

Studies In Creationism

Studies in Creationism

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1. Bestial or Divine?

“Is man an animal?” This is a rather common question. The answer among people in general may be an emphatic Yes or an equally emphatic No! The correctness of the answer will be judged by each individual according to his personal philosophy on that point.

From the point of view of scientific classification, all living things, including man, are placed in one or the other of two groups. They are either plants or animals. In this classification man unquestionably is not a plant; therefore, he must be an animal. In common with animals in general, and in distinction to plants, man is able to locomote, or move, from place to place; the cells of his body are without surrounding walls. He is incapable of making his own food from the simple, raw materials-carbon dioxide and water plus certain substances from the soil. And his growth and development proceed in a strictly limited fashion, consisting chiefly of enlargement and maturing, with no continued production of new organs and tissues during the course of his life.

Furthermore, man, in common with animals, has a body, which is formed of the chemical elements of the earth, the dust. The breath in his body is the same as the breath in the body of beasts. The processes of life in him are the same as those in the beasts, and they die alike. “That which befalls the sons of men befalls the beasts; even one thing befalls them: as the one dies, so dies the other; yea, they have all one breath; so that man hath no preeminence above a beast.” Ecclesiastes 3:19.

The food of man, like that of the beasts, consists of carbohydrates, as sugar and starch; of fats, as butter and coconut oil; of proteins, as portions of milk, eggs, nuts, and beans; of vitamins; of minerals; and of water. Because these foodstuffs are the same for man and animals, the enzymes in their bodies, which bring about the digestion, assimilation, and oxidation of the materials, are identical. The hormones, or chemical messengers, of man are the same as those of animals, some of those of the latter frequently being taken from the bodies of animals and placed in the body of man to save his life, as in the use of insulin for diabetes, and of adrenin, or adrenalin, for acceleration of a heartbeat which has become dangerously slow and feeble.

As far as the essential anatomy of man is concerned, he is so similar to certain higher animals in his bones, muscles, nerves, digestive tract, and all the rest, that the same manual of dissection can be used in all its minutiae for the body of man and that of any of the higher apes; that is, the gibbon, the orangutan, the chimpanzee, and the gorilla. The structures are almost identical. The differences are quite entirely those in proportions and relations of parts.

However, similar as man and beast may seem when viewed from the close-range angle of the anatomists and physiologists, still, the differences are not imaginary. The proportions of the skeleton are so characteristic as to make it generally possible to classify a bone as human or ape even though a small fragment only is at hand. When a man and any one of the manlike apes are stood up together with the intention of demonstrating their similarities, the student quite invariably finds himself impressed, rather, with the great differences between them. Yes, man differs from the ape in his sparsity of hair, in his more flexible hands, and in his efficiency as a ground-dwelling biped, whereas the ape is basically a tree-dwelling quadruped. In fact, the structure of man's foot is one of his greatest anatomical differences from the manlike apes in the shortness of the four lesser toes, in the falling in line with them of the great toes, and in the expanded heel bone for a prop at the back, characteristics which at once mark man as destined to walk most efficiently in an upright position upon flat surfaces which are nearly, if not entirely, horizontal. But the comparison of man with ape impresses upon the student the fact that real differences do not depend upon and cannot be explained entirely on the basis of their dissected bodies.

In mathematics the whole is equal to the sum of its parts, but this is not always true in biology. Any animal is considerably more than the total of the organic substances, the secretions, and the deposits that make up its body. There is something in addition to this demonstrable physical complex. The multitudinous structures of the bodily mechanism of any animal are operated and controlled by a mental mechanism which, at the present time, we cannot explain in terms of physics and chemistry. In each kind and variety of animal this mental control takes the form of a definite pattern of greater or lesser complexity which is peculiar to each variety of organism.

Fish, amphibians, reptiles, birds, and mammals other than man possess, in common with man, brains which have such principal parts as the cerebrum, cerebellum, and medulla oblongata. The more complex the structure of the organism is, the larger the cerebrum is in proportion to other parts of the brain. Intelligence, when the word is used in the sense of the power of meeting a novel situation successfully by adjusting one's

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behavior to the total situation, is shared by man with practically all animals. Of course, the more complex the structure of the organism, the more capacity it possesses for greater power of intellect. Intelligence occurs to any considerable extent only among the back boned animals, and here it is not much in evidence among those members that do not have the outer layer of the cerebrum well developed. Man shows a larger proportion of cerebrum to other brain parts than do even the manlike apes. Furthermore, the whole brain of man, on the average, is, by volume, two to three times that of the great apes.

The activities of many animals, even as complex as the frog, are almost entirely reflexive and instinctive. If the cerebral hemispheres are removed, the frog still acts in quite a normal fashion. With greater development of the cerebral cortex in animals, intelligence increases. Repeated and controlled experiments on horses, dogs, raccoons, and particularly on apes and monkeys lead us to believe that such animals do draw simple inferences. They possess little or no capacity for abstract thought or conceptual reasoning.

Yet on occasion they perform certain acts as means to an end which they would not perform if they did not have this end in mind. Technically, it is difficult to distinguish between such mental operations and what we call reason in man.

However difficult it may be to draw a clear-cut line between certain actions of highly intelligent animals and the simplest processes of reason in man, still, above this narrow borderline zone of action stands the incomparable ability of the human mind to engage in abstract thought. A monkey can look at the starry heavens, but only a man can ponder their meaning. In its broadest sense, only the human mind has the power of reason. Only the mind of man can have any conception of time, of space, and of self determination. Only man is self-conscious and possessed of the ability to understand the difference between right and wrong.

It is this tremendous difference between the human mind and the mind of beasts that lifts man above any classification with the brutes. This distinctive mental mechanism of man with its electrochemical effects upon the intricacies of the organ systems of the human body, similar though these systems are to the organ systems of the beasts, places man in a class entirely by himself. As we contemplate the great gulf that the fact of the mind of man stretches between him and the beasts, we feel to join those who answer No! to the question at the beginning of this chapter. When we consider the anatomy and the life processes of man, indeed, he "hath no preeminence above a beast."

But rather than the body, of man, considered from an egocentric point of view, it is his mind which has shaped the past, which constitutes the present, and which determines the future. Because of this fact, man can rightly be contrasted with beasts rather than compared to them. He is unique among animals because of his thought mechanism. Animals excel man in every sense he possesses, and yet he has established his kingship of the earth through the marvelous mechanism of his incomparable mind.

We have recognized the fact that in his anatomy and in his life processes man has no special preeminence above animals. In their vegetative and reproductive processes men and animals are unquestionably practically identical. This fact leads us to our next question: "Does this identity of life processes of man and animals mean that they have the same ancestry?"

It is upon this point that the general public is divided into three broad categories in the matter of conclusions. Some, either from lack of interest in the problem or possibly as a result of their study of it, conclude that the origin of man cannot be discovered. We designate such individuals as agnostics. The members of a second group conclude that man and beast either are blood related because they have all evolved by natural processes from a very simple common ancestor, or have developed naturally from several spontaneously originated first forms. We call these people evolutionists. The members of the third group believe that man and the various kinds of animals and plants are not blood related but were spoken into existence in their present-day kinds by a Creator. These individuals are known as creationists.

In our day evolutionism prevails in the large majority of public educational institutions of America. Most of the scientists of our time are evolutionists. In textbooks and in lectures dealing with the origin of organisms rarely, if ever, is any other theory than that of evolution suggested. It is unusual to be able to find books in public libraries which cast any doubt whatsoever upon the assumption that complex forms of life have evolved from simpler forms; that is, upon the assumption that man, in his heredity, is part and parcel with the beasts.

In the light of this present paucity of books which attempt to elucidate the philosophy of creationism, especially from the viewpoint of the creationist scientist, the author feels that a real need still exists for at least one more such exposition.

Among the general masses of people today creationism is quite entirely unknown. Furthermore, on

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those rare occasions when the doctrine of creationism is mentioned in the schoolroom, it is very unusual for an accurate portrayal to be made. Those who report on it almost invariably depend upon hearsay and gossip as the sources of their information. The belief in creationism is built upon the facts of nature in the light of the statements of the Bible, yet quite universally those who make allegations about the assertions of creationism have not even exerted themselves to read the first eight chapters of Genesis. These distorted representations of the theory of special creation close the minds of students to original investigation in this field.

The scientific mind is theoretically ever alert for additional concrete facts from any and every source; and yet scientists, as a group, will not investigate one of the greatest facts in the world, the fact of the Bible. This book stands as the most ancient and accurate record of facts on earth. The fact that searchers for truth refuse to investigate these statements stands today as one of the greatest modern mysteries.

Creationism, also commonly called the theory of special creation, is not a recent philosophy. Compared in age with evolutionism, it was already a well-developed philosophy accepted by at least several millions of people at the time the idea of organic evolution was born and started its existence in the simplest of swaddling clothes. The Greek natural philosopher Anaximander, who lived approximately between the years 611 and 547 BC, is commonly credited with being the first to suggest a simple form of evolution. It was his opinion that human beings were first in the form of fishes which finally cast off their skins and went up on the dry land as human beings. [1]

From this ancient time onward a current of evolutionary thought can be traced through the literature dealing with organic nature. From its small beginning with the Greek natural philosophers in the sixth century BC, it dwindled to a mere rivulet during the Middle Ages.

However, near the close of the eighteenth century evolutionary thought suddenly widened into a broad stream. The popular nature writer Buffon contributed some to this through a few suggestions; but the preparation for popularity of the theory probably came mostly through the biological writings of Erasmus Darwin, Goethe, Lamarck, and Saint-Hilaire. Furthermore, Lyell's epoch making work *Principles of Geology*, published in 1830, which developed the principle of the necessity of interpreting the occurrences of the past in the light of the occurrences of the present, that is, the principle of uniformity, came out just in time to give great impetus to the conception of gradual change through vast periods of time. Finally, when Charles Darwin's famous book *On the Origin of Species by Means of Natural Selection* arrived at the firesides of educated Christian peoples during the middle of the nineteenth century, organic evolutionism became a greatly publicized philosophy, and gained adherents rapidly among scientists and laymen.

On the pages of profane history the theory of special creation appears among the earliest philosophies of origins to take form from the vagueness of prehistoric times. Even the most critical of modern critics of the Bible will recognize that the Deuteronomic Code, with its basic doctrine of divine creation, was already the guide in the minutiae of daily living in the lives of millions of Israelitish people at the time the first-known concept of evolution of man was penned by Anaximander, of Miletus.

While evolutionism was dwindling still more from its insecure start among the Greek natural philosophers, creationism continually gained in number of adherents. Jesus Christ, of Nazareth, the greatest philosopher of all time, was a special creationist. He was not influential directly as a scientist; but the Christian religion, which spread rapidly over the civilized world after His crucifixion, had as one of its major tenets the concept of special creation. Apparently no great divergence in views regarding the length of the days of creation week existed for several centuries after Christ. The literal meaning of the statements of Genesis were accepted without question; that is, the days were commonly conceived of as having been twenty four-hour periods of time.

However, as the Christian religion spread westward during the early centuries, it came in contact with the philosophies of the Greeks. Augustine (AD 354-430), the first of the great theologians to discuss specifically the question of creation, became intrigued with the teachings of Aristotle. The latter's conception of the earth's being the center of the universe harmonized with the view of the church, as did also his doctrine of a creation which was guided by a divine intelligence. The fact that Aristotle conceived of a derivative type of creation; that is, that each more complex form was a derivative of a preceding type of greater simplicity, instead of a creation which produced the most complex types of organisms at the same time that simple types were formed, did not seem to trouble the church Fathers of that early day.

Thomas Aquinas (1225-1274), also one of the great theologians of the Catholic Church, approved of Augustine's view, concurring with him in the belief that the days of creation week were long periods of time and that creation had been worked out by the Creator through processes of evolution of kinds. In fact, he was largely an expounder of Augustine. It is for this reason that in almost any list of the early, influential

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evolutionists the names of St. Augustine and Thomas Aquinas are included with those of Ariaximander, Empedocles, and Aristotle.

The explanation of the origin of organisms, as set forth by these early church Fathers, was a comfortable sort of doctrine for scientists because of its general nature, with no teaching particularly specific except that the earth was the center of the universe and that God was the author of living forms. This easily adaptable theory of creation came into no special conflict with the ideas of scientists within the church nor with those of the few independent scientists who were not church members. In the minds of modern theistic evolutionists the Aristotelian notion of the development of life, which was accepted by Augustine and Thomas Aquinas, was the true interpretation of the Mosaic story of creation.

However, even though these views of creation were held by the early leaders of theological thought, strange as it may seem, all classes of theologians later turned aside from the standards set up on this point by these Fathers of the church. And from the middle of the sixteenth to the middle of the nineteenth century, they universally accepted the doctrine of special creation. [2]

Near the close of the sixteenth century, in a large part resulting from the teachings of a Spanish theologian named Suarez (1548-1617), a more specific doctrine of special creation took form. Suarez [3] wrote a tract entitled *Tractatus de opere sex dierum*, in which he took exception to the views of Augustine regarding the work of creation. He was a strong advocate of the literal interpretation of all Scripture, and insisted that the days of creation week were twenty-four-hour periods of time. If the teaching of Augustine on this point had remained the teaching of the church, the establishment of the doctrine of evolution would have come at least a century earlier. But the conception of special creation brought into prominence by Suarez on the Continent became almost at once the teaching of the church on this point. This same literal view of special creation was taken up by John Milton (1608-1674) in England in his great epic *Paradise Lost*. The works of these two men molded into specific form a picture of creation which became the opinion of the clergy of England and of the Continent.

That the days of creation week were twenty-four-hour days is the most obvious interpretation of the story as given by Moses. This point in the doctrine of creationism is acceptable logically. But other teachings of the church bearing upon this aspect of creationism were impossibly narrow and out of harmony with the facts of nature. The idea of fixity in the world of organisms was extreme, yet was elevated to the level of a dogma in science as well as in theology. This idea allowed scarcely any variation whatsoever in organisms. The life processes of animals, such as digestion, absorption, circulation, and assimilation, were held to be carried on by some mysterious and unexplainable action of the supernatural. For example, the circulation of the blood was considered to be due to the invigorating effect of a vital spirit which resided in the heart and which caused the blood to bound out to the distant parts of the body and back at the right time to be reinvigorated. It was considered to be sacrilege to investigate these processes in order to ascertain the details of their mechanism. Things consisted by the agency of God, and man was to accept this fact without any investigation of the "how." In the matter of astronomy, the earth must be considered to hang at the center of the universe.

It was this scientifically inaccurate type of creationism which was taught in the great universities of England and the Continent even as late as the 1830's, when Charles Darwin took his theological degree from Cambridge University. The medieval universities were under the charge of the school men, or scholastics, and were controlled completely by the church. In truth, all components of society were held in the close grip of the church. Academic freedom was a thing unknown. To differ from the theological or scientific dogma of the church was to court disastrous and painful economic boycott.

All thinking men who were of a materialistic turn of mind chafed under the heavy hand of the church. The revival of classical influence in Italy in the fourteenth century, stimulated by the fall of Constantinople, which drove the Byzantine scholars with the literature of Greece into Western Europe; the invention of printing. The global discoveries of various navigators, along with the generalization of Francis Bacon (1561-1626) that man overcomes nature by obeying her laws and learns to understand her by putting proper questions to her. And the building of the foundations of modern physics and astronomy by Galileo Galileo (1564-1642)-all tended to bring irrepressible force upon the cramped, inexpansive philosophical structure of the church. The inaccuracies of the philosophy of special creation as taught by the school men, with its foundations laid upon authority, became too obvious. Finally, through the scientific discoveries of Harvey (1578-1657), Boyle (1627-1691), Newton (1642-1727), and their colleagues, thoughtful scientists were forced to break with the church because of its unreasonable insistence upon obeisance to the authority of the past, built largely upon the scientific findings and assumptions of Aristotle and Galen in the earliest stages of scientific investigations.

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Galileo's sad experience with the church in the matter of whether or not the earth was actually located in the center of the universe is known to all. His meek acquiescence to the demands of the church illustrates clearly the grip which it had upon the people of that day. It seemed that every advance in scientific discovery met with the dis-favor of the church, which ever faced the past and clung blindly and militantly to its ancient and obviously unscientific positions.

From the standpoint of scientific accuracy, it must be observed that the clash between new scientific discoveries and the dogmatic pseudo science of the church was not due to the teachings of the Scriptures on fundamental points of physics, chemistry, and biology. The Bible does not teach that the earth is the center of the universe, yet the church affirmed that such was the case. The Bible does not say that God upholds and operates the universe in ways that man cannot discover, yet the church represented it so. To the school men things happened merely by the grace of God amen, that is, in mysterious ways not understandable to man and not subject to investigation by him. The Bible does not teach that the processes of our bodies are carried on in supernatural ways, yet the church affirmed that such was the case.

When we consider the subject from the historical angle, there is little wonder that modern scientists commonly say that it was not until the theory of special creation was discarded that science could make progress. These scientists have not read the Bible to learn that the creationism of the Catholic Church of the Middle Ages was not the creationism of Genesis. Huxley¹ recognized this fact when he stated pointedly that the new theory of organic evolution found itself in conflict with the Miltonic rather than with the Mosaic cosmology. Obviously Huxley was interpreting Moses in an indefensible way himself; Ibid. but, at least, he recognized that the notorious explanation of the theory of special creation, enforced so malevolently by the medieval church, was not in harmony with the creationist portrayal of Moses.

When we meditate upon the intellectual servitude in which science in general was held from the sixteenth to the nineteenth centuries, it is not remarkable that when Charles Darwin offered an alternative theory which portrayed progress as a law governing nature, and which set no bounds to individual freedom and attainment, the more materialistic thinkers of the world flocked after him en masse. True, not half a century had passed before the doctrine of descent fell into a state of near chaos because of a division over the effects of variability and natural selection versus the direct influence of environment upon the individual, complicated by a number of special attempts to explain the causes of evolution, but no one regretted having escaped the clutches of scholastic creationism.

The purpose of the present study is to brush aside the early and inaccurate portrayals of the ' theory of special creation and to examine it in its original form in the light of the present-known facts of nature. The question, "Is man an animal?" has deep implications. Evolutionism leaves man no higher than a noble beast, and part and parcel with the beasts, self-made and self-satisfied. Creationism would acknowledge the divine origin of man, thus leaving him with no drop of the blood of beasts in his body. Creationism states that although formed of the dust, the first man was the son of God. The difference in the implications of these two doctrines is so tremendous, in a practical way, that it is most reasonable that every thinking man and woman study most earnestly to discover which, philosophy is the correct one.

2. Creationist Theories

While considering a few introductory matters in the first chapter, we have touched very briefly upon the histories of creationism and evolutionism. A knowledge of the developmental story here would not be essential to an experimental scientist. He would need only a knowledge of the work of his immediate predecessors. But for those who study into the deeper meanings of science in general, particularly with regard to certain scientific theories and their bearing upon other realms of thought, it is necessary to understand something of the past, classic expressions of these theories. Therefore, in this chapter and the next will be a list of a few of the outstanding philosophies of creationism and evolutionism.

It is really refreshing, in our extremely complex age, to realize that with regard to the matter of origin of living things, we have but two philosophies or hypotheses. This fact is expressed somewhat bluntly by Dr. H. H. Newman, emeritus professor of zoology, University of Chicago, in the following words:

“There is no rival hypothesis [to that of evolution] except the outworn and completely refuted one of special creation, now retained only by the ignorant, the dogmatic, and the prejudiced.” [1]

The clearness of the field in the light of this statement by so high an authority is gratifying. The solution of the question of whether creationism is an outworn and completely refuted theory, is the quest of the following chapters. But let us now review very briefly the outstanding expressions of the theories of creationism and evolutionism. In this chapter we shall consider the creationist theories.

Prior to the time of the French naturalist Charles Bonnet (1720-1793), little attention had been given to what might be termed a “scientific” theory of creationism. Until the days of Bonnet the idea of a special creation of living things was considered quite entirely from an ethic or religious point of view. Before the dawn of profane history, from the very beginnings of the events of the Hebrew Old Testament, man had accepted in great simplicity the idea that God, in the beginning, created all organisms. Apparently little thought had been given to any details of the act from the point of view of a scientist—just how did God go about the creative task of bringing a world of complex creatures into existence.

The Israelites early take form from the vague background of profane history, bringing with them a simple belief in a Creator who spoke all types of plants and animals into existence in a literal solar week as described in Genesis. This belief has prevailed all the way down to our day among certain individuals, but the number who held to this theory of origins grew rapidly less as the times of the Middle Ages came on. Men predominantly believed in a special-creation type of origin, but gradually it became sadly confused with Aristotelianism and strange old wives' fables. Augustine and Thomas Aquinas were most influential in commingling the ideas of special creation and evolution. Likewise, the scholastic Scottish theologian John Duns Scotus (1265?-1308), and even John Wesley (1703-1791), the English founder of Methodism, appear to have portrayed a universe created with the capacity and impulse to evolve. The teachings of these influential theologians naturally did much to swing general opinion away from the simple type of origin pictured in Genesis to a belief in an original creation which afterward underwent all sorts of transformations and evolution.

The Creationism of the Scholastics

By the close of the Middle Ages, as the Renaissance began, say about AD 1400, any Christian scholar was likely to entertain strange ideas about origins, which he would assert were Scriptural. He did not go to nature for his information in the field of natural science, but rather delved into ancient texts. It made no difference with him who the author was, whether Greek philosopher, Roman naturalist, physician, medical writer, worker in magic, or theologian, just so long as the author had been dead a very long time. Half fabulous animals walked his earth doing the most fanciful things; and plants, gems, green strings, etcetera, possessed mystical properties.

Strange as it seems to us now, it appears never to have occurred to these creationists, called scholastics, to obtain information by observing nature directly. For centuries it was held that the common salamander exuded an icy cold which put out fires, but apparently no one thought to set one by a fire to test the idea. Up until the time of the Italian anatomist Versalius (1514-1564) men supposed that all the sons of Adam were short a rib on one side. It never occurred to them to count their own ribs. It was taught that the statement of Genesis that the earth and its waters brought forth abundantly at the time of creation also applied to their day, so that the earth was continually bringing forth from inorganic matter great swarms of living things by a sort of spontaneous generation. It was held that the Scriptures, through the riddle set forth

by Samson, also taught the spontaneous generation of living things from dead organic matter.

Belief in witchcraft was orthodox among creationists of those days. John Wesley in his journal for 1768 says, *"The English in general, and indeed most of the men of learning in Europe, have given up all accounts of witches and apparitions, as mere old wives' fables. I am sorry for it; and I am willing to take this opportunity of entering my solemn protest against this violent compliment which so many that believe the Bible pay to those who do not believe it. . . . They well know . . . that the giving up of witchcraft is, in effect, giving up the Bible."* [2]

However, with the passing of the eighteenth century juries of laymen refused to convict witches on any testimony. Along with a belief in witchcraft went belief in werewolves and the like and in transformations. Men ceased to believe in changes in the forms of beings, and they also ceased to believe in any large amount of bringing forth of living things by the earth. Thus came to a close that long period of confusion and superstition in which credulity was on the throne and man believed everything except his own eyes. The first fruits of the new age of science was a return, in part at least, to acceptance of the simple story of beginnings found in Genesis. Nevertheless, the damage had been done; and even in our day in surprisingly wide circles the theory of special creation is thought to contain all the impossible assumptions and misinterpretations set forth during the crazy reign of the scholastics.

The Creationism of Bonnet

The Frenchman Charles Bonnet, a leading naturalist of his time, was author of the first really scientific theory of creationism. His philosophy is known as the embodiment, predelineation, incasement, or preformation theory. This was the most extreme form of creationism imaginable, in that it assumed that all living things of the past, of the present, and of the future were created in the beginning by the direct act of God as germs. They remain as germs, age after age, until their time comes, and then unroll into adults. Bonnet himself called this process evolution, and that was apparently the first use of the word in natural history. It is an interesting fact that the word evolution should be first used in connection with a most extreme type of special creation.

It is frequently asserted that Bonnet taught that the incased individual in the sex cell was an extremely small miniature of the adult into which it was eventually to unfold. But this is an inaccurate statement, because Bonnet merely assumed that each individual, from the beginning, independent of all the rest, is present in some form that need not at all resemble the adult, but which would develop into the adult in the fullness of time. He thus, as early as 1764, anticipated the chromosomes as the carriers of hereditary factors.

Bonnet assumed a Ladder of Being, a universal chain of living things formed of a graded series of types, from simple to complex, from microbe to archangel, with only one Being out of the chain, and that was its Creator. Thus animals make a linear series from polyp to man with no branching, as in the genealogical trees of our day. The same was assumed to be true for the plants. This, of course, was an echo of Aristotle. However, there is no hint in Bonnet's writings of the descent of one animal from another, nor of any time sequence in creation. Everything was created at one time, and nothing changes after that moment.

The creationism of Bonnet was consistent and ingenious, and with the limited cytological knowledge of his day, and with comparative anatomy only in its early stages, practically unassailable. However, as it came to be known soon after the middle of the nineteenth century through microscopic examination, that embryos are not preformed, and, therefore, could not unroll as Bonnet had assumed, his laboriously erected and minutely constructed theory of preformation broke down. A wider knowledge of comparative anatomy showed that the inside structure of animals and plants was such as to make impossible an arrangement of forms in any linear series. Thus it was that the first seriously scientific theory of origins collapsed beneath the weight of broader scientific knowledge.

The Creationism of Linnaeus

In the extreme creationism of Bonnet there was no place for any group of organisms now known as a "species." According to his philosophy there is no descent from parent to offspring, with the resultant building of a closely related group. Contrariwise, every individual was created separate and without any relation by blood to any other member of its kind. From Bonnet's point of view, the groups of individuals which are now thought to constitute a species would be a purely artificial group recognized only as a matter of convenience. This recognition of the individual as the only real unit in the living world is present-day

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scientific opinion. However, it is now known that new individuals arise from the more or less homogeneous germ plasm of the parents, and this population of closely blood related individuals constitutes a species. The idea of the species itself being a natural group and itself constituting the unit in the creative process rather than the individual germ of Bonnet's philosophy, is the kernel of the second scientific theory of special creation.

Building upon the work of the English naturalist John Ray (1627-1705), the Swedish botanist Carolus Linnaeus (1707-1778) emphasized the idea of species. Although he is remembered largely for his services to natural science in the field of taxonomy and by his fixing attention upon the species, he is recognized here as the author of this second scientific theory of special creation. According to the philosophy of Linnaeus, creation is by adults, and the young arise from them through a building of entirely new parts from a homogeneous parent plasm, not by evolution from previously created germs. The organic world is not a uniform thread but a series of separate, distinct, self-reproducing units which he called "species." The Linnaean theory is sometimes called the theory of created pairs. Each species was, by definition, all the descendants of one original created pair.

Linnaean creationism is a simple doctrine, and a summary of it would contain but three main points as follows: (1) Each species was specially created as a single adult pair. (2) As the offspring from the original pair increased, they sought out favorable dwelling places over the surface of the earth where we find them today. (3) No species has become extinct, because the Creator ordained that they appear on the earth and, as species, survive the Flood and all accidents. It follows from the last statement that all fossils are the same species which are still living on the earth.

Linnaeus was a man of great authority in his day, so it came about that, in the minds of many people since about 1750, creation means the creation of "species." By the close of the eighteenth century the conception of creation by germs had been replaced by the Idea that the Bible teaches Linnaeanism, that is, the creation of species.

However, the doctrine of Linnaeus fell into difficulties as a knowledge of fossils and of natural groups among living organisms increased. It became obvious that many fossil kinds were no longer living on the earth, and because he had set the limits of many of his species too narrow they were more and more frequently found to overlap. Crossing of certain of his species occurred with the production of fertile hybrids, as for example, the horse, *Equus caballus* L., with the zebra, *E. zebra* L., and the American bison, *Bos bison* L., with the European bison, *B. bonasus* L. [3]

In his more mature years Linnaeus himself recognized that he had possibly set the limits of the original created units too narrow. As the vast numbers of species over the world became apparent and as the production of fertile hybrids between species became known, he changed from his earlier position that the species were the created units, finally omitted from the last edition of his *Systema Naturae* his assertion of "no new species," and returned to his very earliest opinion that genera, not species, are the created units. However, people generally refused to recognize his mature opinion and maintained then, as now, that Linnaeus assumed that species were the created units. Usually those who do recognize that Linnaeus finally abandoned his second earliest view on the created units, attempt strangely to use this shift of Linnaeus to a larger unit as proof against the possibility of a special creation of primitive units. Logically, all this change in opinion amounts to is that Linnaeus himself merely came to recognize that many of his species boundaries had been drawn too narrow to contain all members of original kinds.

The Creationism of Cuvier

The third scientific theory of creationism was constructed by the French naturalist Georges Cuvier (1769-1832), founder of comparative anatomy and of vertebrate paleontology. Cuvier's life just about spans the interval between the speculative period of the natural history sciences in the eighteenth century and the more strictly scientific period of the nineteenth. Cuvier, in part returning to Aristotle and altogether breaking with Bonnet, developed the classification of the animal kingdom that is the foundation of our present-day system.

Where Linnaeus had cut up the continuous Ladder of Life, or Scale of Being, of Bonnet into discontinuous species, Cuvier in turn cut up the more or less continuous series of species of Linnaeus into four distinct, discontinuous types, corresponding in rank to the fourteen or more phyla of today. These were the vertebrate type, the molluscan type, the articulated type, and the radiated type. Cuvier showed that although these types are distinct, still their representatives overlap so that the lowest forms of a higher type are simpler in organization than the higher forms of a lower group. This was directly at variance with the idea of Scale of Being, and overthrew that doctrine.

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As Cuvier studied the fossil record he observed that the fossil forms were not intermixed in all layers, but rather, were present in characteristic groupings. Successively higher layers of rocks contained new, complex forms of life which were generally absent in lower layers. Furthermore, he ascertained that there were many forms of life in the rocks which are now extinct. In direct conflict with the unanimous theological opinion of his day that no species once created could ever perish, he was able to demonstrate, for example, that pterodactyls, and giant deer, Megaceros, had once lived in the area that was now Europe, and that large ground sloths had lived in the Americas, but these forms and many others were now absent. He concluded that there had been very extensive world catastrophes which had destroyed probably as many species as were now alive on the earth.

At first Cuvier inclined to the opinion that the new groups of animals in the higher strata of rocks were the results of new creations. Afterward he changed his mind. He never was much given to speculation, but instead, usually stayed very close to the demonstrated facts. He could prove that certain large animals had become extinct, but he could not prove that they were not living on the earth at the end of creation week. Therefore, he concluded that there had been a great many extinctions since the beginning of life on this earth but no new creations.

The different groupings of fossils in different strata Cuvier assumed to be the result of great catastrophes which had occurred rather periodically since creation, about 4000 BC. His mature creation doctrine is essentially a theory of multiple floods of which the Noachian Deluge was the most recent. He assumed that none of these floods completely destroyed dry-land forms, but that isolated parts of the earth escaped each deluge, and became the centers of propagation for the fauna and flora of the new epoch.

With regard to species, Cuvier was a firm, unhesitating believer in their immutability. He says little about their creation. Just about everyone in his day took creation for granted. But with species once upon the earth, Cuvier assumed they must have remained distinct, otherwise transitions between extinct and now existing forms could be found. But there are none.

To summarize the creationism of Cuvier, Linnaean species were the units of creation, and these were created in adult pairs, a single pair for each species. Where Linnaeus assumed a single migration from Eden to the present location, Cuvier taught many migrations back and forth over the earth, each catastrophe necessitating new migrations from the points of survival. Instead of all created species continuing through to our day, there were large-scale extinctions. The creationism of Linnaeus took only the present into account, but that of Cuvier attempted to cover not only the present but also all geologic time. However, Cuvier had scarcely more than fairly set forth his view of creationism when it began to break down under the interpretation that began to be assigned to the rapidly accumulating evidence from fossil remains. It was found that frequently a species which occurs in a lower stratum of rock does not reappear in a higher one. If Cuvier was correct, it was argued, and animal species had always, in a few areas, survived each catastrophe, then the same species should, as a rule, be found in higher rock levels. But such a condition in the light of evidence then available seemed not to exist, so it came to be assumed that the catastrophes must have been worldwide, leaving no animals to migrate. Therefore, the renewal of life after each catastrophe would necessitate a re-creation, at least, in large areas of the earth's surface. This brings us to the fourth scientific theory of creationism.

The Creationism of Agassiz

Louis Agassiz (1807-1873), Swiss naturalist and teacher in America, is commonly said to be the last great naturalist to believe in special creation. The form of creationism which he taught is amazing to many creationists who accept the literal interpretation of Genesis. Agassiz ignored the Noachian Deluge completely, substituting in its place the glacial theory. The phenomena which preceding creationists had assigned to the Flood, he affirmed, were produced in the closing stages of an ice age of the late Pleistocene. Agassiz was forced into this position by his acceptance of the idea that supernatural acts of the Creator were alternated with long periods of time when natural forces alone acted upon the surface of the earth. In his acceptance of geologic time, of course, Agassiz differed from all creationists who had preceded him. In his mind the first creation of life on our earth was much longer ago than 4000 BC, possibly as long ago as sixty million years.

In contrast with the doctrine of Cuvier, Agassiz pictured the creation of large numbers of each kind. He portrayed little movement of animals from place to place. There was no dispersion from an Eden. His general conclusions here are illustrated by his decision regarding blind cave fishes which he declared had been created blind and placed in the caves just as we find them today.

From his study of the fossil-bearing strata, Agassiz assumed that vast numbers of kinds of animals

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had become extinct since the beginning of life on this earth. He thought the only possible explanation of these layers was to assume that short, catastrophic periods of mountain building would follow long and quiet ages. These catastrophes had occurred possibly a hundred times, absolutely wiping out every plant and animal over vast areas. Then after natural forces had settled down again following each wild crisis, the Creator would again create a new flora and fauna in the desolated area.

Thus Agassiz taught more separate, large-scale creative acts than any other man. It was his conviction that the Creator improved and repatterned the successive creations so that more complex forms followed simpler forms. He expresses it thus in his *Essay on Classification*, which appeared in 1859, the same year with Darwin's *Origin of Species*:

“Yet, through all these intricate relations there runs an evident tendency toward the production of higher and higher types, until, at last, Man crowns the whole series. . . . Who can look upon such a series, coinciding to such an extent, and not read in them the successive manifestations of a thought, expressed at different times in forms ever new, and yet tending to the same end, onwards to the coming of Man, whose advent is already prophesied in the first appearance of the earliest Fishes!” [5]

The creationism of Agassiz was one of the most complex of all creation theories. It is interesting to observe that most persons who held to it believed that this doctrine was set forth in the first chapter of Genesis. However, it amazes us today that anyone could think that the loving Creator of Genesis, who obviously took pride in His work, and who, at the close of each day of creation, pronounced the work of that period “very good,” should suddenly, without provocation, completely destroy that perfect work and create an entirely new fauna and flora, and repeat this performance many times. The facts are that Agassiz, who is frequently quoted today as a creationist and believer in Genesis in opposition to evolutionism, was the one who, premeditatedly or unpremeditatedly, possibly did more than any other one man to undermine the truth of every assertion of Genesis.

Modern Creationism

In a general way it may be said of much of the creationism of today that it has largely passed out of the realm of scientific facts. The last four creationist theories listed above were developed and defended by competent scientists of their day who built their philosophies upon the facts of natural history. Much of the creationism of our day is purely theological dogma, which commonly does not pretend to have any scientific standing. Considerable confusion exists as to just what are the claims of creationists with regard to origins and to the maintenance of natural processes.

In its narrowest sense, the one basic criterion which distinguishes creationism from evolutionism is the point of origin of species. Modern creationists commonly hold that the created units were what have come to be called “Linnaean species.” Creation was by pairs, with gradual dispersion from Eden. The Flood is commonly considered to have been less than worldwide. On the other hand, many creationists with reasonable logic and factual backing deny all three of these assumptions.

However, in an over-all view, the number of creationists has decreased markedly with the years. Most of the larger churches have assumed that the speculations of scientists regarding the great age of our earth must be correct. This comes about through the general acceptance of the doctrine of uniformitarianism, which held, and still holds, that in the building of the earth no powers were employed that are not natural to the globe, nor is any action to be admitted except that for which we know the principle. Therefore, where any value whatsoever is placed upon Genesis, it is assumed that the days of creation week must have been long periods of geologic time. Such persons commonly claim to believe in creation, but a creation by evolution. Technically, these individuals must be classed, not as creationists, but as evolutionists. Charles Lyell, publicizer of the doctrine of uniformitarianism, and Charles Darwin were creationists at first, and both continued to believe that a Creator produced the first life and possibly maintained it through natural forces. But these apostles of evolutionism certainly were not special creationists.

