a complete muscular and nervous apparatus for “bristling”. Often, a newly-born baby has a more or less complete downy coat (lanugo) which does not, however, grow on the palms of the hands and the sole of the feet. The appendix, an organ which is so often the cause of serious illnesses, is also a

vestigial organ. In herbivorous animals there is a long blind tube called caecum which helps in the digestion of cellulose. It is probably the result of changing over to flesh-eating that this caecum in man has shrunk and become a worm-like blind tube about 10 cm long. A study of comparative embryology provides further evidence for evolution according to these biologists. A very young human embryo looks very similar to the young embryos of other mammals, birds and reptiles. At certain stages in their development all these embryos have fish-like characteristics with gill slits in their pharynx and a vascular system with a single circulation. From these and other characteristics it is possible to infer that land vertebrates probably had aquatic ancestors.

Charles Darwin, an Englishman, together with Wallace put forward the theory of natural selection where only the fittest individuals survive. He thought that there would always be only a certain number of particular plant or animal on earth and as years go by, accompanied by climatic changes, new types of plants and animals would be produced. The struggle for existence suggested by Darwin arises out of the high rate of increase and reproduction which is present among all animals, Man perhaps being the only one to show signs of being an exception. As a result of overcrowding, some members of a community get pushed out of a favourable environment into less ideal surroundings. Here, they will either disappear or, by virtue of unusual characteristics survive and even thrive. Again, in the course of time some variants will arise which are more adapted to the climate and environment than the original inhabitants. They will overpower and eventually eliminate the original species. On the other hand, other variants will possess features which make life almost impossible. These, which are called monsters, are soon eliminated from the competition of life. However, in a way the monster is very closely allied to the genius who is an equally strange variation from the normal and as such a matter of chance. Today, we know that mutation is one of the important mechanisms which confer certain advantageous

characteristics to certain species. Thus, a mutant may have a slight advantage in the struggle for existence and could become widespread in the population within a few generations.

The question often arises as to whether evolution and natural selection apply to man nowadays as to other animals. The answer is either yes or no. This is because man has so profoundly altered his environment that the meaning of the word “fittest” is changed. “Fittest for what?” is the question that must be asked/ until man arrived on the world-stage, animals that survived were those fittest to combat such difficulties as presented by the climate – heat, cold, winds and rain in whatever combination possible. Obtaining food and warmth were the main considerations, even of the first wandering tribes of man. But gradually these elemental difficulties have been solved, at least in part, by the progress of civilization, particularly by trade, commerce and science, until they form nowadays but a minor consideration in man’s life. Man’s intelligence is now free to be devoted to his job, to the learning of the arts and sciences, and to conscious study of his own conditions. No longer does each man fight his individual battle for life. He depends on other fellow men, each having a special part to play, while he himself takes a portion of what they produce and provides his own contribution in return. If you consider how an object like a loaf of bread reaches you, you will realize how many people you depend on for it. This is only one example of the idea of service and dependence within a community.