PART III

WHERE DID WE COME FROM?

THIS SECTION EXAMINES CURRENT THINKING ABOUT EVOLUTION IN relation to the Christian concepts of *imago Dei* and salvation. This section will explore such issues as purpose and meaning, varieties of views of evolution, cultural presuppositions about the meaning of biblical texts, and God's relationship with and way of relating to people.

Is there a purpose for humanity? Are people the pinnacle of the natural order? One is struck by the rich diversity in the living world, over one million species of animals alone. Many species are connected in a symbiotic relationship; for example certain plants can only be pollinated by a single species of insect. One also discovers that there is fossil evidence that many species became extinct before many species living today appeared in the fossil record. Finally, humans are apparently the only species conscious of its existence. This section reviews the current scientific theories concerning the origin of life, the development of life, and the place of humans in the chain of life. The development of the current understanding of life will be traced back to the Greek philosophers.

The Bible makes clear that all life comes as a result of the creative activity of God. Intentional rather than accidental force caused life. The nature of people depends upon this origin of life and relationship to God as "creature." As creatures made in the image of God our ultimate goal depends upon the experience of "re-creation" as expressed in the Christian understanding of salvation.

Must a biblical perspective of creation be static, or may it be dynamic (continuous creation)? Does the presence of dynamic emergence in the natural order preclude creation? How does evolutionary theory relate to the Christian concept of "adoption" and "indwelling" by the Holy Spirit? How does evolutionary theory relate to Eastern religious ideas about the relationship between people and the divine?

CHAPTER SEVEN

ORIGIN OF LIFE

How do we know if an organism is alive? It is difficult to come up with a precise definition of life, but a broad definition would be that something is considered alive if it has the following properties:

- Organization: Living things consist of one or more cells (complex assemblies of molecules enclosed in membranes).
- Sensitivity: Living things respond to internal and external stimuli.
- Homeostasis: Living things maintain relatively constant internal conditions despite changes in the environment.
- Growth: Living things change during their life.
- Importation: Living things take energy and materials from their environment.
- Reproduction: Living things produce offspring like themselves.
- Adaptation: Structures, physiology, and behaviors of living things are suited for their survival in a particular environment.

Any theory about the origin of life and about life today has to explain the diversity of living organisms, the similarity of living organisms, and the fossil record. *Diversity* is reflected in living organisms, ranging from microscopic bacteria to visible organisms such as roses, redwoods, dogs, whales, and people. On earth, life is found in diverse locations: the cold of the Antarctic, the heat of hot springs, the temperate climate of Tennessee, the tropics of Brazil.

At the same time, scientists also observe *similarities* in living organisms. These similarities allow scientists to develop taxonomic classification systems. Classification systems result from the examination of the anatomy, biochemistry, genetics, ecology, and fossil record of organisms. Today, scientists classify living organisms by using a system of seven categories: kingdom, phylum, class, order, family, genus, species. (A memory aid my son learned in seventh grade for remembering the relationship of these divisions is "Kelly played checkers on Fred's green stage.") Scientific names for organisms are given by the genus and species classification for the organism. For example, a common bacteria in the human intestine is commonly called "E. coli" which is an abbreviation of its genus and species names of *Escherichia coli.*

Aristotle, in his classification systems, divided life into two kingdoms of plants and animals. Most scientists today divide life into five kingdoms: animals, plants, fungi, protista, and monera. The kingdom *monera* contains unicellular organisms without a nucleus; bacteria belong to this kingdom. Most *protista* are unicellular and microscopic, containing a nucleus; examples of the kingdom protista are algae and amoebas. When one thinks of a type of organism today, one usually thinks in terms of the species classification. This is because the species label gives one a unique group, a biological group containing biologically related organisms that can interbreed. Figure 7.1 lists the current estimates of the number of species in each kingdom. Scientists estimate that there are ten million different living organisms.

Kingdom	Number of Species
Monera	10,000
Protista	68,000
Fungi	100,000
Plants	275,000
Animals	1,000,000

Fig. 7.1. Number of Species in Each Kingdom.

Figure 7.2 reveals how as one moves down the classification scheme, the organisms become more and more similar until finally a unique classification is reached at the species level. Let us use the domestic dog as an example. The dog belongs to the animal kingdom as do starfish, beetles, and fish. At the kingdom level there is a lot of difference between these organisms. Once one reaches the family level, there is much more similarity. Finally at the species level, we have only one choice: the dog.