There are people living today who are not greatly concerned whether their religious dogma is contradicted by facts of natural history. During the Middle Ages, as we have previously noticed, man strangely was more inclined to worship authority and antiquity than to wrest the truth from nature firsthand. Theological dogma prospered in that kind of soil. But as man became awakened more and more intellectually through scientific discovery, he actually, but not necessarily, became more materialistically minded. Stronghold after stronghold of ignorance and superstition fell before the inquisitive turn of mind that man had developed. By and large, the attitude of the doubter and the insistence upon proof apparently made the world a better place for man. The harmfulness of the scientific attitude came with its extreme

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application in the field of theology. When man insists on believing only in that which he can demonstrate in the laboratory, he is certain to cut himself off from some of the most vital, worth while things in the universe.

This materialistic turn of man accompanied by an extremely high regard for the findings and explanations of scientists which almost amounted to worship, resulted in a general swing away from the creationist philosophy. Scientists found that natural forces were responsible for tile life processes of organisms, and man strangely decided that God was not so necessary in the picture. Scientists concluded that millions of years had been required in the molding of the surface layers of the earth, and theologians echoed with the decision that creation must have been much longer ago than the Bible indicated. Scientists came commonly to assume that organisms had evolved from simple, one-celled ancestors; and theologians obligingly concluded that creation had been accomplished by evolution instead of by the spoken word.

The effects of the findings and assumptions of scientists upon the scientific theories of creationism are clearly shown in the doctrines of Linnaeus, Cuvier, and Agassiz. Linnaeus accepted the simple statements of Genesis regarding the creation of distinct kinds and the destruction by the Flood as scientifically correct. Cuvier, in the light of additional scientific data and speculation, decided that there must actually have been many more catastrophes than the single Noachian Flood described in Genesis. Finally, Agassiz in the presence of much more geologic data concluded that Genesis was wrong in just about every statement except the one regarding the origin of first life by the spoken word of God. There can be little wonder that evolutionists have small respect for creationism when creationists in general have at first vigorously rejected the evolutionist explanations of natural facts, and then later, quite invariably, followed along in the wake of evolutionist pioneering. The explanation appears to lie not so much in the logic of the new suggestions as in the psychology of the fact that the new suggestions became very popular.

Baldly stated, creationists have too frequently been guilty of merely following the crowd even where facts did not justify such a procedure. To illustrate, it was assumed b L ell and his followers that vast periods of time were absolutely necessary in building up the fossil-bearing strata of the earth. This idea of the uniformitarian principle was adopted by scientists in general and finally accepted by most creationists because it was the popular thing rather than because there was no other reasonable explanation. The popular theologian, patting his brother scientist on the back, now rejects the literal interpretation of the creation story of Genesis. This is a sort of compromise, where the theologian came all the way over to the scientists' viewpoint in the matter of uniformitarianism. This may be a sad situation, because the uniformitarian principle, which included the assumption that the formation of rocks bearing fossils required ages of time, and that the fossils in them became extinct, not owing to sudden changes, but to gradual changes, is not only unproved but unprovable. In fact, in our day there is considerable real fossil evidence which absolutely negates the uniformitarian doctrine.

Since the days of Agassiz creationism has had no champion among the great scientists. Perhaps, in the light of the influence of its past defenders among the scientists, this has not been a serious handicap. A scientist may make a poor creationist, because to remain a scientist lie supposedly dares not make assumptions which cannot be demonstrated in the laboratory. He is thus required to stay very close to the writings of scientists, and in so doing he is often carried away by their unscientific speculations and philosophies. Peculiarly, the great creationist scientists seemed unable to see the harmony which actually exists between the literal statements of Genesis and the facts of science.

In our materialistic age creationism faces a new challenge. It must build much of its philosophy on natural facts in order to satisfy the informed man and the thinker. The need of accuracy in the statement of these facts at once places creationism in a position of dependence upon scientists. Although creationism today has no proponents among the great scientists, and although the popular churches now worship at the shrine of the evolutionist scientist, still the doctrine of special creation is very much alive and counts its adherents by the hundreds of thousands. Among its numbers are many clear-thinking scientists, men who are recognized by the scientific world for their contributions to science, but who are convinced that the theory of evolution is not true. It would have been easier and more honorable in the eyes of the majority for these men to have worshiped the scientific authority of our day and gone evolutionist. But being clearly convinced in their minds that relevant facts of science negate the idea of evolution and support creationism, they are using pen and voice in the unpopular cause of promulgation of the theory of special creation.

Since these careful scientists have been added to the ranks of the creationists a new respect is being shown for that philosophy, and its numbers are being, markedly increased among those who are not satisfied with the purely subjective type of evidence which is offered today as the only proof for evolution. The following chapters of this book contain a portrayal of a widely accepted doctrine of special creation-a

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doctrine which not only recognizes all the pertinent facts of science but also explains how, in a world which was created perfect by a loving Creator, there is everywhere present a sanguine drama of conflict between good and evil.

3. Evolutionist Theories

Aristotelian Evolutionism

Already reference has been made to the rather crude, earliest-known expression of evolutionism which is found in the teachings of Anaximander, who lived in the sixth century BC. However, it was in the philosophy of Aristotle, who lived in the fourth century BC that we find the first approach to a really complete theory of evolution. Aristotle was a teleologist. That is, he held that everything in nature was the result of intelligent design and direction. God created a primordial soft mass of living matter, from which more and still more complex forms of life were evolved by directed natural forces through a line of plants, "plant and animals," such as sponges and sea anemones, and then animals with "sensibility," and from these by graded steps up to man. He rejected any idea of the survival of the fittest because it was based upon chance. Fortuitous happenings had no place in his philosophy, because he believed that God personally directed operations in such a way that nothing could occur by chance. He fathered the idea of "prenatal influence," and believed in the inheritance of acquired characters.

Aristotle's philosophy of a creation by evolution of forms, that is, of a derivative type of creation, as we have already noted, was never widely accepted. Nevertheless, these germs of evolutionist thought which existed in the philosophy of the Greek naturalists were retained in a more or less inactive state among medieval thinkers who did any reflecting upon the subject of creation. Nearly two thousand years of time and the labors of many quiet naturalists were required to collect enough data by observation and experimentation to overthrow the narrow doctrine taught in the medieval universities on the subjects of maintenance of the life processes of plants and animals and of the degree to which variation actually occurs among living things. During that time the scientists, for the most part, left a consideration of evolution to the philosophers, and when they did speak on the subject the balance of scientific opinion was against evolutionism.

However, it had become more and more clear through the experimental work begun in biology by William Harvey (1578-1657), in his demonstration of the mechanical nature of the circulation of the blood, and through the discoveries in celestial mechanics of Nicolaus Copernicus (1473-1543), and of Isaac Newton (1642-1727) in astronomy and in basic operations in physics, that the scientific dogma of the medieval theory of special creation was too often out of harmony with the facts of nature. These discoveries profoundly altered man's idea of the position of his world and of himself in the universe. The discovery that at least many of even biological processes were accomplished through the operation of the laws of physics and chemistry drew a great deal of attention to this field of science. There developed a tendency among scientists to ignore the possibility of a supernatural influence in nature. At least, if such an influence was recognized, it was not considered to be of much force.

A comparatively large number of scientists swung completely away from special creation to the opinion that no supernatural agent was necessary at all in nature. Purely mechanistic philosophies arose, and it was stated that very soon biochemists would synthesize living protoplasm in the laboratory. However, this prediction has never been fulfilled. Among living things the fact of variation within certain groups of plants and animals became increasingly clear, and various naturalistic philosophies were constructed to account for this difference in the expression of form and quality even among closely related individuals. Of these philosophies those commanding the greatest amount of attention were the theories of Lamarck, Darwin, Weismann, and De Vries. These were comprehensive theories dealing with the processes of evolution as a whole.

Lamarckian Evolutionism

Chevalier de Lamarck (1744-1829), a French zoologist, was the first to develop a theory of evolution that has held a place in the intellectual world up to the present time; and thus he may justly be regarded as the founder of modern evolutionism.

In his *Philosophie Zoologique*, published in 1809, his mature opinions on evolutionism are found. He states two propositions. First, in every kind of animal which is still in a period of development, the frequent and sustained use of any organ gradually strengthens the organ, develops and enlarges it, and gives it a strength proportional to the length of time of such use. Conversely, constant lack of use of such an organ gradually weakens it, causing it to reduced in size and function, and ends in its disappearance.

Second, the advantages and disadvantages gained by every individual as the result of the structural changes resulting from use or disuse are handed down to its descendants, who begin where the parent

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leaves off, and so are able to continue the development or the decadence of the character.

A few years later Lamarck extended his theory somewhat in a few minor points. Possibly the most important addition was the point that the production of a new organ is the result of a new need which continues to make itself felt. Thus briefly, variations of organs arise in organisms mainly through use and disuse, and new organs have their origin in a physiological need. Lamarck is not uncommonly misrepresented on this point by the assertion that he assumed that an animal had merely to wish for or desire any organ, and it would develop. Actually Lamarck assumed that the new organ arose as the result of some mysterious reflex action arising from new conditions. To illustrate, the neck of the giraffe, grew longer and longer as he was forced to feed at levels higher and still higher from the ground. The next generation began the neck stretching where the parents left off and added a bit of length and so on as new generations arose.

The portion of his philosophy now known as the Lamarckian doctrine is the idea that acquired characters are inherited. Interestingly, Lamarck seems to have been so completely sold to this idea that his arguments are not inductive in support of his theory, but rather deductive, postulating it.

From the scientific angle the principal difficulty with Lamarckism is that it does not explain why the mere need for a certain change in some organ should produce such a modification. Experiments set up to test the possibility of the transmission of acquired characters to the next generation have generally given unquestionably negative results. The few cases in which positive results have been claimed have not stood up under the test of critical scrutiny and repetition.

As a result, modern Lamarckists, sometimes called Neo-Lamarckists, or mechano-Lamarckists, have been forced to withdraw to a position which removes the whole question from the realm of the experimental method. They claim that nature has vast time periods at her disposal. So, although experiments over relatively short time periods have given negative results, it is asserted that acquired characters may yet be transmissible under vast time periods. However, from the angle of what is known about hereditary factors today, it appears that no mechanism exists whereby some influence acting at the body periphery can even indirectly bring about the change in the gene which would be required in order to transfer the change into hereditary protoplasm. Because of the difficulties into which it has run, Lamarckism now exists only round the edges of biology, now and then catching the fancy of some speculative thinker.

Lamarckism failed to take hold upon the fancy of the public for at least three reasons. The principal one was the powerful influence of the great French naturalist Cuvier (1769-1832), whose opposition was so strong and vigorous that it caused the theory of Lamarck to be completely ignored by the French people. Then also, the time was not ripe for the acceptance of such theories. Scientists were busy with the taxonomic and morphologic aspects of biology—that is, the earlier stages of the science—and were not ready to be interested in any speculation about origins. Then too, men had become disgusted with the extravagant speculations of the school of Natur-Philosophie under Oaken, and the reaction against that school was so strong that it was difficult to get a hearing for any theoretical speculation. Finally, there was no great principle set forth by Lamarck which could be easily understood as was that of natural selection in Darwin's theory.

Darwinian Evolutionism

The English biologist Charles Darwin (1809-1882) was a keen observer of nature. His theory was based on the following fundamental facts of natural history: (1) Living organisms are enormously fertile, yet the total number is approximately the same. (2) Organisms must continually adjust to shifting conditions of life produced by climatic changes, fluctuations in food supply, and waxing and waning of destructive checks. (3) The vast majority of organisms which come into the world are doomed to early death, constituting a more or less active struggle for existence in which some are fitted by heredity to compete favorably for themselves while others are equipped less advantageously. (4) Variation and heredity, together with the struggle for existence, bring about a selection of the fittest.

Recognizing this general situation in nature, Darwin asserted that if certain members of a group meet the demands of life through trivial variations in one direction and others of the same group through trivial variations in other directions, then divergences among the forms through the continued action of natural selection through successive generations must in time be sufficient to make them rank as separate "species." This was his conception of the origin of "species," a concept which he shared with the English naturalist Alfred Wallace (1823-1913). The same process, continued through the many millions of years which he assumed had elapsed since life first appeared, he reasoned, was sufficient to have given rise to the

great diversity of life on the earth today.

The inspiration and deepening of reverence that Darwin experienced in this conception of origins is shown in the last sentence of the concluding paragraph of his *Origin of Species*:

“There is a grandeur in this view of life with its several powers, having been originally breathed by the Creator into a few forms or into one. And that, while this planet has gone circling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being evolved.”

Although Darwin states in the introduction of his *Origin of Species* that he is “convinced that natural selection has been the main, but not the exclusive means of modification,” still he offers nothing further to supplement the theory of natural selection except that of sexual selection. However, experimental evidence has led modern evolutionist biologists to discredit quite wholly the development of sex ornaments, song, and elaborate ceremonies of courtship through sexual selection. Facts indicate that the female usually receives any male of her kind when she is in the right physiological state regardless of his appearance or behavior. The one exception to the general rejection of the idea of sexual selection is the assumed development of fighting organs in the males through this type of selection.

With regard to the main cause of organic evolution according to Darwin's theory, the chief shortcoming of the process of natural selection as a causative agent lies in the fact that the mere sifting out of the fit by exterminating forms which have varied unfavorably in trivial ways cannot itself initiate new variations. This has been concisely stated in the often-quoted statement of an unknown author, “Natural selection might explain the survival of the fittest but falls to account for the arrival of the fittest!” Whatever it is that causes the variation to appear will have to be the primary factor in change.

We recognize that natural selection will, with any of the possible forms of variation produced by all known heritable agencies of change—that is, mutation, recombination, and chromosomal aberration which will be explained later—serve as a policing agent which will prevent continued change in disadvantageous directions, and thereby tend continuously to improve adaptive relations within any group. To illustrate, a change in some hereditary factor affecting coat color in a rabbit which would cause the animal to be more conspicuous in its environment would be eliminated by the destruction of the noticeable individuals by hawks, owls, foxes, and the like. Conversely, color changes which enable the rabbit to resemble more nearly the color and pattern of his surroundings will enable that variety to prosper and eventually to become the commonest wild type. But as an originator of favorable variations, natural selection is completely impotent.

It becomes a matter of considerable interest to explain how a theory of origins based on such weak foundations could suddenly win over to its side the greater part of scientific opinion of that day. The earliest objections raised against it were the ones which later resulted in the rejection of Darwinism by evolutionists. Still, in the face of this valid criticism, it became generally popular in only a few years. The reasons for this are not easily determined, but probably lay largely in the fact that the old university theory of special creation had proved unscientific on numerous points, and had been closely associated with soulless obeisance to authority and with bondage of individual freedom of opinion for several centuries. Darwinism was less philosophical than Lamarckism. It dealt with everyday matters with which all were acquainted. Furthermore, it apparently harmonized with known facts of the day and employed them in ways which appeared very plausible. In addition, it portrayed most appealingly the idea that free competition was actually a natural law. This was very plainly an ally to the spirit of liberalism, which had developed as a natural reaction to the oppressive domination of all avenues of life by the church of the Middle Ages. In Darwinism man had a weapon with which he could counteract the consistently carried-out system of ultraconservative dogma of the church in science. The liberals were in no mood to consider deficiencies, so Darwinism rode triumphantly upon the crest of the wave until the time came when its claims could be tested in the laboratory in a less heady atmosphere.

As scientists endeavored to prove the validity of Darwin's doctrines, they found them inadequate to the requirements of expanding knowledge. Since Darwin, Darwinism has gone through a complex development and severe renovation. Although Darwin spoke disdainfully of Lamarck's theory, still he himself accepted Lamarckism as a supplement to his own doctrine. Neo-Darwinism had as its first task the elimination of all traces of the idea of transmission of acquired characters. The Neo-Darwinian period may be said to have ended with the close of the nineteenth century with the widespread rise of experimental studies on heredity and variation, which constitute the subject matter of modern genetics. The type of Darwinism which continues today in the theory of origins accepted by most geneticists may rightfully be called Darwinism because it depends upon natural selection to combine the hereditary elements into the

integrated complexes which characterize varieties, races, species, and other groups of living things which are adapted to their present environments. However, due to its vital difference in other points from the doctrine of Darwin, and due to the method by which it has been constructed, it should possibly be called inductive Darwinism.

Weismannian Evolutionism

The most brilliant representative of Neo-Darwinism was the German biologist August Weismann (1834-1914). He erected a very pure type of Darwinism by eliminating all Lamarckian traces. Weismann's doctrine shows considerable evolutionary development, for his more mature observations and opinions differed from his earlier views.

The large points in the Weismannian theory are as follows: (1) Realizing that the greatest weakness of the natural-selection theory lay in its inadequacy as an originator of variations, he proposed here the idea of germinal selection. He assumed that all heritable variations have their origin in the germ cell, where there is a struggle among the determiners for available food and the advantageous positions in the cell. Those determiners which gain the advantage are able to initiate the development of larger and more perfectly adapted organs. These favored determiners could compete more advantageously in each succeeding generation, so that the characters represented by them would steadily advance in a linear direction toward a state of complete adaptation to their environment. (2) Every character that appeared in the body of the organism would meet the winnowing process of natural selection. (3) The germ plasm is immortal in that it is perpetuated from generation to generation by indirect cell division, each germ cell being the product of a division of a previous germ cell all the way back to the first germ cell on the earth.

Thus Weismann outdid Darwin in his acceptance of the Darwinian theory of natural selection as an all sufficient principle in evolution, even carrying the idea of competitive struggle for existence among the germinal constituents themselves. According to this principle of germinal continuity, the germ cell cannot be the product of the body, but, to the contrary, the body is the product of the germ cell. Accordingly, there can be no inheritance of acquired characters. Today it is an almost universally accepted opinion among scientists that the problem of inheritance is not a problem of the transmission of certain characters from the body of the parent to the offspring, but it is rather the carrying over of certain fundamental materials which are common to both parent and offspring. Weismann's germ plasm idea is the cornerstone of modern genetics, though some far-seeing physiologists, looking at the thing from a physiological bias, cannot make themselves believe in the total independence of any tissue. The particular types of mechanism suggested by Weismann to explain inheritance were but ingenious speculations, but they served to inspire an immense amount of research (luring the last decade of the nineteenth century, chiefly in the fields of cytology and embryology).

Weismann thought that natural selection was an all sufficient cause to explain adaptation and through it evolution. Moreover, he, with Darwin, assumed that the variations upon which natural selection worked were the small variations such as are found in a continuous series in stature of men. If enough cases are taken, it is possible to find men differing by only the hundredth part of an inch throughout a considerable range in height. On such minute variations selection was supposed to work and to produce, in geological time, new varieties and new species.

But before the new century began, De Vries in Holland and Bateson in England showed that the ideas of Darwin and Weismann were incorrect here. It was observed that large mutations often occur, especially after hybridization, and new varieties may be established at once. The hope of scientists in the discovery of an explanation for variation swung away from natural selection among small variations to the possibility of selection among larger changes which appeared at a single throw.

De Vriesian Evolutionism

Darwin had recognized "saltatory variations" or "sports," which are mutations, but he had considered them too infrequent to furnish any real material in nature for selection. However, Hugo De Vries (1848-1935), a Dutch botanist, thought he saw in these mutants the very building stones of new species. His well-known theory of evolution is easily told. He held that the formation of species is due not to gradual, small changes, but to sudden mutations, and that natural selection presides over and improves the variants arising in this way. Thus he accepted the principle of natural selection first commented upon by Darwin and Wallace, and followed Weismann's lead in assuming that variation arose in the germ plasm, but at the same time refused the doctrine of both Darwin and Weismann that evolution builds up among small

fluctuations.

According to Darwin's view, the new types arose only at the expense of the old, for only through the elimination of the old, less fit types could the new types progress toward further fitness. On the other hand, according to De Vries' view, we have distinctly different, pure-breeding types at once, which, if isolated, would be new elementary races from the first. Selection acting among mutants would eliminate the unfit promptly but allow the sufficiently fit to survive alongside the parent types. Darwin's doctrine was not suited to an explanation of distinct types, because the process of selection proceeded by imperceptible stages, but De Vries' view gives distinctly different, full-fledged types which breed true from the start.

Evolutionism of Today

The evolutionist philosophy of today is a synthesis of earlier theories, the obviously impotent, ineffective processes having been replaced by other processes which are assumed to have accomplished the multiplicity of kinds of organisms from a single-celled first form in the last billion years or more. A present-day exposition of evolution varies more or less depending upon who is making the exposition. Thus opinions regarding evolution fall into one of three types: (a) the purely mechanistic type, in which processes of chemistry and physics are assumed to furnish the first cause as well as to accomplish the changes which it is assumed followed (see chapter 4). (b) The teleological type, in which it is assumed that God created the first living matter in a simple form and brought it to its present complexity through the operation of natural processes to serve certain ends (see chap. 5). (c) The emergent type, which assumes that the developmental process is characterized by the appearance at successive stages of new types of realities which are unpredictable by the laws of the preceding stages (see chap. 5).

In a general way today, with regard to the *modus operandi*, a sort of inductive Darwinism seems the most popular assumption among scientists. This modern attitude assumes that evolutionist change is carried out on three levels. On the first the heritable variations are produced. Three genetic processes are apparently responsible for these variations; namely, (a) recombinations, which result from new groupings of hereditary factors. (b) Chromosome changes, which include all processes that result in the addition or substitution of one or a few chromosomes from a set, in changes in the order of hereditary factors or genes in a chromosome, or in the increase of the chromosome number by whole multiples of the haploid number (the number commonly found in the nucleus of the mature sex cell). (c) Mutations, which include all changes in any given gene. These processes are discussed more fully on pages 99-135 in my book *Evolution, Creation, and Science*.

On the second level of this modern doctrine, it is assumed that natural selection acts upon the hereditary elements resulting from the processes of variation to combine them into the-integrated complexes which characterize the different varieties, breeds, races, and kinds, which are adapted more or less to the environments in which they now live.

At the third level occurs the development of reproductive isolation between clusters, which prevents the newly formed groups from exchanging heritable materials, and thus guards against the erasing of the discontinuity which has been attained. It is assumed, of course, that the processes of these three levels, rather than being distinct, as described here, are interdependent. The mechanism by which kinds of plants and animals have evolved is thus assumed to be exclusively the present-day natural processes, which are assumed to have been in existence at least ever since life appeared upon the earth, and to have operated since that time at the same rate at which they now operate-the principle of uniformity.

From the standpoint of scientific accuracy it must always be kept in mind that the processes of variation referred to are demonstrable facts, but the statement that these processes under the influence of natural selection produce new kinds of organisms is absolutely without scientific-that is, laboratory-confirmation. The appearance of varieties, breeds, or races within a kind has been demonstrated. But all evidence which is available for proof of change sufficiently great to produce new kinds is entirely inferential. In truth, the modern theory of change of simple to complex stands in direct conflict with all real evidence. Demonstrated fact today, whether having to do with organisms of earlier times-that is, paleontology-or with modern forms, shows no evidence of actual building up of new kinds from previously existing kinds.

4. Materialism and Vitalism

Two opposing viewpoints in biology over which a controversy has waxed and waned at least since the days of Aristotle is the still-much-debated problem of vitalism versus materialism. Is life merely a process or function among natural components, or is it a separate, supramaterial essence?

Living things are distinguished from nonliving things by several characteristics. Of the ninety-six chemical elements now known, including the four new man-made ones, neptunium, plutonium, americium, and curium, which do not exist in appreciable amounts on the earth, [1] only about twelve or fourteen enter with constancy into the composition of living things, and these are present in the bodies of organisms in the same few kinds of organic compounds known as proteins, carbohydrates, and fats, or their derivatives, and the inorganic mineral salts, and water. These chemical compounds, furthermore, are always associated so as to constitute protoplasm. This living substance is usually formed into units called cells, and the cells are grouped into tissues, these into organs, and organs into systems so as always to constitute some specific kind of plant or animal. The living substance, in contrast with nonliving things, is always in a state of flux: that is, it is continuously breaking down and building itself up again.

By a preponderance of the building-up processes over the breaking-down processes, living things, for a period at least, add to their substance, incorporating the new materials within and among those already present. Living things are able to reproduce themselves, and as the new individual develops toward adulthood it always follows a definite pattern for each kind of plant and animal. In contrast with nonliving things, living forms are susceptible to stimulation from their eternal environment and from within their own bodies. Each organism is remarkably suited to its surroundings. The debated point with regard to these distinguishing characteristics is, Are they completely explainable by physics and chemistry and the known laws of matter, or is there something of the supernatural involved?

The Vitalistic Concept

By vitalism is meant a directive tendency outside the physical constituents of protoplasm which manifests itself in and is peculiar to the living organism. During the Middle Ages the strong religious tendencies of the day led scientists to the belief that the principal difference between living things and nonliving things was that the former were controlled by a spiritus vitus. This vital force was assumed to give to animals and plants the power to synthesize organic substances and to accomplish the circulation of the blood and all other vital processes.

However, when in 1628 the English anatomist and physiologist William Harvey (1578-1657) demonstrated the movement of the blood in a circuit and showed that it was due, not to the influence of a vital spirit, but, instead, to the laws of simple hydrostatics, many departed from the ranks of the vitalists. Strangely, from an opinion that God was personally responsible for the pushing of the blood through the vessels, many scientists swung to the other extreme, and concluded that, after all, God was in no sense necessary in the life processes of organisms.

A return to vitalism by the majority of scientists occurred at the end of the eighteenth century under the powerful influence of Marle Bichat (1771-1802), French physiologist and anatomist and father of histology. He rejected the theory of Hermann Boerhaave (1668-1738), Dutch physician and philosopher, that life should be regarded as a purely mechanical process, stating that "the true essence of life is unknown; it can only be studied through the phenomena it manifests. Bichat called particular attention to the phenomenon that life, as long as present, continually resists the effects of the forces which disintegrate the body as soon as life is gone.

However, the synthesis of urea by the German chemist Wöhler in 1828, just two centuries after Harvey's demonstration, likewise came as a shock to more vitalists, because they had assumed that the vital force enabled organisms to synthesize organic substances, none of which, it was thought, could be artificially produced in the laboratory. After the synthesis of urea the greater number of scientists again forsook vitalism. Those who still remained vitalistic assumed that even though man by his superior intelligence was able to synthesize organic matter, such synthesis was possible in nature only because of the vital force which living things possess. However, as many more of the processes originally claimed by the vitalists to be distinctively vital were shown to be physical or chemical, the number of vitalists among scientists became greatly reduced.

Even though continual progress in the explanation of life processes has been made by mechanistic methods, there are still a number of natural phenomena which constitute a stronghold for a small number of

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vitalists. These consist in the remarkable adaptive restoration of mutilated embryonic or mature organisms; in the apparent effort of an organism to maintain its individuality in spite of all disturbing factors. In the fact that often the formative process at work in the development of an organism if prevented from producing a given organ in the usual way may nevertheless produce it by a different method. And in other evidence of what appears to be purposive striving toward an end result. The vitalists believe they find evidence of purpose in cellular activities and that these activities are unexplainable in terms of chemistry and physics.

There are two points of view among vitalists today with regard to vital force. The one, illustrated by that of the German biologist and philosopher Hans Driesch (1867-1941), held it to be distinctly not of this world. This vital force he called *entelechy*, which he described as “neither a kind of energy nor dependent on any chemical material.” The other vitalistic point of view is illustrated by that of, the English philosopher, E. Rignano, who holds that the vital force is of this world and therefore to be classed with other forms of energy, only different from them.

The vitalism of the first group is clear cut, and conveniently beyond any capability of disproof in the laboratory. The error of assumption of the second group is shown by the fact that all physical energy can be summated. Chemical energy can be added to electrical, electrical to radiant, and so on, and the total energy in a system is the sum of the separate energies. Vital energy cannot be added to the other forms; therefore, it must not be energy as understood in physics.

A recent inconsistency of the vitalistic philosophy is the claim that the selection by the body cells from the very complex mixture of chemical substances dissolved in the tissue fluid of exactly those compounds of ions capable of maintaining the specificity of the protoplasm demonstrates the action of vital force. Unfortunately, for the vitalists, the facts of cell physiology here are that the cell is equally as quick to absorb toxic bodies which poison it.

At our present stage of scientific progress, practically all the arguments of vitalists, properly called neovitalists, rest on gaps in present scientific knowledge. However, it is possible that these gaps are only temporary, and to rely upon mere lack of knowledge is dangerous.

The Mechanistic Concept

Mechanism, Materialism, Determinism. Mechanism is a philosophy which is in contrast with vitalism and which states that life can be explained in terms of natural transformations of energy and matter, without the introduction of any immaterial, extranatural, or supernatural “vital force.” Although mechanism is the term commonly applied to this doctrine, still it is more properly materialism, because the former implies that protoplasm is a machine, whereas materialism states only that it is wholly physical and chemical in nature.

Although determinism is used in philosophy to designate a characteristic denial of the reality of alternative modes of action—that is, the assumption that acts of will result from causes which in reality make the individual a mere automaton—in science it is used commonly as a synonym of materialism. Thus a deterministic philosophy and a materialistic philosophy would be quite identical in their explanation of the characteristics of living protoplasm.

It has always been a characteristic of man in his attack upon the larger problems of the universe, when faced by a situation which he cannot grapple with in his mind, to limit and here and there completely to ignore enough of what actually exists for his observation until he has finally whittled the problem down to the small size of his intellect. Men of an extremely materialistic turn of mind who would flee from any possibility of a supernatural, all-wise Power who might possibly require for their own good, certain distasteful conduct on their part, seize upon the materialistic concept.

It is possible that these men were not entirely without excuse for wanting to escape the unpleasant complications of the sort of religion that was forced upon them during the Middle Ages. As a few particularly courageous individuals risked losing the approbation of the church by engaging in the vulgar business of counting horses' teeth and men's ribs with the intention of discovering the facts of nature and thus to unveil her laws, it began to be shown that the -natural laws of the transformations of energy observed in the physical world and explained by Newtonian dynamics were responsible for at least some of the life processes of plants and animals. Materialistically minded scientists commandeered this idea and carried the doctrine of mechanism to great extremes.

In the history of biology vitalism and mechanism have alternated with each other for the last three hundred years. The French philosopher Rene Descartes (1596-1650) taught a sort of dualism in which man's body was assumed to be purely mechanical in contradistinction to his soul, which was extramaterial.

The French Encyclopedists, whose volumes were edited by the French philosopher and writer Denis Diderot (1713-1784), adopted the system of dynamics built by Newton and used by him and his immediate disciples to demonstrate the wisdom and goodness of an all-powerful Creator, to show that man, both body and soul, was but a machine. The influence of the doctrine of the separation of reason and faith by the Scottish historian and philosopher David Hume (1711-1776) combined near the close of the eighteenth century with that of the Encyclopedists to build an extreme type of materialism. But at the close of that century vitalism was once more in the ascendancy as a result of the influence of Bichat. Yet again, as a result of the research of the French physiologist Claude Bernard (1813-1878) and his pupils, together with Darwin's theory of evolution by natural selection, a reaction set in toward determinism, especially among German philosophic materialists aided by the German biologist Ernst Haeckel (1834-1919). Max Verworn, of Germany, and Jacques Loeb, of America, a speculative biologist and a comparative physiologist respectively, who died in the early twenties of this century, are among the most recent extreme mechanists. In the words of Nordenskiöld-

“On the whole, the mechanistic speculations in the sphere of modern biology give a somewhat monotonous impression. . . . Those who are constantly making the assertion that there is no essential difference between animate and inanimate very quickly lose all appreciation of what is truly characteristic in living matter and its metabolistic phenomena.” [2]

From Descartes' time until now mechanists have assumed that physical science reveals reality. However, natural science is but an abstraction because it is looking at reality only from one short-ranged point of view. For this reason mechanism is periodically seen to fail. It is continually giving promises which it is never able to fulfill. For that reason mechanism naturally leads back to the idea that a supernatural force is associated with the body and controls, or at times even suspends, physical laws to some appointed ends. This brings us again to what is at least a form of vitalism. Man's better judgment prompts him inwardly that he is not a machine. Thus the American zoologist William Keith Brooks (1848-1908) objected to the thoughts of his mind being regarded simply as the “rattle of machinery.” And so it is that in our day vitalistic theories of various kinds are being produced as scientists once more rather disappointedly swing away from extreme mechanism. Among the vitalists of recent years the names of J. S. Haldane, J. A. Thomson, E. S. Russell, and E. W. MacBride may be mentioned, leading scientists of England and America who have each cited one or more instances among the phenomena of life where they believe an explanation in mechanical terms is impossible.

Vitalism, Materialism, and Creationism

A consideration of the concepts of vitalism and materialism challenges the creationist to accept one or the other. However, because neither of these philosophies satisfies fully, he must seek a third interpretation.

The error of the vitalists appears to be that they have tried to apply the idea of the supramaterial and of purpose to the separate, limited problems of physiology which can be studied only from the angle of analytical laboratory methods. However, purpose is largely manifest in the organism as a whole, and possibly can only be revealed by a type of philosophy which will enable us to look at reality from the widest point of view. To illustrate, even though it can be demonstrated that the circulation of the blood is accomplished entirely by the operation of the simple laws of confined fluids under pressure, still it is possible that this is only one small part of the larger reality of a supernatural power working in ways we call natural laws to accomplish the entity we call a man whose being and function as an entity is the level at which what we term the extramaterial begins to become more manifest. Science may be able to explain how a man, but philosophy must be called upon to explain why a man. In other words, the vitalist by focusing his attention on the many vital processes of plants and animals commonly has set his study at too low a level to perceive the supramundane. He has obviously predestined his own failure, because it daily appears more likely that eventually all the transformations of energy and matter which constitute the life processes of organisms may be explainable in terms of physics and chemistry.

On the other hand, the error of the materialists, as already pointed out, is that they assume that the small, component processes which constitute the physiology of the organism are the whole of reality. In other words, they appear to think that when a phenomenon can be expressed quantitatively in mathematical terms it is explained philosophically as well as scientifically. The entire functioning organism is more than the sum of its parts and processes because in the functional whole we have another type of system entirely. A study of the whole of reality must include this wider view.

Recent changes in physics which were begun in 1925 by Heisenberg in Germany seem likely to

weaken the argument for materialism. The field of physics has always been the stronghold of evidence for scientific determinism. Here it seemed the evidence admitted no place for any supramaterial force. A complete circle of material components appeared, at first, to exist. But the new wave mechanics developed by Heisenberg and others now seems to suggest that there is a principle of indeterminacy beneath the ultimate units or electrons, which makes it absolutely impossible to measure their position and velocity at the same time. If this unexpected development proves to be correct, the strongest evidence from science for philosophic determinism will break down. It is well to bear in mind that acceptance of the concept of indeterminacy may lead to an ultramundane predestination philosophy.

As early as the fourth century BC the Greek philosopher Democritus stated that everything in a natural system either does or could exist in a mechanical one. In disagreement with this purely materialistic view, his fellow countryman Aristotle, a vitalist in one sense of the term, argued that there is something non mechanical in a living system. At least two philosophers, the German metaphysician, Immanuel Kant (1724-1804), and the American philosopher E. A. Singer, claim that, diverse as these viewpoints may appear, there is one common point where they are compatible. In the words of the American plant physiologist William Seifriz these ideas can be harmonized as follows:

“We might view the matter in this light: A sundial, an hour glass, and a clock are quite different types of mechanical systems, yet all have one function; at this point they meet. As mechanisms they are quite distinct; as timepieces, they are members of the same functional class. The point at which they meet is non mechanistic, for a function is not mechanical. Thus, life as a physical and chemical system is mechanical. Its individual parts we can understand. As a living functional system, it is non mechanical. Its whole we cannot understand.” [3]

Organization is typical of any functioning system and constitutes a true reality. But it is necessary for us here to recognize that a functional whole is still entirely within the realm of the natural world. The supramaterial does not enter at the level at which we can observe a whole which is greater than the sum of its parts. It appears that the most perfectly and elaborately functioning system is still completely materialistic.

