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The Question of Time In Evolution Or Creation: The 1962 Faculty Lecture

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THE 1962 FACULTY LECTURE

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The science faculty of a church sponsored college such as George Fox College is constantly faced with the task of relating the evidences of scientific investigation of nature to the evidences of scriptural revelation. A basic principle in this situation is to realize that there is only one truth expressed in nature and in the scripture. If there is apparent disagreement between the two sources of knowledge, it is necessary that a reinvestigation of both sources be made. Too often, such an investigation is conducted by persons that value one source of truth above the other. It is hoped that this attempt is not so biased nor would it be colored by too much speculation.

It is certain that any investigation of the past will contain some degree of speculation. For, except in very recent years, there is no first hand record of the past. Since conclusive evidence is not available, it is essential that an attempt be made to postulate probable situations that are consistent with known scientific data.

There is no problem to be resolved for the person who considers the universe to be only material. For the person who considers the material universe to be created and personally controlled by a Spiritual God, there is a problem.

Such a person finds it reasonable to expect that this Go would want to communicate with man in order to give hir aids to discover the Truth about the existence of man an the universe. Such a communication is believed to occur i the Holy Scripture. Examination of this record shows tha it is first designed to reveal God. It is written in words o man with illustrations from man's experience. Although i is not an account of natural science, the statements concern ing the natural world must be consistent with the concep that an omniscient God would know what the world is like To interpret the Holy Scripture, it is necessary to believ that it is a source of truth. And then with the leading o God to seek out the consistent message as presented by th entire Bible.

The investigation of nature is done through the metho of science. Scientific fact can be objectively verified. T find the explanation of observed facts, the scientist pose the best explanatory hypothesis or guess that fits the data available to him. He then experimentally tests his guess with all possible methods. Quite often the experimental results will show conclusive agreement or disagreement with the hypothesis. In other cases, the data discovered may not conflict with the hypothesis, but it may not substantiate the hypothesis either. In such case, the scientist chooses the most consistent theory presented, while suspending final judgment.

I. Development of the popular modern view of the past.

In dealing with past events, such as the method of how present forms of life came to be, there can never be a scientific experiment that can reproduce the exact relationships that existed. Therefore theories concerning these past events are unprovable theories. We can only attempt to find the theory that fits most of the facts available to us.

A. Principle of uniformity.

To illustrate the application of consistency in the interpretation of facts, let us consider the problem of dating the past. This was considered an impossible problem until James Hutton proposed the Principle of Uniformity in 1788. This principle is that the past may be interpreted in light of known present forces and explained by them. Charles Lyell

popularized this concept with the publication of the textbook, *Principles of Geology*, in 1830. Since then, this principle has dominated the interpretation of past events as recorded in the rocks of the earth's crust.

The explanation of sedimentary rock strata was the interest of Charles Lyell. It was necessary for him to make some conclusion about how fast these layers of rock were produced. He based his conclusion on observations of mountains. Only a slight amount of uplift of mountains has occurred in recent times. Should a mountain rise rapidly, life on it would be destroyed. To Lyell this was unthinkable. So he concluded that geologic changes are slow, gradual processes. Was this conclusion justified? There are many attractive theories of how mountains are made, but none have been proved and today it is an open problem. However, it is a matter of basic observation to point out that what is the top of a very high mountain today, was at one time near or below sea level. No force operating today could raise the mountains rapidly, so the position of Lyell is understandable. However, he violated scientific principle by not leaving the way open to experimentally seek for possible forces not operating today and to determine the consequence of these forces.

B. Organic Evolution.

The influence of Lyell upon Charles Darwin was very close. In the opening passages of *The Origin of Species*, Darwin credits Lyell with the inspiration to write the book. So it is apparent that Darwin's theory is an attempt to be consistent with this concept of Lyell that processes like erosion, sedimentation, fossil production and growth of mountains proceeded at a very slow rate.

The theory of organic evolution is an explanation of the changes undergone by living things. More broadly, it is the theory that plants and animals now living are the modified descendants of somewhat different plants and animals which lived in times past. It is not that one modern form descended from another, but that similar modern forms descended from the same form. Organic evolution is a progress from simple to complex forms.