	Classification	Possibilities			
Kingdom	Animalia	starfish	beetle	fish	dog
Phylum	Chordata	snake	lizard	bird	dog
Class	Mammalia	monkey	whale	elephant	dog
Order	Carnivora	skunk	cat	seal	dog
Family	Canidae	red fox	African hunting dog	jackal	dog
Genus	Canis	timber wolf	coyote	dingo	dog
Species	Familiaris	dog	dog	dog	dog

Fig. 7.2. Classification of Domestic Dog.

Fossils are remains of plants and animals preserved in sedimentary rocks and other material (asphalt, amber, and ice). For our purposes, three points about fossils are important: their age, their relationship to living organisms, and their distribution in the geological record. The age of fossils ranges from 3.5 billion-year-old traces of blue-green bacteria to 10,000-year-old ice age remains. Many fossils look like animals and plants that exist today; an example of this is an insect. Anyone who has collected amber jewelry can recognize that amber often has an insect trapped inside. In other cases, the fossil does not resemble anything alive today; an example would be the dinosaurs. An examination of the distribution of fossils in the geological record reveals that a species starts and stops, only to be followed by other species. An example is the trilobite. The first trilobites are found in the geological record about 570 million years ago, with the last trilobite fossils being found about 250 million years ago. Another observation about the fossil record is, in general, the lower strata have simpler organisms, while the higher strata have more complex organisms.

Responses to Observations

As we have discussed, when a scientist observes life on earth, he or she observes a diversity of life forms, similarities between organisms, and a fossil record. The worldview of the scientist affects how he or she interprets these observations. These interpretations also laid the foundation for modern biology. Although we have used the terms *scientist* and *biology* in our discussions, these terms did not appear until the 1800s. A person who studied nature was a *natural philosopher* or a *naturalist*. The word *biology* was coined by the Frenchman Jean Baptiste Lamarck in the early 1800s while the word *scientist* was coined by the Englishman William Whewell in the 1830s.

One group of scientists interpreted their observations of nature from a Protestant worldview. The English naturalist John Ray (1628–1705) pioneered the systematic classification of organisms. He was the first to define a species as a group of interbreeding organisms. The orderliness he observed in nature revealed to him a Great Designer who created the universe. The Swedish naturalist Carolus Linnaeus (1707–1778) developed the current system of *binomial nomenclature* (genus and species) to label organisms. His inspiration for a classification system was his belief in God's original creation of fixed "kinds." Although he originally believed that the fixed kinds of Genesis were at the species level, he later revised it to the genus and finally to the order level. Both Ray and Linnaeus wrote essays in natural theology, using the order of nature to provide information about God.

The French naturalist Georges Cuvier (1769–1832) was of a Huguenot background. He expanded Linnaeus' classification system by adding phylum and family to Linnaeus' class, order, genus, and species. Cuvier also applied this classification system to fossils. The fossil record convinced him that extinctions had occurred and that life was ancient. Since he believed in fixed species, he proposed catastrophes and re-creations to account for the fossil record. In 1813 the Scottish geologist Robert Jameson (1774–1854) published an English translation of Cuvier's *The Theory of the Earth*. In Jameson's preface to this translation, he proposed the "age-day theory" of creation; the six days of Genesis represented six long periods of time. The Rev. William Buckland (1784–1856), the first Oxford professor of geology, responded to Cuvier's catastrophes by proposing the "gap theory." In his work *Relics of the Flood* (1823), Buckland proposed that there were millions of years between the creation and the first day of Genesis. During this gap, all the geological catastrophes proposed by Cuvier would have occurred.

Parallel to and interacting with the previous group of scientists was a group of scientists who took a more materialist interpretation. The French naturalist Georges Leclerc, Comte de Buffon

(1701–1788), presented one of the first modern accounts of history that was not based on the Bible. In 1779, he published *Epochs de la Nature* in which he divided the history of the earth into seven epochs. Physical laws were used to describe the origin of the solar system as well as the origin and development of life. He proposed that the earth was seventy-five thousand years old. The English physician Erasmus Darwin (1731–1802) was influenced by the English ideas of progress and free enterprise. He believed that an inner force drives organisms to higher forms. The new forms would result from accumulation of experiences. Erasmus was the grandfather of Charles Darwin.