Organization obviously is a very important factor in living protoplasm. Anything which happens to protoplasm to disturb seriously the finely balanced physiochemical system so characteristic of it will cause its death. This may be accomplished quite instantaneously by temperatures either too high or too low, by poisonous chemical substances, and by mechanical distortions. The impossibility of living substance ever being synthesized by biochemists hinges upon this very fact of the complex internal organization of protoplasm. The correct percentage of water, carbohydrates, proteins, fats, vitamins, mineral salts, and all the rest may be present; but to place these chemical substances into the proper interrelationships is obviously impossible. There is no hope of making living substance from chemicals poured together from bottles until man can restore “life” to the dead mass of the simple myxomycete, which is killed merely by pushing it through a sieve. It was alive only a moment ago, and presumably it still possesses all its chemical substances in the right proportions, but no man can restore it to “life.” Why? Because he cannot re-establish the necessary interrelationships of the component parts of that complex polyphase colloidal system.

This statement is made on the assumption that there is no supramaterialistic essence present in living protoplasm. This assumption appears to be in complete harmony with all known facts. Does one become a materialist by making this assumption? Not necessarily. Materialists, if they grant the presence of any sustainer whatsoever in the universe, do not consider Him necessary in the functioning of natural processes. He is remote, unassociated with, and entirely removed from, the mechanics of the universe. The creationist, by contrast, sees the sustainer through the natural processes. To the creationist gravity is a force maintained by God; atomic energy is a form of the power of God; all the chemical elements were made by Him and exist moment by moment by His power. He formed the innumerable entities of our earth and of the universe. The intricacies of the protoplasmic system were established by Him and are maintained by Him. He made the raw materials and furnishes the necessary energies. He sits as an individual above and apart from all the works of His hands and maintains the physiochemical processes of the great cosmos through forms of His power which operate in regular ways, ways which we call mechanistic or materialistic processes, the natural laws.

In the light of these assumptions, is the creationist a materialist? Only to the extent that he believes that even the vital life processes consist in the natural operations of chemistry and physics. Is he a vitalist? Only to the extent that he believes that the great I AM created all these things and sustains them moment by moment by His omnipotence. Creationism thus portrays a reasonable, first cause, a significant present existence, and a glad future with promise and hope. This philosophy carries great satisfaction for the

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scientist because it is, and will always be, in complete harmony with every demonstrable fact.

5. Additional Concepts, Philosophies, and Principles

Before the student accepts a theory of origin of living things, or before he constructs one for himself, it is first necessary that he familiarize himself, at least briefly, with several additional concepts, philosophies, and principles to those touched upon in the preceding pages. A few of these more important concepts will be brought together to constitute this chapter and chapter six.

Mechanistic Evolutionism

In chapter 3, part 7, we have already noticed that the evolutionism of today is divided into three types: mechanistic, teleological, and emergent. A brief consideration will be given the last two of these viewpoints at this time. The mechanistic philosophy has been discussed in the preceding chapter, so any further consideration will be omitted here other than the statement of fact that mechanistic evolutionism is that doctrine which teaches that life first appeared upon our birth in a very simple form as the result of purely natural processes, and then, under these undirected processes of chemistry and physics, developed into the present-day harmonious complexity. This philosophy recognizes no other influence or force than the natural forces. It is a doctrine which is satisfactory only to those who are very nearsighted and narrow in the matter of philosophy. Its first assumption, that life arose spontaneously, is unscientific. And the idea that natural forces can bring themselves into existence along with matter, and that the present state of cosmos, with all its finely balanced interdependencies, in our universe arose from an original state of chaos without supramundane power or guidance is most fantastic. This extreme theory is accepted by very few scientists today.

Teleology

This broad philosophy is one in which the world as a whole-or at least particular forms in it's considered to be due to the realization of an end or purpose on the part of some intelligence existing in the world, or outside of it, or in both realms.

Teleology is as old as the human race, standing revealed in the earliest existing writings of man. The Israelite people were pronounced teleologists. Aristotle insisted on the importance of discovery of "material," "formal," "efficient," and "final" causes. During the Middle Ages all except the latter, the final causes, were usually ignored, and so much emphasis was placed upon final causes, even in physics and chemistry, as to become absurd.

The essence of teleology is the assumption of intelligible ends, or purposes, in the world, and to interpret natural phenomena by reference to these ends. It is an explanation of nature in terms of design and purpose, that is, of final causality, in contrast with the scientific method of the mechanist which explains the phenomena of living things in terms of concrete, mechanical processes. To illustrate this difference: The scientist who keeps within the bounds he has set for himself by adoption of the scientific method says, "The rain falls because of the force of gravity on large drops of water which have formed in the clouds by the coalescence of smaller drops, the latter having developed from molecules which arose by evaporation from bodies of water on the surface of the earth. The fallen rain, still under the influence of gravity, accumulates at the lowest points and eventually forms rivers which flow to the sea." Of the same phenomena, the teleologist would say, "God causes the rain to fall in order to moisten the soil and to keep the streams flowing and thus help to make the earth a fit home for man."

Again, the mechanist would say, "The growing tips of a plant that sits back from a lighted window manufacture a hormone which passes down the shaded side of the stem, stimulating the cells on that side to more rapid growth than occurs in the cells on the lighted side. This results in the curving of the plant toward the lighted window." The teleologist would say, "The plant grows toward the window in order that it can get more light for better development of its body." Thus teleology endeavors to make things more intelligible by showing their relation to an end that is being realized. It answers the questions, "Why?" and "For what purpose?" Mechanism is concerned only in answering "How?" Its whole duty is to show how the result has been produced by the functioning of natural causes according to fixed, invariable laws.

At the very foundation of all philosophy lies the question, Is our earth with all its multiplicity of meaningful and fruitful processes merely the natural result of orderly mechanics acting without any intelligent direction and plan, or is some design or system of purposes being worked out?

Is the modern scientist wrong when he says that the plant curves toward the window because of the unequal growth of cells? No. Is he inaccurate when he says that it is gravity which causes the rain to

fall? No. The modern teleologist agrees completely to the rights of mechanical explanations in every possible phenomenon. But he does not stop there. He goes on to recognize a purpose underlying every mechanical performance. In terms of modern aviation, there can be no collision between mechanical explanations and teleology because they are flying at different levels. Science, at a lower level, explains how processes of chemistry and physics result in the purification of our blood, which keeps us alive. Teleology, at a higher level, explains why the blood, the life, the individual. The only system the teleologist can confidently apply in science to determine phenomena objectively is mechanism. However, as Kant teaches so earnestly, mechanism is and must remain the only principle we can apply in our natural world, but we are obliged to postulate a realm of more final and complete reality, where teleology, through its recognition of moral purpose, becomes the ultimate principle.

It is probably true that all creationists and theistic evolutionists who read the paragraphs of this part will agree with the assertions made. These two philosophies meet on common ground on the broad acres of teleology.

Creative Evolution

These two doctrines are essentially the same and were constructed to meet a dilemma which developed in certain minds when it at first appeared that the mechanists of the last century, through their modern physics, had done away with vitalism, but which finally ended in a situation in which ultramodern physics has apparently done away with mechanism. It truly was a state of affairs which required the services of a philosopher.

The French philosopher Henri Bergson (1859-1941) attempted to fill the need by trying to salvage the best of mechanism and vitalism in a theory which he called creative evolution. In this philosophy living matter is interpreted as an organized functional system, and thus he escapes a rigid acceptance of either vitalism or mechanism, as well as avoids the fatalistic attitude of those who regret the harsh severity of laboratory science.

Bergson tried to brush away both physics and logic. To him life is a universal stream of becoming, in which divisions are mere illusions and reality can be experienced but not reasoned about. The final causes which he accepts are not like the earlier predestined finalism, but are recast into new forms as creative evolution proceeds. Thus, at successive stages, new types or realities appear which are unpredictable by any of the laws of preceding stages. According to this philosophy, the essence of reality is becoming, a continual and active process. From such Abstractions the student of natural science returns with relish to a philosophy which uses some of the mechanical and some of the vital but avoids the impossible extremes of both materialism and vitalism. These, it will develop, are the very characteristics of creationism.

Concept of Organism

This concept, in common with that of creative evolution, assumes that the essence of vitality is becoming. It was developed by the English mathematician and philosopher Alfred North Whitehead (1861-1948) as a substitute for the cold, mechanistic and now apparently unscientific determinism developed by the physicists. The investigations of the latter are largely analytical. They have dissected matter into atoms and electrons and have finally reached a place where mechanical models fail. They have arrived at an apparently fundamental principle of uncertainty.

Scientific determinism results from the fact that science is a process of abstraction. To illustrate, mechanics develops the abstract concepts of time, space, and matter from the ideas occasioned by sensations. On these it builds a logical, materialistic scheme from which only abstractions of the same nature as those put into it can emerge. Thus, from the point of view of mechanics, nature is inescapably mechanical, and from the angle of cold logic it can only be deterministic.

But there are other perfectly legitimate points of view which exact science cannot reach. It is possible that a synthetic treatment of biology may be as accurate as the analytic method. The analytic method is particularly applicable in physiology, where much can be reduced to chemical and physical terms, but in the great realm of natural history living organisms are viewed as wholes. In the light of this fact Whitehead insists that a further stage of realism is required in which the scientific plan is reformed and founded on the ultimate concept of organism.

In the development of his theory Whitehead calls attention to a fallacy which Sir William Dampier likewise points out several times in his book *A History of Science*. This inaccuracy, as Whitehead

expresses it, is the fallacy of misplaced concreteness. A failure on the part of those who revolted against the mechanistic system to recognize this point resulted in their usually being losers in any controversy with the mechanists. This inaccuracy in the philosophy of the mechanists is their assumption that the abstractions unavoidably necessary for science are the whole of concrete reality. Where we take all nature and experience into the picture, there is much more than mere processes of chemistry and physics. The concrete entities of our earth are complete organisms, so that the structure of the whole has its effect upon the character of the parts. The indeterminate electron of modern physics, when located in a man, is determined in its course of action by the type of organism that man is. The structure and function of the whole organism is affected by its mental state. This has its effect in changed behavior right down to the electrons. In the words of Dampier, "An electron blindly runs, but within the body it blindly runs as conditioned by the whole plan of the body, including the mental state." [1]

Thus the concept of organism, built upon synthesis, is suggested to replace the unfeeling, impersonal theory of mechanism constructed upon analytical studies. Rather than discard the scientific method as a device for interpreting man in his world, Whitehead suggests that we take a wider, synthetic view of the concrete and observe "that we are within a world of colors, sounds and other sense objects, related in space and time to enduring objects such as stones, trees, and human bodies. We seem to be ourselves elements of this world in the same sense as are the other things we perceive." [2]

Through his wider view of concrete reality Whitehead comes several steps nearer to creationism than the mechanists with their fatalistic wheels and screws in the form of the processes of physics and chemistry. He seems almost to portray a world of beauty and moral value constructed upon a purely scientific base. However, the creationist believes that a still wider view of the universe is necessary, a view which reveals the omniscient, omnipotent Creator and Sustainer as the cause of the organism which subsists moment by moment in a cosmos by His power manifested in the form of the processes of physics and chemistry.

Pantheism

This philosophy was one of the developments which came from an effort to reason back in the natural world from effect to cause. Any amount of reasoning whatsoever in the matter of explanation of evident interdependence of organisms and of the "Why?" for the obviously purposive processes of nature, leads the individual to infer the existence of some superior being.

The greatest pantheist of all time was the Dutch philosopher Baruch Spinoza (1632-1677). He assumed the identity of cause and effect, and the consequent adequacy of each effect, if rightly interpreted, to indicate its cause. In this pure-thought structure each existing thing contains within itself all the explanation of its own existence which it is possible to obtain. He had deep awe for the infinite, eternal, immutable, "that which is in itself and is comprehended out of itself." He called this substance and assumed it to have innumerable forms, of which man could perceive only two-material objects and the spiritual consciousness. The true characteristics of the substance were assumed to be, unexplainable, although everything on the earth, under the earth, and above to the third heaven was explained by its aid.

Spinoza's idea of substance was purely metaphysical. He declared that the development that seems to take place is only apparent, and that everything, after a brief existence, reverts to the substance, like a wave that sinks back into the sea, to be followed by new entities equally evanescent. This doctrine sweeps away the whole Christian economy, does away with the necessity for the atonement, and makes man his own savior. Goethe was strangely influenced by pantheism, and Haeckel and his monist disciples gave it enthusiastic support.

Fundamentalism

This term appears to have been used first in 1920 by C. L. Laws, editor of the Baptist publication Watchman-Examiner, to specify a movement within Protestantism in opposition to modernistic tendencies. It re-emphasized as fundamental to Christianity the following doctrines: inerrancy and infallibility of the Bible, the virgin birth of Christ and His complete deity, the literal resurrection of His body, the atoning sacrifice of His death, and His second coming in bodily form. The liberal wing of Protestants deny the validity of these five assertions, or urge that a belief in them is not essential.

The particular reason for mentioning fundamentalism here is that the indirect effect of the controversy among Protestants was the attempt on the part of some of the conservative wing to influence legislation against the teaching of evolution in tax-supported schools. This is regarded by many modernists

as a dangerous attitude for blocks of the public to take against the “glorious advancement of science.” This regret arises in the minds of these modernists because they confuse the facts of science with the doctrine of evolutionism.

Every evolutionist who is in possession of the facts knows that the evolution of complex kinds from simpler kinds has never been demonstrated scientifically. Therefore, evolutionism, as with creationism, is still a theory only, and because of that fact should not, as fact, be thrust down the throats of students in tax-supported schools. Creationists and evolutionists both support the public schools, and in the sense of fairness and justice, if origins are discussed, both creationism and evolutionism should be given balanced treatment. To this, evolutionists generally answer, “Absurd!” Nevertheless, if the tables were turned, and the evolutionists were forced to sit in schools which they support with their taxes and listen continually to a presentation of creationism as scientific fact, and with, at the most, only a brief, unfair presentation of evolutionism, they would be the first to shout, “Unjust!” The marvel is that the hundreds of thousands of creationists submit to this great American injustice with no sturdy protest!

Natural Selection

Soon after the first edition of my book *Evolution, Creation, and Science* had come from the press a prominent evolutionist wrote to me commenting on the book. For some reason that I myself cannot explain, I had omitted any discussion of natural selection as such. Only a brief reference was made to it here and there. This evolutionist remarked, “Of course, being a creationist, you completely ignore the effects of natural selection.” To this assertion I would reply that no creationist scientist can ignore the fact of selection in nature. As a matter of fact, no scientist dare ignore any demonstrable fact, be he creationist: or evolutionist.

My friend, the evolutionist, was himself doing what many do who accept the principle of natural selection in its fullest sense. He was assuming that the acceptance of natural selection was the negation of all teleology. Therefore, he assumed that a creationist would refuse to accept the principle in any sense. However, a creationist who is one in the true sense will search out every demonstrable fact in the natural world and modify the details of his philosophy as necessary to include all the facts.

It is true that the doctrine of natural selection, in its fullest or extreme form, negates teleology, because it holds that there is no end in view, merely a continuous, haphazard change in individuals and environment which may, now and then, result in marked adaptation and suitability between organism and environment which would give the appearance of the working of a directing Power with a plan. This sort of doctrine is the logical end of the philosophy begun and charted by Francis Bacon, who taught that laboratory demonstration, empirical experiment, was the sole road to natural knowledge. Darwin, Wallace, and Weismann came to regard natural selection as a cause all sufficient to explain adaptation and through it the evolution, from simpler forms, of all the complex living forms of today.

Any student of natural history will recognize the principle of selection at work in nature. It explains the present distribution of plants and animals. The banana cannot grow north or south of the tropical or subtropical regions because it cannot survive the lower temperatures. The best temperature for its growth is above 90° F.

Apples, on the other hand, will not carry on in the tropics because the temperature runs too high. The apple requires a mean summer temperature of not over 70° F. Polar bears and penguins do their best on fields of snow and open ice. A monkey would perish in a few minutes if exposed to the low temperatures polar bears and penguins prosper under. The geographical distribution of organisms today is largely determined by the survival of the fittest. Each is sorted and isolated in his particular niche through the operation of natural selection. Those who wander into inhospitable areas must retreat or perish.

Likewise, the student of natural history observes the operation of natural selection in any one ecological niche. If through the laws of genetics any variety of plant develops which has better powers of competition—for example, through a superior root pattern or through some peculiar chemical quality of its protoplasm which makes it unsuited to the attack of fungal parasites—it will eventually become a dominant of that area, or at least will be the representative of its kind in the area. Less vigorous plants vanish from the population. In a similar manner, if by natural means a variety of animal develops which, for example, has greater powers of reproduction, or is less conspicuous to its enemies, or is immune to the parasites of its parent species, this variety will succeed and eventually replace the earlier type of that area. These facts are recognized by all scientists, even by creationist scientists, to the apparent amazement of evolutionists.

True, the creationist does not follow the principle of selection beyond demonstrated facts into the doctrine of natural selection. But he most certainly recognizes its tremendous force in the determination of

the floral and faunal populations of any ecological or geographical area.

He does not assume that this process of the survival of the fittest would eventually lead to the erection of new kinds of animals. Why? The first good reason is recognized by evolutionists themselves. The survival of the fittest furnishes no mechanism providing for the arrival of the fittest, that is for arrival of new kinds which might have superior adaptations.

Many biologists, beginning with Darwin and Wallace, have been keen observers of this actual operation of natural selection in producing superior varieties of already existing kinds. In their observations they made no mistake. But in building their philosophy of evolution upon this observed operation, they used it as a springboard from which to sail off into undemonstrated and fantastic assumptions which so captured the attention of the scientific world that it ignored the tremendously vital discovery of Gregor Mendel in the field of genetics, and worse than wasted forty years in building profitless evolutionist air castles. The much vaunted doctrine of natural selection, rather than being the fabulous aid to science it was claimed to be, actually sidetracked biologists most unprofitably for many precious years.

Other Theories

In an attempt to explain the origin of kinds of animals, four theories have been offered by their authors as substitutes for natural selection. These theories are:

1. Lamarckism. This is the theory of the inheritance of acquired characters. In chapter 3 consideration has been given to this theory, which assumes that, as a need for some new structure or modification of an already existing structure arose, the change was produced. In the light of modern genetics, of course, this theory finds no support in fact. Lamarck's theory was, in a sense, orthogenetic: in that it depended upon directed variation. But Lamarckism differs from the theories of true orthogenesis in that the directing influence was assumed to come from the environment, not by a trend inherent in the organism itself.

2. Orthogenesis. When this term is used in discussions of origin of kinds of plants and animals, it implies that variations, and hence evolution, occur in straight lines regardless of whether the progression is in the direction of something useful to the organism or not. Theories of orthogenesis all stand in sharp contrast with the theory of natural selection in that they assume directed variation. Various special theories of orthogenesis are illustrated by those of Mageli, Eimer, and E. D. Cope.

The orthogenetic philosophy of the German botanist Karl von Migeli (1817-1891) involves a belief in a sort of mystic principle of progressive development in organic nature which directs organisms into a better adaptation to their habitats. This idea of an inner directing force, resembling somewhat the "entelechy" of Driesch and Bergson's "creative evolution," is vitalistic. According to Migeli, plants and animals have evolved to their present complexity without any struggle for existence.

The American paleontologist E. D. Cope (1840-1897) also developed a vitalistic philosophy of orthogenesis. He used "bathism," or growing force; "klnetogenesis," or the direct effect of use and disuse and environmental influence; and "archaesthetism," or influence of a primitive consciousness, as ways of accomplishing a directed development into modern forms. Cope and a group of associates were popular Neo-Lamarckists in the later years of the nineteenth century.

Theodor Eimer (1843-1898), German biologist, developed a nonvitalistic theory of orthogenesis which was more scientific and less mystical than Niigeli's. His conception of evolution was that the lines of development were not haphazard in all directions, but were confined to a few well-defined directions, determined at their start, not by natural selection, but by laws of organic growth, helped by the inheritance of acquired characters. Eimer placed the causes of orthogenesis, not in a vitalistic influence acting as an automatic inner perfecting principle, but in the effects of external influences, climate, nutrition, or the specific constitution of the organism. He did not completely reject the idea of natural selection, but placed it in a subordinate position.

There are three groups of facts in the field of paleontology-that is, the science of fossils-which are assumed by some to indicate a directed sort of development of new kinds. Because of the presence of these facts, it is quite the usual thing to find uniformitarian paleontologists leaning to orthogenesis.

These facts, which are considered to constitute three main lines of supporting evidence for directed evolution, are, first, the groups of apparently blood-related forms, such as the horses, the elephants, or the camels. In each group these forms can be artificially arranged from simple to complex, for example, in North America, from the little, four-toed Eohippus to the modern one-toed horse, Equus. Second, the appearance of parallel development in at least two divisions of large classificatory groups at the same time, as is suggested in the possibility of arranging the true horses of North America as just stated, and in a

similar apparent progression among the pseudohorses of South America, terminating in a one-toed form, *Thoatherium*. Third, those cases among the fossils in which an apparent line of development, once started, seems to outrun itself and lead to an undesirable or even fatal end. An example here would be the Irish elk, which is considered by orthogeneticists to have become extinct because of a gradual over development of its horns to such a ponderous size as to become incompatible with life.

However, if such lines of development did occur, they could come about just as well as a result of orthoselection as by orthogenesis. That is, a greater or lesser advantage would accrue in the increased development of a character so that natural selection would, in a sense, cause directed development, a process technically called orthoselection. There is scientific proof today that some processes of variation, for example mutation, do occur more frequently in a certain few directions instead of in all directions. The principle of the survival of the fittest operates to eliminate variants in directions which are not suited to the environment. And a shifting in environmental conditions serves equally as well to explain the extinction of the Irish elk, the saber toothed tiger, and the Columbian elephant as does the orthogenetic idea of over development continued to a lethal stage.

However, it is most important to bear in mind in all discussions of "evolutionary lines" of horses, elephants, camels, and the like, that it has not yet been possible to demonstrate that a four-toed horse is older geologically than a modern horse. Conformable rock layers containing modern horse remains have not yet been found above layers containing four-toed horses. Absolutely objective proof of differences in times of burial would require this order of stratification: fossils of the four-toed *Eohippus* lying in rock overlaid by an undisturbed layer containing bones of *Mesohippus*, the three toed horse, and this stratum in turn overlaid by an undisturbed layer which contained the bones of our modern horse, *Equus*. At least, this vertical order in undisturbed strata would be necessary. But no such arrangement has been found. In fact, miners in Colorado found a hoof of our modern horse deeper than the bones of *Eohippus*. [3]

Therefore, in the light of present facts, it is perfectly logical and scientifically accurate to assume that all members of the group of horses were alive on the earth at the same time. A Noachian Flood could, within a single year, have destroyed all those we now find as fossils. That variations have occurred within the groups of horses, elephants, camels, etcetera, is very possible; and natural selection, made more potent by a shift in environmental conditions, doubtless weeded out those which were unfit to survive the new conditions. But to assume that successively the more complex members of these groups lived at successively more recent geological times is absolutely without foundation in fact. These facts agree with a theory of creation of varieties of these groups and their subsequent destruction in a worldwide Flood. This philosophy requires no evolution, however directed, to explain the presence of series of horses, elephants, and camels.

From the point of view of creationism, the statements of the first chapter of Genesis indicate that at the creation of organisms they were formed in such a way that when they reproduced they brought forth, not something that was of a different kind, but rather, forms which were indisputably of the same basic kind as the parents. This mechanism would make evolution of new kinds impossible.

The presence of original basic kinds in nature, living and reproducing under the processes of variation, would explain the horse series, the elephant series, the camel series -series which have forced many evolutionists into orthogenesis in an attempt to explain them in a fauna built up by chance evolution from simpler kinds. The creationist, especially if he assumes that several varieties of each kind were created, has no trouble understanding such clusters of apparently related individuals. Furthermore, he understands why each series stands out distinctly from other kinds of animals with no links joining, for example, the horse series with any other series, an insolvable problem for the evolutionist, even if he hold to the orthogenetic philosophy.

3. Mutation. This explanation of the origin of new kinds does not recognize natural selection as the primary process. Rather, it assumes that instead of development of new kinds occurring slowly through selection among the minute individual or continuous variations that are universally present in practically all living forms, they arose through new, distinctly different, pure-breeding types which appeared suddenly through the sort of variation which geneticists now assume is caused by a chemical change in a hereditary factor or gene.

In the same way that Darwin and Wallace fathered the idea of natural selection, the Russian biologist H. Korchinsky and the Dutch botanist Hugo De Vries should share in the credit for this theory of origin of new kinds by mutation. Korchinsky anticipated De Vries several years and called his idea heterogenesis, but because of the parallelism between his theory and that of De Vries, and also because of the wider experimental basis for the latter's doctrine, De Vries is most commonly credited with the origin of

the philosophy. We have already considered this doctrine briefly in chapter 3.

The occurrence of mutations is a very real phenomenon in nature, and that this process is a real factor in the production of different varieties is most obvious. The Ancon sheep, a short-legged breed, descended from a single mutated ram that appeared in 1791 on the New England farm of Seth Wright. The hornless or polled Hereford cattle descended from a single mutated calf born at Atchison, Kansas, in 1889. Tailless cats and dogs, and hairless cattle, dogs, cats, mice, and horses are additional examples among domesticated animals of origin of new types by mutation. But the scientist must, and the philosopher should, stay close to demonstrated facts here, and recognize that mutation under the guiding influence of natural selection has never been demonstrated to produce a new kind of organism. Evolution of new kinds in this way must at present be recognized as pure, unfounded speculation.

4. Tetrakinetic Processes. This alternative theory to natural selection, which is a recent restatement of the causo-mechanical basis of evolution, was developed by the American paleontologist Henry Fairfield Osborn (1857-1935). This theory is the delight of the person who unconsciously wishes to ignore any possibility of a force greater than natural force. In it Osborn starts with energy and calls our attention to the fact that in physics energy controls matter and form. In every instance some kind of energy or work precedes some kind of form. He believed from this that it is probable that energy also precedes and controls the evolution of life. It is true that no form of energy in living substance has yet been demonstrated in the laboratory which is peculiar to life phenomena. In a broad sense, all these manifestations of energy are subject to Newton's dynamical laws. It is his third law, that of the equality of action and reaction, which is the foundation of this modern doctrine of energy.

Research in the field of the changes which occur in living protoplasm seems to indicate more and more that the living organism consists in an incessant series of actions and reactions operating under the dynamical laws which govern the transfer and transformation of energy. According to Osborn, in each organism the phenomena of life represent the action, reaction, and interaction of four complexes of physiochemical energy. It is because of this principle assumption that the doctrine is called the tetrakinetic theory. These four energy complexes are those of the inorganic environment, those of the developing organism, those of the germ-cell chromatin, and those of the life environment. Osborn suggests that these four sets of internal and external energies play upon and within every individual, molding it into this or that fashion and causing the development of the complex from the simple.

The basic importance of energy goes without question. Viewed at short range, that of the operations of physiochemical laws, it appears very reasonable. However, it is inadequate in explaining the first appearance and source of all energy and the cause of its orderly persistence.

6. Concepts, Philosophies, and Principles Continued

In addition to the theories of orthogenesis and tetrakinetics discussed briefly in the previous chapter, there are three additional minor philosophies of the cause or origin of new kinds which will now be considered. These are the ideas of hybridization, of isolation, and of intraselection.

Hybridization

By hybridization is meant the crossing of any two organisms which are diverse enough to constitute at least different varieties of a single kind, as black pigs and white guinea pigs, or red sunflowers and yellow sunflowers. The process may refer to crosses so close as these or to the very widest crosses possible, such as radish with cabbage and chicken with turkey. Wider crosses appear to be possible in plants than in animals.

With regard to hybridization as a philosophy which attempts to explain the origin of new kinds, it is at present merely a matter for speculation. If we limit evolution to the formation of new varieties, breeds, or races within a kind, creationists and evolutionists will agree that hybridization has been a large factor in producing variation, which in turn has produced varieties with better survival value. The new “rustproof” strains of wheat, resulting from careful hybridization, illustrate the role of crossing in producing the only type of evolution which has ever been demonstrated—the erection of new varieties or breeds or even races within kinds. Hybridization has also accomplished the erection of new modern species.

An illustration here is furnished in the new species of vinegar fly, *Drosophila artificialis*, developed by Kozhevnikov from strains of the common vinegar fly, *D. melanogaster*. The new group of individuals developed by this worker breed true among themselves and scarcely or not at all with the parental stock; hence, in the light of the definition of a species on the basis of ability to cross, they may be called a new species. However, it is most important to observe that this new species is a group of individuals which are unquestionably the same kind of animal as the parent stock. They are all vinegar flies.

The Dutch botanist J. P. Lotsy (1867-1931) collected a considerable amount of evidence for the importance of hybridization as a cause of variation in nature. The idea of Lotsy and of other workers with this belief is that crossing of individuals of different groups brings about a combination of hereditary factors that may produce individuals possessing characters which would have better survival value. Some of the present-day workers in hybridization refer to this as introgressive hybridization, by which they mean the infiltration of the germ plasm of one species into another. The crossing of animals of two different kinds might be expected to produce some conspicuous new types. However, the natural barrier which prevents the appearance of these new types is the chemical incompatibility which everywhere exists between members of two different kinds, making the fusion of germ cells in a true fertilization impossible.

This chemical incompatibility is the road block on the way to the production of new kinds by hybridization. In all cases of plants or animals in which fertilization can occur and a hybrid result, the individuals which cross are so similar morphologically as obviously to belong to a similar basic kind. For example, radish and cabbage cross, but their reproductive structures, the flowers, are morphologically identical, indicating close relationship. The horse, *Equus caballus*, and the ass, *E. asinus*, cross; but they are more similar morphologically than many breeds of dogs which are all members of the same species, *Canis familiaris*. In these wider crosses the hybrids are usually sterile, a fact which militates still more against the idea of origin of new kinds by hybridization.

The field of possibility of crossing is so narrow as to cut off all hope for evolution of new kinds in this way except in the minds of those who are still optimistic in the face of prohibitive facts. To the evolutionist who has boundless time at his disposal, any process of variation is looked upon as a possible factor in producing evolution. However, if we are really honest with ourselves, we will recognize that all processes of variation, hybridization included, can be demonstrated actually to accomplish no more than the erection of a new variety of an already existing kind of organism. The gaps between kinds are truly “bridgeless abysses,” which even extended time cannot span.

Those not acquainted with the real facts of hybridization possibilities, and who depend upon the news magazine and daily paper for their information, could paint a rather lurid picture as regards what might have been accomplished in the building of new kinds by crossbreeding. News publications are completely unreliable as sources of information on this point. In the revised edition of *Evolution, Creation, and Science*, pages 141-146, I have related the truth about the “fur-fowl” in Indiana which was said to have

been a cross between a hare and a hen, and about the “skvader” of Sweden, described and also portrayed in a photograph as a cross between a wild grouse like bird and a hare. These accounts were given in all apparent seriousness so that the public would be left with the impression that the crosses had really occurred. In actuality they appeared in *Time*, the *Weekly Newsmagazine* as a form of practical joke.

One more recent illustration of this type of thing is to be found in the *Denver Post* for Sunday, December 28, 1947. In this issue of the newspaper appears a photograph of a rough-haired little beast which the legend declares has a cat for a father and dog for a mother. The picture indicates no such origin but shows merely a forlorn, ragged-haired little dog who appears to have been raiding garbage cans all night. However, the short article accompanying the picture reports the owner of the beast as saying that a veterinarian in Kearney, Nebraska, had accomplished the cross by artificial insemination. She also is reported to have said that the same veterinarian had crossed cats with rabbits in the same way.

In response to a letter of inquiry about these purported marvelous feats of their veterinarian, the Kearney Chamber of Commerce, under date of February 16, 1948, replied as follows:

“DR. MARSH: Kearney veterinarians state they know nothing about this and agree with you that such a cross is impossible. Our daily newspaper -editor states he was contacted by the Associated Press to verify the *Denver Post* story. After his contacts with Kearney veterinarians, he informed the AP that apparently one of their reporters (AP) concocted the story to gain a little publicity.”

Isolation

One of the objections to the effectiveness of natural selection in producing new kinds was that a favorable variation, appearing in an individual or even in a small group, would be lost because of interbreeding with the much greater number who did not possess it. Any sort of agency which would partially or completely prevent crossbreeding would give the new character a chance to survive. Several theories have arisen which are concerned with possible isolating agencies.

The geographic isolation theory was founded by the German traveler and naturalist Moritz Wagner (1813-1887). He traveled extensively, and became well informed in the details of the geographic distribution of animals. He at first thought of his theory as a supplementary one to natural selection, but as he collected more and more facts he came to believe that isolation was an independent agency in species formation, and he developed it to replace natural selection.

An illustration of how geographic isolation works as an aid in variation is furnished by the work on distribution of Hawaiian land snails by John T. Gulick (1832-1923), who was also an exponent of the efficacy of such isolation in species formation. On the island of Oahu the volcanic cone has been eroded into a series of radiating isolated valleys. Trees and other vegetation grow in the valleys, but the dry ridges between the valleys are complete barriers to the tree-dwelling land snails, which do not easily move on the ground and cannot travel any distance over a land surface devoid of shade or moisture. Thus the snail population is divided up into isolated groups, one group for each valley. Gulick found that almost every valley had its particular variety or varieties, differing in size, color, and shape of shell. The degree of difference between varieties is directly proportional to the distance that separates them. Recent collectors have reported a variety that was confined to a single tree which was sufficiently isolated to prevent transfer. Because environmental conditions are practically identical in all the valleys, the variations cannot be due to environment. Similar cases have been observed in the marine snails of the genus *Thais* in Puget Sound and in the land snails of the genus *Partula* in Tahiti.

From a study of these snails it appears that the development of non useful characters may occur merely as a result of isolation. In case a shift in the environmental conditions would occur, these characters would become subject to selection, and as everywhere in nature where man does not interpose, those with the most advantageous adaptations would eventually predominate in the new environment.

The fact of development of new groups under geographical isolation is well established. It is becoming more and more obvious that many groups of plants and animals to which species names and even generic names have been assigned by the earlier taxonomic workers, are in reality merely geographical races of some single kind. Illustrations of such groups are the eleven species of caribou listed for North America, the nine species of red foxes, and the six species of coyotes. Ernst Mayr of the American Museum of Natural History, in his recent book, [1] calls attention to a number of additional cases.

The question this variation presents is this, Is this type of variation which results from geographic isolation capable of producing new kinds of organisms? Many plants and many animals such as the snails show a great tendency to vary. But it must be observed that with all their variation there is no proof that these latter have ever developed any new sort of animal. As snails they start to vary, and snails all of them

ever remain. To assume that, given enough time, they would change into some new sort of animal is fantastic in the light of present-day facts, which reveal the fixity of the kind. Apparently the boundaries of the kinds can never be crossed because no mechanics exist which can, collectively or singly, accomplish the vast changes necessary to build a truly new kind.

The second type of isolating mechanisms is that of reproductive or physiological isolation. These may be subdivided into (1) those which prevent the parental forms from meeting, such as the presence of different varieties in different habitats in the same area (ecological isolation), or the representatives of two groups in the same habitat reach the adult stage at different seasons (seasonal or temporal isolation). (2) Those mechanisms which operate where the parental forms occur together but do not produce hybrids because of lack of mutual attraction (sexual or psychological isolation), or crossing is difficult or impossible due to physical incompatibilities (mechanical isolation), or for some reason after cross-pollination or mating the sperm fails to reach or fertilize the egg. Of course, all cases where fertilization does occur and development starts but the embryo soon dies, or where the hybrid lives to sexual maturity but is sterile, would belong to this second division.

All these isolating mechanisms are tremendously important to both the evolutionist and the creationist. The former has a very large order to fill in finding ways whereby the very stable kinds of organisms can give rise to new kinds. The creationist has the less-difficult task of discovering how the multitude of variations, breeds, races, and even modern species and genera have arisen within basic, created units during the centuries which have elapsed since the Noachian Flood.

Interselection

One of the difficulties of the theory of natural selection was to explain how factors in the external environment under selection could accomplish the origin of the "fine and delicate inner adaptations" when they were not in direct contact with them. In 1881 the French physician and bacteriologist Pierre Roux (1853-1933) proposed the theory of intraselection to explain this delicate inner adaptation. This theory is sometimes called the "battle of the parts," because he believed that contacts, stresses, and pressures of part on part either helped or hindered the development of organs. Where the most was demanded of muscle or bone, there the development would be greatest. Thus parts improved with use. Of course, the weakness here is that any such change could only affect the race by assumption of Lamarckism, which, at present, is negated by the facts of genetics.