Charles Darwin is generally credited with the concept.

However, Alfred R. Wallace published similar ideas abou the same time. Recent investigation has added to the theor by showing the mechanism by which the process of chang takes place. This mechanism was not known at the time o Darwin.

To summarize the modern view of organic evolution i is noted that change must first begin with an individual o a species. The study of genetics, or the science of inheritance has clearly demonstrated that living things are marvelous ir their ability to preserve the characteristics of the species. Lik gives birth to like nearly one hundred per cent of the time However, mechanisms of variation and change do occur. The traits of a species are preserved by a coding device called genes. To carry all the traits each individual has many genes that can be combined in an infinite variety of ways. In addition to this, every individual requires two similar genes for each trait. These are separated in the formation of reproductive cells and recombined in offspring so that every individual of a species has a different set of genes. The result is a great variety of individuals that make up the total population of a species.

In addition to this method of variation, there is a method by which entirely new traits may enter the species. These are sudden changes called mutations. Among the forces that bring about mutations are chemicals, high temperature and radiation. These forces cause a disruption of the gene pattern. Most of the mutations are not passed to offspring because they usually cause the death of the offspring before birth or before reproductive maturity. But a few mutations that are not harmful are brought into the species. It should be pointed out, however, that in a given population of a species in which completely random mating is possible, the mutation rate is high enough so that all possible unusual changes will reach a maximum value of incidence within a few generations. So that in a relatively short time, a species will have an individual that represents each possible mutation. The result is that no evolutionary change will occur unless something happens to select particular individuals in preference to others. This is the step of organic evolution that was carefully described by Darwin.

It is called the process of natural selection, which is often

recognized by the key phrase, "survival of the fittest." This is misunderstood to be a "dog-eat-dog" concept of change. Also it has been criticized as being "progress by chance." It is more correct to think of natural selection simply by saying that environmental situations will favor one individual over another. Since species are composed of a great variety of individuals, and since the environment is different from place to place on the earth or from time to time at the same place, it is concluded that some individuals will be more capable of living and reproducing in the changed environment than others.

If circumstances are favorable for reproduction, a species tends to overpopulate an area. Some of the weaker will die. But some will migrate into new regions, or some will have a rare trait that equips them to live in a slightly different environmental niche. As the individuals become more and more separated from the original ancestral group, they will show increasingly greater difference until they may become recognized as a species different from the original. This process will take place at all borders of a population, so that several species will be derived from the same ancestor due to migration into different environments. The structural difference between these extreme variants could be quite great.

The total result of the process of organic evolution is diagramed by using the "Tree of Life." The leaves of the tree represent the modern species; the branches represent the ancestral species that would be the genus today; the stem of the tree would represent the family of modern classification and so forth. A grave problem comes up in using such a diagram. There is a great lack of ancestral links. Not only is there one missing link, but very many appear. Fossils do not show gradual change, but instead occur in abrupt, discontinuous changes.

On the other hand, it is a proven fact that small changes called "microevolution" do take place to bring about varieties within a species. It is argued that since microevolution is a proven process, then if there is a long enough time, the gradual environmental change as assumed by uniformitarian geologists will produce larger changes. These large changes are called "macroevolution." They would be the abrupt changes shown in the fossil record.

C. Geologic time scale.

The point of criticism of the theory of organic evolution is the validity of the assumption of gradual change brought about by slow changes in environment. The geological time scale is a manifestation of this same assumption. The strata of rocks shows a sequence of fossil remains similar to the sequence of development of life forms as theorized in organic evolution. Because of this similarity, estimates are made of the length of time necessary for each level of complexity of life to be produced by microevolution. Some examples of such estimates are that invertebrate animals began about 600 million years ago, flowering plants and reptiles started about 200 million years ago, mammals evolved about 60 million years ago and man evolved about two million years ago. The estimates by various authors vary greatly. The trend is to estimate longer time spans than those estimated in the early days of geology.