The French naturalist Jean Baptiste Lamarck (1744–1829) in 1809 proposed the first comprehensive theory of organic evolution. He proposed that life arose by spontaneous generation. Through the inheritance of acquired characteristics new species are formed. He also believed that an inner force was at work improving the species. The Scottish geologist Charles Lyell (1797–1875) was a student of Buckland. Unlike Buckland, Lyell proposed natural causes for the geological formations. During 1830–33 he published the three-volume work, *The Principles of Geology: Being an Attempt to Explain the Former Changes of the Earth's Surface by Reference to Causes Now in Operation.* As stated in the book's title, Lyell proposed that the same geological forces have always been at work. Assuming long periods of time, these forces have shaped and reshaped the earth. This is *uniformitarianism* in contrast to Cuvier's *catastrophism.*

Charles Darwin and Alfred Russel Wallace

When a person speaks of evolution today, one name always comes to mind: Charles Darwin. Actually, both Darwin and Alfred Wallace simultaneously and independently arrived at the concept of evolution by natural selection. They reached this conclusion based on the work of the previously discussed scientists as well as their own field work. The word *evolution* is derived from a Latin word that means "unrolling." The meaning of evolution ranges from a process of change to a theory that current plant and animal species developed from preexisting plant and animal species. *Natural selection* is a natural process by which populations of plants and animals become adapted to their environment.

Charles Darwin (1809–1882) graduated in 1831 from Cambridge, where he had developed a love for natural history.

After graduation, he signed on as the naturalist for the voyage of the H.M.S. *Beagle*. The purpose of the five-year (1831–1836) voyage of the *Beagle* was to explore the coast of South America and the islands of the Pacific. Darwin took on this voyage Lyell's *Principles of Geology,* which introduced him to uniformitarianism. In South America Darwin observed fossils of extinct animals that closely resembled modern species. He also observed the effect of natural forces on the earth's surface. On the Galapagos Islands off the coast of Ecuador, Darwin observed that each island supported its own tortoise, mockingbird, and finch. Each was different in structure and habitat from island to island. After Darwin returned home, he began studying the diversity of species.

In 1838 he read the Rev. Thomas Malthus' (1766–1834) *Essay on the Principles of Population*. This work was the key to his understanding of how nature selects species for extinction and survival. Malthus had observed that populations increase faster than their food supply does. This population increase results in either famine, disease, or war. Darwin thought that a similar struggle for food must hold for all forms of life. The part of the population that survived the struggle would be the most fit (best able to compete for food). This struggle for existence was what Darwin labeled "natural selection." Thus, Darwin had arrived at the theory of evolution by natural selection. For the next two decades, he continued to refine his theory.

In 1858 he received a communication from Alfred Russel Wallace (1823–1913) asking for Darwin's comments on Wallace's theory of evolution by natural selection! Darwin had Wallace's letter as well as one of his own published together in the *Journal of the Linnaean Society* in 1858. In 1859 Darwin published *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle of Life*. In 1871 he published *The Descent of Man* in which he argued that no special design or creation was needed to explain the human mind. Upon his death he was buried in Westminster Abbey.

Alfred Russel Wallace explored the Amazon Basin from 1848 to 1852. From 1854 to 1862 he explored the Malay Archipelago. He noted fundamental differences between the animal species of Asia and Australia. He observed that the mammals of the Malay Archipelago are divided into two groups separated by an imaginary line currently called the Wallace Line. West of the line are Asian mammals, with Australian mammals east of the line. Wallace wrote *The Malay Archipelago* (1869), *Contributions to the Theory of Natural Selection* (1870), and the *Geographic Distribution of Animals* (1876). Wallace established the principle of *animal geography* or the study of the geographic distribution of animal species. He differed with Darwin in regard to the human mind. While Wallace proposed natural selection as the means for the development of life forms, he did not believe that natural selection could explain the development of the human mind.

The Triumph of Darwinian Evolution

Most modern biologists are Darwinian evolutionists. However, Darwinian evolution did not immediately sweep through biology. By 1900 there were many who did not support evolution. Of those who did support evolution, there were as many Lamarckian evolutionists as Darwinian. This was because Darwin could not explain changes that occurred in the characteristics of organisms from parent to offspring. Lamarck's idea of inheritance of acquired characteristics made more sense to many. During the early 1900s, the work on genetics by the Austrian monk Gregor Mendel (1822–84) was rediscovered. Genetics could explain the variation in characteristics. The current theory of evolution was finalized by the end of World War II and is called *neo-Darwinism* or the *synthetic theory*. The current theory is a synthesis of Darwin's theory of natural selection with modern population genetics.