Species

About the middle of the nineteenth century, when evolutionism first began to catch the fancy of naturalists, owing to the influence of the creationist taxonomist Linnaeus, the word "species" was commonly used synonymously with "kind." At least, Linnaeus had attempted to assign the name "species" to a group of individuals in nature which he believed had descended from a created pair. There was the man species, the sheep species, the oak species, et cetera. In many cases Linnaeus assumed that several different species had been created in a single kind-for example, in the horse kind, the horse, *Equus caballus* L., the zebra, *E. zebra* L., and the ass, *E. asinus* L. When Darwin wrote *Origin of Species*, he was seeking for the origin of different kinds of animals and plants.

As the controversy continued during succeeding years, the creationists maintained that the species had arisen by creation and had continued through the centuries unchanged except in comparatively minor details. The evolutionists, on the other hand, maintained that new species were gradually developing by transmission of acquired characters, by natural selection, or by some other natural process. Both schools used the word "species" to designate kinds of organisms as distinct as cows, horses, cats, and dogs, or corn, wheat, clover, and roses.

However, near the close of the nineteenth century there began to become common a type of namers of plants and animals (taxonomists) who came to be known as "splitters." In contrast with those like Linnaeus (the Jumpers') who wished to assign species names only to very broad groups of individuals which differed from those of other groups in many details and which would breed among themselves but not with those of other large groups, these workers began to assign species names to smaller and smaller groups of plants and animals. Such extremes were finally reached by the splitters that they were assigning not only different species names but also different generic names to groups of individuals which differed no more than by a few spots on the back, more or less, as in lady beetles.

Thus, as years passed, the opinion grew in many quarters, and most especially among taxonomists,

that a “species” is what a taxonomist calls a species. This was a most convenient thing for the taxonomist, but it licensed a procedure which completely obscured the old problem of origin of species. Added to this was the appearance of several species concepts in addition to the practical species concept just referred to. There was the morphological species concept, the genetic species concept, the concept based on sterility, and the biological species concept.

Consequently, in our day the word “species” has been stated to erect a different picture in the mind of every person who thinks of it; and our lists of species names are a conglomeration of names assigned by jumpers, by splitters, and by compromisers. What effect has this chameleon like shift in the use of the word had upon the old controversy of “origin of species”? In a general way today, evolutionists and creationists are talking about two entirely different groups when they say, respectively, “New species arise today,” and “New species do not arise today.” The whole situation is largely a case of understanding. A redefinition of terms is necessary.

When the evolutionist says new species arise today, he is referring to this very superficial modern species which may arise by the crossing of two other modern species, by mutation, or by some combination of several of the processes of variation. Illustrations of new modern species are Logan's loganberry, merely another variety of the raspberry-blackberry genus (*Rubus*); Skovsted's pinkflowered horse chestnut, another variety of the horse chestnut genus (*Aesculus*); and Kozhevnikov's artificial vinegar fly, *Drosophila artificialis*, from the crossing of two strains of another species of vinegar fly. Because the evolutionist has seen these new modern species erected in the laboratory, he thinks the creationist is little above a moron for insisting that new species do not arise today.

However, when the creationist makes such a statement he is not so dull, but rather merely looking to the past and not keeping up with the shift that has occurred in the significance of the word “species” as a result of different usage. He is talking about the species as it was understood in Darwin's day; that is, he is talking about kinds, as elephants, camels, giraffes, petunias, marigolds, et cetera.

The facts are, both groups are correct. New superficial groups do arise within already existing kinds, and species names have been assigned to many of these. Texts of zoology, botany, and biology are filled with illustrations of these new groups of individuals. However, in marshaling such cases to prove evolution of kinds, these authors merely proclaim that they themselves are confused. The origin of new varieties within already-known kinds is in no sense evolution of new kinds.

On the other hand, the creationist is correct in maintaining that new species (meaning kinds) have not been demonstrated to arise. Many poorly Informed evolutionist teachers teach their students that the evolution of kinds is a demonstrated fact. They themselves are confusing mere varieties of already existing kinds for new kinds. Evolutionists who know the facts here admit this truth. To illustrate, H. H. Newman, emeritus professor of zoology, University of Chicago, says:

“Reluctant as he may be to admit it, honesty compels the evolutionist to admit that there is no absolute proof of organic evolution.” [2]

Likewise, the late Thomas Hunt Morgan, founder of the Morganian school of genetics, which is now accepted by practically every geneticist in America and England, said:

“Within the period of human history we do not know of a single instance of the transformation of one species [kind] into another one. . . . It may be claimed that the theory of descent is lacking, therefore, in the most essential feature that it needs to place the theory on a scientific basis. This must be admitted.” [3]

It is not wise for the creationist still to insist that new species do not arise when the word “species” has so many meanings and when the general populace understands it in the narrow, superficial sense. In our day, if the word is used in other than taxonomic literature, it must be carefully designated in just what sense it is being used. The word “kind” is likewise vague; still I prefer to employ it in place of the Linnaean species, or rather, in place of “species” when applied to those original basic groups in nature which Linnaeus thought he was naming when he assigned his species names, because it has been less abused, and it is one which suggests greater differences than does the word “species.”

In our day the origin of “species” through the action of natural selection on the products of genetic variation is a demonstrated fact. But these “species” are not the “species” that Darwin was talking about in his *On Origin of Species by Means of Natural Selection*. He was talking about organisms as diverse as man, chimpanzee, opossum, and eagle. The “species” whose origin can be demonstrated today are apparently not steppingstones to new types of organisms. The more variable the organism is, be it snails, pigeons, or maize, the more fully the fact is demonstrated that, in each case, all the processes of variation act within a restricted locus, the boundaries of a kind, and are completely powerless in the erection of a new

kind.

Actually the mass of illustrations pulled together in textbooks of the biological sciences, with the intention of demonstrating origin of species (kinds), acts in the opposite direction. The more of these illustrations of variation and of citations of the improvement of our domestic plants and animals, the more firmly the perpetuity of the kind is demonstrated. Pigeons are known to us in the Jacobin strain, the homer, the nun, the carrier, the turbit, the swallow, the owl, the tumbler, the pouter, the fantail, and the leghorn runt. And yet the greatest possible variation here has never yet done more than produce another breed of pigeon. Our domestic dogs vary into more than two hundred breeds, but every one of these is unquestionably 100 per cent *Canis familiaris*. Some geographers and anthropologists divide man into as many as 138 different breeds (Griffith Taylor, [4]), and yet zoologists never question for a moment that these-Bushmen, Hottentots, Pygmies, all are members of a single species, *Homo sapiens*.

To assume that all we need in order to accomplish the origin of species (kinds) is geological time plus natural selection, is an assumption based on pure speculation. In the first place, the existence of our earth for millions of years has never been demonstrated. In the second place, elephants, horses, and camels appear in distinct kinds in the rocks with no inter-grades. The individuals in these kinds today are clearly linked with elephant like, horse like, or camel like ancestors. The origin of species (kinds) by natural selection is even a better fable today than in Darwin's day. I would suggest that the only theory relative to origin of kinds which harmonizes with the facts of variation is the assumption that each was caused to appear as a separate, distinct basic unit possessed of great power of variation within itself, but with no capacity for the production of variants which could evolve into new basic forms.

Ontogeny, Phylogeny, and the Biogenetic Law

Ontogeny is the development of the individual from its beginning at the fertilization of the egg to the final adult condition. Phylogeny is the evolutionary development of the group, race, family or order. Thus ontogeny is a demonstrable series of bodily changes, and phylogeny is an evolutionist philosophy which attempts to trace the ancestry of any plant or animal all the way back to its assumed earliest one-celled ancestor. This idea grew out of the enthusiasm with which Darwin's *Origin of Species* was received in 1859. The scientific world became so imbued with the task of tracing the evolutionary history of organisms that the embryologists could see the developmental changes of ontogeny only as a series of phylogenetic events. Led by the German biologist Ernst Haeckel, who developed the biogenetic principle, also called the "recapitulation" theory and the "biogenetic law," actually formulated by Fritz Muller, embryologists juggled the facts of embryological development in an endeavor to show that the embryonic development of an individual represents the recapitulation of the phylogenetic history of its kind. The war cry was, "Ontogeny repeats phylogeny." law." General biology texts and uninformed biology teachers still speak positively of the "biogenetic law." However, those who have exerted themselves to learn the facts of embryological development know that this "law" has now fallen from grace. Evolutionists still hold that there is some good in the principle, but the general status of the doctrine is described thus by Nordenskiöld:

***"In fact, the entire 'biogenetical principle' is nowadays severely challenged, even as a hypothesis. In the vegetable kingdom it has received no confirmation, which is indeed strange for a theory proposed to hold good as a general explanation of life, but even zoologists who in general give any support at all to the recapitulation theory do so with considerable reservations, called for by the results of modern hereditary research and experimental biology."* [5]**

The modern embryologist A. F. Huettnier says of this theory:

***"As a 'law,' this principle has been questioned. It has been subjected to careful scrutiny and has been found wanting. There are too Many exceptions to it. However, there is no doubt that it contains some truth and that it is of value to the study of embryology,"* [6]**

Doubtless to the amazement of the evolutionist, the creationist will agree with Huettnier that there is "some truth" in the recapitulation of race history in the development of the embryo. This is possibly true in such cases as 100th germs in the jaws of embryos in jaw regions which have no teeth in the adult stage, collar bones of the embryo sheep and their absence in the adult, and the development of optic cups in the embryos of certain blind cave fish and their absence in the adult. It may be that there was a time when adult whalebone whales had teeth, adult sheep had collar bones, and all adult fish had functional eyes, but through mutational change these structures are now lost before the adult stage is reached. If this is true, then there would be a certain amount of recapitulation of racial history in ontogeny.

Abiogenesis, or Spontaneous Generation, and Biogenesis

A biogenesis, or spontaneous generation, is the doctrine that life arises, or at least arose, from inorganic matter, without pre-existing life. Biogenesis, on the other hand, assumes that life comes only from pre-existing life or parents.

From Aristotle, 325 BC, to the Italian physician Francesco Redi, AD 1668, the scientific writers outside the church spoke scornfully of any who doubted the spontaneous generation of living things. Aristotle, Bacon, and Harvey appear on the list of those who accepted this doctrine. An illustration of the prevailing belief and the attitude toward those who doubted such origin of living forms is furnished in the literature of the seventeenth century in a comment made by Alexander Ross concerning Sir Thomas Brown's doubt that mice might be bred by putrefaction. We read:

***"To question this is to question reason, sense, and experience. If he doubts this, let him go to Egypt, and there he will find the fields swarming with mice begot of the mud of Nylus, to the great calamity of the inhabitants."* [7]**

From Redi, 1668, to Franz Schulze and Theodor Schwann, 1837, such doubting Thomases as Redi, Swammerdam, Vallisnieri, Needham, Spallanzani, Schulze, and Schwann examined the problem carefully by experimental tests, and the cumulative effect of their work was to disprove the doctrine of abiogenesis.

However, in 1859 the French naturalist and physiologist Felix Pouchet (1800-1872) opened again this question which had been set at rest. He decided that spontaneous generation must occur in nature, and although he experimented his case was prejudiced. He appeared to get opposite results from those of Spallanzani, Schulze, and Schwann, and declared the falsity of their conclusions. His position as director of the Natural History Museum of Rouen gave considerable force to his report, so the whole controversy was revived. But the most careful experiments of the French chemist Louis Pasteur (1822-1895) and of the distinguished English physicist John Tyndall (1820-1893) apparently forever disproved, on the experimental basis, the hypothesis of abiogenesis.

Today one of the most firmly established biological principles is the origin of life only from preceding life. Commenting upon this fact, McFarland says:

***"Thus Harvey's law omne vivum ex ovo which had long been accepted with reference to the higher beings became applicable to the lowest organisms in the modified form omne vivum ex rivo, and the doctrine of spontaneous generation of life might be supposed to have received its death blow. The evidences thus collected were subsequently investigated by a great number of workers, by a great variety of methods, but with uniform results and at present almost every scientific mind is satisfied that life in the forms in which we now know it is never spontaneously evolved. . . . It is almost certain that life is no longer being generated, and that its original appearance upon this planet took place under circumstances no longer existing."* [8]**

These facts notwithstanding, there are a number of scientists today who still cling to the hypothesis of spontaneous generation from a theoretical standpoint. It would appear that the idea of life having to originate in some supernatural being is distasteful to them.

Uniformitarianism.

At least as early as the close of the fifteenth century the doctrine of uniformity, the uniformitarian theory, was stated in its essence by the Italian painter, sculptor, architect, and engineer Leonardo da Vinci (1452-1519). Three hundred years later, in 1785, the Scotch geologist James Hutton (1726-1797) published his Theory of the Earth, in which he stated his conviction with regard to what forces were to be invoked in an understanding of geology. "No powers," said he, "are to be employed that are not natural to the globe, no action to be admitted except those of which we know the principle." This certainly is a beautifully clear illustration of a man whittling this portion of the universe down to his own small size. He seems not to have been concerned with the possibility of natural forces having acted in unnatural ways in the building of the present crust of the earth. With one flourish of his pen he brushes aside every possibility except that which he can see with his eyes and handle with his hands and understand with his mind. This immediately places the uniformitarian theory under suspicion of being too narrow to serve as a valid philosophical screening device for all reasonable theories regarding the origin of the earth's crust.

Hutton's uniformitarian theory did not receive any general acceptance until William Smith, Georges Cuvier, Jean Lamarck, and Charles Lyell had made their contributions to geology. The first three named added to the knowledge of fossils; and Lyell (1797-1875) in his Principles of Geology, published in 1830-1833, brought together all available evidence bearing on the manner and extent to which the earth is

still being reshaped by such forces as water, volcanoes, and earthquakes, as well as all known facts about fossils. Scientists were impressed for the first time by the possibilities of cumulative effects of long-continued natural processes. In the light of these facts the ground was prepared for Lyell to popularize the theory of uniformity, which Hutton had voiced forty-five years earlier.

Lyell is recognized as the founder of modern geology, which in its historical aspect, lamentably is built entirely upon the assumption of uniformity. In this way he was also a pioneer of the descent theory. Lyell's Principles came out while Darwin was making his five-year voyage around the earth and was thus just in time to give Darwin great encouragement in the opinion which he wished to adopt, that organisms had had vast periods of time in which to accomplish the development from simple to complex.

Because of their accurate portrayal of the effect of the assumption of uniformity upon a science which should be of the greatest importance to us, and because of the portrayal of the relationship between creationism and uniformitarianism, I will quote the following four paragraphs from George McCready Price:

“From all this, we conclude that, by following true principles of scientific investigation, we ought to be able to decide very positively whether or not any such event [as a world Flood] has ever happened to our world. A true induction, if it is good for anything at all, ought to be able to find out for certain whether or not the present regular and mild action of the elements has always prevailed in the past; so that there would be no need of assuming uniformity beforehand and then reading all the records of the past in the light of this assumption.”

“But the theory of uniformity was first taught when the scientific world knew nothing of the life at the bottom of the ocean, and when the most absurd notions were commonly taught about the mechanical and chemical conditions prevailing there. The whole geological series was blocked off, and much of the details arranged, before any of the leading scientists would acknowledge that man or any of the living species of plants and animals had anything whatever to do with these geological changes, or that actual representatives of our modern living forms were found as fossils in any of these ancient rocks. The fossil world was considered as entirely separate and distinct from the modern one; the two worlds were regarded as separate, having nothing at all to do with each other. People still treat this doctrine of uniformity, not as a mere hypothesis to be tested according to the evidence, but as a Procrustean law to which every newly discovered fact must be made to conform either by lopping off or by stretching.”

“But it is absurdly unscientific to assume uniformity and thus to decide beforehand just how the various geological deposits took place, and then throw out of consideration any and all evidence which does not seem to agree with this Procrustean law. If a coroner, called upon to hold an inquest, were to content himself, after the manner of these uniformitarian geologists, with glittering generalities and average statistics about how people are all the time dying of old age, fever, and other causes, coupled with assurances regarding the quiet, regular habits of all his fellow citizens, we could not admire the scientific methods which he employed, if there was clear and ample evidence that the poor fellow under consideration had been shot. just so with this doctrine of uniformitarianism; it is not approaching the subject in a judicial manner. It is not following the method of true scientific research, but the medieval method of scholastic dogmatism. The geological formations are not regarded as presenting materials for solving the problem of the past of the earth, but as materials for illustrating a preconceived theory of the present order of things prolonged and projected indefinitely into the past. Hence it is not much to be wondered at that under the tyranny of such a doctrine, the science of geology has made little or no advance in its theoretical aspects and in its methods during the past three quarters of a century, though during this period all the other sciences have been making astonishing progress.” [9]

“For these two theories [creationism and uniformitarianism] are in direct antagonism; the one is the direct denial of the other. We are done with the old burlesque of a long succession of catastrophes, in serial order, as taught by Cuvier and his followers. If we are to consider the theory of a world catastrophe at all, we must take it as it comes to us from the oldest and most venerable history of the human race, in which it appears as a veritable overturning of all the quiet and regular action of the elements, earth, and air, and water; and such an event can never be made to fit into any scheme of uniformity. The hypothesis of a flood or a deluge is that of a great world catastrophe, absolutely universal in its sweep, wholly abnormal, and essentially different from any event which has taken place under scientific observation, and of incalculable violence and power. And if there ever was such an event, this theory of uniformity can not be true. The two ideas are antagonistic and mutually exclusive. Each theory is on trial; and the evidence from the rocks must decide the one or the other to be the

probable explanation of how the major part of the geological changes took place.” [10]

Evolution and Special Creation.

Definitions of evolution and of special creation in textbooks for zoology, botany, and biology classes are characteristically impossibly vague. To illustrate, the definition for “evolution” in a college biology text used quite widely in the Central States area reads as follows: “Evolution, The theory that animals and plants have undergone, and do undergo, gradual changes through successive generations; that all living organisms are constantly changing.” [11]

This definition tones down the assertions of evolution to a point where even creationists could accept this sort of change and still be creationists. These constant fluctuations and small changes that do occur are not evolution in the sense that the theory of evolution demands. The theory asserts that all life began as one-celled forms from which more and more complex forms have developed; that is, new kinds must continually appear as assumed ages roll. Variations such as the above definition alludes to are actually known to occur; and a comparison of fossil forms with living forms of the same kind shows that small changes, principally in size, have occurred in geological time. The appearance of new forms so diverse from any thing else as to constitute a new kind of organism has never been demonstrated to have occurred. The extinction of kinds in large numbers has occurred in the past, but the erection of new kinds has never been proved. Hence the great interest of evolutionists in the degree of change that the known processes of variation can singly or collectively produce. They have a theory that is dear to their heart, and they are trying almost desperately to prove that theory scientifically can less be said of creationists?

The same college text in biology from which the aforementioned definition of evolution was taken defines “special creation” thus: “Special Creation.” The doctrine that each species of organisms is specially created. In the light of the variety of conceptions of a “species” today, this definition is unacceptable. With species being erected by taxonomists today upon characters no more basic than the number and pattern of spots on the back, or upon the existence of sterility when mated with a group which is morphologically identical, and with species being made to order by hybridization, it becomes absolutely absurd to assert that creationists maintain “that each species of organism is specially created.”

With all the welter of variation, one thing stands out crystal clear, and that is that any variant form of plant or animal is always indisputably still a member of a kind which is already in existence. These groups which possess boundaries beyond which hybridization and variation cannot demonstrably go are the basic units or kinds which creationists claim were created. [12] They may be vinegar flies, bumblebees, cats, rabbits, or squirrels; or they may be oaks, elms, sunflowers, or petunias; but whatever group they constitute they do nothing more than produce additional variants within their group, and they do not hybridize with the members of any other group (kind). Thus special creation is the doctrine that these distinct kinds were created about six thousand years ago.

Special creationists are just as much interested in processes of variation as are the evolutionists. In fact, they demand even more of variation in six thousand years than do evolutionists. An acquaintance with the mosaic pattern, which is universal in widely distributed plants and animals, shows that variation has occurred along with geographical distribution. This variation has gone to such lengths as to produce forms sufficiently different to receive separate species names from the splitter taxonomists. Illustrations here are the seven species of wild goats (Capra) of Eurasia, the six species of coyotes, the nine species of red foxes, the eleven species of caribou, and the seventy six species and subspecies of meadow mice in North America. That known processes of variation combined with geographical isolation are observed to produce these breeds which have been called “species” on our mammal lists, but do not bridge, and according to the geological record, have not bridged the abyss to new kinds, inclines the honest student from evolutionism to creationism.

7. Origin of The Earth

The problem of the origin of the earth has been approached with one of at least three attitudes of mind. The inorganic materials are considered to have erected themselves, or to have been spoken into existence by a Creator, or to have originated in ways which are unknown and unknowable.

Not uncommonly it is assumed that the earth has come about by progressive development and organization from a simple beginning, without plan and only by chance. No primary cause is admitted, at least not after the first materials were brought into existence. Regarding this first appearance, these individuals are extremely vague. Their attitude is usually agnostic here; that is to say, they maintain that the ultimate origin of the universe cannot be known, and they wish to make no assumptions. But with the simple materials on hand, they feel sure that no Creator was involved, but that purely natural forces acting by their own innate power have achieved the placement, development, and organization of the earth into its present position and state as an astronomical body. Individuals having this philosophy are said to possess an atheistic slant of mind, and the process by which they assume the development occurred is that of mechanistic evolution.

The creationists vary considerably in their philosophies of the origin of the earth, but they generally divide into two groups. One group assumes that the Creator was the primary cause; but that after having spoken the inorganic materials into existence in simple form, He left its operation and possible further development to secondary causes without personal intervention. The Creator is not necessary in such a universe after its creation, because it is assumed that it operates by inherent power and natural law. This is deism. These deistic creationists are really evolutionists and, to all practical purposes, after making the first assumption regarding the actual origin of materials, are likewise mechanistic evolutionists. Their Creator is most impersonal, unconcerned, and unnecessary after the primary creation.

The other group of creationists assumes the Creator to be not only the primary cause but also the sustainer who continuously directs and upholds the universe by a manifestation of His power which is spoken of as secondary cause or natural law. This is theism. The Creator of the theist is greatly interested in man; in fact, He has formed and equipped the earth especially to serve as a pleasant and suitable home for him. There are at least two kinds of theists: the evolutionist theists, or as commonly designated, theistic evolutionists; and the creationist theists, or theistic creationists, as the case may require. The former hold that God has, and is, creating by evolution. The latter hold that God spoke all kinds of organisms into existence about six thousands years ago during a creation week, and that since that literal week only limited variations have occurred within the original kinds.

The third general attitude of mind is that of the person who does not concern himself about origins. He says he and the universe are here and that is enough for him. He affirms that the beginning of our earth is unknown and unknowable. The chief concern of these individuals, called agnostics, is the present moment. Neither past nor future appears to challenge them.

Three principal hypotheses have been advanced in an attempt to explain the origin of our earth by natural forces. These are the nebular hypothesis, the planetesimal hypothesis, and the gaseous-tidal or tidal hypothesis. We will consider each of these briefly.

Nebular Hypothesis

This theory of the formation of the solar system was first suggested by the Swedish scientist and philosopher Emanuel Swedenborg (1688-1772), and then by the German metaphysician Immanuel Kant (1724-1804). It was later elaborated by the French astronomer Laplace (1749-1827), with whose name it is now identified. The theory was advanced to account for the formation of all the planets of our solar system. According to Laplace, the sun and all the planets were formed out of a nebula, or cloud, of intensely heated gas, which under the action of gravitation assumed a globular form. The mass gradually condensed and decreased in size while the velocity of rotation increased. Its whirling motion tended to flatten the globular mass at the poles. The continued contraction then caused rings of nebulous matter to be thrown off into space, as might appear to be the case of the rings of Saturn. Cooling would cause a rupture at the weakest point in each ring, allowing its gases to contract into a spherical planet whose orbit would mark the position of the ancestral ring around the central nebula.

Laplace did not investigate the origin or the formation of the original nebula, but confined himself to theories describing the evolution of the solar system from the nebulous mass. For a century Laplace's theory dominated the astronomical thinking of the world, but has been abandoned in the light of new

discoveries and a more critical analysis of known phenomena.

The scientific objections are so devastating that but few now accept Laplace's hypothesis. Some of these objections are as follows: (1) The present stable condition of the sun, The hypothesis demands that it should be rotating rapidly, bulging greatly at the equator, and about ready to shed another ring. On the contrary, the sun rotates leisurely and is not appreciably flattened at the poles. (2) Irregularities of the solar system. If formed as this hypothesis states, all satellites must revolve in the same plane and in the same direction as that of their planet. Moreover, each must revolve more slowly than its planet rotates. Therefore, exceptions which the hypothesis cannot explain are formed by Phobos, the inner satellite of Mars, which circles Mars twice every time Mars revolves once. By the eighth and ninth satellites of Jupiter, because these two are completely retrograde in motion; and by Phoebe and Hyperion of Saturn; by one satellite of Neptune; and by two of Uranus, which all travel obliquely to the plane of the orbit of these planets.

Objections to the nebular hypothesis which are more fundamental in nature are as follows: (1) Equatorial rings probably would be too hot and tenuous to hold together, with the result that the gases would leak away into space. (2) Actual momentum present in the solar system is insufficient to have caused the centrifugal force demanded to produce a ring unless the postulated nebula had shrunk to dimensions smaller than the orbit of the innermost planet. (3) Distribution of mass and momentum among the planets is out of harmony with the demands of the hypothesis.

Planetesimal Hypothesis

About the year 1900 two American scientists in the University of Chicago, the geologist T. C. Chamberlin and the astronomer F. R. Moulton, suggested an entirely different hypothesis, and boldly urged the abandonment of all theories based on an original, vast, rotating nebula. A brief exposition of their planetesimal hypothesis is as follows: Millions, perhaps billions, of years ago, a star larger than our sun passed close enough to the sun to pull out of it, by the tide producing force of gravity, an immense cloud of matter, constituting two filaments on opposite sides of the sun. This ejected material, to quote the words of the authors, consisted of "a streaming knotty pair of arms of nebulous matter shot from the sun and curved into spiral appendages about it by the joint pull of itself and a passing star." The larger knots became nuclei of the planets, which, as they established their orbits about the parent sun, grew larger by collecting the scattered nebular material. This scattered material consisted of swarms of dust like particles, planetesimals, revolving in their own orbits and occasionally colliding with the larger objects. Thus the planets grew by the slow accretion of myriads of tiny bodies, and these particles also fed the smaller nuclei, forming the satellites and planetoids. In course of time all the scattered material was gathered in by the larger bodies, and the solar system took its present form.

Some of the objections to the planetesimal hypothesis are as follows: (1) Structure of the earth. There is reason to believe that the earth has a metallic core surrounded by successive layers of less-dense materials, the granite rocks forming only a thin surface veneer. It is not clear how this density stratification could be attained in an earth that remained solid as it grew by the in fall of solid particles. (2) Limited salt in the oceans. According to the planetesimal hypothesis, there would be weathering of the materials gathered by the slowly growing earth since the stage when it was large enough to hold an atmosphere. Probably two thousand miles of its crust would have to suffer weathering. However, there is sufficient sodium in the average igneous rock at the earth's surface to supply all the sodium of the oceanic salt if no more than the outer half mile of the earth's crust had ever been weathered. (3) Dissipation of material. It has been argued also that if planetesimals were formed, their mutual collisions would have serve to scatter them into dust or a gaseous condition because they were individually too small to exert much attraction. If this be granted, the material ejected from the sun would eventually have been largely dissipated into a gaseous condition.

Gaseous-Tidal, or Tidal, Hypothesis

Most astronomers now accept the theory that the solar system was born through the disruptive influence of a passing star, but not all agree with the hypothesis that the planets grew by capturing planetesimals. A very recent hypothesis called the gaseous-tidal, or tidal, hypothesis has been developed by two Britishers, the astronomer James Jeans and the geologist Harold Jeffreys, that, in the eyes of many scientists today, more successfully avoids certain difficulties still faced by the planetesimal hypothesis. [1]

According to this hypothesis, the disruption of the sun by a passing star was caused by the tide-producing force with little or no aid from the eruptive activity of the sun. Instead of hot gas bolts shot out

from the sun from time to time, a streamer of very hot gas was steadily pulled out of the sun by the passing star and drawn forward by the star. This streamer, which reached the outer boundary of the solar system, became disrupted into ten parts, which formed into spheres, nine of them planets, and one of them the group of the planetoids. When the passing star moved far enough away, the planetary bodies, then dominated by the attractive influence of the sun, began to revolve around the sun in orbits.

According to this doctrine, the earth was originally a highly heated, incandescent gas. Then it cooled to full size molten condition. About the beginning of geological time a solid crust formed over the fluid interior. The earth was then surrounded by a very thick, hot, dense atmosphere which in time cooled enough so that its contained water vapor could condense in tremendous quantities, and thus produce the oceans and initiate the geologic processes of erosion. As cooling and solidification proceeded, lighter rocks were formed in the outer shell of the earth, and heavier and heavier material was formed downward toward the center.

This new theory, in the opinion of many scientists, appears to offer great promise. The following statement from Encyclopaedia Britannica is quite typical of the light in which it is held by many scientists:

“It cannot be denied that it [the gaseous-tidal hypothesis], also encounters formidable difficulties. Still, compared with other theories which have so far been suggested, it may fairly be said to show the greatest capacity for accounting for observed facts, and to be free, so far as is at present known, from any insuperable objections.” [2]

The most serious objection to the tidal theory, aside from that of the origin of the stars involved, is that if a streamer were attracted so far from the sun by a passing star, the gravitational attractive force toward the sun would by reason of increased distance be less than at the sun's surface, and that directed toward the passing body would be correspondingly greater. The budding planets would trail after the passing star instead of returning to swing in regular orbits around their parent sun.

According to the creationist doctrine as described in this present volume, our earth originated from nothing by the word of the Creator. In the beginning God created the heaven and the earth.” Genesis 1: 1. “For in six days the Lord made heaven and earth, the sea, and all that in them is.” Exodus 20: 11. “I have made the earth, and created man upon it: I, even my hands, have stretched out the heavens, and all their host have I commanded.” Isaiah 45:12. “Worship him that made heaven, and earth, and the sea, and the fountains of water.” Revelation 14:7. “The worlds were framed by the word of God, so that things which are seen were not made of things which do appear.” Hebrews 11:3.

It is apparent that the Creator could have shaped the raw materials of our earth through the employment of some such method as the gaseous-tidal hypothesis suggests. The statement of Genesis is that “in the beginning God created the heaven and the earth.” He could first have created the central mass or sun, then have formed the other members of our solar system somewhat as this hypothesis suggests. However, the philosophy of the creationist on this point is well expressed in the following statement by Mrs. E. G. White:

“The theory that God did not create matter when He brought the world into existence, is without foundation. In the formation of our world, God was not indebted to preexisting matter. On the contrary, all things, material or spiritual, stood up before the Lord Jehovah at His voice, and were created for His own purpose. The heavens and all the host of them, the earth and all things therein, are not only the work of His hand: they came into existence by the breath of His mouth.” [3]

The creationist holds that the substances composing our earth did not come from any other heavenly body, as, for example, from the sun as the gaseous-tidal hypothesis suggests, but were created specifically for use in our earth. When the Creator came to deal with this part of the universe He spoke the materials into existence. “God was not indebted to pre-existing matter. All things, material stood up before the Lord Jehovah at His voice.” From the point of view of the Scriptures, there seems to be no reason or excuse for assuming that the Creator went about the formation of the earth in any such roundabout way as the gaseous-tidal hypothesis outlines.

It might be well right here to remind ourselves that as each object in the progressive patterning of the earth's surface and of its inhabitants was caused to stand up before the Creator, the material from which it was formed was not simultaneously brought into existence. Reference to Genesis 1:9-12,20,24; 2:7,9,19,22 makes this point clear. The conclusion is that after the creation of the raw materials had occurred, all physical and biological formations of the six days of creation week were mediate in character. The earth was not heavier after the uplift of the dry ground on the third day (Psalms 104:5-9) than before the dry ground appeared, nor was it heavier after the plants and animals were formed from the materials which had earlier been brought into existence than before living forms existed.

It becomes an extremely interesting thing to observe the way in which scientists who do not accept the inspiration of the Bible, wave aside the story of origins given in Genesis. The geologists Schuchert and Dunbar say, "The first explanation to merit serious consideration as a scientific hypothesis of the origin of the earth was that presented by the French astronomer Laplace in 1796, now commonly known as the "Nebular Hypothesis." [4] This statement epitomizes the philosophical position of most modern scientists. Their philosophy is built upon two secondary assumptions: first, that the only way to arrive at the truth regarding origins is to adopt the scientific method-that is, only those things are true which can be demonstrated in the laboratory; and second-and this naturally arises from the first assumption-the Genesis story of the origin of the earth is untrue. These assumptions are in turn built upon the primary assumption of uniformity; that is, our earth has come into being and developed into its present state through purely natural processes which can be investigated in the laboratory.

In order to put their minds at ease in regard to the problem of the origin of the first basic material, mechanistic scientists, consciously or unconsciously, verbally or quietly in the recesses of their minds, endeavor to persuade themselves that nature has developed itself organically out of itself, from beginning to end, and continues to develop itself unceasingly. Concerning this Glenn Gates Cole says:

"The use of the word barah shows the concept of the miraculous; and it can be used in no other sense. It is no violation of discriminating scholarship to believe that all force and matter came into existence through a miracle. As such there is no scientific equivalent for it, since science does not deal with any forces other than natural ones. Miracles are not possible in science, since science is but a limited department of knowledge, and takes into account only natural phenomena. The only possible way for science to blot out the miraculous is, like Buckner, to make nature and natural law self-evolving; but, in doing so, it destroys nature and natural law itself by ascribing to it a property that the science of to-day emphatically denies. If there is any one principle that scientists insist upon above all the others, it is that nature is uniform and has always acted in exactly the same way. Shull avoids this difficulty by assuming that those activities which are impossible in nature today might have been possible in nature at some other time. A theory that assumes one fixed, invariable law one moment, and denies it the next, requires more 'blind faith' than the clear-cut statement of creation through miracle.

"It must be granted, then, at the very beginning of our discussion, that the word 'creation' belongs to a realm outside of that which is comprehended in science. But that does not authorize the scientist to deny that such a realm exists. This is the weakness of much of modern science, that it assumes there are no laws or processes outside of the scientific laws and processes. However, the late Mr. Charles Steiglitz was a type of scientist exceptional in this. He explicitly stated that his conceptions of matter and force were that there was a great supernatural realm in which they originated, into which science had no entrance, and that science was limited to the natural realm alone. Such an attitude would solve the friction between science and religion for all time. It is to be wished that all our scientists would acknowledge such logical grounds. While the more devout and reasonable ones do occupy that ground, there are too many of the scientific seekers after notoriety who deny the existence of the supernatural, and are so inclined to trust to natural law alone as to set out to solve the problems of religion, morals, law, society and life upon the dead level of material and natural law." [5]

The shortsightedness of those scientists who assume that the scientific method is adequate in the discovery of all truth, including the facts of origins, is dismayingly obvious and, ignoring supernatural influences, quite unexplainable. But the situation becomes tragic when these individuals, having, so to speak, placed short-range lenses before their eyes and blinders on the sides of their faces to exclude all possibilities except the operation of forces which can be demonstrated in the laboratory, speak loftily of what is and what is not "scientific" (using the term to proscribe all allusions to any supreme being) in regard to origins. The inflection of voice employed when saying, "But that is not scientific," is very effective, especially when enunciated by some seasoned scientist, in putting less experienced individuals into line. It does not take long for a generation of budding scientists to develop who speak mightily those things which they have not reasoned out for themselves but which have been passed on to them by "authorities." Thus Schuchert and Dunbar say, "The first explanation to merit serious consideration as a scientific hypothesis of origin of the earth was -" That pronouncement is sufficient reason in the minds of too many modern men to justify waving aside any consideration of the manner of origins described in Genesis. One of the greatest tragedies of all time is committed when a created being becomes so satisfied with his own small notions as to banish his Creator completely from his considerations. By such an act he automatically cuts himself off from any possibility of arrival at the truth regarding origins.