The errors in the logic by which these estimates are made will not be pointed out. There is general realization by geologists today that these numbers do not represent absolute time measurements. The numbers continue in use at the present time because there is no accepted way of obtaining any other time divisions that are any better.

D. Radioactive dating methods .

The discovery of radioactive dating methods has shown possibility of providing absolute dating of the past. A method based upon the radioactive disintegration of uranium to lead is one of these. Since the time that it takes the process to occur is accurately known, it is possible to analyze rock for the ratio of the amount of uranium to the amount of lead and then calculate the age of the rock. By this method the age of the earth has been determined to be about five billion years. The problem of dating fossils in sedimentary rock is more difficult. Sedimentary rock contains very little uranium. And since the fossil is dated by the rock near it, the assumption that the fossil is the same age as the rock is questionable. Radioactive dating methods can give only the relative ages of the strata. Again, this is not a method by which absolute dating can be obtained.

Radioactive carbon dating is more useful in giving ab-

solute time scales. In this case, the nitrogen isotope number 14 is the common isotope that occurs in the atmosphere. This isotope is subject to cosmic radiation from sources outside the earth. The amount of this radiation has only been measured for a brief time, but it seems to be a constant quantity. The result of radiation striking atoms of N-14 is to produce atoms of carbon isotope 14. The C-14 is then mixed with ordinary isotopes of carbon, isotope 12, and both are taken into the tissue of living organisms on the earth. It is assumed that the relative quantities of these two isotopes have been constant as long as fossils have occurred. Since cahbon-14 is radioactive, as soon as the plant or animal dies, carbon-14 begins to disintegrate into carbon-12. If the plant or animal is fossilized, the date that the fossil was formed can be calculated from the quantities of the two isotopes remaining in the fossil today.

This technique has been evaluated by determination of samples of known historical age such as tree growth rings or objects from burial tombs. Near agreement of age is found as far back as about 3,000 years B.C. or 5,000 years B.P. This method of age determination has a maximum use to about 30,000 years. (Zeuner, p. 342). At this age all the carbon-14 will have disintegrated. However, the application of the method is doubtful for time determinations very much beyond the 5,000 years for which it is verified. This criticism is based upon the knowledge that any change in the amount of carbon-12, nitrogen-14, or cosmic radiation reaching the atmosphere would greatly change the calculations. It is known that the amount of carbon in the air was much greater in past times when the carbon was not locked in coal, oil, and limestone deposits. There is no absolute evidence about the amount of cosmic radiation entering the atmosphere. Less radiation would give ages that would be too great.

Definite statements about the time of past events as indicated by scientific evidences would show a fairly accurate age calculation for the earth itself, about five billion years. Also there is a very good accuracy for dating recent times back to 5,000 years or 30,000 years at the very most. Between these two limits there are no aids to absolute time determination. There are only determinations that give the

relative ages of the rock strata. Approximations are made to establish probable time of events indicated by the sedimentary rocks.

II. The Scriptural view of the past.

Does the interpretation of the Scripture agree with the generally accepted view of the past that is held by geologists? The meaning of the references dealing with time in the scripture is the center of a very active debate by Biblical scholars also.

A. What is a Day?

The word "day" in Genesis is compared with the word as it is used in II Peter 3: 8, "One day is with the Lord as a thousand years, and a thousand years as one day." It is argued that the word "day" can refer to any length of time. This would eliminate the conflict between the uniformitarian geologist and the days of Genesis. It would be that at various and sundry times, God created. He did so in the order shown by the fossil record. Yet the statement in Genesis is never simply "day," but that these were days with an evening and a morning. This modification relates their length to the amount of sunlight.

B. The events of "creation."

The order of events of creation is very significant. There is much misunderstanding about the statements of the Genesis account. Actually there are two statements. The more complete one is given in chapter one and a brief summary is repeated in chapter two. The latter gives special detail relating to the creation of man and woman.