A synopsis of the current prevailing thought on the origin and evolution of life would begin with the formation of the earth about 4.5 billion years ago. About 3.5 billion years ago, life appeared with the chemical synthesis of biological molecules (DNA, RNA, proteins) that self-assembled into a reproducing cell. About 700 million years ago multicellular organisms appeared. Marine algae flourished about 500 million years ago which would have been instrumental in creating the current oxygen atmosphere. During this time, the first vertebrates appeared. About 400 million years ago, land plants appeared, followed by insects and amphibians. Reptiles appeared about 350 million years ago and mammals about 250 million years ago. Dinosaurs flourished from about 200 to 65 million years ago. Modern flowering plants appeared about 35 million years ago. Finally, hominids appeared from 6 to 2 million years ago.

According to the theory of evolution, the following factors are involved in one species changing into a new species (*macroevolution*). Variation in the members of a species is introduced by sexual reproduction and mutations. *Mutation* refers to random changes in genes which introduce new traits to the species. Sexual reproduction generates an enormous amount of variation within a population. Sexual reproduction leads to new combinations of traits; and at a given time, it is probably much more important than mutations. When a part of a species' population is isolated from the rest of the population, then these variables can become important to survival. *Plate tectonics* (the theory that the earth's crust is divided into thirteen mobile plates) can result in geographic isolation. At the boundary between colliding plates, mountain ranges can arise, changing the climate from wet to dry, from hot to cold. In these new environments, certain members of the population may have traits that allow them to survive the new conditions better: they reproduce more efficiently; and ultimately, a new species should form. This natural selection results in the *survival of the fittest*.

Today there is a philosophical triumph of Darwinism in all sciences. Most scientists work from an assumption that only naturalistic processes can be used to explain observations. In biology adaptation to the environment has replaced design. Chance, within the constraints imposed by the physical world, has replaced purpose. Is this triumph justified? Let us examine the evidences given to support Darwinian evolution to answer this question.

Evidences for Darwinian Evolution

Below are listed some observations that have been used to support Darwinian evolution. After each observation, the interpretation to support Darwinian evolution will be given, followed by an alternative interpretation.

1. Fossil Record

Observations. Most organisms preserved as fossils were buried under layers of mud or sand that later turned to rock. Relatively few species are preserved. Oldest rocks contain the simplest forms of life that differ from species living today. Essentially all extinct and living body forms (phyla) emerge in the fossil record at the base of the Cambrian rock layer about 570 million years ago. Of the about one hundred new body forms that appeared in the Cambrian period, only thirty phyla remain today. After the diversification of the body forms in the Cambrian, younger rocks have fossils that show a "top-down" pattern of diversification in the fossils. Using the established body forms, there is an increase in the number of classes, followed by an increase in the number of orders, followed by an increase in the number of families, and so on.[1]

The fossil record indicates the occurrence of mass extinctions. For example, the Permian extinction some 200 million years ago resulted in about 96 percent of species becoming extinct. After such extinctions, no new phyla (body forms) appear in the fossil record. Rather, the fossil pattern again shows the "top-down" pattern of diversification based on the established body forms. The fossil record also contains what appear to be transitional forms between the taxonomic categories. Examples are *Archaeopteryx,* which has reptile and bird properties, and *Basilosaurus,* which has the body of a whale with hind legs. Although the previous discussion concerned changes in the fossil record, in other cases there appears to be little change (*stasis*) in the fossil record. For example, some species are *living fossils* since they seem to be little changed from their earliest fossil records. Examples, with the earliest date of their fossils, include: horseshoe crabs (500 million years ago), crocodiles (200 million years ago), and coelacanth fish (350 million years ago).

Darwinian Evolutionary Interpretation. There are two interpretations for the fossil record. Evolutionists favoring *gradualism* say that the fossil record shows a progression from the earliest simple organism to complex organisms alive today. Transitional forms reveal a common ancestry between groups of animals such as reptiles and birds. A second interpretation is *punctuated equilibrium,* which assumes that evolution occurs in spurts between long periods showing little evolutionary change. Both of these views would agree that these changes occur only by natural processes.