Man is a faith creature. This fact cannot be escaped even by those who choose to ignore the

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supernatural. The material substances of our earth are here, and their presence can be demonstrated. But today man quite universally recognizes that these substances have not always existed. By faith it is assumed that they originated sometime, somewhere. To believe that they brought themselves into existence from nowhere is naturally preposterous. The supernatural nature of their first appearance is an assumption which cannot be escaped. The marvel is that any man is content to omit from his philosophy that all-important part which gives sense and possible direction to all his conceptions of material substances. The inadequacy of any mechanistic doctrine of origins in explaining the first appearance of matter is most apparent. The measure of faith of the mechanist on this point is beyond comprehension.

Strange as it may at first appear, the supernatural explanation of the origin of our earth is the most natural and reasonable of all existing theories. It demands so little faith because it is so very reasonable. The material could appear from the immaterial only by the power of the Supernatural. The creationist theory of the origin of the earth thus becomes completely adequate, not only because it furnishes a reasonable origin for the basic materials, but also because it contains a satisfactory explanation of the shaping of these materials into the earth as we know it today.

8. Age of the Earth

In ascertaining the age of the earth, at least two points of view are possible. The student may assume that its age is discoverable by employing purely natural methods, or he may assume that its age cannot be determined by any natural means but only by accepting by faith the statements of Genesis.

Strange as it may seem at first thought, evolutionists and not a few creationists (shall we call them “uniformitarian” creationists?) conjointly accept the major premise that the age of the earth is discoverable by methods which are entirely natural. That is to say, this various group assumes that the age of the earth can be ascertained by a study of the concentration of ocean salts, by present rate of sedimentation and denudation, by number of varves, by the proportions of radioactive minerals. The great majority of “uniformitarian” creationists, however, agree with uniformity only in the case of the radioactive minerals.

The remainder of the creationist group (shall we call them “supernatural” creationists?) hold that it is impossible that the age of the earth cannot be entirely determined by natural methods because, it is assumed, the formation of the crust of the earth has not resulted from uniformity, but rather, largely by natural processes acting in unnatural ways during the Noachian Flood. A very important point which the “uniformitarian” creationist overlooks when he insists that radioactive disintegration is a true measure of the age of the inorganic portion of the earth, is the effect of this very Flood. All radioactive time calculations are built upon the assumption of uniformity, and yet this principle most certainly was not in operation during the terrific abnormal stresses and strains in the crust of the earth during and following the Noachian Flood. The radioactive time clocks would obviously be reset in at least many areas during that Flood. The “uniformitarian” creationist, as well as the latter, supernatural group, assumes the Noachian Flood was less than six thousand years ago.

The “supernatural” creationist also differs from the uniformitarian” creationist in his assumption that God, at the creation of the raw materials of the earth, did not necessarily create all inorganic elements in a pure state or in the cases of radioactive substances, in their parent form (for example, all uranium but no radioactive lead), but that He possibly created all members of the radioactive series, actively disintegrating as now, at the same moment of time. This philosophy is easy for the creationist biologist to accept, because that very situation obviously existed in the newly created plants and animals. We do not know whether or not Adam had a navel, but at least he was created a fully mature man of marriageable age. (Genesis 2:20-25.) We do not know whether or not the trees showed annual rings, but Genesis 1:11,12 portrays trees bearing fruit on the first day of their existence. One creationist writer in describing the appearance of the earth at the close of creation week says most logically, “The heights were crowned with trees more majestic than any that now exist And the Lord God planted a garden eastward in Eden.' . . . In this garden were trees of every variety, many of them laden with fragrant and delicious fruit.” [1] We do not know what marks of time the water animals may have shown; but we do know that, according to Genesis 1:21, at the close of the fifth day, great mature whales were moving in the waters.

Just suppose that a “uniformitarian” scientist had been set upon the earth at the close of the sixth day of creation week without any knowledge of how the plants and animals had originated. He would have stated positively, and apparently justifiably, that Adam was at least twenty-five years old; that the whales were, because of their size, possibly centuries old; and that the largest trees were obviously thousands of years old. But the facts were, according to Genesis, that not one was over ninety-six hours old.

The “uniformitarian” creationist argues that the Creator did not have to create uranium first and then get radioactive lead by “natural” disintegration, but that He chose to get that sort of lead in that way. The “supernatural” creationist argues that if the Creator chose to form mature men, whales, and trees in a moment of time, without depending upon the natural rates of growth, it would be expected that He would also create inorganic materials in a moment and yet in such a way as to indicate possibly great stretches of time. The doubting uniformitarian exclaims, “But why should the Creator form such obvious deceptions?” That question no man can answer, because the created cannot plumb all the thoughts of the Creator. But it is most important to observe that, according to the Genesis story, God did not permit man to be deceived. Adam talked with his Creator. What was necessary for his correct understanding of the age of the earth, that which could not be discovered from the earth itself, was supplied to him verbally by his Maker. In this the creationist doctrine is beautifully complete and satisfactory. The information with regard to the origin and age of the earth and of organisms upon it which day not be discoverable from nature alone, that which was imparted to Adam by the spoken word is available to the modern scientist in the written Word. Thus is the consistency of the Scriptural story of origins most perfect. A very brief consideration of the apparent

age of the earth as suggested by various natural phenomena will be given here.

Astronomical Estimations

Probably the first scientific attempt to determine the age of the earth was that of the British mathematician and physicist William Thomson Kelvin (1824-1907), who accepted the nebular hypothesis of the origin of the solar system, and then assumed that the constant shower of energy sent into space from the sun was the result of shrinkage of its diameter. On this basis Kelvin concluded indirectly that the earth was probably less than twenty million years old and certainly not over forty million. However, as later discoveries showed Kelvin's assumption concerning the origin of the sun's energy inaccurate, and as Darwin insisted that twenty to forty million years was too short for biological evolution; and as geologists insisted that more time was required to lay down the vast thickness of sedimentary rocks, his calculations were abandoned. Since Kelvin's attempt astronomy has had little to offer in determination of the age of our earth. According to the astronomer Ernest W. Brown, "there are no known methods derived from astronomical data alone for estimating the age of the earth." [2]

Salinity of the Ocean

If the water in the ocean was originally fresh; if all oceanic salt has been derived from the weathering of primary rocks; if all the sodium carried to the ocean remains in solution. And if the principle of uniformity has been in operation in delivering sodium to the ocean at a uniform rate, that is, if the present rate of erosion is an average for all geologic time, then total sodium in the oceanic salt divided by the annual increment equals age of the earth. Estimations based on the rate of delivery of salt by rivers to the ocean run all the way from fifty million to one hundred million years.

D. J. Whitney [3] has recently made a careful review of the determination of geologic age of the earth from ocean salts, and clearly shows why this system of computing time has now largely fallen into disrepute. In their discussion of these uncertain factors, the geologists Charles Schubert and Carl Dunbar, of Yale, conclude that "the method [of determining the age of the earth by the salinity in the ocean] at present offers no promise of a reliable quantitative value. It is not even certain that all oceanic salt has been produced by weathering." [4]

Denudation and Deposition of Sediments

As early as 450 BC the Greek historian Herodotus, through his observation of the annual overflow of the Nile spreading a layer of sediment over its valley, conceived of the possibility of determining the age of the earth from a study of the annual rate of such deposits. A concrete illustration of his deduction was made in 1854 when the foundation of the colossal statue of Ramses II at Memphis was found covered with nine feet of river mud. Because it is quite certain that the statue was at least three thousand years old, the rate of deposition at that spot averaged about three and a half inches per century. The total depth of river deposits at Memphis was found to be forty feet. According to this estimation, about 13,500 years would be required for the deposit of this surface veneer of the delta. There appears to be only one possibility of error here, but that is a very real one. It is not known that the average rate of deposit of sediments was the same for the mud below the foundation as for that above it.

The denudation and sedimentation method of age determination has been used during the present century more than any other method. The variety of age estimates by various workers is most amazing. Of this lack of agreement among sedimentarians, C. L. Burdick says:

"A little examination of the variations in estimations of rates of deposition will suffice to show how ludicrous is the attempt to estimate geologic time from the sediments. Some stratigraphers have claimed that one foot of sediments in 100 years was about the average, whereas others placed the figure as high as one foot in 2,350 years in the case of limestone, one foot in 1,000 years for shale, and one foot in 750 years for sandstone. Others have said that in some places it required 87,100 years to deposit one foot, a variation of 871 to 1.

"On the island of Timor in the East Indies, the upper Triassic is only 2.1 meters thick, but this thickness is claimed to represent millions of years of time. The Tertiary of the Ventura quadrangle of California is 9,000 meters thick, but this thickness is assumed to represent about the same lapse of time as the two meters of Timor. According to this assumption the California rate of sediment deposition was about 4,000 times that of Timor. Thus we see an enormous variation in rates of deposition in various times and places, even though comparative uniformity is postulated, according to the standard geological conception.

But according to the new Catastrophic Geology of the Deluge we can easily conceive of 9,000 meters or more being deposited in a very short time during the Deluge period.” [5]

It is in the light of this situation that none less than the high geologic authority of Yale, Charles Schuchert, remarked, “We do not as yet know the mean rate at which any kind of deposit accumulates. . . . That the local rates of sedimentation vary immensely among themselves is well known from the accumulations now going on.” [6] If that is the situation now, which is a time of comparative quiet, how would a possible world deluge such as the Noachian Flood about forty-three centuries ago further confuse the picture for sedimentarians?

The student of the determination of the age of the earth by natural methods finds himself repeatedly face to face with impossible problems. Neither is he aided in clearing this perplexity by studying the statements of “authorities” in the field of stratigraphy. To illustrate, Charles Schuchert and Carl Dunbar say: “It is already evident, therefore, that a study of the rate of formation of sedimentary rocks can give us no exact results for the total length of geologic time. It merely indicates that the Earth is very ancient.” [7] But the student recognizes this statement as to the certainty of the great antiquity of the earth can be true only in case the principle of uniformity is a true principle, and that cannot be demonstrated. There is always the possibility of at least one Noachian Flood in the past, and that possibility completely invalidates the principle of uniformity.

To the student who may be described as careful and thorough and not merely gullible, one who makes use of authorities where they are reliable but who rejects them when they go into the sort of philosophy which pertinent facts or possibilities do not necessarily support, the science of age determination of the earth by stratification and fossil content is ever a most dismaying thing. It has a saddening effect upon the cautious student to see the whole science of historical geology built upon the assumption of organic evolution. Scientific evidence for evolution is completely lacking, and yet here is a science which has most unfortunately erected very nearly all of its superstructure upon this unproved assumption. The following two quotations make this fact clear:

“Since each formation has distinctive fossils by which it can be recognized from place to place, it is possible by the extension of the kind of investigation suggested above to piece together the record and build up a complete chronology for a large region.

“In this reasoning only one assumption is involved, namely, that the rocks of a given age have fossils distinctive of that time and different from those of any other age. If that be granted, and it must be from the acquired knowledge, it is possible to correlate rocks of the same age from place to place over the Earth and thereby to determine the true sequence of events everywhere that fossiliferous rocks occur. Upon this principle much of the whole science of Earth history rests.” [8]

“Since the first introduction of life on the globe it has gone on advancing, diversifying, and continually rising to higher and higher planes. . . . Accepting, then, the undoubted fact of the universal change in the character of the organic beings which have successively lived on the earth, it follows that rocks which have been formed in widely separated periods of time will contain markedly different fossils, while those which were laid down more or less contemporaneously will have similar fossils. This principle enables us to compare and correlate rocks from all the continents and, in a general way, to arrange the events of the earth's history in chronological order.”[9]

The “acquired knowledge” of which Schuchert and Dunbar speak in the first of these two quotations is found on examination to be a very vague “something” which turns out to be merely biased interpretation of subjective data. The student must first accept the hypothesis of evolution before he will see any reasonableness in the evidence which geologists present here. There is always the chance that these different animals from different parts of the earth's surface were alive at the same time.

The average thickness of sedimentary rocks around the world is usually estimated to be about twenty-five hundred feet or nearly a half mile. However, upon the assumption made in the last two quotations, that different fossils lived at different ages, the thickness of all these strata patches from here and there over the world are added together, and according to Schuchert and Dunbar, “the total thickness of the stratified rocks now recognized would exceed 500,000 feet (95 miles) if the beds were directly superposed.” [10] The thing that chills the blood of the careful student is that, by the adoption of this strange method, the geologist, in estimating the age of the earth, first assumes that many long periods of evolutionary time, each represented by key fossils, have occurred. Then after adding the thickness of the deposits of these separate periods together, he proceeds to figure out the age of the earth, apparently entirely oblivious that in doing so he first assumes the very thing he set out to prove. There is no wonder

that age estimates based on this method vary from 95,000,000 to 536,000,000 years, and are absolutely valueless in giving even a rough estimate of the true age of the earth.

Varve Theory

A varve in geology consists of two kinds of mineral sediments, one lighter colored and coarser, deposited in the summer, and one darker and finer, deposited in the winter. Many geologists believe with Schuchert and Dunbar that “the bands in the varved clays, like growth rings in trees, record definite years of time, and it is a simple and quite certain matter to count the varves in a given clay pit and determine how many years were required for the deposition of that particular body of clay.” [11] However, the practice of geologists of adding together the varves from different localities is extremely questionable. It cannot be shown scientifically that the varves of one geological “age” in one locality were not being laid down at the same time that varves of another age” were being deposited in some other region.

Question is again raised on the accuracy of varves in indicating ages of deposits by the Siberian mammoth which, although with flesh and hair intact and with its stomach filled with undecayed food, still was buried within a series of varves. [12] If the varve theory is correct, many years, even centuries, passed before the carcass was covered. If the varve theory is true, we naturally question why the flesh of the mammoth did not decay or become eaten by wolves before the carcass was finally covered.

Radioactive Time Clocks

The demands of evolutionist biologists upon evolutionist geologists that the earth must be demonstrated to be at least billions of years old had the latter in a most difficult position. Only by the most fantastic methods, such as the merry-go-round type of reasoning referred to in the last section above, could they furnish an earth which was anywhere near as old as the evolutionists asserted it had to be. Due to this difficult position in which they found themselves, geologists in the early part of this century welcomed with great relief the radioactive time theory because it appeared to portray a very ancient world.

The chief radioactive elements which are concerned in this theory are uranium and thorium. These elements occur in certain types of granite igneous rocks, and in certain mineral veins, such as pitchblende. It has been assumed that, regardless of chemical associations, heat, pressure, or any other conditions, these elements undergo a slow and uniform disintegration into lead and helium. In a mass of uranium, the disintegration is extremely slow; but, it has been assumed, the rate is constant, regardless of all circumstances. After a crystal of uranium-bearing mineral has been formed, the uranium must therefore gradually waste away, and lead steadily accumulate. In this spontaneous disintegration one helium atom after another is lost, and the uranium changes through a series of substances until, with the loss of the eighth atom of helium, it becomes lead and is stable.

It has been ascertained that uranium disintegrates at a speed which would require 4500 million years for half of the uranium in a mineral to change to lead. At this rate of change the ratio of lead to uranium should give the age of the mineral, provided all the assumptions involved are correct. By the use of these data the earth has been estimated to be at least two million years old. [13]

There are several very good scientific reasons why the radioactive time clock is not a reliable indicator of the age of the earth. Briefly expressed, the more important of these points as adapted from C. L. Burdick's paper [14] are as follows:

1. Instability one of the outstanding characteristics of radioactive ores. Uranium is found in many minerals, such as phosphates, arsenates, sulphates, carbonates, and silicates, which are of secondary origin. It is associated with such unstable materials as copper, lead, zinc, bismuth, and silver ores. It is leached very easily and enters into many chemical combinations. Every time this occurs, that particular time cycle ends and a new one is started. This is going on all the time at infinitely varying rates and combinations. Therefore, there is no definite stability which would make a definite starting point possible.

According to the best authorities on sedimentation and mineral ore formation, this erosion, leaching, transportation, and redeposition cycle take place numerous times in the history of minerals and their elements. Twenhofel throws a flood of light on the question when he says:

“If an environment always remained constant at the conditions that permitted a mineral to form, there would be no changes. There are probably no places on the earth's surface, or in the outer crust, where immutability is possible. . . . Environments are constantly changing.” [15]

Whether therefore in igneous, metamorphic, or sedimentary rocks anywhere in the crust of the earth, most all ores are subject to chemical transformation and to transportation. Therefore, the likelihood

of the especially soluble uranium ores remaining unaffected by their environment for even a few years is so remote as to be negligible.

Much new light is now being thrown on the radioactive elements by the reports published by the Government of the hitherto secret war operations. That these radioactive elements, or minerals, are not particularly stable is revealed by the fact that in separating the rare uranium 235 from uranium 238, the elements were first changed into the gaseous state. In nature they are leached, then enter into new chemical combinations, and recrystallize. Each time this occurs, the continuity of the time calculations is upset. When uranium is volatilized in nature, most of the gas escapes, and time calculations are upset again.

These recent reports also state that when volatilized these uranium minerals were extremely corrosive. A corrosive substance is one that has a powerful affinity for other substances; and because of this characteristic, it easily makes new chemical combinations which neutralize their value as time markers. Mineral ores far more stable than uranium have been known to be seriously affected within the lifetime of one man.

In addition to the alteration caused by outside influences, internal forces would help to hasten the breakdown of the mineral crystal, and expose it to the processes of leaching. On this point Keevil says: "The crystal structure of radioactive minerals must be badly shattered by radioactive decay, . . . liberating a large amount of energy, and leaving . . . eight helium atoms and one lead atom [for every uranium atom]. This renders the mineral susceptible to alteration and selective leaching of lead and radioactive atoms and permits a partial escape of helium." [16] Under the enormous pressure and heat of metamorphism crystals are melted and re-formed, and there is every opportunity for loss of much of the by-products of decay. In 1927 Spitzin [17] showed that radium emanation is removed from radioactive minerals by flowing water.

It is beyond the realm of common sense to assume that these unstable, soluble minerals in the rocks could withstand perfectly the processes of erosion and leaching even for a few years. To assume in the face of these facts that they constitute accurate time clocks is little short of presumptive.

2. Suitable materials for age analysis not available. Until recently most scientists ignored contamination. They ignored the possibility that not all lead found with uranium was radioactive. They ignored the fact that common lead might be associated with uranium at the time of crystallization. They ignored the possibility of contamination with primordial helium. That such helium exists is suggested by the fact that it is found in some spring water, and in some natural gas it is present up to as much as 2 per cent. But no one has yet suggested the oil and gas fields as sources of uranium. The world's greatest supply of helium gas is from locations in Texas where there are no signs of unusual amounts of radioactive elements or any of their derivatives. Horwood [18] admits the possibility of contamination with primordial helium.

The Handbook of Physical Constants [19] enumerates five rigid requirements which each mineral to be tested for age must meet: (a) The mineral must be fresh and unadulterated and show no signs of leaching. (b) The isotopic constitution of the lead must be determined; (c) all chemicals must be checked for lead content; (d) all analyses must be made on the same sample; and (e) primal radiogenic lead must be absent.

The authors of this section of the handbook remark that "no radioactive mineral has been found which satisfies all of these requirements." This is the latest authority put out by the National Research Council and should carry some weight. According to the previous statement, there has not as yet been even a close approach to an accurate measurement of geologic time by this method.

3. No guarantee of uniformity in radioactive disintegration. That brilliant worker in the field of radioactivity Arthur Holmes put his finger on the sore spot when he said, "The only assumption that can reasonably be called in question is that of uniformity, and it is involved equally in both calculations [i.e., in sedimentary and radioactive calculation]." [20] That was made prior to the recent new developments in atom splitting. Today his statement would be much more forceful than when he made it. Dr. Gaschler [21] did succeed experimentally in disrupting the principle of uniformity when he succeeded in accelerating the disintegration process of uranium by submitting uranium oxide to strong rushes of momentary high-tension electric currents. This was done in the laboratory, but both Joly and Gillette [22] claimed its occurrence in nature under certain conditions.

These valid scientific reasons why radioactivity cannot be used in determining the age of the earth, plus the other good reasons discussed in Burdick's paper, show us that once again scientists are up a blind alley in their attempt to determine the age of the earth by natural means only.

The unreliability of age determination by the proportion of radioactive materials present is further exaggerated in attempts to date each geologic formation by this method. It is really quite impressive to hear

the evolutionist assert that the radioactive time clocks testify to the truth of his assumption that certain strata, for example, those containing fishes (375,000,000 years old), are older than those containing amphibians (235,000,000 years old). Until the creationist discovers the techniques employed in these determinations, he may well wonder why radioactive disintegration would apparently indicate that the evolutionist is fairly correct in his age estimations here.

But a light begins to shine when we read Adolph Knopf's [23] assertion of what is first necessary before the age of a formation can be determined by this method. With regard to the material upon which the determination is to be run, Knopf says, "The geologic age of the mineral should be known." In commenting upon this statement, Burdick, with clear discernment, observes:

"If the purpose of the test is to determine the age of the mineral ore or formation it might not be out of place to inquire why the age of the mineral deposit must be known in advance. Is the radioactive system unable to stand on its own feet?

"If the radioactive time-scale were merely applied vaguely to the age of the earth as a whole the difficulties might be less than by attempting to affix an age for each geological formation. Although the ages of the formations as computed by the radioactive formula are much greater than by the older methods, they are strangely proportional. (One naturally wonders and questions if this is because 'the geologic age of the mineral should be known in advance.')" [24]

Certainly if these very scientists were to discover any of their fellows perpetrating such hoaxes upon the public, they would be quick to brand such a statement as this one that the radioactive time clocks verify the evolutionist's assumption of greater age for rocks containing simple fossils than for those containing complex fossils as bald horseplay and nonsense.

In conclusion it should be noted here that not one of these methods for determining the age of the earth has any particular starting point. The year one in all these age determining methods is at a time when the earth was already in a physical condition much as it is today, and several of them postulate an earth as suitable for life as it is at the present time. Such an age is as meaningless as the calculated age of an antique automobile based on the time the last purchaser came into possession of it.

Creationist Assumptions Regarding Age of the Inorganic Earth

As we have remarked earlier in this chapter, two schools of thought exist among creationists with regard to the age of the inorganic part of the earth. Those in one school imagine a great gap in the Mosaic record between what they call a primary creation, when our entire solar system with its raw materials is said to have been established as an astronomical unit, and a secondary creation, in which the superficial features of our earth are assumed to have been shaped and the living things placed upon it during six of the literal days of creation week.

It would appear that the theory of the creationists of this school has been strongly influenced by the opinions of modern physical scientists. Largely from the observations of the phenomena of the radioactive time clocks, and to a lesser degree from a study of the phenomena relative to the speed of light, these creationists conclude that the inorganic, or mineral, portions of our earth are very much older than six or seven thousand years. Having made this conclusion, they apparently return to the Bible and search for texts which can be interpreted as substantiating such an opinion.

The three chief Scriptural references commonly given by this school, and brief explanations of them, are as follows:

"In the beginning God created the heaven and the earth. And the earth was without form, and void; and darkness was upon the face of the deep. And the Spirit of God moved upon the face of the waters. And God said, Let there be light: and there was light." Genesis 1:1-3. It is assumed that a vast gap of many millions of years occurs in this record between the second sentence and the command that light appear.

"I am the first, I also am the last. Mine hand also hath laid the foundation of the earth, and my right hand hath spanned the heavens: when I call unto them, they stand up together." Isaiah 48:12,13. These students state that the last expression here, "when I call unto them, they stand up together," tells us that the earth as an astronomical body stood up, or was created, along with all the rest of the hosts of the universe.

"Through, faith we understand that the worlds were framed by the word of God, so that things which are seen were not made of things which do appear." Hebrews 11:3. It is taught that this statement says that "worlds were framed"; therefore, our world must have been made at that first and, it is assumed, only "primary creation" of inorganic materials, which took place at the beginning of our entire universe. It is thought that this must be the case because, it is said, if our earth were created after other astronomical

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units, then the materials of our earth were made of substances which were already in existence somewhere. But the text says it was “not made of things which do appear.”

The opinion of the “uniformitarian” creationists is divided on whether or not God was bound to create the raw materials of our earth when all the rest of the universe was formed at the “primary creation.” Some maintain that the Creator could have created the raw materials on the first day of creation week, but that He chose to create them back at the time of the creation of all other heavenly bodies. Others claim that God was bound by His own natural laws to create our solar system when He formed all other astronomical bodies, because of the catastrophic effect resulting from unbalance which, it is assumed, would follow the insertion of our solar system at some time after the “primary creation.”

However, from a neutral point of view it must be recognized that these references are themselves neutral, neither decidedly supporting nor decidedly refuting the idea of a “primary” and “secondary” creation. The first of Genesis gives us a description of the earth which may apply as well to a creation of the raw materials on the first day of creation week as at some time millions of years before creation week. On that first day the Divine Potter first creates and then prepares His building materials, so that the inorganic mass lies before Him as shapeless as the mass of clay which the potter begins to mold into a vessel. This understanding of Genesis 1:1-3 is certainly as justifiable as is the assumption that a vast gap in time occurs between verses 2 and 3.

Likewise, Isaiah 48:12,13 most clearly does not state that the earth was created when all other astronomical units were caused to appear. The Hebrew word translated “call” is the word *kore*, which may also be translated “called.” However, commentaries uniformly translate it into the present tense. The Douay Bible places it in the future, thus, “I shall call them, and they shall stand up together.” Two typical expositions of this verse are the following: (1) Matthew Henry. They stand up not only in reverence to their Creator, but in a readiness to execute His orders; they stand up unanimously, concurring and helping one another in the service of their Maker.” (2) Jamieson, Fausset, and Brown. “The Almighty God who has founded heaven and earth, can, and will, restore His people. . . . But it is not their creation so much which is meant, as that, like ministers of God, the heavens and the earth are prepared at His command to execute His decrees.” To claim that these verses teach the creation of our earth at the time the universe was made to appear, clearly is a straining of the text to serve an opinion which is already formed.

Hebrews 11:3 makes clear to us that “in the creation of the earth God was not indebted to pre-existing matter.” It says nothing about the time of creation of any astronomical body. But it does state most clearly that at the time of creation of the earth or of any of the host of heaven, God spoke the material into existence instead of using material which was already present where the new unit was made to appear.

Considerable emphasis is placed by “uniformitarian” creationists upon the wording of the fourth commandment as an indication of a gap between Genesis 1:2 and Genesis 1:3. On this point Louis T. Talbot says:

“The Bible does say that in six days the Lord 'made' heaven and earth, but there is a difference between the words 'made' and 'created.' 'To create' is to bring into existence out of nothing. 'To make' is to take pre-existing matter and change its form. The latter is what the Lord did in six days.” [25]

But the careful Bible student observes at once that the story of what was “made” in the six days as related in Genesis 1 does not bear out this idea. Instead we find in Genesis 1:21, 28 that God did create during the six days. And the Genesis record makes it clear that the forms which are said to have been “created” were made out of material already in existence. Owing to this interchangeable use of *bara* (create) and *asah* (make), the careful Bible student dare not attempt to differentiate in this way between a “primary” creation and the work done on the six days of creation week. There is no Scriptural foundation for the removal of the creation of the mineral elements from the first day of creation week.

With regard to what are stated to be “records of primary time”—that is, the radioactive minerals and the speed of light—here again one must first assume the principle of uniformity in the case of radioactive disintegration before it can be considered as an indicator of great age of the mineral portion of the earth. But it certainly is not necessary to assume that the Creator would be bound to create uranium first and then let it disintegrate naturally in order finally to get radioactive lead. He could have created all members of the series, and this radioactive series would have presented an appearance of great age before it had stood for a single day. Some say that this could not be the case, for in so doing the Creator would be perpetrating a lie or deception. But it must be recognized that this would be true only if the Creator made no basic explanations to man. However, God did talk with the first man, and He has left on record sufficient details to clarify the situation in nature. The Creator avoided deception by supplying first the verbal and later the written information for the proper orientation of the mind of man on this very point. In the light of this most

important fact, the Creator cannot justifiably be charged with the perpetration of practical jokes or works of deception.

As we have noticed before, a uniformitarian, with no basic explanations on the part of the Creator, two minutes after the creation of Adam could justifiably have maintained that because Adam was mature and of marriageable age, he must have been at least in his twenties. And the presence of fruiting trees on every hand certainly would indicate a period of several years. The Creator could have formed the fertilized egg and caused Adam to develop naturally from the zygote, or He could have caused the trees to appear first as fertilized eggs which later developed naturally into adult trees. But Genesis states that He did not so choose to start the flora and the fauna. In the light of these known facts, is it not perfectly reasonable to assume that God likewise formed all members of the radioactive series of minerals at the same moment? At the end of creation week Adam, although giving every natural appearance of being at least in his twenties, was but one day old. The radioactive series could likewise have appeared to be millions of years old although actually but seven days old. The careful student must recognize these possibilities, and temper his conclusions concerning the age of the inorganic earth accordingly.

The second "record of primary time" of the "uniformitarian" creationists is the argument that because the light of galaxies, which are more than 500,000,000 light years (one light year equals about 5,880,000,000,000 miles) away from the earth, is now falling upon the earth; the earth must, therefore, have been here ever since the light left the star 500,000,000 light years ago. But even the simplest reflection on this point will show us at once that the fact that light which left a certain star these millions of billions of years ago is just now reaching us does absolutely nothing in the way of indicating the age of our earth. The earth could have been created only yesterday; but if it were set in the path of this light from the distant galaxy, that light would be upon the earth at the earth's first appearance as substance.

Some "uniformitarian" creationists insist that because of the effects of universal gravitation, the Creator would be incapable of adding our solar system to the universe any time after the universe was created, because such an addition would disrupt the balance in the entire universe. Theoretically, the disturbance of such an addition may be calculated, but practically and actually there are places without number in the universe where a solar system such as ours could be added without causing more than the slightest perturbation in the movements of any of the other units of the universe.

In its present location our solar system is about three and a half light years distant from its nearest neighbor, Alpha Centauri. The comparatively insignificant size of our solar system, considered with the fact that bodies in our universe attract each other with a force inversely proportional to the square of the distance between them, enables us to see that the presence or absence of our sun with its planets has no appreciable effect upon even the nearest star. This illustrates well the vast difference between theoretical astronomy and practical astronomy.

A very real objection to the idea that the inorganic portion of our earth was created along with all other members of the universe at some extremely distant time is the description in Genesis of the physical conditions of this earth before light appeared. Genesis 1:2 makes it clear that water was present at that time as water. According to Butler [26] this is a description of the earth during those millions of billions of years which he assumes elapsed before the first day of creation week when the sun first blazed forth its light. On the pages referred to, Butler assumes, from Job 38:4,9 and Genesis 2:4-6, that the earth was surrounded with a cloudy mantle and that a mist went up from the earth and watered its surface during those assumedly almost endless ages of "primary time."

The great difficulty here is the problem of explaining how the earth could circle through the frigid temperatures of interstellar space for those ages and, with no sunlight to warm it, still maintain a temperature above zero Centigrade. Even if it is assumed that it first appeared as a molten mass which had its heat conserved by a cloudy mantle, still during the profundity of duration which is assumed to have elapsed during "primary time," it would have cooled to a point where, on the first day of creation week, the Spirit of God would have had to move upon the face of the ice fields instead of "upon the face of the waters," as stated in Genesis 1: 2. Uniformitarians dare not assume any greater rate of radioactivity during "primary time" than now, and the radioactivity at our time certainly does not prevent the formation of ice even when the sun has "gone south" for only a few weeks.

In defense of a primary and a secondary creation of our earth it is suggested by some that during that great lapse of time between the two creations the sun need not have been so cold as to permit a universally frigid earth. However, it is very questionable if a sun would be able to keep the earth as warm even as zero Centigrade, which was so cold as to cast no light upon it. At least, the clear cut record of Genesis 1:2 states that "darkness was upon the face of the deep."

The difficulty which confronts the “uniformitarian” creationist who maintains that the earth must be very old because of the evidence of the radioactive time clocks is very great. He is obliged to assume that the mineral portion of the earth must have remained through his assumed “primary time” in much the same condition as now. For example, if the earth was a molten mass, his all-important clocks would not be in operation. But if he does not assume some temperatures above the melting point of the radioactive metals, the temperature of his sunless earth will fall below the freezing point of water millions of years before the first day of creation week, a situation which differs from the actual state of the earth on that first day before light appeared, as described in Genesis 1:2.

The other school of creationists on this point, those who may be referred to as the “supernaturalist” creationists, stay close to the literal reading of Genesis and of the fourth commandment. One most obvious teaching of these portions of the Bible is that of the length of the days of creation week. One writer expresses it thus:

“No language could have been chosen more explicit, nor any terms found in the Hebrew more definite, to express literal days, than those here employed. There was a first day, a second day, a third day, etc., each opening and closing with a definite evening and morning-literally rendered. There was evening, there was morning, day two, etc.” [27] Another writer, commenting on this same point, says:

“Like the Sabbath, the week originated at creation, and it has been preserved and brought down to us through Bible history. God Himself measured off the first week as a sample for successive weeks to the close of time. Like every other, it consisted of seven literal days. Six days were employed in the work of creation; upon the seventh, God rested, and He then blessed this day, and set it apart as a day of rest for man.

“In the law given from Sinai, God recognized the week, and the facts upon which it is based. After giving the command, 'Remember the Sabbath day, to keep it holy,' and specifying what shall be done on the six days, and what shall not be done on the seventh, He states the reason for thus observing the week, by pointing back to His own example: 'For in six days the Lord made heaven and earth, the sea, and all that in them is, and rested the seventh day. Wherefore the Lord blessed the Sabbath day, and hallowed it.' (Exodus 20:8-11.) This season appears beautiful and forcible when we understand the days of creation to be literal. The first six days of each week are given to man for labor, because God employed the same period of the first week in the work of creation. On the seventh day man is to refrain from labor, in commemoration of the Creator's rest.” [28] (Italics supplied.)

This latter author makes a most important point here. The basis of the fourth commandment is the integrity of creation week. The beautiful harmony and consistency of a twenty-four-hour Sabbath to commemorate six twenty four-hour periods of creation is disrupted if we assume that all the mineral portion of the earth, along with the natural laws and forces which operate or exist in it, was already here for millions of billions of years before the first day of creation week. “For in six days the Lord made heaven and earth, the sea [that is, the inorganic portion of our earth as an astronomical unit], and all that in them is [that is, the plant and animal life].” The logical reason for the Sabbath expressed by the Creator Himself in the fourth commandment, is the fact that in six literal days He created our entire earth and then rested during the seventh twenty-four-hour period. The second school of creationist thought on whether our earth was created all at one time or was begun in a “primary” creation and then completed in a “secondary” creation at a later date, considers the establishment of the Sabbath to constitute very real evidence that all visible substance was created during creation week.

Conclusions

Thus as we consider the problem of the age of the earth, we find that for the evolutionist scientist and for the creationist scientist there exists no natural method which is reliable in determining actual age. The evolutionists, ignoring the possibility of supernatural acts and strongly influenced by their acceptance of the theory of gradual development through vast reaches of time, feel certain that the earth gives every indication that it is very old. “Uniformitarian” creationists, working under the assumption that the uniformitarian principle actually applies in the case of the radioactive minerals, feel that we must conclude that the raw materials of our earth are very old. “Supernaturalist” creationists, interpreting the Bible most literally in those statements which apply to the origin of our earth, accept by faith the statements of Genesis 1 and 2, and of Exodus 20:8-11, considering that they teach us that the Creator formed our complete earth during the first six days of creation week. This apparently means to them that no part of the earth is more than six or seven thousand years old. This view has the advantage of being entirely consistent with the

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Biblical story of origins. According to Genesis, plants, beasts, and man appeared in a moment, many of them bearing in their bodies every evidence of having lived and developed for many years. The assumption that the radioactive series of minerals likewise appeared in all stages of decomposition is most logical.

All three of these views rest basically upon faith in something. Neither has any advantage over the other in this matter. Every scientist, in order to build a philosophy of the age of the earth, must forsake his characteristic method of laboratory demonstration and become a creature of faith moving in the realm of philosophy as he erects his theory upon the doctrine of uniformitarianism or upon the literal statements of the Bible.

9. The Bible

Everyone in general and the scientist in particular is interested in facts. In the light of this situation it is an incomprehensible thing that the Bible, one of the greatest facts in the history of the earth, should be such an unfamiliar book. I have frequently heard scientists make statements against the Bible, but in each instance the man was misquoting the reference or pulling it out of its explanatory setting; and generally, the most obvious fact was that he had not read it for himself, but was merely repeating some groundless charge that someone else had made in his hearing.