The account begins with the simple statement that God created the heavens and earth. It doesn't say how or when. Although one opinion is that verse two follows immediately in time, there is reason to think that there is a time gap between verse one and verse two. Analysis of the subsequent statements seems to point to this. In verse three, light appeared, and in verse sixteen, the sun and moon appear. These are not expressions of creation, but of being made visible. The sun, moon, and earth were created, as stated, in verse one, but something happened to this original creation. Verse

two describes the surface of the earth as being in a state of destruction. It is without structures and without light from the sun reaching the earth.

The substance that caused the darkness is identified in verse six as being a great cloud of vapor. On the first day, the vapor diffused enough for the light of the sun to be apparent, but no shape of the sun was visible. On the second day, the vapor divides into condensed water on the surface and a great cloud of vapor that rises into the sky. This leaves a "firmament" or expanse between. The water that rises off the surface is of unusual nature. A situation is described that is not known today. This is not just an ordinary cloud that lifts, cools and loses its moisture as rain. No rain is mentioned until the Flood of Noah begins, "but a mist watered the earth." (Gen. 2:6) So this vapor must have been carried into the upper atmosphere and remained there.

Today, temperatures of the air decrease upward in the lower atmosphere or troposphere and then increase upward in the upper atmosphere or stratosphere. There is thus a temperature barrier between these two layers to prevent water from entering the stratosphere and restricting water and weather to the troposphere. If there were any way of getting moisture into the stratosphere, it could hold an enormous amount of water. Once the vapor is there, its effect would be to hold down the loss of heat from the earth so that there would be an even temperature over the surface of the earth like a hot-house. Also, it would shield the earth from cosmic rays. As mentioned, cosmic rays produce the carbon-14. Cosmic rays also cause mutations of the genetic make-up of living things and are a factor in causing death by producing tissue failure. This vapor in the stratosphere would give protection and provide a climate not known today.

Returning to the Genesis events, it is noted that plant life and seas were formed on the third day. The term "let there be" is used for these events. This is used when a non-creative event takes place. Plants must have been on the earth before the destructive events prior to verse two. Roots, seeds, and spores of plant life are difficult to destroy. So as soon as the water had run into the sea, the plants began

to grow.

On the fourth "day of creation," as it is often thought to be, there seems to be an impossible situation. The sun and moon are thought by some to have been "'created" on this fourth day. But light came earlier, and the plant life, which depends upon the sun, was created on the day before. Here again it is important to distinguish between the process described as making or creating out of nothing and the process of being made apparent. The latter process does not involve creation. The picture conveyed for this fourth day is that the vapor had dissipated from cloud form that obscured the shape of the sun to minute crystals or gaseous form which would not prevent direct sunlight from reaching the earth.

Creatures of the sea were able to survive the destruction of the earth's surface also. Water is very protective to the life it supports. Water minimizes any temperature change, withstands pressure change, and shields from radiation. Organisms in the sea are often equipped with strong shells to prevent harm during adverse circumstances. So even if some of this type of life were destroyed, it is indicated that enough survived so that they did not need to be created. However, larger sea life would not have been so fortunate or else they did not exist before the destruction. At any rate, they and bird life were created on that fifth day.

The sixth day was the major day of creation. Animal forms of all kinds are especially susceptible to destruction by temperature, pressure, oxygen loss and increased radiation. Creeping things, beasts, and finally man had to be created. Man was distinctive of the created things. He was made with traits like the Creator. He had power over the entire creation, wisdom to name the animals, ability to fellowship with the Creator and the privilege of free choice.

In reviewing this account of the events of the beginnings, many of the events can be compared to events observable today. However, the exact methods that God used are not given in detail. Are these methods beyond the possibility of being discovered by scientific investigation? Certainly God is able to use methods beyond man's ability to probe and to understand. So there would be much that man must

take by faith. But religious faith should never blind investigation into the processes by which God could have created. That God could have used natural processes such as organic evolution is not contrary to the statement of the scripture. Indeed, if such were the case, it would only serve to show that God works within the framework of laws of His own making. God would certainly know when to invoke the proper law that would bring about His purpose.