Alternative Interpretation. The fossil record seems to indicate variations on the theme of a few body forms. Since these body forms do not appear to overlap in the fossil record, these body forms could indicate intelligent design. Once these body forms were established, life seems to have some plasticity (ability to adapt and change) to fill all available ecological niches.

2. Geographic Distribution of Species

Observations. Oceanic islands arose from the sea floor and have never been connected to the mainland. Hawaii, Tahiti, and the

Galapagos Islands are examples. Native species found on oceanic islands are those that can easily travel over long stretches of water: flying insects, bats, birds, plants whose seed can float. For example, the Galapagos Islands do not have any native land mammals or amphibians (frogs and toads). The species of oceanic islands are most similar to those on the nearest mainland, even if the climate is different. The Galapagos Islands are dry and rocky, while Ecuador has a wet tropic coast, yet there are similar organisms on each. The Galapagos Islands have thirteen species of finches, which is more than any continent. All these species are unique to the Galapagos Islands.

Darwinian Evolutionary Interpretation. A limited number of species came to the island and developed into new species to occupy all environments.

Alternative Interpretation. This could be an example of variation on a design with adaptation to fill all available ecological niches.

3. Embryology

Observations. Embryology is the study of the ways organisms develop during the earliest stages of life. The appearance of the early embryos of all vertebrates are very similar in appearance during some stage of their development. As an embryo, mammals form three types of kidneys in succession. In mammals, the first two perform no function and break down. In the embryos of fish, amphibians, and reptiles, one of these first two types of kidneys becomes the mature kidneys of these animals. A human fetus grows a coat of hair that is usually shed before birth.

Darwinian Evolutionary Interpretation. The interpretation is stated as "ontogeny recapitulates the phylogeny," or the developmental stages of an organism reflects its evolutionary history. Thus, mammals are retaining some of the developmental features of their evolutionary ancestors.

Alternative Interpretation. Even though the vertebrate embryos have similar appearance and developmental stages, they always end up as the expected vertebrate. They are developing according to a genetic plan. A plan implies a planner.

4. Homologous Structures

Observations. Comparative anatomy studies have revealed that vertebrates have a fundamental likeness in body architecture. The appendicular skeletons of frogs, horses, and humans have similar arrangement of bones. The major muscles of vertebrates are similar and perform the same function. Both of these cases are examples of *homologous structures*.

Darwinian Evolutionary Interpretation. Homologous structures imply a common ancestor.

Alternative Interpretation. The homologous structures are the result of a common design that has been changed by natural or supernatural modifications.

5. Vestigial Organs

Observations. A *vestigial organ* is a bodily part or organ that is small or degenerate in comparison to one more fully developed in other animals. Examples are cavefish, which are blind but still have eyes; porpoises and pythons with a pelvic girdle; humans with a rudimentary tail with a complete set of muscles for wagging it; and humans with an appendix.

Darwinian Evolutionary Interpretation. The vestigial organs reflect some earlier evolutionary stage for the organism at which time the organ had a function.

Alternative Interpretation. In some cases, so-called vestigial organs have been shown to have a function; for example, the appendix has some immune system function. Other cases could again indicate a common design with modification.

6. Biochemistry

Observations. All organisms use the same biochemical molecules, including DNA (genetic code), ATP (energy storage molecules), and enzymes (catalysts). Comparison of structures of biochemical molecules between species reveals some interesting relationships. Cytochrome c is the molecule used to synthesize the energy molecule ATP. The following number of amino acid sequence differences are noted between the cytochrome c molecule of a human and monkey (1), duck (11), and yeast (51). Analysis of the DNA sequences reveals the following differences between a human and chimpanzee (2.5 percent) and lemurs (42 percent).

Darwinian Evolutionary Interpretation. The similarity between the biochemical molecules implies a common ancestry. The more similar the chemical structure of the molecules, the more related are the two animals. Thus, humans would be more related to chimpanzees than lemurs. Comparison of biochemical molecule structure differences can be used to create an evolutionary tree.

Alternative Interpretation. This is another example of common design.