A typical illustration here is the charge that my professor of physiology once made in his university class that the story in Genesis of Jacob's work with the flocks of Laban is the first and greatest proof of the Bible's untruthfulness. He asserted that the Bible taught that all the mother had to do to mark the fetus within her was to look at some object, for example, the ring-streaked and spotted sticks of Jacob. That Jacob thought that that was the way nature operated is most evident in the story. But for the professor to assert that the Bible taught that type of prenatal influence was evidence that he had never really sat down and read the whole story for himself. If he had read this complete story, he would have discovered that the true teaching of the Bible here is found in Genesis 31:4-13, and the teaching of these verses shows complete harmony with the teaching of modern genetics. In chapter twenty-one we will discuss this experience of Jacob's.

A second illustration of inaccuracy in presenting the statements of the Bible is found in the following quotation from a college text in general biology:

"The Bible alludes to this belief [in spontaneous generation] when Samson propounded his riddle, 'Out of the cater came forth meat, and out of the strong came forth sweetness.' Samson saw flies coming out of the decaying body of a lion, took the flies for bees, which he believed were arising spontaneously from the lion's body, hence the riddle." [1]

Those who have actually read this story in Judges chapter 14 know that the explanation given by these authors is entirely inaccurate. According to the story as told in Judges, Samson had killed a lion in the desert. The carcass of this lion became largely mummified in the dry climate, so that it made an attractive shelter for a swarm of bees. When Samson came by that way again he found that the carcass contained honey. He gathered some of this and took it home to his parents. The incident later formed the basis of his riddle. There is not the slightest suggestion that the insects were flies, or that they had originated spontaneously from the decaying flesh.

In situations where students have not studied the Bible for themselves in their homes but have been forced to sit in public schools and hear a constant, unsuspected misrepresentation of the statements of the Bible by the teachers, there is small wonder that our generation should contain so many scientists and laymen who look upon the Bible as a mere collection of tales and legends.

As we have stated above, the Bible is actually one of the greatest facts in our present-day world. It is a most outstanding effect for which every man, scientist as well as layman, can profitably seek the cause. In fact, if the Bible proves to be a book of truth, then its statements are an absolute necessity in the formulation of every philosophy of life, whether, for instance, it is concerned with the matter of origins or with an explanation of the present day behavior of human beings.

As a book, the Bible is most unique. Most books are authored by one or a few men, and each book is quite invariably written by a single generation. But the Bible was written over a period of sixteen centuries, probably by nearly forty authors, who were men of many diverse professions who wrote not only in different centuries but also in different languages. And yet, amazingly, they wrote one book.

Another remarkable thing about the Bible is the fact that it has been preserved through all these centuries not only from destruction but also from corruption of its statements. The complete canon of the Old Testament has stood unaltered since it was fixed by Ezra, the scribe, and the "great synagogue" in the fifth century BC. As regards the canon of the New Testament, the Council of Carthage (AD 397) formally ratified what had for a considerable time been the judgment and conscience of the church. The firm conviction of those who preserved the Bible through all these centuries, that it contained God's messages to man, caused them to be most careful not only to preserve it but also to keep its wording accurate. Because of this fact, although the original text of the Bible has been copied many times, still no errors in copying have occurred which were sufficiently great to present inaccurately or to obscure the requirements for salvation from sin. Undoubtedly for some significant purpose we are able to read in our own language bits of conversation and many of the intimate details in the lives of men and women some of whom lived nearly

six thousand years ago.

It is remarkable that the Bible came through the Jewish nation, a nation with no other literature whose quality even approaches to the literary excellence of the Bible. The Talmud of the Jews can only be contrasted with the Bible in its literary qualities. How did the Jews, a people in constant turmoil and active revolt against the principles set forth in the Bible, and at that time an isolationistic, clannish sort of race, ever produce amid all their weakness and confusion a work of such sublime strength and harmony which teaches the brotherhood of all mankind? There is no natural explanation of this phenomenon.

No false volume of mere legends could ever have stimulated the intellects and energies and drawn the love and veneration of men as has the Bible. The extent to which the Bible has molded and influenced the intellectual and moral life of our world is almost beyond comprehension. Where the highest developments of civilization are to be found, there can be traced the words and principles of the Bible. It has always inspired the best in many at every level. The powerful modern epic *Paradise Lost* and that marvelous musical creation *The Messiah* have as their central themes the great topics of the Bible.

The Bible is with us, and exerts an even greater influence for truth and right than ever before. As one of the greatest facts in the world, it dare not be ignored by any, and most particularly by the scientist. The Book is before him. Dare he accept it as authentic?

Some appear to have the impression that it is a task for a specialist to determine whether or not the Bible is a reliable book. However, that is not the case. The Bible is a reasonable book written for reasonable men. Some faith is necessary in its acceptance as a trustworthy book, but man does not have to forsake his common sense in order to exercise the requisite faith. Man should never allow Bible critics to do his studying and reasoning for him. The critic may have some helpful suggestions, but man should never swallow unhesitatingly all that the critics say or ignore his own ability to reason.

The more familiar one becomes with the Bible statements in the light of the findings of modern science, the less of faith is necessary in accepting the Bible as reliable. The Bible student has everything to gain in a study of natural facts. The man who fears to face the facts of nature lest he lose faith in the Bible and God, evidently has little faith to lose. However, care must be taken to distinguish between the facts which scientists discover and the assertions which they make. Unfortunately, in this modern age, man in general has come to fairly worship science. In many minds the fact that a man is a scientist seems to qualify him to speak authoritatively upon any subject, including Bible criticism. In the presence of this attitude of mind science teachers do great harm in diverting men and women from Bible study.

The two foregoing instances relative to Jacob's experience with Laban's flocks and Samson's riddle about the bees, illustrate situations repeated times without number in schools of the country where the teacher talks the Bible down rather than leave it as an open subject for each to study for himself. A recent college text in general biology contains the following bald statement:

***"Advancement of science has rendered the Scriptural theories of life beginnings obsolete."* [2]**

This statement is misleading in two ways. First, in the Bible there is only one theory of the beginnings of life. Second, the facts of science never have shown and do not show the Bible theory of origins false. The very real fact of discontinuity in nature among all living things and among fossils completely harmonizes with an origin of diverse forms through creation, and absolutely negates a theory of evolution of complex from simple. And yet, gullible youth, in the presence of what they may justifiably consider authority in science, experiences a subtle to blatant undermining of the truthfulness of the Bible statements. There is small wonder that atheism today claims over half the students of many institutions of higher learning. The pathetic sequel comes when these very educators sit down and mourn because of the apparent failure of modern education to produce a sensible, restrained, Christian generation. The very effect of the teachings of the Bible in the molding of enlightened, sensible, dependable citizens is one of the powerful arguments in favor of its divine origin. The teachings of man too often lead to folly. They fail to endure through all tests.

It is not surprising, in the light of the natural results of anti-Biblical teachings, that we read such statements as the following by Will Durant:

***"The greatest mistake in human history was the discovery of 'truth.' It has not made us free, except from delusions that comforted us and restraints that preserved us. . . . This is the pass to which science and philosophy have brought us. . . . Faith and hope disappear; doubt and despair are the order of the day. . . . It is not our homes and our treasures that are empty, it is our 'hearts.'"* [3]**

The author of this statement fails to distinguish between science and philosophy. The findings of science have neither damaged our civilization nor lessened confidence in the truth of Bible statements. These evils have been accomplished through the philosophies of laymen and scientists. Too frequently

scientists fail to remain in their field, but digress to throw their influence in realms of thought where they do not belong. The president of the University of Chicago has appropriately remarked:

***"You will have noticed, too, that it has become almost a tradition in this country for a natural scientist after he achieves eminence and leisure, to employ some of both in metaphysical, and even theological, speculations. Without any particular training in these disciplines and with a healthy contempt for those who have, he proceeds to confuse the public further about the greatest questions that have confronted the human mind."* [4]**

Characteristically and inexplicably, when scientists endeavor to illustrate just how the Bible is obsolete in its statements regarding scientific facts, they misquote and misrepresent it. It is difficult to conclude otherwise than that they have some ulterior motive in this deliberate inaccuracy.

An illustration of this attitude toward the Bible is the common charge by some scientists that Genesis 2:20-25 teaches that man has only twenty-three ribs because one was said to have been taken from Adam for the making of Eve. [5] The most elementary knowledge of genetics tells us that any mutilation of the body of either parent is not passed on to the next generation.

Again, a common charge is that Genesis 30 teaches a type of prenatal influence whereby a pregnant female can mark her fetus by merely looking at some object. That Jacob thought such a thing was possible, the Bible record makes very clear, but it also makes very clear in Genesis 31:10-13 that the true cause for the marking of the offspring was the simple working of Mendelian principles of inheritance. This statement in Genesis 31 the critics seem always to have missed.

Again, the Bible is said to teach in the story of Samson (Judges 14) that spontaneous generation was a fact. [6] The critics assume that Samson saw flies in the lion carcass instead of bees, and that he assumed they had risen spontaneously from the decaying flesh. Actually the story in Judges chapter 14 does not in the remotest way suggest such an origin for the bees, and bees they were, as evidenced by the honey which Samson took home to his parents.

Again, it is asserted that the Bible teaches that the earth is flat and has four corners. (Revelation 7: 1.) True, the Bible does speak of the corners of the earth, but so do we in our "enlightened" age. We commonly speak of the four points of the compass and make such remarks as, "From one corner of the earth to another," the while never for one moment meaning that we believe the earth is flat. The teaching of the Bible with regard to the shape of the earth is found in Isaiah 40:18, 22. "To whom then will you liken God?" "It is he that sits upon the circle of the earth." It is very correct also to translate the latter verse in this way, "It is he that sits above the globe of the earth."

Not infrequently critics get the statements of the Bible confused not only with the interpretations given them by the church of the Middle Ages but also with the tales of mythology. An illustration of the latter is the claim that the Bible teaches that the earth is held up by some Atlas or elephant or turtle, or by all these combined. However, the Bible teaching here is very clear: "He [God] stretches out the north over the empty place, and hangs the earth upon nothing." Job 26:7.

Again, scientific critics assert that the Bible teaches that the earth stands still at the center of the universe, and that the sun moves around it. It is a strange standard which permits man in our day to say with impunity that the sun "rises and sets," but which immediately brands the Bible as "unscientific" and "obsolete" when it employs the very same terminology. True, the church during the Middle Ages taught that the earth stood at the center, but it was not Biblical on that point. The Biblical statement here is as follows: "Has thou commanded the morning since thy days; and caused the dayspring [dawn] to know his place? It [the earth] is turned as clay to the seal." Job 38:12-14. How very apt are these words of God as quoted by Job. Not only is the true motion of the earth indicated as its surface turns toward the east and ushers in the dawn, but the purpose of the motion is suggested-the clay is turned to the seal not just for motion but to receive the imprint of the seal. The earth turns toward the sun to receive the effects of the vitally important rays of the sun.

And so it goes; every charge which scientists have brought against the Bible in an attempt to disprove its claims of truth has proved on examination to reveal but one thing-the critic failed to discover the actual statement of the Bible on the point. In fairness to the Bible or any other book, the scientist or anyone else must not misrepresent statements. It becomes an arresting point in connection with an examination of the Bible to discover that every statement it makes which can be checked by science is found to be entirely accurate. He who doubts this must cease to depend on the say-so of other careless readers, and carefully examine the Book for himself.

When the scientist examines the Bible to ascertain its reliability, it is necessary for him to bear in mind that he is not examining a scientific treatise. Although the Book contains information which is of

tremendous importance to the scientist in his scientific study and in the erection of his scientific philosophies, still the Bible is couched in the language of the common, reasonable man. The scientist is on the search for truth, and he must beware lest his personal prejudices and dislikes, induced very possibly by extravagant statements, arrogance, and name calling on the part of individuals who pose as Bible students, sidetrack him in his quest for all truth, whether found in nature or in the Bible. It would constitute a tragedy indeed if a man should let pride prevent him from the discovery of vital truths in the Bible which may be absolutely necessary in the building of his philosophy of life.

The Bible commends itself to the attention of the sincere student not only because of its amazing antiquity, naturally unexplainable origin, remarkable preservation, and scientific accuracy, but also because of its credibility. Perhaps I should explain the use of this term here. The Bible is credible because of the high repute of its writers, because of its agreement with the known facts of history, because, without exception, its content is helpful to every level of society in every situation, and because archaeological discovery is found to verify its assertions. Because it is true in every one of the many ways in which its veracity can be checked, it follows with little faith that those assertions which cannot be checked are likewise true.

The supernatural, divine origin of the Bible stands without question in the light of the most exacting test that can be applied, the test indicated by the Book itself in the words: "You shall know them by their fruits." Matthew 7:16. What the Book does is the best test of what it is. Man, in a generic sense, has always felt his need of and dependence upon some supernatural power. Religious men among all peoples have sought after this Being, and several noted codes of morals have been developed by man as he has endeavored to satisfy the indwelling urge to reach higher levels of conduct and thus honor the invisible influence. Typical religions erected entirely by human efforts are Buddhism, Confucianism, Hinduism, and Mohammedanism. To determine whether these religions are divine or human, one needs but to look at the countries where they prevail and bear fruit: Buddhism and Hinduism in India, Confucianism in China, and Mohammedanism in Turkey and Iran. These desperate attempts, amounting often to a system of heroics, have failed to carry their devotees to that level of civilization where the individual is important, and where each man is his brother's keeper.

In sharp contrast with the conditions in these heathen countries is the enlightened progress always found in individuals and lands where Christianity has free course. The highest human development to be found has always been in those areas where the teachings of the Bible are applied the most closely. Where that area is located does not matter. The principles of the Bible produce the same fruit in every corner of the earth. This fact was borne home with a rush of relief to our boys in the last war when they were forced to bail out over supposedly hostile native jungles. The divinity of the Bible flashed forth once more as these black Christians ministered to the needs of their white brothers. Can human wisdom change lives, transform human character, give strength to the weak, impart courage to the depressed, or bring hope to the dying? When man seeks God by his own wisdom, futile heathen ritual with its hate results; but when, through the Bible, God seeks man, the way stands clearly marked for Christian brotherhood and higher planes of living. Do we need any further evidence for the divine origin of the Bible?

It is occasionally possible for a man to make a guess concerning some future event and then possibly see his guess come true. But the characteristic thing about the guesses of man is that he guesses incorrectly at least as often as he guesses correctly. In the light of the expected outcome of human guesses, it is amazing to the student of the Bible as a book to discover that, when understood from God's viewpoint, every event which writers of the Bible foretold came to pass in the specified manner and at the predicted time. The prophecies of the Bible and their fulfillment constitute a most fascinating story. The earlier of these foretell, many years before the event, such details of the capture of Babylon as the name of the man who would be the conqueror, the suddenness of its fall, and even the detail that it would be captured during a drunken feast, and finally that the ruined city was to remain perpetually desolate. These things all came upon Babylon exactly as predicted. The details regarding the series of calamities that would come to the great city of Tyre and the manner of their fulfillment are astonishing. The same is true of the fulfillment of the prophecies of Egypt's downfall and of those relative to the national history of the Jews. Except, of course, in cases of conditional prophecies, not a single prediction of the Old Testament failed in even one detail.

Since the closing of the canon of the Old Testament in the fifth century BC, its greatly detailed prophecies concerning the birth, life, and death of Jesus Christ have been fulfilled in every point. The books of Daniel and the Revelation are filled with predictions covering the centuries from the time of Daniel to the present. The twelfth, thirteenth, and fourteenth chapters of Revelation contain prophecies

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covering the time of the Christian Era and include reference to the rise, progress, and destiny of the United States. The detailed fulfillment of these prophecies demonstrates in a most approved manner the truth of the claim of the Bible that it is of divine origin. The student of truth dare not leave the reading of these proofs to others. These evidences are necessary at first hand in his decision regarding the source of the statements contained in this incomparable Book.

In the near past a characteristic attitude of unfriendly critics of the Bible was the lifting of the eyebrows in feigned amazement should anyone claim in their presence to accept the facts and statements of the Old Testament. They have asserted with an air of the summation of all knowledge that the records of the Bible are loaded with historical and chronological inaccuracies. The impression they have endeavored to make was that the Old Testament was entirely unreliable.

However, most interestingly, these loud assertions have grown steadily less voluble as the archaeologist's spade has continued to explore the sites of old civilizations. This changed situation has been brought about by the fact that every time the spade has uncovered anything which has a bearing on the Bible it invariably tends to prove, confirm, and corroborate the Bible record.

In the face of all these positive evidences of the divine nature of the Bible, there is small wonder that sincere students of truth are convinced that the Bible constitutes a portion of all truth which is of basic importance. The student who is content to listen to the opinions of others regarding the veracity of the Bible or its lack of veracity, and allows himself to be guided by what others think on this subject, is in a most unfortunate situation. Obviously the Bible is one of the greatest facts in the world. It must be studied fairly by every man. A philosophy, for example, of the origin of man or of the explanation of the conduct of man today, must of necessity be woefully lacking if it does not take cognizance of the great truths expressed so clearly in this most amazing and most astonishing and absolutely incomparable Book of books. And yet, the student of truth does not worship the Bible because it is a book. Rather, he cherishes it soberly, thoughtfully, and reverently, because through its pages the voice of the great I AM who caused all things to appear and through whom all things consist, speaks significant words to him.

10. Evolutionism or Creationism

Evolutionistic scientists and creationist scientists travel the same road as long as they confine themselves to natural facts. They are companions in research and discovery. Both have made great contributions to the facts of science. However, few scientists are content to spend all their time on the natural road. Such limitation of study does not answer the greatest questions which confront the human mind. It amazes the average man to see that there are a few scientists who appear satisfied to remain atheists or agnostics. One wonders how they can be content to be so superficial. Have they no imagination whatsoever, and how do they satisfy the stirring of their minds with such a nearsighted, low-level view of the universe? Furthermore, the faith which must be exercised in order to be an atheist is appalling to the average man. More accurately, what must be exercised to be an atheist will scarcely qualify as faith, because faith is a reasonable, sensible belief in something. An atheist cannot be reasonable or scientific and assume that our universe built itself from nothing. Things do not happen that way in a purely natural world. To believe that no higher power is necessary in our universe is more accurately presumption, not faith.

To illustrate this fact, let us consider the two theories which mechanistic (atheistic) scientists have set forth in an attempt to explain the origin of life on our earth.

Spontaneous Generation

If it is assumed that the first life appeared on our earth as a result of natural processes, the assumption is unscientific because one of the most basic and firmly established facts of biology is the principle of life only from life. And yet, knowing these demonstrated facts, some scientists are ever ready to guess unnaturally. For example, we read, *“Would it be too much to speculate on the origin of some simple form of life by allowing a flash of lightning to release the pure nitrogen of the air in some form of nitrate which would combine with the life elements found in sea water and the carbon dioxide of the air?”* [1] Natural things happen naturally. If they behave unnaturally, it is because of some supernatural force acting through them. For the atheist to assume spontaneous generation of living substance he must, in his philosophy, step out of the natural world and invoke some unnatural act. The assumption that natural substance would act in an unnatural way, being outside the realm of common sense, constitutes presumption. It would be more in harmony with natural processes and with pure logic for the atheist here to join the ranks of the theists.

Cosmozoic Theory

If it is assumed that life came to this earth from some other part of the universe (cosmozoic theory), again the assumption will be unscientific, for we know of no natural way in which protoplasm could bridge the celestial gap. If the low temperatures and absence of oxygen of interstellar space did not destroy it, the heat generated by the vehicle as it entered the earth's atmosphere would most certainly kill it. Of course, the assumption that life came from some other body in space merely evades the real issue, and makes any solution impossible. This philosophy of origin of life on our earth does not face the problem at all and, therefore, is not worthy of consideration.

The deistic evolutionist escapes the impossible problem which confronts the atheist by assuming a Creator who brought the first living forms into existence by creation. But from that point he plunges nature into a situation where it has to develop itself by its own laws, that is, lift itself with its own bootstraps. Here again we run into unscientific assumptions which impute unnatural actions to a system which, if it is assumed to be natural, cannot act in such supernatural ways. The deist arrives at the same point as the atheist. He must have recourse to unnatural processes if nature is to bring forth its present complexity from a primitive simplicity. His philosophy, to be logical and workable, must ever and anon fall back upon a supernatural power to miraculously lift natural processes continually into higher planes of operation. We have no evidence that nature is laid out on a grand spiral like a recording for a record player. Rather, natural processes behave more as concentric grooves on a disk. The needle follows around and around in the same groove; that is, for example, the unaided processes of nature are not progressive in the matter of the building of distinctly new forms of living protoplasm, but tend ever onward at the same levels. To set the needle in a wider circle requires a supernatural hand. In other words, according to all real scientific evidence, in order to bring forth a more complex type of organism some supernatural power must be invoked. This sort of philosophy would constitute double talk because it would be antideistic.

The proportionate number of mechanistic (atheistic) evolutionists among the scientists compared

with deists or theists has grown smaller in recent years. In fact, theistic evolutionists dominate the scene today. These scientists believe in a God who created the universe, and who is still the cause of its natural processes. Thus from a scientific point of view the essential difference between evolutionists and creationists is discovered in the answer to this question. Did God accomplish the present-day complexity among organisms during hundreds of millions of years of time through the operation of His power in the form of what we call natural laws, that is, by “evolution”; or did He speak into existence the most complex as well as the simple on the third, fifth, and sixth days of a literal, solar week, creation week, not over seven thousand years ago, that is, by “special creation”?

The problem here is to decide just how far the student shall limit his working forces to present-day natural processes. In other words, shall we assume that science alone can explain the presence of great complexity of structure and function in modern living forms, for instance, by assuming evolution. Or is it possible or even probable that man, unaided, is insufficient for the task and that a correct understanding here may require certain explanations by the Creator Himself?

Theistic evolutionists are largely of the mind that the former situation holds, that is, that nature herself reveals the origin of modern complexity; and they are in quite general agreement that this creation was by evolutionist processes working through vast periods of geologic time, the “days” of creation “week.” They often recognize that evolution cannot be demonstrated scientifically but nevertheless believe it has occurred. In the words of E. L. Rice, “Logically evolution still is, and must always remain, only probable; but the logical probability has become a practical certainty.” [2] Such is the effect of what a man wishes to believe upon what he believes.

The “practical certainty” of evolution is written into almost every biological text of our day. Often considerable space is occupied with “proofs” of evolution. This “proof” is assembled into several different categories, which we will now take up one at a time, very briefly, and study to see whether the logical probability is so great as to constitute a practical certainty.

Variation

Variation among living things is a most obvious fact. Our domesticated stocks of plants and animals show astounding variants as illustrated by the more than two hundred breeds of dogs; by the numerous breeds of pigeons; by the “cabbages,” including kale, cauliflower, Brussels sprouts, and our multitude of modern cabbages. And by the many color forms of our sweet peas. No one should attempt to deny variation within many stocks, because it is a very easily demonstrated fact. This great power among our plants and animals to vary reveals resident forces which evolutionists believe are sufficient to carry variation so far as to produce, in time, some new kinds of plants and animals. But the amazing thing here is that evolutionists quite invariably fail to observe that even in the most variable forms no new kinds appear. Dogs with all their differences are still unquestionably dogs; and sweet peas whether frilled or plain, scented or scentless, red, blue, or white, are still sweet peas. The evolutionist says, “Just give it time, and you will get a new kind”; but that is philosophy, not science.

This fact of variation is very greatly publicized by evolutionists, but the sad thing for evolutionism is that the more we study variations the more pronounced the fact becomes that all variation can do is to multiply varieties within already existing kinds. Neither can it be demonstrated that variation has produced any new kinds in the past. The pedigrees of horses, elephants, and camels are very possibly merely variants of kinds which were all living on the earth at the same time.

The fact of discontinuity is as obvious as the fact of variation. We find the kinds of nature standing clearly delimited—cats, dogs, and raccoons; sweet peas, clover, and locoweed. The same clear-cut discontinuity occurs among the fossils.

Thus there is no “practical certainty” of evolution from a study of variation. The facts, rather, harmonize completely with the idea of creation of complex as well as simple during creation week, each “after his kind,” just as stated in Genesis.

Taxonomy, Ontogeny, and Phylogeny

Taxonomy is the science of classification of plants and animals. Ontogeny is the development of the individual organism from the fertilized egg to adulthood. Phylogeny is the assumed developmental story of a group of organisms, that is, the evolution of the group.

The classification of all animals into a comparatively few main groups is possible because of the remarkable correspondence in fundamental structures, such as one-celled body or many-celled body,

presence or absence of a body cavity, radial or bilateral symmetry, ventral or dorsal nervous system, and presence or absence of a backbone. The natural fact that many animals have, for example, a backbone, is most obvious. The question here is, "What is the significance of this similar body structure?" The answer can only be philosophical. The evolutionist, quite to the extent of dogmatism, says it indicates blood relationship resulting from descent through a common ancestor. The creationist, with equal dogmatism, says that it results from the Creator choosing to make animals in natural groups, where, for instance, many kinds all have a backbone. Why (did the Creator do this? That is a question to which several answers might be suggested without profit. No scientific proof is available in the field of classification to determine which of these explanations is correct.

The development of the individual from fertilized egg to adult (ontogeny) presents a most intriguing, and often dazzling, complexity of procedures. The fact that each back boned animal begins as a fertilized egg, a single cell, and in the adult form always has an elongated body and two pairs of appendages as well as many structures similar to those of other vertebrates, means that, of necessity, it will look much like all other vertebrates in its early development. The question arises, Does the fact that man is one celled, the fertilized egg, in his earliest stage mean that his earliest ancestors were one-celled forms, or does it mean that the Creator chose to begin all vertebrates as fertilized eggs? Again, Does the presence of "gill arches," and occasionally a "gill slit," in his embryonic development mean that his ancestors once breathed by means of gills, or are these "arches" merely the beginnings of the adult lower jaw and throat structures which develop from them? Any positive statements on either side here would be unscientific because neither viewpoint can be demonstrated to be true.

A fact often overlooked by the creationist is that of secondary adaptation. If we designate such suiting of organisms to their basic environments, the fish for water and the bird for the air, as primary adaptations performed by the Creator during creation week, then we might designate those adjustments which have occurred since creation as secondary adaptations. Illustrations here are the complete adoption of the chimney nesting habit in our chimney swifts since chimneys have been built in America, and the change in color of pelage in Northern weasels from brown in summer to white in winter. Most creationists would doubtless be amazed to see the extent to which organisms have become secondarily adapted as living conditions have changed and processes of variation have accomplished their limited changes from the original pattern. An illustration of the latter situation is found in certain blind cave fishes in which a perfectly normal optic nerve and optic cup begin to develop in the early embryo but degenerate to a mere stub of the optic stalk in the adult. Evolutionists see this very real evidence of limited recapitulation in certain embryos, and jump to unjustified conclusions regarding the extent of change that has actually occurred as new generations have appeared during the phylogeny of the group. It must be borne in mind that no real evidence exists here that complex has developed from simple.

Homology and Analogy.-Homology is defined as structural likeness resulting from descent from common ancestry. Thus the term belongs to the evolutionist philosophy. Analogy likewise is likeness, but likeness in function instead of structure. All facts in this field are subjective. The fact that practically the same bones are found in the forelimb of the ox, the horse, the cat, the dog, and the man does not prove evolution, nor even suggest it except to the mind of one who already accepts the evolutionist philosophy. To the creationist these data suggest unit structural plans in the mind of the Creator, certainly as logical an explanation as the assumption that similar structure must indicate blood relationship. It is logical to assume that the fitting of many animals to similar conditions of life would result in much similar morphology or structure. In these situations the structures are as logically analagous as homologous and, therefore, not necessarily belonging to blood-related individuals.

Vestigial Structures

According to the evolutionist philosophy there are many structures, mostly in the bodies of higher animals, which correspond in plan and position to functional parts of other animals which are assumed to be related. Illustrations here are the splint bones in modern horses which are said to be vestiges of the second and fourth digits, the greatly reduced wing bones in the kiwi of New Zealand, and the atrophied optic nerve of the blind cave fish mentioned previously. In order to be truly vestigial, an organ must first be proved to have no function either in the embryo or in the adult. This eliminates the major part of such commonly listed structures, including the "gill arches" of the embryo man. Again, to be of evolutionist significance the vestigial organs must be proved to have been capable, when functional, of forming a different kind of organism. This eliminates such structures as the atrophied optic stalk of the cave fish, because a fish is a fish whether blind or sighted. Without doubt some so-called vestigial structures are truly

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vestigial; that is, degenerated structures which, back in the ancestry of the organism, were once functional. The degenerated eyestalk of the blind cave fish well illustrates this.

These vestigial structures really prove nothing in the direction of evolution, because even if each such structure were fully developed, the animal possessing them would merely have its “homologous” structures increased, and this could just as well indicate created adaptations as evolutionist change. Again, the logical probability of this evidence is far removed from the practical certainty claimed by evolutionists.

A very large fact in nature that evolutionists strangely do not take much cognizance of is that plants quite entirely lack structures which might be construed to be recapitulatory or vestigial. Recognition of this fact is given in the New International Encyclopaedia in these words: “There are reasons for believing that vestigial structures are rarely, if ever, present in plants.” [3] One evolutionist professor explained this to me by saying, “The reason the changing morphology of the plant embryo is not important in portraying the development of the race is that there is no embryo of the plant which could portray its ancestors as is the case with animals.” it would seem that this situation in plants should give pause to recapitulationists and vestigialists, because there is no logical or reasonable explanation of why protoplasm in developing animal individuals should assumedly rather slavishly relive its ancestral history, whereas plant protoplasm should make no gesture whatsoever toward the past. The logic of the creationist is clear on this point in assuming that the developmental story and the structural facts of the adults are what they are quite entirely because the Creator elected to make them that way, and not because the organism is reliving an evolutionist development in its ancestral tree.

The student of anatomy is every now and then face to face with some body structure which, in our state of incomplete knowledge, appears to have no function anywhere during the life of the individual. An illustration of what I refer to here is furnished in man in the nipples of the male. In the presence of such structures the creationist often feels inclined to accept Louis Agassiz's idea that each kind of animal, although created separately, was nevertheless formed in accordance with an ideal type, thus many homologies, and likewise, possibly, the presence of structures which, in certain groups, do no more than round out an architectural plan as the frieze which lies between the architrave and cornice of a building.

In commenting on such an idea, W. C. Curtis and M. J. Guthrie remark:

“Such an idea is a theoretical possibility, provided there is evidence that animals originated by creation in their present form and have not changed. However, animals do not seem to have originated in their present form, and they do seem to have changed during geologic time.” [4]

It should be pointed out here that origination by creation does not demand that each animal today look just as it did at creation. Creationism only states that original kinds have not changed into new kinds nor have given rise to new kinds. That some minor changes have occurred in most forms is evidenced by a comparison of fossil forms with living representatives of the same forms. But the changes of “geologic time” cannot be demonstrated to have done more than produce new varieties of created kinds. These facts, by the admission of Curtis and Guthrie, leave the idea of ideal types completely logical.

Biochemistry

Another large fact in nature is the exhibition on the part of animals that are structurally quite similar, of a certain degree of correspondence in the chemical nature of their blood. Here again we have unsatisfactory evidence because of its subjective nature. Similar chemistry proves nothing necessarily because in embryonic development a man and a giraffe develop from a human and a giraffe egg as a result of the different chemical setups in these eggs. The chemistry determines the morphology. This is apparently true, because specific form is determined by the genes in the chromosomes of each form, and the genes appear to be complex organic molecules. Similar morphologies have very similar chemical natures. This suggests evolution only in case different morphologies resulted from evolutionist development. But suppose the various morphological structures originated by creation. The same chemical differences would exist. Again, there is nothing of the nature of a practical certainty in all the physiological or chemical evidence that has been accumulated with great labor.

Geographic Distribution

It is the opinion of most evolutionists that the facts of geographic distribution fit very poorly into the creationist philosophy. The following statement by E. L. Rice illustrates this attitude: “If each species represents a special creative act, it is difficult, at least, to understand why zoological relationships should be so closely correlated with natural areas of distribution.” [5] This statement typifies a general

unacquaintance with the assertions of creationism. In the first place, modern creationists do not teach that every “species” was created. It is common knowledge to all biologists that many new “species” have been developed or have arisen naturally even in the last few years. But it is likewise recognized that no new kind of organism has been developed. All that has arisen is really merely another variety of vinegar fly, or primrose, or horse chestnut, or tomato. The assertion of creation here is not regarding “species” but regarding kinds—no new kinds have arisen since creation.

Another misunderstanding regarding creationism in this connection is its teaching concerning distribution. Because Louis Agassiz (1807-1873), who claimed to accept creationism, believed each organism to have been specially created and placed in its present location, it is assumed by evolutionists that all creationists have that opinion today. However, that is definitely not the case with regard to the great majority of creationists. These hold that the Noachian Flood, which occurred about forty seven centuries ago, was universal, and destroyed every land animal except those in the ark. These survivors disembarked in the mountains of Ararat and from this common center eventually found their way into their present locations. The distribution problem of creationists is thus practically the same as that of evolutionists.

It thus becomes evident that a creationist explanation of zoological relationships is not at all “difficult.” The innumerable situations around the world, such as the distribution of the giant land tortoises on the Galapagos Islands, are exactly as the creationist would expect them. In these islands fourteen different “species” of tortoises have been named on nine of the largest units. The creationist philosophy harmonizes completely with this variation within the kind, which, with geographical isolation, results in a mosaic pattern of distribution around the world within many kinds. The difficulty which evolutionism falls into in the light of all this variation with distribution is to explain how any evidence for such a philosophy can be claimed when new kinds can never be demonstrated to have arisen even in the ideal situation of geographic isolation.

Geological Succession

The open-minded student of geology finds that, with regard to the fossils, as a general rule, the remains of simpler animals are found at lower levels in the rocks and those of more complex types at higher levels. However, in not a single instance is it possible in any one place to find the changing forms of any line of animals which would be required to prove an evolutionary development of one kind into another kind. This fact is well worth pondering. Surely, if evolution had occurred as claimed, a great number of situations would be found where successively higher strata of undisturbed rocks would contain the connecting links between two kinds. At least, one such case should be known. But even that one case is lacking. The evidence that one fossil is older than another, except where vertical distribution in undisturbed strata might occur, is entirely subjective. It must first be assumed that the simple lived before the complex, and then with evolution postulated, the fossils are assembled and dated.

Concerning this situation in geology, W. J. Tinkle most sensibly remarks:

“Already we have seen how the age of rock strata is estimated by the included fossils much more often than by its position. Unfortunately for us this makes the geologic record of very little value for the present study, for if the fossils are used to tell the age of the rocks, we cannot turn around and use the rocks to tell the age of the fossils. The evolutionary geologist assumes the truth of the theory of evolution and bases his study upon it. Consequently his findings cannot be used to prove that animals have developed from simpler forms.” [6]

It is of tremendous import that the transformation of simple to complex can be demonstrated neither today nor in geological time. G. G. Simpson, [7] paleontologist of the American Museum of Natural History, tells us that the same discontinuity which is seen among living kinds today occurs among fossils. True connecting links are absent between all fossil kinds. So-called connecting links are merely assumptions, not demonstrated facts. The duckbill of today may be postulated unscientifically as a link between reptiles and mammals. But just as reasonably it may be assumed that it is a created kind. The same holds for all the forms which paleontologists assert are connecting links between two kinds. With an entire absence of intergrading forms this is the only scientific conclusion possible. With regard to the physical condition of fossils, their abundance and posture in the rocks, their vertical distribution, et cetera, the creationist theory of the universal Noachian Flood fits the facts without difficulty.

Of necessity, the present treatment of these groups of evidence has been very brief. For a fuller discussion of them I would refer the reader to the revised edition of my book *Evolution, Creation, and Science*. [8] However, probably the best discussion of these evidences obtainable today is contained in the

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book *Is Evolution Proved?* by Douglas Dewar and H. S. Shelton, 1947, published by Hollis and Carter, London. It is important for the sincere student of origins to realize that all the “evidence” for evolution presented so voluminously in biological texts and journals of our day under the foregoing headings is only subjective. It is evidence which is convincing only to one who already accepts the doctrine of evolution. Every evolutionist explanation of this evidence is balanced by one which is at least equally logical from the point of view of creationism. This fact is made most evident in the book by Dewar and Shelton. Even whole volumes of evidence of this unsatisfactory sort cannot prove or demonstrate evolution.