C. The date of the "creation."

Continuing then to the events that follow the creation, we find that the man and woman, Adam and Eve, which God had created exercised their free will and chose to disobey the direct command of God. This made them different in such a way that they gained the punishment of death. Their offspring all continued in the way of disobedience and continued to have the condemnation of death. A notable exception was Enoch. He is interesting in that he reestablished fellowship with God and did not die.

There are many who doubt the accounting of ages and the long lengths of life of the men between Adam and Noah. The problem is sometimes explained by saying that the ages represented the length of eras ruled by dynasties that carry the name of the principal ruler. Also no summary statement of the length of time is made. Usually this occurs in the scripture. This is a difficult question to resolve, but a more literal interpretation is suggested by the careful accounting of the birth and death years, the unusual case of Enoch not dying, and the individualization of Noah. It would be suggested that the time between Adam and Noah is close to the summation of the birth events. There are minor discrepancies in the accounting of this series of genealogies and others given later in the Bible. But by no stretch of the terms can the date of the creation of Adam be greater than about 10,000 years ago. Bishop Ussher was no doubt taking an extreme position to place creation at 4004 B.C. But the method of searching the Scripture to determine the antiquity of man is a valid method. It is concluded that whatever number seems most consistent with the Scripture, the length of time for man to be present on the earth is relatively short by comparison to the estimate made to be consistent with the uni-

form change principle.

D. The judgment of the Flood.

After the fall of man, the race of human beings deteriorated. So great was this moral decline that the Bible records that God repented that He had made man. A judgment was pronounced upon the earth. The entire air breathing population was to be completely destroyed except for a select few. Noah and his family were to be the only human beings that would survive. They were to select a reproducing pair of every "kind" of air breathing form of life. The word kind is not to be equated with the scientific term "species." Kind" referred to reproductive units, but that these were the same reproductive units identified today as "species" is not a necessary conclusion.

The Flood brought a severe degree of selection to animal life. As mentioned, selection is a necessary requirement for microevolution. It would follow that this selection and the migrations after the Flood would result in a very rapid rate of change in the forms of life on the earth. The gradual environmental change of uniformitarian geology would take thousands of years to accomplish the same evolutionary change that came to pass in a year, if a world-wide destruction took place.

Again there are differing opinions as to the extent of the destruction. It is argued that the word "all" does not always mean completeness in the Bible. It sometimes is used to mean the majority or many. From this it is argued that the extent of the flood could have been limited to the Tigris-Euphrates valley. However there are compelling reasons for the interpretation to be a world-wide flood. The expressed purpose of the Flood was to destroy all human life. Certainly in the length of time between Adam and Noah people would have had time to migrate beyond the bounds of the mountains above the Tigris-Euphrates valley. Another evidence for a universal flood is that the Flood of Noah took six weeks to be produced, remained 16 weeks at its peak, and took 31 weeks to subside. No local flood in recent history has been described in these terms.

The waters that brought about the Flood had a source

that is not known today. To be consistent with the theory that the vapors covering the earth raised into the stratosphere, the major source of the water could be explained as a result of this vapor losing its stable situation and falling to the earth. The Bible also says that water came from subterranean locations also. This could refer to underground seas or perhaps water from volcanic eruption.

The detailed effect of all this rain from above and volcanic eruptions is not given in the Bible. But if the effect of major floods that occur today is used as a guide, there would be very extensive erosion and sedimentation. Since rain had never fallen before, the soil would be especially light and easily washed by water. Geologists are generally agreed that most material now in sedimentary rocks was washed from a warm climate into warm seas. This is because the great majority of fossils are tropical or semitropical forms of plants and animals. Evidence also shows that, excepting the present climatic zones and the period of glaciation prior to the present, warm climates have prevailed over the greater part of the earth's surface for most of geological history.