7. Current Observation of Evolution

Observations. Certain species undergo physiological changes due to humans causing disturbances in the environment. Disease-causing bacteria can develop a resistance to drug therapy. Before the industrial revolution, most peppered moths in England were white with black spots. This caused the moth to blend in with the lichens that covered the tree trunks. There were only a few black peppered moths. During the industrial revolution, most trees became blackened. The number of light-colored moths declined, while the number of black moths increased.

Darwinian Evolutionary Interpretation. This is an example of rapid change in response to an environmental change. "Natural selection has favored the dark form of the peppered moth in areas subject to severe air pollution, perhaps because on darkened trees they are less easily seen by moth-eating birds."[2]

Alternative Interpretation. These are examples of microevolution or changes within a species. The peppered moth example has been in biology textbooks for decades.[3] Recently a book was published which showed that the heart of the pepper moth example is incorrect.[4] The peppered moth does not rest on trees, and thus the change in distribution between black-and-white varieties has nothing to do with the color of the trees. Also, pictures of the peppered moth resting on trees have been shown to be staged. At present, scientists do not understand the change in the distribution of the peppered moth varieties.

8. Artificial Selection

Observations. Animal and plant breeders can produce many different varieties. An example is the many different breeds of dogs which have been developed.

Darwinian Evolutionary Interpretation. Darwin used this as an example of artificial selection which corresponds to natural selection. He believed that this artificial selection would eventually lead to enough change to produce a new species (macroevolution).

Alternative Interpretation. This is another example of microevolution. No new species has ever been produced. Also, these breeds have been guided by an intelligence, man.

Major Problems for Darwinian Evolution

Darwinian evolution is the attempt to explain the origin and development of life by materialistic means. Darwinian evolution proposes that everything about life, from the function of DNA to the structure of the largest dinosaur, resulted from the nature of matter and the laws of nature. As discussed in chapter 9, Darwinian evolution also denies a purpose to the development of life. There are at least three problems for the materialism and purposelessness of Darwinian evolution: information, irreducible complexity, and anthropic principles. It must be remembered that even if these three problems remove the materialistic basis for Darwinian evolution, they do not eliminate the possibility of evolution, of change in living organisms. It would mean that scientists would have to consider modifying evolution to include Intelligent Design.

Information

DNA (deoxyribonucleic acid) is a double helical molecule found in the nucleus of cells. DNA contains the master blueprint, in coded form, of an organism. The code is written with a four-letter alphabet called the bases. The bases are projected from the double helical backbone. The four bases and their one-letter designation are adenine (A), cytosine (C), guanine (G), and thymine (T). DNA carries instructions for the synthesis of proteins. Proteins, made of amino acids, serve as muscles, enzymes, hormones, antibodies, and structural elements in organisms. A gene is a specific portion of the DNA molecule that codes for a particular protein. Combinations of three bases, called a codon, specify for one amino acid. A segment of DNA might look like this: CGTTACCCTCAG . . . ATTCAC. In this example, the triplet TAC is the codon for a chain initiation signal, while the triplet ATT is the codon for a chain termination signal. The triplet CCT is the codon for the amino acid valine, which is the first amino acid in the protein insulin, which is made of 51 amino acid units. The code has to be in the correct order so that the 51 amino acids are assembled in the right sequence or something other than insulin will be synthesized. Insulin is a small protein; on the other hand, a large protein like hemoglobin contains a total of 574 amino acids.

What is the source of this information? What determined that a certain codon triplet would be a start signal or a stop signal?

How are the codons arranged in the right order to make a particular protein? What was the source of the information? Information is different from (independent of) matter. As an example, let us consider the information in this chapter. First an intelligence (the author) came up with the information which was stored in his brain. This information was then transferred to a yellow pad, was transferred from the yellow pad to a computer chip, subsequently to this book, and is now being transferred to the reader's brain. Thus, the information is independent of the medium. Changing the medium does not change the value of the information. Darwinian evolution has not successfully answered the question, "How can information only arise from matter and physical laws?"

Irreducible Complexity

Charles Darwin stated, "If it could be demonstrated that any complex organ existed which could not possibly have formed by numerous successive, slight modifications, my theory would absolutely break down."[5] Michael Behe in his book *Darwin's Black Box* presents biochemical structures which he believes are too complex to function unless all the parts are present. Behe proposes that the biochemistry involved with vision, blood clotting, and cellular transport are systems that are too complex to develop piecemeal. As a mousetrap can only function when all its parts are present, Behe proposes that these biochemical systems can only function as a complete unit. If he is correct, then how did these irreducibly complex systems arise only from matter and physical laws? Behe says that Intelligent Design must be included to explain these irreducible complex systems.