For this reason the honest student searches for real evidence bearing on origins. Informed evolutionists say we cannot find any demonstration of evolution in the living world, but they insist that such evidence is found in the fossil record. However, as we have noted above, authorities on paleontology tell us that the same discontinuity occurs among the fossils as occurs among living forms. Not one or all of the “connecting links” actually connect any two kinds. Furthermore, this discontinuity goes all the way back to the “earliest” appearance of each kind in the rocks. This great truth needs careful study and thoughtful consideration. The tremendous significance of the meaning of this fact grows upon the open mind. Here in the actual discontinuity of living and fossil forms is real evidence, and it is evidence which can be explained logically from only one viewpoint, that of the creation in the beginning of life on this earth of discrete, discontinuous, self-producing kinds of plants and animals.

An evolutionist once said to me, “The theory that kinds were specially created is blasphemous because it pictures God as deliberately attempting to deceive man. All the evidence in nature favors evolution. Because of this situation I cannot accept special creation because I believe God is an honest worker. If He had formed kinds by special creation, they would not give the appearance of having evolved.”

Such a conclusion as this is most sad. This man had approached nature through evolutionist teachers with an “open mind” regarding origins, and had through faith accepted the dogma of evolution because it was, for various reasons, the least distasteful to him. He had accepted a philosophy which can never be demonstrated to be true.

The creationist philosophy does not admit an open minded study of nature in the matter of origins. The Creator instructed man face to face as regards his origin and the origin of all living things. When it became evident that man might get confused regarding origins, God told the story to Moses, who wrote down the basic facts, which constitute the first book of the Bible. Under God's direct instruction the children of Israel drilled their children from their earliest years in the fact that the great Creator had formed all in six days. Thus the question, “How did these things originate?” was never raised. Man never wondered about that because he knew. On down to the present day his study of science began, and still should begin, with the few facts of Genesis, facts which are absolutely necessary to a true philosophy of science.

Thus the Creator never intended that man should become confused. I-le provided him with the Bible to assure his correct orientation. When man begins to feel self-sufficient, and refuses to accept the Bible as the guidebook in all philosophy, he is left to wander inexcusably, a danger to himself and to others. The evolutionist who sincerely believed the theory of special creation to be blasphemous furnishes a sad sequel to the rejection of the Guidebook and the adoption of an “open mind” in the study of the problem of origins. Only the creationist and the student of science who truly has an open mind (and he will of necessity become a creationist) can see the real conflict between evolutionism and the facts of nature. God knew that a nature deranged by sin would require a guidebook. The Bible is that book, and through a careful study of its pages we vision the real harmony and significance of the things of nature as they portray God's love for us.

11. The Days of Creation Week

Because of the simple, plainly expressed, straightforward quality of the narrative of Genesis 1, apparently no question regarding the length of the days of creation week arose in the minds of those who read it prior to the time of the early geologists who had accepted the principle of uniformity and concluded that the earth must be millions of years old. As this idea that the appearance of the earth's surface was due entirely to the action of natural forces acting in present-day natural ways began to spread, it became more widely apparent that an almost unlimited amount of time was needed to account for such phenomena as the Grand Canyon of the Colorado and the remnants of various mountain ranges which apparently had been worn down by processes of erosion. This demand for vast stretches of time was greatly strengthened by the acceptance of the idea of evolution which Charles Darwin set forth. Millions upon millions of years were required by his theory in order supposedly to give time for the simple to evolve into the complex.

Furthermore, just before the middle of the nineteenth century the English physicist John Tyndall (1820-1893) argued that the fossils embedded in the rocks gave every indication of great age rather than of the comparatively short existence they would actually have had if formed from created organisms as Genesis stated. He said, "If God made these in an instant of time, He has perpetrated a lie upon the human race." He objected that God could not have created an age-old fossil in an instant of time. This argument caught the attention of many who did not believe in miracles. Thus it was that the day-age theory sprang from an effort on the part of those who still wished to accept the Bible, to harmonize Genesis with the conception that present-day forms have evolved through vast periods of geological time. The days of Genesis were assumed to each constitute a period of such time.

With regard to the length of a geological period, Schuchert and Dunbar say: *"The periods as now defined vary in length from about 20 to 100 million years each, the two longest ones being the Cambrian and Ordovician; but when the principles of diastrophism and organic evolution are fully applied, ten, instead of seven, periods will be recognized in the Paleozoic, and the length of these will be between 20 and 45 million years each."* [1]

Actually, the idea that yom (day) means a period of time longer than twenty-four hours finds no substantiation in reputable Hebrew dictionaries, such as those of Buhl; [2] Brown, Driver, Briggs; [3] and Koenig. [4] Skinner remarks: "The interpretation of yom as aeon, a favorite resource of harmonists of science and revelation, is opposed to the plain sense of the passage and has no warrant in Hebrew usage." [5] Dillmann says, "The reasons advanced by ancient and modern writers for construing these days to be longer periods of time are inadequate. [6]

It is well to bear in mind that in Genesis 1: 5 the Hebrew word yom (day) is used in two different senses. Day (yom) when used with night (layelak) must refer to the light part of the day, roughly twelve hours. When the statement is made that the day is ended, the same word is used to mean a twenty-four-hour period. In Genesis 2:4 Tom is used in such a way as to embrace all the "yoms" of the first chapter. Furthermore, as pointed out by Rimmer, the word yom is translated in the Authorized English edition of the Bible "118 1 times as 'day,' 67 times as 'time,' 30 times as 'today,' 18 times as 'forever,' 10 times as 'continually,' 6 times as 'age,' 4 times as 'life,' and 2 times as 'perpetually.'" [7] In the light of these many uses of yom it is argued by day-age theorists that there is no way of telling from the context how long a period of time is indicated.

However, a careful study of the statements of Genesis 1 leaves no ground for such a conclusion. In fact, the context is the key to the length of duration to which reference is being made when the days of creation week are described.

At least nine good reasons exist for concluding that the days of creation week were literal, twenty-four-hour days. These reasons are as follows:

1. Testimony of Reputable Authorities.-This is the point to which we have referred in the third paragraph above this one. Hebrew dictionaries are our primary source of reliable information concerning Hebrew words. These sources know nothing of the notion that yom means an indefinite period. Commentators with critical leanings utter very decided statements to the effect that yom when used to refer to one of the periods of creation week can only mean a twenty four hour day.

2. Use of "Yom" When Accompanied by a Definite Number Serving as an Adjective.-In the Hebrew manuscripts, in every instance in which yom is accompanied by a definite number, a solar day is indicated. Without fail we have the second yom of the feast, the third yom of the journey, the seventh yom of the week, the seventeenth yom of the month, et cetera, et cetera. Applying this fact to the days of

creation week, we note that a definite number is used with each of these periods from one to seven inclusively. This leaves us with only one valid conclusion, these (lays were twenty-four-hour, solar days.

3. Instant Accomplishment. The very wording of the narrative indicates a shortness of time involved. To illustrate, in Genesis 1:11 the command is *dasha*, which literally says, "Earth, sprout sprouts!" And verse 12 records the prompt response to the command: the earth caused the plants to "go out" (*yatsa*). There is nothing in any part of the record which would in any way indicate that aeons or periods of time are involved. The phraseology of the record for each day indicates an instantaneous action.

4. Each Day a Period of Light and Darkness. It is impossible to reconcile the fact that each period of creation week was divided into a light portion and a dark portion with the idea that each of these periods was millions of years in length. This designation of the days is in exact conformity with the method of recording time in the Mosaic period. Evening and morning constituted one twenty-four-hour period.

5. Plants and the Dark Period. On the third day all kinds of plants appeared, the flowering, seed-bearing sorts as well as the simpler forms. Most obviously, if this "day" were a period of geological time, all plants would have perished during those millions of years of darkness before the light of the fourth day broke upon the world. Again, the only valid conclusion is that this day, as the others, was one solar day.

6. Interdependence of Plants and Animals. According to the statements of Genesis 1, plants, including flowering kinds, were created on the third day, but no animal was formed until the fifth day. The interdependence of plants and animals is a very conspicuous fact in the world of living things. To illustrate, in the matter of pollination alone multitudes of plants could not carry on from generation to generation without insects. And yet the record states that seed-bearing plants were successful from the very start. This could not be the case if insects did not appear until some twenty to forty millions of years later, as would be the case if the days were geological period.

7. The Sabbath Not a Geological Period. In the fourth commandment we read, "For in six days Jehovah made heaven and earth, the sea, and all that in them is, and rested the seventh day: wherefore Jehovah blessed the Sabbath day, and hallowed it." Exodus 20:11, A.R.V. If we assume that the days of creation week were geological periods, then, to be consistent, we must likewise assume that the day of rest was a period of millions of years. But in that case God is still resting, because Bible chronology shows clearly that not more than six thousand years have elapsed since the creation of Adam. If God is still in His seventh day, and resting, then it is difficult to explain the statement that Jesus made, "My meat is to do the will of him that sent me, and to finish his work."

8. Geological Time and the Age of Adam.-If these days were geological periods, then man was created in the sixth such division. According to the story of Genesis, Adam was created on the sixth day. Even if he had sinned and died as early as Sunday, he still would have lived through one entire period and parts of two others. This would require that he live at least twenty million years. But the record of Genesis 5:5 states that Adam lived 930 years.

9. The Sabbath Command. As we have already noted, the wording of the fourth commandment (Exodus 20:8-11) can be harmonized with creation week only when the days of that week are considered as solar days. The fourth command states in very clear language, "For in six days the Lord made heaven and earth, the sea, and all that in them is, and rested the seventh day." This is the statement of the Creator Himself, and in these words there is not the slightest evidence that the days of creation week were other than twenty-four-hour periods. The Creator's stated reason for asking man to keep the seventh solar day holy is the fact that He created all things concerning this earth in six solar days. In this commandment the Creator specifies what shall be done on the seventh. Six twenty four hour days followed by another twenty-four-hour day of rest alone can furnish a consistent analogy for our working six days and resting on the seventh day. The beauty and forcefulness of this reason appears when we understand that the days of creation week were literal.

Thus it becomes evident that the simple, clearly worded story of Genesis 1 tells in unmistakable words that creation week was a week of seven solar days, just as every other week has been since that time. No one doubted the literal nature of this week until individuals arose who, for various selfish reasons, did not feel inclined to accept the Bible story. Even many of those who still believed that God had created all things were inclined to be influenced by the speculations of unbelievers, and came to believe more and more in the principle of uniformity. They thought that the work of some of the days of creation week, that of the third, for instance, was too great to be compressed into a single twenty-four-hour period. Gradually, under the impact of the philosophy of evolution, the completely unjustifiable doctrine that the days of creation week were long periods of geological time has become the popular teaching of our day in most modern churches.

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We most certainly recognize the fact that the actual discoveries of science should aid us in making the correct explanations of certain Bible texts. Nature and the Bible have the same author, and so will never contradict each other. Wherever the Bible record is as clearly expressed as it is in Genesis 1, no conflict between the statements of Scripture and demonstrated scientific facts exists. It is extremely important to remember that those who promulgate the doctrine of evolution have no real proofs for their idea which cannot also be explained with at least as much sense from the viewpoint of the literal interpretation of Genesis. There is no necessity in nature for attempting to explain the days of creation week as periods of geological time. Complete harmony exists between the clear-cut statements of Genesis and the order of nature about us.

Evolution teaches that man is a glorified beast, a creature who has never fallen but who has always climbed higher and higher. Such an origin for man would make the death of Christ of no effect in his behalf, because there can be no redemption of that which has not been forfeited. However, the self-evident truth of the statements of Genesis assures man that he is not a descendant of beasts but instead can trace his lineage directly back to "Adam, which was the son of God" (Luke 3:38)-the man who forfeited his membership in the household of God by sinning. This fact places man in line for redemption and reinstatement into the household of God through the death of Christ. Meditation upon this tremendous fact will lead the individual who seeks for truth to praise his Creator that the doctrine of evolution is a false doctrine.

12. Science and the Christian Religion

Can a scientist be a Christian, or, vice versa, can a Christian be a scientist? Surprisingly, it is the opinion of not a few individuals that in order for a person to be both a Christian and a scientist he must have a sort of Dr. Jekyll-Mr. Hyde personality; that is, he must lead a double life.

Are the purposes of science and of religion so mutually contradictory as to make them incompatible? It seems to me that the famous physicist Robert A. Millikan (1868) has stated these purposes well in the following words: "The purpose of science is to develop, without prejudice or preconception of any kind, a knowledge of the facts, the laws, and the processes of nature. The even more important task of religion, on the other hand, is to develop the consciences, the ideals, and the aspirations of mankind." [1] Thus the Christian religion would be the development of these most important aspects of mankind around a central theme of the gospel of Jesus (God as the Father, perfect in all ways), and the gospel about Jesus (God . . . in Christ, reconciling the world unto himself." 2 Corinthians 5:19).

Millikan's statement directs our attention to the essential difference between science and religion. Science, when moving in its only legitimate sphere, is concerned with nothing more than natural things, those things we perceive and measure with our senses. Religion, on the other hand, has as its chief concern the evaluation of natural phenomena, and thus is synonymous with philosophy. In the eighteenth and early nineteenth centuries science was considered a division of philosophy, natural philosophy, a meaning still retained in the academic degree Doctor of Philosophy, which may now be given to individuals who have studied entirely in the field of natural processes. But today true science is limited (or at least should be limited) to the answering of the questions, "How?" and "When?" and "Where?" and philosophy is left to answer the single question, "Why?"

In many cases science may answer correctly the question, "Why?" by invoking natural processes. Thus, in response to the question, "Why does a plant turn toward the light?" the scientist replies, "Because of the unequal growth of cells on two sides of the plant as the result of a growth-stimulating hormone which is formed at the growing tip and which passes down the shaded side." However, it is observed that this answer is really explaining, "How?" instead of answering, "Why?" The philosopher may answer the "Why?" by explaining that a Creator has established such reactions in organisms as the turning of a plant toward light in order to enable the plant to carry on its growth, flowering, and fruiting successfully until it can have some part in equipping the earth as an ideal home for man.

Thus the two former divisions of philosophy, (1) natural philosophy, and (2) mental and moral philosophy, are now in practice designated, respectively, physical science and philosophy. The branch of philosophy which has to do with the service and adoration of God or a god as expressed in forms of worship is termed religion.

It seems very probable that the antipathy of some scientists for the Christian religion, which is not at all unknown today, harks back to the Middle Ages, when religious philosophy claimed all natural science and, being in civil power in many places, persecuted scientists for making observations known which were opposed to the teaching of the medieval church. The difficulty which Galileo got into when he declared that the earth did not hang at the center of the universe illustrates this unwholesome situation which is certain to develop when the church incorporates current scientific explanations into its dogma. The Christian religion today dares erect its dogma only upon the clear teaching of the Scriptures.

The friction which at times develops between science and the Christian religion is due to a failure on the part of either the scientist or the minister, or both, to recognize the bounds of their respective fields. As regards the scope of the field of the minister, a model is set for him in the manner in which the Scriptures treat upon science. The Bible contains many references to natural facts, but, except for a very few basic concepts, such as the creation of all things in the beginning, it is not a scientific treatise. How glad the creationist is for this fact! If Moses had filled Genesis with those things which were accepted as scientifically true in his day, Genesis would appear absurd to us today. Truth would have been so mingled with untruth as to confuse every reader since Moses' day.

Those who wish that the Bible, the foundation of the Christian religion, had been written as a scientific treatise should bear the foregoing fact in mind. Almost any scientific book is out of date and inaccurate in thirty years, if not sooner. It is reported that the library of the Louvre, in Paris, contains three and a half miles of scientific books which have become obsolete in fifty years. It is most significant that the Bible avoided any such scientific discourses as would require it to be rewritten every thirty years or more. The preachers of the Christian religion, that is, the ministry, would have done better all the way down the

stream of time if they had distinguished as discreetly between philosophy and current science as is done on the pages of the Bible. Current scientific truth is adapted to illustrative purposes if carefully handled, but it must never be written into the dogma of religion.

We live in a day when there seems to be a craze to test Scripture with science. Most lamentably the majority of modern preachers modify their presentation of the origin of man to harmonize with the majority view of scientists, that man has originated by evolution. This is the case to such an extent that the following words by Jan Christian Smuts, at the time he was president of the British Association for the Advancement of Science, constitute a true statement of the modern situation:

“The acceptance of the theory of evolution has brought about a far-reaching change in our outlook on the universe and our sense of values. The story of creation, so intimately associated with the groundwork of most religions, has thus come to be rewritten. . . . And man himself has had to come down from his privileged position among the angels and take his proper place in the universe as a part of the order of nature.” [2]

It is only on such points as these that any conflict at all arises between science and religion. The Scriptures teach clearly that though formed from the dust, Adam was the son of God. Science has not yet been able to demonstrate the evolution of man from lower forms. And yet, because it is now the opinion of most modern scientists that man has evolved, the popular pulpits of our day tag along after these men whose opinions have characteristically changed with every generation, and teach that man has not the lofty origin that Genesis teaches but rather is part and parcel with the beasts. It may be that in this life we shall never comprehend fully why man in our day is so worshipful of science, a structure which is largely a golden calf of his own manufacture. Reverence and worship are built into the very structure of man. He must worship something. Most unfortunately for the human race science has usurped the place of the Bible and has come to be the object of veneration. Before science an appallingly large percentage of the civilized peoples of our world bow adoringly.

H. B. English, of the Wesleyan University, Middletown, Connecticut, writing on the conflict between science and religion, says:

“The conflict between science and religion ... is most real.... Man's moral life is seen as the inevitable outcome of heredity and environment. . . . As science progressively takes possession of our modes of thought, religious modes become increasingly impossible.... Evolution in biology is now accepted by cultured people as a matter of course. . . . Religion claims to possess divine truth or a divine way to truth. It can not give this up and remain religion. And science demands no less than the unconditional surrender of this claim to truth. . . . Belief or disbelief in God matters little.” [3]

When James, M. Yard was director of religion in Northwestern University he made the following statement:

“College professors have put the supernatural in the museum of historic relics. It plays very little, if any, part in their thinking. Science has taken the place of God. You may think such things happen only in Russia. The only actual difference, I suspect, is that the Russians blatantly proclaim that they have scrapped the supernatural and enthroned science. We do not advertise that in America, but science is our God, and the scientific method is His high priest.... That morality must be based on science, and not on supernatural authority, is a new idea for many churchmen.” [4]

That Dr. Yard has exaggerated the atheistic situation somewhat is evident by the list of names of eminent scientists sent forth to the press in the early thirties by the physicist R. A. Millikan, declaring in no uncertain terms their faith and belief in God the Creator. Still we must recognize the general acceptance and teaching of the evolutionist philosophy with all its excuses for immorality in man.

If there be a conflict between science and the Christian religion, it lies right here in the fact that scientists have repeatedly trespassed into the realms of philosophy and have attempted to require all religion to be tested by the scientific method, the “high priest” of science. To do this is to assume in the most amazingly shortsighted manner that no other things exist in our universe except those things which we can perceive with our senses. The cheerful side of this picture lies in the fact that millions of individuals still live, scientists as well as laymen, who believe in the existence of God the Creator, and who believe that His plans for man include those things which are higher than the highest human thought can reach. The moral philosophy of science, an unnatural, unwholesome, and monstrous hybrid, draws man continually downward toward his supposed bestial antecedents, whereas, the true Christian religion lifts man by a Power from above. Man is the son of God, and God's infinite plans for the future of this being of His creation are above the greatest expectations possible to the imagination of man.

There is no conflict between true science, that is, natural facts, and the true Christian religion

except as the student of this vitally important issue employs faulty technique. Harry Rimmer [5] has illustrated this fact aptly by referring to the proper way to study minute objects through a microscope. A must of the microscope is to study the specimen through the lenses of the machine. Important and amazing truths are made known as the specimen is viewed through the lenses. But just imagine the inaccuracy of the observations and conclusions if the student were to pick up the slide upon which the specimen is mounted and attempt to study the microscope through it! Absurd! We say. But that is exactly what the scientist is doing when he places natural facts before the truths of revelation. As long as the observer studies the instrument through the specimen, he may never discover the most important and significant truths in the universe. That is to say, as long as the student limits himself to natural laws he can never gain a true philosophy of the origin and maintenance of our universe. It is through the employment of such faulty technique that the apparent collisions between science and the Christian religion occur.

Nature reveals God only to those who really have openness of mind. An atheistic philosophy quite completely closes any way to a discovery of God. But to the theist nature is pregnant with suggestions of a Higher Intelligence. The fact of matter must logically lead to the conclusion of a creation. Creation is evidence of intelligence, and intelligence resides only in a personality. Evidence of personality leads us to conclude there is a God.

However, the face of nature today may not necessarily reveal God to everyone. Those who insist on viewing the microscope through the specimen often think they see no evidence of the Supernatural. The existence of millions of heathen today is evidence that the natural revelation of God falls short of setting Him forth fully. A few of our great scientists and naturalists have clung to atheism until their dying day. This is evidence that, today, unaided nature cannot reveal God unquestionably. A study of the microscope through the specimen may reveal many worthwhile things, but how much more sensible to use our microscope, the Bible, as it was intended to be used-to serve as an indispensable guide in those key points of fact upon which we construct our philosophy of life. The fact of the Bible is evidence that God saw man's very need of the statements found on its deathless pages.

After depending quite exclusively upon unchristian philosophy and science for years, Will Durant was finally led to return from those soul-emptying exercises to Christian fundamentals. He finally came to remark: ***"Through all the adventures of the mind among philosophies and creeds the figure of Christ remains beyond comparison the most appealing in history. We do not need a new religion so much as a return to the old in its essentials and its simplicity."*** [6]

As scientists come to a careful study of the Guidebook of the Christian religion, they find that actually no ground exists for any conflict whatsoever between scientific facts and the Christian religion. Although the Bible contains some of the greatest truths, still it is not a scientific treatise. This situation in the Bible is most worthy of careful consideration. If Moses had written down the very best scientific opinion of his day, advancing science would have discovered its inaccuracy long ago. But the scientific facts stated in nonscientific language thousands of years ago are still completely accurate scientifically. That is one of the marvels of the Bible. That Moses, who was learned in all the wisdom of the Egyptians," and that Daniel, in whom the Babylonians considered that the spirits of the gods of wisdom dwelt, should write into their messages nothing of the accepted doctrines of beginnings of their day places the Bible outside of natural sources. Only those things were stated which evidently were everlastingly true. To the present moment no scientific inaccuracies have been discovered. True science can have no conflict with such a book.

The high point of controversy between science and the Christian religion concerns origins. It is the difference of opinion between numerous scientists and the book of Genesis in the matter of origins which has caused many scientists to brand the Bible a book of fables. Many of these teachers have through the years of their teaching experience and research developed a high degree of egotism. They have reached the lamentable point at which their conclusions must be received as infallible, or their dignity suffers. The statements of the Bible are declared to be old fashioned, legendary, and unscientific because it expresses different opinions from their own.

However, it must never be let slip from mind that there is no science of origins. Science confines itself to facts. The origin of living things cannot be demonstrated in one way or in any other. Hence, a study of origins departs from science and enters the sphere of philosophy. And philosophy depends entirely upon human conclusions, and these shift from generation to generation unless built upon the enduring Bible, which consistently spoke the same word through its succession of authors.

Thus we return once more to the theme at the beginning of this chapter. There can be no conflict or collision between science and the Christian religion, because these two realities exist at two entirely

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separate levels. With our science kept pure, concerned only with natural facts, and with our religion kept within its true sphere of explanation of the “why” of all we see and feel, there can exist no conflict. According as the Christian's faith in the statements of the Bible stands, will his philosophy of life be built. There is every reason for believing that a scientist who is a Christian will excel in his work because he will be consciously endeavoring to think the thoughts of God after Him. These thoughts can be discovered only through honest toil and devotion directed by enlightened minds. Workers of this type are rewarded with the secrets of nature.

13. Creation Week; Sunday to Thursday

Origin of the Creation Story. The Bible gives no explanation of the origin of the account of creation contained in Genesis. It is reasonable to assume that God Himself communicated the facts to Adam and Eve. From them it likely came by tradition to Moses, who wrote down the facts under divine inspiration, omitting any errors or inaccuracies which might have crept into the story by his time. The story is complete and satisfactory from every point of view. The Bible critic Skinner says, "It is a bold thing to desiderate a treatment more worthy of the theme, or more impressive in effect, than we find in the severely chiseled outlines and stately cadences of the first chapter of Genesis." [1] The Scriptures themselves treat this account as pure history. Note the following passages: Exodus 20:9-11; 31:17; Psalms 8 and 104; Matthew 19:4-6; 2 Peter 3:5; Hebrews 4:4.

1. THE FIRST DAY

a. Creation of the Substances of the Earth

"In the beginning God created the heavens and the earth. And now, as far as the earth was concerned, it was waste and void, and darkness was upon the face of the deep, and the Spirit of God was hovering upon the face of the waters." Genesis 1: 1, 2." [2]

This statement answers the question, 'What was the beginning of the earth?' Things began by the word of God in His creation of heaven and earth. As far as the earth is concerned, it had no existence before this time. The Creator is said to be *elohim*, a Hebrew word in the plural form, used to indicate the one who by His nature and His works rouses man's holy fear and reverence. These verses show clearly the falsity of the claims of pantheism by emphasizing the personality of God. He existed before the materials and forms of our earth, and spoke them into existence. Therefore, they cannot constitute parts of His person.

The word *bara*, here translated "created," is never used in the Bible in the *Kal*, or simple, form of the verb of other than divine activity. This word does not of itself always mean the causing of something to take substance and form from nothing. To illustrate, in Isaiah 65:18 we read, "Behold, I create [*bara*] Jerusalem a rejoicing, and her people a joy." Again in Genesis 1:26, 27, "made" (*asah*) and "create" (*bara*) are used interchangeably. However, in Genesis 1: 1, where no material is present which can be worked over, *bara* means "creation out of nothing." This doctrine is also taught in Romans 4:17; Hebrews 11:3; Psalms 33:6, 9; and Amos 4:13.

The statements of verses 7 to 10 of Genesis 1 make it logical to assume that the "heavens" and the "earth" of verse 1 are our firmament and our world, respectively. True, the same God created the rest of the universe; but, except possibly for the allusion to the stars (verse 16), the Genesis story is concerned first and last with our solar system and specifically with our earth.

Having stated that the two parts of our world, earth and firmament, or heaven, originated at the word of the Creator, the author of Genesis next describes the look of the raw materials of the earth mass immediately after its creation. The Hebrew phrase here translated "waste and void" is *tohu wavohu*. *Tobu* is a noun meaning "unformedness" and so can mean "waste" only in the sense of not yet being arranged in its final shape. *Bohu* comes from the root "to be empty," hence means "emptiness."

In commenting on this expression Dr. Leupold says: "Tohu is really a noun used as an emphatic adjective, as is also, of course, *bolgu*. The verb 'It was,' *hayethah*, cannot bear the emphasis in a sentence where two such significant predicates follow. It must merely serve as a copula. Consequently, all attempts to put into this verb some thought like: the earth then was there, or lay thus for quite a time, are grammatically quite inadmissible." [3]

This same expression, *tohu wavohu*, is used in Jeremiah 4:23 to describe the earth during the millennium, when living forms are to be absent, or nearly so. Yet it should be observed that the condition of "waste and void" pictured in Jeremiah referred only to the surface of the earth. In the light of this text it seems reasonable, therefore, to assume that the description in Genesis 1: 2 pictures the earth fully formed as an astronomical body and established in its geology, with the exception of its surface features, fully under control of "natural forces," and characterized by its lack of any living thing.

Absolute darkness existed at the surface of the earth mass. Apparently not even the light of stars reached the surface. That stars were in existence at that time is certain, because we now know that falling on our earth is starlight which left the stars millions of light years ago-and our earth, according to Bible chronology, cannot be more than seven thousand years old. It is probable that the blanket of fog which later

verses indicate surrounded the earth prevented starlight from reaching its surface.

The word here translated “deep” is the word *tehom*, which comes from the root *hum*, meaning “to resound.” That “deep” refers to water as we know it is indicated by the next clause where the word “waters” is actually substituted for it. It would appear that at least a large portion of the shapeless surface of the earth, if not its entire surface (see Psalms 104:7-9), was covered with water, and apparently, for some reason, this water was in sufficient agitation to be noisy. Common opinion to the contrary, air was not created on the second day but must have been brought into existence earlier with the other inorganic materials. If air had not been present, *tehom*, the “deep” or “waters,” would have evaporated promptly into the vacuum above the earth. Thus it would have been possible for atmospheric wind to act upon the waters to produce a noisy state.

Ruach elohim, the Spirit of God, or Holy Spirit, is presented as hovering protectively over the surface of the formless earth mass. This participle, *mera(ch)ckepheth*, is never used in the Bible to suggest brooding. It rather suggests hovering. The difference may be significant. A hen, for example, broods eggs but hovers chicks. The mythical interpretation of the Spirit hatching the world egg is not defensible.

The plural nature of *elohim* in the first verse is partly explained in the second verse by the presence of the Holy Spirit. This verse in connection with John 1:1-3, Colossians 1:16, and 1 Corinthians 8:6 makes clear that “the Gods” who created our earth were the Father, the Son, and the Holy Ghost. The plan was developed by the first two members of the Godhead: Christ, the Word, gave the command for the appearance of materials and forms, and the Holy Spirit was the active agent in supernaturally accomplishing the work. Thus *elohim*, “the Gods,” was triune in nature, the Trinity.

b. The Appearance of Light.

“And God said: Let there be light! and there was light. And God saw that the light was good, and God separated the light from the darkness. And God called the light day and the darkness He called night. Then came evening, then came morning-the first day.” Genesis 1:3-5.

The orderly sequence of the work of creation week is most impressive. In order to provide for the appearance

and sustenance of plants and animals, the raw materials had first to be brought into existence and placed under the type of control which we call “natural law.” Then the most essential prerequisite for life and existence was light

with its accompanying heat.

The Hebrew text here reads, *Ye hi or wa ye hi or* (Exist light, then exists light!). The word *or* does not refer to a heavenly body but rather to the physical phenomenon we call light. The source of this light is not revealed here. It is not illogical, however, to assume that our entire solar system was formed on the first day. In that event the sun would be present, and its light would appear in a diffuse form through the heavy moisture clouds that doubtless enshrouded the earth. That the earth began its rotation on its axis at its first appearance is shown in the fact that the first day consisted of a dark portion and a light portion, evening and morning. The last three days of creation week are clearly controlled by the sun, whose disc was first visible on the fourth day, and all the days are described in the same terms used to delimit the first three. This constitutes a strong argument that the first six days were alike in length and in nature, and were normal days of twenty four hours.

The Hebrew word *wayyabdel*, which is translated, “And God separated the light from the darkness,” does not mean that light was mingled with darkness and had to be disentangled, but rather means literally, “And he caused a division.” Thus one functioned at one time, and the other at another time. We can even be justified here in claiming that a separation of light and darkness in space occurred. The passage in Job 38: 19, 20 leads to such a conclusion.

It is of interest to note that in verse 5 the word “day,” *yom*, is used in two different senses. “Day” (*yom*) when used with “night” (*layelah*) must refer to the light part of the day, roughly twelve hours. When the statement is made that the “day” (*yom*) is ended, the same word is used to mean a twenty-four-hour period.

It is sometimes set forth that the expression “then came evening, then came morning” means that the day began with morning rather than with evening. The argument used at such times is that verse 5 describes the conclusion of this day's work, not its beginning—that is, evening merges into night, which is terminated by the next morning, the beginning of the next day. This is the view of a group exemplified by Procksch,[4] who holds that “evening” is used as the termination of the light portion of the day and “morning” as the end of the dark portion. However, it must be recognized that the beginnings of the two

halves of each day, i.e., “evening” for the dark portion and “morning” for the light portion, could just as well be used to indicate the whole day as could the endings of the two halves. In fact, it appears much more logical that each half be demarked by that which sets it off from the half which precedes it than that the ending of each half be used to indicate the twelve-hour period which it terminates. The argument that all of verse 5 describes the conclusion of the first day does not necessarily hold. It will be noted that the expression, “came evening . . . came morning” appears at the close of the record of each day. The author obviously uses this expression not only as a summarizing statement for each day but also for the purpose of making very clear the fact that all the days were equal in length, each consisting of approximately twelve hours of darkness followed by approximately twelve hours of light, “evening” and morning.”

It is not necessary that the student be puzzled as to whether each day began with evening or with morning. Any apparent difficulty here is cleared completely when we recall that the Creator Himself redefined the limits of the Sabbath to the children of Israel in His direction that they should observe the sacred day “from even unto even.” (Leviticus 23:32) We read in Genesis 2:2, 3 that the final act of creation week was the sanctifying, or setting apart, of the seventh day to holy use, and the placing of a very special blessing upon the hours of that day. This memorial of the work of creation and token of the love and power of the Creator was to endure as long as the earth should last, and on into eternity. (Isaiah 66:23.) That it was a permanent institution already in existence before the law was given on Sinai is evidenced by the miraculous provision of manna on the week days and by its being withheld on the Sabbath, as well as by the rebuke from God of those who looked for manna on the seventh day. (Exodus 16:22-30.)

The seventh day of creation week began at the close of the sixth day, which, in the light of Leviticus 23:32, closed with the setting of the sun on Friday evening. It is wholly inadmissible to hold that the Creator would have told the children of Israel that the Sabbath began at sundown Friday if, at creation, it had actually begun with the rise of the sun on the seventh day. If Procksch is correct in his assumption that the word “evening” is used to mark the close of the light portion of the day and “morning” is used to mark the end of the dark portion, then the Sabbath delimited for the children of Israel would have consisted of the dark portion of the sixth day and of only the light portion of the seventh, the only day which was sanctified in its entirety. But the statement in Genesis is that the sixth day had ended before the seventh day, or Sabbath, began. There can be but one correct conclusion here—that the seventh day began as did the last five which preceded it, at the setting of the sun on the preceding day.

The idea that yom (day) means a period of time longer than twenty-four hours finds no substantiation in such reputable Hebrew dictionaries as those of Buhl; [5] Brown, Driver, Briggs; [6] and Koenig. [7] Skinner remarks, “The interpretation of yom as aeon, a favorite resource of harmonists of science and revelation, is opposed to the plain sense of the passage and has no warrant in Hebrew usage.” [8] Dillmann says, “The reasons advanced by ancient and modern writers for construing these days to be longer periods of time are inadequate.” [9]

The fourth commandment (Exodus 20:8-11) states that because God made the “heaven and earth, the sea, and all that in them is” in six days and rested on the seventh, we are likewise to labor six days and rest on the seventh. Six twenty-four-hour days followed by one such day of rest alone can furnish a proper analogy for our laboring six days and resting on the seventh.

2. THE SECOND DAY

a. The Establishment of a Clear Space

“And God said: Let there be a firmament in the middle of the waters, and let it be causing a division between waters and waters. And God made the firmament and He caused a division between the waters under the firmament and the waters above the firmament: and it was so. And God called the firmament heavens; and came evening, and came morning. Second day.” Genesis 1:6-8.

The word “firmament” is from the translation of firmamentum of the Vulgate which connotes something firmly set in place. However, the Hebrew word translated “firmament,” *raqia*, indicates something nebulous or intangible, a limitless expanse. Thus the command here becomes literally, “Let there be something nebulous and unlimited spread out between the waters, to separate the waters from the waters.” These verses indicate that at the beginning of the second day the surface of the earth was largely covered with water, and the atmosphere was a chilling blanket of fog that obscured the heavenly bodies like a thick veil. Objects could be seen only when very near at hand. In order to provide a space in which life could exist on this planet, the Creator separated the waters on the earth's surface from those above it by causing heavy, dry air to fill the space formerly occupied by the fog. The fog lifted above this sea of dry

air, and accumulated in the form of a heavy, continuous cloud layer. All the natural forces were apparently at work since matter had been spoken into existence the day before. The firmament may have been cleared in the same way that fog banks vanish today. The warmth of the sun upon the earth's surface doubtless had much to do with this change in atmospheric moisture as the world rotated for the second time before it. Rather than a creation of air, the work of this day was to cause a separation of water by interposing dry air between the surface water and the moist air, causing respective layers. The expression *wihi mabbdil* (and let it be causing a division) is a very clear case of the use of the participle to express the permanence of a certain relationship. Continuously since that day, intermediate agencies, the sun and buoyancy, have caused the clouds to ride high in the firmament and thus leave a clear space for the motions of living things on the earth and in the air about it.

b. The Vapor-Envelope Theory

This theory, which has been favorably considered by some creationists, states that when the Creator separated the waters on the second day He formed a transparent water-vapor shell or envelope above what is now our present atmosphere. According to the theory, this water vapor layer would have a modifying effect on the sun's rays. Indeed it would absorb a large portion of the actinic rays that, under present conditions, stunt plant growth and cause animals to seek shade in order to survive. The theory further asserts that this envelope would also conserve heat from the sun's ray by preventing its loss to interstellar space, and would thus contribute to a subtropical climate on the earth from pole to pole. According to this theory, at the time of the Flood this vapor envelope condensed and descended upon the earth, making it possible for rain to fall continuously upon the entire earth for forty days and forty nights. With such an enclosing layer present, pressure at the earth's surface would be much greater than now, and its sudden collapse would produce tidal and other disruptive action at the earth's surface.