Events in this world-wide Flood would begin with soil and debris washing into the shallow seas and bays. This would trap the bottom dwelling animals. As the sea filled up, the fish life would become engulfed, but not completely exterminated. Then as the Flood raised higher over the land areas, the animals would be engulfed in order of their ability to escape the water. The larger, faster moving animals would survive longest. The fossils that would be produced would be primarily from the simpler forms of life that would be covered by sediment and buried first. Animals that resisted the Flood till the last would be floated on the surface of the water and eventually decompose rather than be fossilized. In the length of time that the waters stood on the face of the earth, there could have been much sorting out of silt, sand, gravel and clay to give the different strata of deposits. Just how much of this took place would be too speculative to discuss. The total effect of the Flood could easily be postulated to have produced much of the upper sedimentary strata and their fossils.

In order for land masses to reappear after the Flood, there next would be an adjustment of the ocean basins to hold the water. In the period of subsidence of the Flood and gradually diminishing thereafter, the bottom of the oceans would lower and the lighter land masses would be lifted upwards. This is the geological process of isostasy. It is the most accepted of the various theories of how mountains are lifted. In the uniformitarian interpretation, isostasy is a gradual process. It would occur equally well as a result of the Flood, but would take place more rapidly.

As the mountains were lifted up, the recently deposited sediments would be eroded more readily because there would not have been time for the sediments to solidify. Cases of this extreme erosion are observed today.

Annual climatic changes or seasons did not occur before the Flood. This was one of the signs given to Noah that the Flood was over. It is probable that the earth did not have the 23½° tilt of its axis to the plane of its orbit, which is the cause of seasons today. This also is suggested by recent investigations of the location of the magnetic poles in the past. Evidence shows that the poles are in no way fixed and have changed greatly in the past. (Durham) For one period of time, the poles were just the opposite from today. Had such a tilt of the axis been inaugurated at the time of the Flood, the rain would be a rain of snow in the polar region, while Noah witnessed a rain of water. The glacier that resulted would trap animals of the region. This is an outstanding evidence of the rapidness of the Flood, for many of these animals are still found quite well preserved in the melting glaciers of the Arctic. Uniformitarian geologists have weak explanations for this seemingly unusual phenomenon.

III. Criticisms and comparisons.

The occurence of fossils is more readily explained by suggesting geological catastrophies. Fossils are formed under conditions of rapid killing and covering. Under normal conditions, dead animals and plants are eaten or will deteriorate on the surface of land. Or else they will rise to the surface of water and deteriorate. Fossils occur in all ages of

development. If normal situations prevail, fossils would be mostly older, mature individuals of the species.

The uniformitarian theory of the past has a problem of explaining the missing links of the fossil record. A cataclysmic theory has a very reasonable explanation for missing fossils. The cataclysm would be a brief event that would occur between rather long periods of equilibrium situations in which very little change took place. The destruction would cause the formation of many fossils, but a few individuals would somehow survive to repopulate the earth. As they did so, the process of evolution would again occur in which successful variants of the species would be selected as they migrate throughout the earth. The rate of evolution would occur rapidly during this period so there would be very few individuals of the transitional species. Since conditions for fossilization would be poor, the record of their existence would be missing. This is another case in which a cataclysmic theory can explain data better than a non-cataclysmic theory.

IV. Conclusion.

The issue of time has been drawn out to show the controversy between the assumptions of uniform rate of change versus non-uniform rate of change. Was the course of development of life forms a very gradual one that consumed over 600 million years? Or were there equilibrium situations of undetermined length in which very little change took place, but which were broken by periods of very rapid change? Both assumptions are in agreement with the known mechanisms of change as summarized in the process of mircoevolution. Chance enters into both explanations. However, laws of chance and process of change are like other natural laws. They do not deny the operation of a Creator. A Divine Creator does not work against His creation, but knows His creation and applies the laws of His creation to bring about the events which fulfill His design for the creation. God is the God of chance and process as well as He is the God of any feature of the universe. The uniformitarian geologist must have a great length of time for the evolution of life to take place in order to "use up" all the improbable events. The

Divine Creator controls the probabilities and could just as well invoke a rare event yesterday as a million years ago.

There is then an alternate point of view of the past from the view most prevalent in scientific circles today. A view which includes the events recorded in the Bible has been shown to be consistent with observable data of the natural world. It demands serious attention as a guide to past events and the purpose of man on the earth.

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