An argument against "irreducible complexity" is the paradox that because we cannot explain something does not mean that it does not have a physical explanation. A preindustrial person looking at a Boeing 747 might conclude that no one could conceive of something so complex, yet the plane arose from only ninety years of progressive design. Nature has had 3.5 billion years to tinker with living organisms. Of course, this argument does involve an intelligence (mankind) in the progressive development of the 747. Biochemists are beginning to propose "reasonable" solutions to some of Behe's examples. These proposals represent the greatest danger of irreducible complexity—the tendency for it to become another "god-of-the-gaps" theory. The supporters of irreducible complexity must formulate it in such a way that a biochemical explanation for one or more examples will not undermine the whole process.

Anthropic Principles

The Anthropic Principles or coincidences were discussed in chapter 6. At least twenty-six anthropic coincidences have been identified. These imply that the universe was fine-tuned for the existence of life. The challenge to scientists who propose a purposeless, natural cause for life is to explain this fine-tuning of the universe. Why does the universe appear to be fine-tuned for the appearance of life and humans?

Evolution: Another Look

It is difficult to write about something as emotion-laden as evolution. Hopefully, the reader will not leave this chapter thinking either that evolution perfectly explains everything or that evolution explains nothing. Why is evolution so emotional-laden? There are many ways to use the word *evolution:* (1) change over time, (2) relation of organisms through a common ancestry, (3) a theory giving a mechanism to explain all the change, (4) naturalistic tenet that everything is the result of purposeless and natural process.

At its simplest, evolution means change through time. One speaks of evolution of a political party, evolution of automobile design, or evolution of a star. Yet the fossil record shows stasis as well as change. Thus, one cannot say that everything changes.

Evolution is also a hypothesis that all organisms are related through a common ancestry. This is an attempt to interpret the observed common characteristics of organisms. Although the genetic code of all organisms is similar, that observation is not the same as establishing the common genetic ancestry of all life. Expressing evolution as this hypothesis is not an established fact but an inference.

Evolution is also a theory to provide a mechanism to explain similarities and diversities observed in organisms. Since mutations and natural selection have been shown to produce some biological variations, Darwinian evolutionists have proposed that mutations and natural selection are the mechanism that produced the similarities and diversities observed in organisms. The mechanism of evolution is the area where serious debate continues among most biologists; the debate is not over whether evolution occurs but over how it occurs.

The word *evolution* is also used in a philosophical manner when it is stated that everything is the result of purposeless and natural process. As discussed in chapter 1, such a statement moves out of the realm of science and cannot be analyzed by the scientific method.

The usage of the word *evolution* today usually includes a combination of one or more of these meanings. In many instances, one person may be using one meaning of evolution while the other person replies using another meaning. No wonder conversations involving evolution can become so emotional.

A final thing to remember is that evolution is considered a very successful scientific theory. Evolution, with its concepts that "things change with time" and "organisms are related," has been very successful in organizing a lot of scientific observations. As Ernst Mayr explained, "The theory of evolution is quite rightly called the greatest unifying theory in biology. The diversity of organisms, similarities and differences between kinds of organisms, patterns of distribution and behavior, adaptation and interaction, all this was merely a bewildering chaos of facts until given meaning by evolutionary theory."[6] The observations and themes of many different disciplines are linked by evolutionary theory: genetics, animal geography, plate tectonics, radioisotope dating, taxonomy, cosmogony, and so on. Evolutionary theory allows scientists to put all these disciplines together into one "big picture." Evolution is viewed as one of the most successful theories of modern science, in terms of unification, problem-solving strategy, and fecundity.

Summary

We have observed that any theory about life on earth must deal with the diversity of life, the similarity of organisms, and the fossil record. Most scientists feel that the theory of evolution adequately explains all of these variables. Most biology textbooks present the theory of evolution as a materialistic, purposeless process. We saw that there was room for design and purpose in all the observations that evolutionists use to support their theory. We also saw that the materialistic, purposeless presentation of evolution does not satisfactorily address how genes contain information, the irreducible complexity of biochemical structures, or the Anthropic Principles. Finally, we observed that evolution is viewed as a very successful concept in linking together ideas from many different disciplines.