3. THE THIRD DAY

“And God said: Let the waters under the heavens be gathered together unto one place, and let the dry land appear; and it was so. And God called the dry land earth and the collection of waters He called seas; and God saw that it was good. And God said: Let the earth produce grass, and herbs yielding seed, and fruit trees bearing fruit after their kind whose seed is in them upon the earth; and it was so. And the earth produced grass and herbs yielding seed after their kind; and trees yielding fruit whose seed was in them after their kind; and God saw that it was good. Then came evening, then came morning, the third day.” Genesis 1:9-13.

Light has been made to appear, the atmosphere has been cleared of fog, and now on the third day the *tehom*, or resounding deep, is attended to. The waters above the heavens were already collected into a thick, continuous cloud layer, and now the “waters under the heavens” that is, the water over the surface of the earth—are gathered together into “one place.” Rather than indicating one ocean, this expression “unto one place” doubtless means large bodies of water collectively. The evidences which exist on our earth in the form of fossil corals and subtropical plants in the arctic and antarctic regions, indicate that its entire surface, including the polar caps, once enjoyed a temperate to subtropical climate, and suggest that these bodies of water may in fact have constituted a single, much-branched body whose circulation from equator to poles and return would tend to equalize the climate in all regions.

The manner of appearance of *hayyabbashab*, “the dry,” may be pictured for us in Psalms 104:5-9. “Who laid the foundations of the earth, that it should not be removed for ever. Thou covered it with the deep as with a garment: the waters stood above the mountains. At thy rebuke they fled; at the voice of thy thunder they hastened away. They go up by the mountains; they go down by the valleys [the mountains ascend; the valleys descend] unto the place which thou has founded for them. Thou has set a bound that they may not pass over; that they turn not again to cover the earth.” Of course, it is likewise very possible that David, as he made his poem on the mountainside, was speaking of the surface of the earth as he then saw it. In that case, this description would apply to the time of the Noachian Flood rather than to the original condition.

It is observed that the customary approval of the Creator for His work at the end of each day was omitted at the close of the second day. The explanation of this may be the fact that the work of separation of waters occupied the second and part of the third day. On the second day the surface fogs were raised to form a cloud layer, and on the third the muddy earth waters were separated into “the dry” and into *yammim*, or seas, a term here used in a loose sense so that it would include large seas, as we know them, and also lakes and rivers. Then, the separation of all the waters having been completed on the second day

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and part of the third day, the Creator places His approval, "It was good."

The remainder of the work of the third day consisted of the formation of plants. The command was directed to the earth. The word used in verse 11, *daslga*, literally means, "Earth, sprout sprouts!" Verse 12 records that the earth caused the plants to "go out" (*yatsa*). The indication is that plants appeared as a result of growth which was accelerated so as to occupy but a moment of time. Such a product might possibly be indistinguishable from plants which grew naturally. In the light of these facts, we need not ask which came first, the plant or the seed. The plant came first.

Thus the substance of the plant was the substance of the earth. In our day the plant is still a child of the earth. Mineral elements furnish building materials from which parts of protoplasm and cell walls are constructed; they influence osmotic pressure of plant cells; they influence acidity and furnish buffer materials; they influence hydration of cell colloids; they influence the permeability of membranes; and they serve as catalysts. Plants apparently require from the dust of the earth and its atmosphere at least carbon, hydrogen, oxygen, nitrogen, sulfur, phosphorus, calcium, magnesium, potassium, iron, boron, manganese, copper, zinc, sodium, silicon, and chlorine-literal dust of the earth.

The three groups of plants named, grass (*deske*, whose root signifies "to be damp"), herbs (*esebb*, herbage), and trees (*ets peri*, trees of fruit), evidently aim to cover all vegetation. The first group very possibly does not include grass as we know it, but may refer to such forms as mosses, lichens, and other carpeting species of the earth than grass. That the members of the second group are distinct from those of the first is borne out by the passages 2 Kings 19:26 and Isaiah 37:27, where they are again mentioned separately in an enumeration. Also the members of the second group are described as *mazrta zera*, or "seeding seed." It would thus appear that members of this group are prominent as seed bearers. It is this group, *esebb*, which is stated in verse 29 to have been given to man along with fleshy fruits and nuts as his food. The translation "herb of the field," which is used in Genesis 3: 18 to describe a part of the food given to man after his sin, is from this same *esebb*. *Esebh* is also used in Deuteronomy 11: 15 to describe the food of cattle. Thus this second group appears to include everything between mosses, lichens, ferns, and other non seed-bearing plants and the woody shrubs and trees. *Ets perl*, the term covering the third group, is a singular collective that stands for woody plants bearing nuts and cones, and fleshy fruits as berries, drupes, pomes, et cetera. These three broad groups do not coincide with modern classifications of plants, but nevertheless they are very apt because they are still visible -the lowly forms, the taller herbaceous forms, and the shrubs and trees.

These verses state very clearly that in the span of a single day consisting of a period of darkness and a period of light, i.e., a solar day, the Creator formed all the various plants. It is important to notice that this vegetation included seed-bearing plants, which evolutionists consider to be the most highly and recently evolved forms. The picture is not one of formation of a few simple, one-celled forms which gradually evolved into complex seed-bearing forms through a duration of many thousands of years. Instead, we learn that every distinct kind of plant that ever lived on the earth was formed on this third day.

The statement that the Creator commanded the earth to bring forth the plant "after his kind," and that the earth did bring forth the plant "after his kind," apparently means in part that He formed these organisms after some orderly plan. Witness to this fact is borne in the present logical classification of the plants of the world. Upon an amazing variety of morphological characters it is possible to build numerous extremely interesting groups. The taxonomist in his work is apparently thinking the thoughts of God after Him as he discovers the natural groupings of plants.

An extremely important issue is focused upon verses 11 and 12 of Genesis 1. This issue deals primarily with the physiology of plants instead of their morphology. This is true because the form and structure of a plant spring from the functioning of its hereditary units (genes) under environmental influences. The dogma of evolution states that kinds of organisms gave (and, at times, are giving) rise to other organisms which are of different kinds morphologically and physiologically than are their progenitors. However, these verses state that a complete flora appeared in all its basic kinds upon the third day.

The question naturally arises, Have new kinds of plants appeared since creation week? The following statement by the late noted geneticist Thomas Hunt Morgan is representative of all evolutionists who are in possession of the facts:

***"Within the period of human history we do not know of a single instance of the transformation of one species [kind] into another one. . . . It may be claimed that the theory of descent is lacking, therefore, in the most essential feature that it needs to place the theory on a scientific basis. This must be admitted."* [10]**

With no evidence for the origin of new kinds since the dawn of human history, we naturally ask, Is there evidence of new kinds having arisen in “geologic time”—the only natural record we have of the past? Evolutionists themselves direct our attention here to the extremely important fact that as “far back” as organisms can be traced as fossils in rocks, no series of links can be discovered which bridge the morphological abyss between kinds. [11] Therefore, it must be concluded that no new kinds of organisms have arisen by natural processes since creation week.

Another question which arises here is this, Does the statement “after his kind” merely refer to the following of an orderly plan in the mind of the Creator in establishing the morphology of plants, so that discrete kinds were created; or does it connote such a morphological state and also, at the same time, an innate ability to reproduce only after their kinds? Biblical scholars quite unanimously agree that reproductive behavior is also described here. Examples of the opinions of scholars on this point are as follows:

“Along with the various species and seeds, along with the determinate propagation of plants, each after its kind, there clearly and distinctly comes in that conception of nature which is already announced in the great contrasts.” [12]

“Each genus [kind] remains fixed, and reproduces 'after its kinds,' i.e., the various species embraced in it.” [13]

“Fruit after his kind. What will Mr. Darwin say to this? Is it not a refutation of his elaborate theory on the origin of species? The growth will always be of the same kind as the seed. There may be variation in the direction and expression of the germinal life, but its original species [kind] is unchanged.” [14]

“Two other marks, however, are appended to this class: first, these fruits bear fruit 'after their kind,' a peculiar and definite limitation, which all those understand best who have seen how the 'kind' sets limitations upon all who would mix and cross them. Nature itself here is seen to have definite limits fixed which appear as constant laws or as insurmountable barriers.” [15]

It stands as a law of reproduction today that the plant which develops from a propagule is always of the same kind as was its parent or parents. As far as any available evidence is concerned, that has always been the case, wheat from wheat, roses from roses, apples from apples, et cetera. Evolutionists state that such was not always the case, but rather, in almost innumerable instances, plants have appeared which were a different kind from their parents. However, that is something for which they can present no proof.

It passes without dispute that extremely diverse kinds of plants cannot cross today and have never been known to cross, e.g., squashes and roses. It seems very reasonable to all creationists to assume that such diverse kinds cannot and never could cross. However, different philosophies exist with regard to some plants with rather similar morphologies which will cross. For example, the radish and the cabbage will cross and produce a few fertile seeds. Are they members of two different kinds or of the same kind?

Some creationists believe the radish and the cabbage must belong to different kinds. Indeed superficial appearance of the vegetative parts of the plants might so indicate. But when we consider (1) the close similarity of their reproductive organs, (2) the chemical similarity, i.e., their physiological compatibility, evidenced by the fact that they do cross, and (3) the fact that taxonomists place them in our taxonomies as genera in juxtaposition, it is not unreasonable to consider them as members of a single original kind. This same similarity always exists between the two individuals where hybridization has occurred. For that reason, many creationists hold to the opinion that impossibility of hybridization exists, and always has existed, between members of two different kinds.

Whether verses 11 and 12 state that plants were formed in such a way that (1) they could reproduce only after their kinds, or whether (2) they merely state that plants were made morphologically according to a plan in the mind of the Creator, the conclusion is essentially one and the same. According to the former opinion, these verses state that plants were formed in such a way that every time a kind reproduced, it brought forth additional individuals like itself. According to the latter view, these verses state that plants were formed in all the multiplicity of kinds that the earth has ever seen; i.e., they do not refer directly to the reproductive behavior of the plants, merely to their morphology. However, the statement of the formation of different morphological kinds indirectly refers to reproductive behavior. Different morphologies, particularly with regard to reproductive parts, arise from and indicate different physiological properties. To illustrate, the chemical setup in the squash appears different from that in the rose, so different that no fertilization occurs when hybridization is attempted. This, it may be assumed, is due to incompatibility between them. Thus whichever view is held, it is possible that the logical end is the same. Plants were formed in such a way that no erasure of original kinds could be accomplished by hybridization with resulting intergrading and intermediate forms. The absence of intergrading forms, i.e., “connecting

links," between all Genesis kinds, fossil -or living, constitutes the greatest, single proof that evolution of plants has not occurred.

4. THE FOURTH DAY

"And God said: Let there be luminaries in the firmament of the heavens to divide the day from the night, and let them be for signs and seasons and for days and years. And let them be for luminaries in the expanse of the heavens to give light upon the earth. And it was so. And God made the two great luminaries, the greater luminary to rule the day and the lesser luminary to rule the night-and also the stars. And God set them in the firmament of heaven to give light upon the earth and to rule over the day and over the night and to separate the light from the darkness; and God saw that it was good. Then came evening, then came morning-the fourth day." Genesis 1:14-19.

The story of creation was written for man. Most reasonably the point of view of the narrator is from the home of man, the surface of the earth. During the first three days light had been upon the earth, but only of a weak, diffuse sort just as it had filtered through the heavy, continuous ceiling of clouds. But now with plants upon the earth, bright light became a necessity. The detail in which the functions, from the point of view of our earth, of the heavenly bodies is described is worthy of special attention. No legitimate opportunity is left for heathen misconstructions and use as astrological portents.

It may be important here to notice that these verses do not say that God created (bara) these heavenly bodies on the fourth day. The word used here is the word *asak*, which is commonly interpreted "to employ materials already in existence; to release from restraint." The second meaning, i.e., "to release from restraint," seems very appropriate here. In the work of the second day the heavy fog blanket was lifted from the surface of the earth but apparently remained as a continuous cloud layer which was penetrated by diffuse light from the sun but which blocked any view of the heavenly bodies. It seems logical to assume that the work of the fourth day was the breaking up of this continuous fog layer into discrete cloud masses, thus making the heavenly bodies visible from the earth. These bodies were already in existence, but from this moment of the breaking up of the fog blanket overhead into discrete clouds, they began to serve a definite purpose in reference to the earth.

It is not uncommon to find creationists who are of the opinion that clouds did not exist until the storm clouds rolled up at the time of the Noachian Flood. However, Ellen G. White is entirely correct when she refers to the existence of clouds in the following statement regarding some of the subjects of study which attracted the attention of Adam and Eve. "God's glory in the heavens, the innumerable worlds in their orderly revolutions, 'the balancing of the clouds,' the mysteries of light and sound, of day and night, all were open to the study of our first parents." [16] Certainly the beauty of any panorama is greatly enhanced by the presence of discrete clouds. It was only the storm clouds which were unknown until the Flood. The fact that verse 1 states that God created the "heavens and the earth" (heavens are mentioned first), and the fact that light appeared on the first day, give us basis for the assumption that on the first day our complete solar system was formed. In our day we understand how the celestial paths of the members of our solar system are determined by the rate of their motion through space and by their mutual gravitational attractions. This knowledge leads us to conclude that the members of our complete, finely balanced system very likely came into existence at the same time on the first day-"God created the heavens and the earth." Then on this first day God did something to the dark mass of the sun which caused it to burst forth suddenly in its present glory of light. Some of this light penetrated the heavy fog blanket at the earth's surface and constituted the light of the first day and of succeeding days. On the fourth day the building of the mist blanket into cloud formations made the disks of the sun and moon visible. It likewise unveiled the majesty of the starry heavens.

Occasionally we hear it claimed that it would be impossible for the Creator to create all the astronomical bodies at other than one time because of the gravitational interactions of these bodies. The thought is that the intricate balance existing between all these bodies is so delicate that the addition of our solar system at a later date would cause perturbations so serious as to result in collisions and 'finally chaos. True, to a certain degree, every body in the universe affects every other body. But where sufficient distance falls between any two bodies their real effect upon each other becomes so negligible in a practical way as to amount to nothing. Gravitational force operates inversely according to the square of the distance between any two bodies. Our solar system is about three and a half light years away from the nearest star, and its effects even upon this nearest star are not worthy of consideration in the matter of serious perturbations. How much more is this true with regard to those lying beyond this distance on out to a distance of at least 140 million light years to the farthest star that has been photographed! I once asked an astronomer friend of

mine what effect the addition of our solar system would have had upon the remainder of the universe. He smiled and replied, I can think of any number of places where our solar system could have been added to our universe, and the addition would have had no effect whatsoever upon the heavenly bodies already present."

On the other hand, the gravitational forces acting between the units of our own solar system are tremendous. The Creator could have held our earth in space directly until the fourth day and could have furnished light directly to it; then on the fourth day He could have hung the sun in space to take over these functions. But the identity of the days of creation week before the sun's disk became visible from the earth, with those of the remainder of the week, and the presence of light from the very first day indicate that the Creator formed the sun at the same time with our earth and caused it to become an incandescent body on the first day. That the Creator usually chooses to manifest His sustaining power in the form of "natural laws" is a most easily observed fact. The display of His power in our solar system in miracles is most exceptional. The advance of natural science shows more and more that this is true.

The more or less parenthetical expression which states that "he made the stars also," could refer to the planets, the "stars" of our solar system, i.e., Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto; or it could also include the more distant starry host. Other instances where the author makes statements which are clearly parenthetical are Genesis 2:24; 10:9; 26:33; 32:32. In verse 1 the word shamayim, which is translated "heaven" in the Authorized Version, is actually in the plural form and should be read "heavens." From man's viewpoint we know of three heavens. In the first the birds fly (Job 3 5: 11) and the clouds float (1 Kings 18:45). In the second the stars are hung (Deuteronomy 17:3). In the third, the heaven of heavens, God dwells (Daniel 4:26; Luke 15:21). The creation of the first heaven occurred during creation week, and also that part of the second heaven which includes the planets of our solar system. These planets are as truly "stars" to us as are the suns of other systems. So the reference here to the making of the "stars" could apply to those which were actually made during creation week, our planets. However, it is possible that the author of Genesis wished in this connection to remind the reader that the same God who formed this earth likewise formed the numberless bodies of the entire universe.

The fact that many stars are millions of light years away from our earth and yet are shedding their light upon us, apparently demonstrates that they have been in existence many, many times six thousand years. This shows that they must have been formed before creation week, unless God caused their light to reach out across space in an instant instead of eventually reaching our location in a natural way. Such a premise does not fit in with all we know about how God chooses to operate the objects of His creation. On this point H. W. Clark very reasonably remarks:

"In passing, let us suggest that the idea that God created these distant suns each complete with beams of light already reaching outward throughout all space, if accepted, would destroy all belief in the regularity of God's laws. All that we know of God's manner of producing light teaches us that when He causes a body to become luminous, beams of light energy travel outward from the source, and are not set in action instantaneously along the whole path of the light beam. God works in regular ways and according to definite laws." [17]

5. THE FIFTH DAY

"And God said: Let the waters swarm with swarms of living souls, and let birds fly above the ground across the face of the firmament of the heavens. And God created the great sea monsters and each one of the creeping creatures with which the waters teem after their kind and every winged bird after its kind; and God saw that it was good. And God blessed them, saying: Be fruitful and multiply and fill the waters in the seas and let the birds multiply on the earth. Then came evening, then morning. The fifth day." Genesis 1:20-23.

The Hebrew word yam, here translated "waters," is applicable to an ocean, a sea, a lake, a pond, a river, a brook, a pool, or a spring. The term yam includes all these.

The Authorized Version is incorrect in the translation, "Let the waters bring forth abundantly." Sharats sherets can only mean, "Let the waters swarm with swarms." The source of water animals and winged forms is not revealed in this chapter. They were simply told to appear in the water and the air respectively. However, in Genesis 2:19 it is made clear that the flying animals were made "out of the ground." This correct rendering of sharats skerets removes the difficulty arising from the translation in the Authorized Version which relates in chapter 1, verses 20 and 21, that winged forms were brought forth by the waters, but states in chapter 2, verse 19, that they were molded out of the ground.

In connection with the formation of water animals and flying animals, the word nephesh, "souls of

life,” appears for the first time. According to the Biblical viewpoint plants do not have life in the sense that animals do. Only animals manifest life in “souls,” but this 11 soul” is apparently to be regarded as nothing more than “that which breathes.” As compared with plants, animals were something new and distinctive. To the average man an animal was an organism which breathed, whereas a plant did not. Biologically animals and plants both “breathe,” because protoplasm, whether in a plant or in an animal, must constantly receive oxygen from the outside else it dies. But for practical purposes with the common man, an organism which could move itself from place to place, “breathe,” and show at least a small degree of intelligence was distinct from a plant.

Kanaph, verse 21, literally “bird of wing,” used in the broadest sense, as it is here, without doubt includes not only the birds but also every other type of being that has wings, whether insect, bat, or flying reptile.

The use of the expression wayyiblgra, “and he created,” verse 21, seems puzzling at first reading. Why should God make plants but create water animals and flying forms? The word for “create” is used here for at least two reasons. First, verse 21 says that God caused animals to swarm in the waters without saying they were formed from any material; therefore, a form of bara, to create, was used. Second, bara, is used where the idea of novelty is to be conveyed (see Isaiah 41:20; 48:6, 7; 65:17; Jeremiah 31:22). To bring into existence such remarkable creatures which breathe and are animated and can go where they wish of their own will is worthy of the term bara.

The word tanninim, verse 21, which is translated “whales” in the Authorized Version, really includes all the large animals of the sea. The word comes from a root meaning “of considerable length.” This would include not only large fishes but also whales, aquatic reptiles, and amphibians.

The Hebrew term romeseth, which has been translated “creeping,” literally means “gliding about” or “moving lightly.” The expressions in verses 20 and 21 meaning “to swarm” and “to teem” certainly do not leave ground for assuming that each kind appeared only in a single pair. However, even though each aquatic animal and each bird was apparently represented by numerous individuals, still they were commanded to keep on multiplying until all habitats around the earth were occupied.

Verses 20-23 stress the same fact that was presented in verses 11 and 12; namely, that water animals and all flying animals were formed after their kinds as were the different plants. That they were shaped into discrete kinds appears to be a very important point. Every water animal and bird of the air, whether starfish or mollusk, sponge or porpoise, hummingbird or teratormis, jellyfish or whale, butterfly or pterodactyl—all kinds were patterned according to their respective distinct morphological differences. No room is left for any supposition that these discrete kinds evolved from other kinds which were of more simple morphology.

14. Origin of Land Animals; “After His Kind”

THE SIXTH DAY

a. Formation of All Land Animals.

“And God said: Let the earth bring forth living creatures after their kind, domestic animals, reptiles, and wild beasts of the earth after their kind; and it was so. And God made the wild beasts of the earth after their kind and the domestic animals after their kind, and the reptiles of the ground after their kind; and God saw that it was good.” Genesis 1:24, 25.

Here as in the case of the plants on the third day, we have a mediate creation. Instead of directly calling land creatures forth by His word, the Creator enables the earth to produce them. The “why” we may not perceive, but we do know that they came from the dust and are able to return to the dust. The command to the earth is totse, “cause to come forth.” This command is quite identical with the statement in verse 12 regarding the earth “causing” the plants “to go out.”

The creatures brought forth on the sixth day are described with the same general title as were the winged forms and water animals. They are called nephesh, “souls of life,” because the animating thing, the soul, is a most prominent feature with them. These land forms are named in three classes. First are the behemah, or “domestic animals,” which are often called cattle. The word behemah comes from a root

meaning “to be dumb.” This does not serve to set any certain group apart, however, because all animals lack the power of articulate speech. The second group are the *remes*, a word taken from a root which means “to move about lightly,” or “to glide about.” Thd, Authorized Version's translation, “creeping things,” is too narrow, because it does not leave room for the larger land' reptiles and amphibians. It would appear that *remes* includes everything that moves on the ground, as snakes, or close to the ground as lizards and spiders. The third class is *chayyath halarets*, or “wild beasts of the earth,” an appropriate name because of their general freedom of movement on the ground. This classification was never intended to satisfy a taxonomic biologist, but for men not trained scientifically it is satisfactory in that it gives a general, varied picture which is sufficient to call to mind all types of land animals. No mention is made of a blessing being pronounced here as is described in verse 22. The natural inferences are that such a blessing was surely given; and one wonders whether Moses, in his haste to record the origin of man in the next verse, did not merely overlook making any statement about it.

b. “After His Kind.”

The fact that each beast was made “after his kind” is strongly emphasized again in verses 24 and 25. It appears to be a fact of the greatest importance. It is doubtless profitable for us to again ask ourselves, “What is the special significance of this statement?”

In their understanding of the meaning of the phrase “after his kind,” creationists divide into two schools; namely, (1) those who are of the opinion that anatomical structure alone is referred to with no physiological barriers existing against hybridization between kinds, i.e., that crossing could occur wherever mechanically possible. (2) Those who are of the opinion that the phrase refers to both anatomical and physiological characteristics with particular emphasis upon the latter.

Members of the first school of opinion tell us that the phrase “after his kind” makes no reference whatsoever to reproductive behavior. To this, members of the second school reply that neither does the phrase say anything about morphology. Indeed, it will be seen by an impartial reading that the phrase makes no mention in so many words of either morphology or physiology. The student must be guided largely by his personal opinion in arriving at his conclusion.

Revelation gives the student no specific help in understanding the significance of the phrase. The only Scriptures which contain the expression are Genesis 1: 11, 12, 21, 24, 25; 6:20; 7:14; Leviticus 11:14, 15, 16, 19; Deuteronomy 14:13, 14, 15, 18; and Ezekiel 47:10. These texts tell us that God formed plants and animals “after his kind”; the earth or the waters brought them forth “after their kind”; the land animals went into the ark “after their kind”; they were clean or unclean “after his kind”; and finally, the fish of the new earth shall be „according to their kinds” exceeding many. Viewed as a whole, these references rule out neither morphological characters nor physiological characters.

What is the testimony of nature with regard to kinds? One of the most obvious facts which impress the nature student is the fact of discontinuity of kinds of plants and animals. Roses, water lilies, oak trees, and maples; squirrels, wolves, deer, and apes stand out with clear-cut distinction. There are no intergrading forms. The paleontologist tells us that the same discrete units stand out clearly in the fossil record, with total absence of connecting links. [1] To the creationist this means that at the time of the Noachian Flood, about forty-three centuries ago, the same kinds of animals were living on the earth that populate it today. Thus the testimony of nature is that morphologically discrete kinds of animals have existed on the earth since before the time it was overwhelmed by a universal Deluge. In the light of Genesis, it seems reasonable to conclude that these distinctly different organisms must be the “kinds” which were created in the beginning. This existing fact of morphological discontinuity appears to furnish us with real evidence that the statement of formation of organisms “after their kinds” must include reference to their basically different morphologies. All the anatomical differences between the rose and the apple, between the dog and the cat, between the ape and the man, were there at the first appearance of the organisms. This is the direct antithesis of evolution. The fact of possibility of classification of organisms today is witness to the truth of Genesis on this point. Any changes that have been found necessary in the field of classification have been due to differences in the opinions of the taxonomists and not to the appearance of morphologically new kinds.

To gain a fuller conception of the meaning of the phrase “after his kind,” we turn again to nature. Hand in hand with the fact of morphological discontinuity is the fact of reproduction “after their kinds.” This is a fact so familiar to us that we sometimes overlook its importance and significance. From duck eggs we get ducks; from pumpkin seeds sprout pumpkin vines; and when our pet cow brings forth her young,

behold, it is always a calf.

With regard to whether or not reproduction has always been “after their kinds,” we are not left entirely to opinion. The fact that morphological discontinuity existed in nature as far back as the Noachian Flood and continues in the same basic models today, is very real proof that organisms must have been reproducing “after their kinds” from their earliest appearance. The total absence of clear cases of hybrids between kinds both walking the earth today and existing in its crust as fossils, demonstrates furthermore that hybridization of kinds was and is apparently impossible.

It is sometimes argued that back when protoplasm was younger and more vigorous, owing to its recent formation by the Creator, it would be possible for crossing of kinds to occur even though it is not possible today. The answer of scientific fact here is that among the animals buried in the Flood no such confusion of forms is found which would occur if kinds could hybridize. Living kinds have their clear-cut ancestors among the fossils, ancestors possessing the same basic morphological patterns that their modern descendants possess.

Such fossil forms as the Archaeopteryx, or lizard bird, which have no living representatives, may be considered as hybrids between two kinds. But it must not be overlooked that it is equally logical to assume that the Archaeopteryx represents that host of originally created kinds which have become extinct since the Flood. Not only is this latter conclusion a logical one, but it also is in harmony with known reproductive behavior—birds and reptiles are not capable of crossing today. There is not one fragment of real evidence which makes it necessary, or which even strongly suggests, that basic kinds were once capable of hybridizing if they chose.

Thus, with the light of known facts focused upon the Biblical expression “after their kinds,” we find present and past anatomical discontinuity indicating that morphological differences, the ones used in the classification of organisms, is evidently included; and with equal certainty manifested in the present impossibility of kinds to cross, and in the fossil evidence that there is no real proof that crossing of kinds occurred just before the Flood, we likewise conclude that physiological differences, which prevented kinds from crossing or reproducing in any other way than according to their kinds, are just as truly included in the phrase.

To argue that the expression “after his kind” concerns morphology entirely and does not even suggest reproductive behavior is to totally ignore the mechanism in nature by which anatomical structures develop. In order for any anatomical structure to arise in the developmental process from fertilized egg to adult, there must first be present certain hereditary units acting as directives in the developing body. That is to say, the anatomical characters of the body are a portrayal of the heredity of that particular organism shaped under environmental influences. Therefore, to say that plants and animals were made “after their kinds” is to say in so many words that each was formed with its own peculiar hereditary pattern. And scientific facts show us that basically different hereditary patterns arise from protoplasms so different chemically as to be incapable of crossing. We cannot abide by natural facts and conclude that “after their kinds” connotes only morphological characteristics or only physiological characteristics. It evidently includes all those devices by which the Creator accomplished the creation of the intriguing variety of basic patterns and the processes by which these differences are continued.

It appears very logical to assume that, if the Creator applied Himself to making the multiplicity of different basic morphological patterns, He intended that they should persist as long as the earth lasted. It seems to us that a wise worker would establish his fundamental patterns in such a way that they could not be erased through hybridization. Nevertheless we repeat the question, “Did God intend that organisms should continue in the basic patterns He created and then make them physiologically in such a way that all kinds could hybridize where mechanically possible, or did He build each kind chemically different from all other kinds so that crossing of kinds was impossible?”

God's attribute of foreknowledge enabled Him to look ahead and see that Satan would arise and would endeavor in every way possible to destroy the order and perfection of God's work. As we study the present complexity of the biological world we see much evidence that God formed organisms to function perfectly in the Edenic state and also made them in such a way that they could become adapted “naturally” to fit into and continue under the reign of tooth and claw, which was ushered in with the entrance of sin. It is possible that structures which might be illustrated by the poison glands of snakes, the stings of hymenopterous insects, the “biting” mouth parts of mosquitoes, bedbugs, etcetera, and even the general body form of fleas and some other parasites, were possessed by these animals in the original state, and were put to diabolical uses only after sin entered. In the spiritual realm God provided for such an emergency as the entrance of sin. Is it not reasonable to assume that He made similar provisions in the natural realm?

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I am persuaded that when God formed plants and animals “after their kinds,” He endowed them with chemically different protoplasms which were incapable of crossing, even when manipulated and directed by a very wise devil. In other words, God did not make organisms in such a way that they could cross and then say to them, “Now don't hybridize.” That could sensibly be said to reasonable beings like man, but not to plants and animals which did not have the power of reason and choice.

The reproductive behavior of plants and animals today is such as to indicate that God formed them at the beginning in such a way that the protoplasms of different kinds were and are incompatible. The original basic kinds have persisted since Eden, and this has occurred only because they were incapable of being erased by crossbreeding.

Some assume that this incompatibility has developed as the result of degeneration of protoplasm since creation. That is to say, crossing of kinds may have been possible, say, until the Flood, but impossible since then. However, I believe it is more reasonable to assume that when protoplasms were nearer their creation they would show their fundamental chemical differences even more markedly than now after sixty centuries of Satan's attempts to distort, confuse, and degenerate.

It is characteristic of creationist biologists to say that it is impossible today to point out the Genesis kinds, with the exception of the man kind. Creationist biologists naturally have a great deal to say about Genesis kinds. In the eyes of the evolutionists this situation is absurd. They tell creationists that they (the creationists) maintain that all kinds of organisms were created as clear-cut units and that creationists then hasten to say, “But we can have no idea of what these units are today.” The evolutionist argues that if such important basic units once existed, and if there were no evolution of kinds, then the creationist should point out these units in nature today or cease to speak of them. Even though the evolutionists cannot point out the connecting links between two kinds in even a single case, nevertheless, I think they are quite reasonable here in their demand upon creationists. Furthermore, I believe that these basic units, the Genesis kinds, can be outlined in most cases even in our day.

We have discussed both the logic of creating kinds which could not cross and also the fact of the existence in nature of certain discrete groups of organisms from the time of the Noachian Flood to our day. I submit the thesis that these discrete units which have apparently remained distinct one from the other since creation because they could not and cannot hybridize, are the Genesis kinds. If I am correct here, we have for our use two concrete laboratory devices by which we may define the Genesis kinds; namely, (1) the morphological test, i.e., similarity of basic anatomical patterns, which, in plants, would apply principally to their reproductive structures, and (2) the physiological test, i.e., reproductive compatibility, at least to the extent that true fertilization of the egg takes place with ensuing early stages of embryological development, even though premature death should occur.

In view of the clear fact that morphology is merely a somewhat variable outward manifestation, due to environmental influence, of the basic physiological pattern of the organism, i.e., its complement of hereditary units or genes, it seems reasonable that the physiological characters in the way of breeding behavior should take precedence over the morphological characters in the determination of the Genesis kind. In other words, even though their morphologies may be very similar, still, if two organisms are cross sterile, I am of the opinion that, except for unusual situations arising from mutational changes, the organisms are representatives of two different basic kinds.

To illustrate my meaning here, man and chimpanzee are strikingly similar morphologically. A laboratory dissection guide for working out the anatomical details of the skeletal, muscular, nervous, digestive, and other organ systems of man can also be used in all its minutiae on the body of the chimpanzee. Nevertheless, man and chimpanzee, as far as scientific knowledge goes, are, and always have been, reproductively incompatible when attempts have been made to cross them. No man-ape cross is known to science, past or present. We are very sure that man is one Genesis kind, and that the chimpanzee is a representative of another Genesis kind. That they cannot cross we are certain. I believe that this is typical of the reproductive behavior when any two basic kinds are involved.

As we study those instances in nature where hybrids have actually been produced, we find that in every instance those that are capable of crossbreeding are similar enough morphologically to easily be conceived of as being members of a single basic kind. Crossing has taken place at least as far as the beginning of embryonic development in the following common animals: lion and tiger; horse, ass, zebra, kiang, and onager; dog, wolf, jackal, coyote, and some foxes. Mouse and rat; sheep and goat; chicken and guinea fowl; chicken and turkey; ox, zebu, yak, bison, wisent, Brahman cattle, and Afrikaner cattle; swan and goose; and house martin and barn swallow. Among plants such interesting crosses as wheat and rye, wild tobacco and petunia, blackberry and raspberry, raspberry and strawberry, and radish and cabbage are

known.

Some creationists, in their philosophy, are not willing to accept two individuals into a single kind when they differ as much in their morphology as the radish and cabbage. However, it should be borne in mind that according to the best available information, cabbage, Brussels sprouts, kale, collards, and cauliflower have been developed from a single plant, the wild cabbage, *Brassica oleracea*, of Europe. They evidently are most certainly members of a single kind. And if plants with such diverse vegetative morphologies are members of a single kind, then it seems very reasonable that the radish with a nearly identical flower may also be a member of the cabbage kind, and for that reason will cross with the cabbage.

It is in the light of these known morphological variants from a single ancestor, somewhat different in their vegetative anatomy but evidently quite identical physiologically, that I maintain that the reproduction test is a valid one to apply today in determining the membership of an original kind. God "hath made of one blood all nations of men for to dwell on all the face of the earth." Acts 17:26. We know that man constitutes a single Genesis kind. He is characterized in all his morphological variation by having a single type of protoplasm which makes crossbreeding of any and all breeds of men possible. It seems logical to assume that the physiological compatibility which characterizes the man kind is likewise a characteristic of all the original kinds.

It might be well here to remind ourselves that there are exceptions within the man kind in which cases the individuals are sterile on mating, but which have been found fertile when married to other individuals. In the common vinegar fly, *Drosophila melanogaster*, the Russian geneticist Kozhevnikov, developed a strain of fly which breeds true but which is sterile when the male is crossed back with the parent stock. [2] These individuals are most certainly members of a single kind, but still are cross sterile. Such cases illustrate the fact that, occasionally, members of a kind may be sterile, and in these cases the reproduction test would fail to be valid. However, these situations are, I believe, definitely the exception to a general rule. A study of hybridization reveals some interesting facts with regard to the chromosome number in the nuclei of the cells of individuals which are cross fertile. The nuclei of all the cells of the horse contain nineteen pairs of chromosomes. Those of the ass contain thirty-three pairs. However, even though this great discrepancy in chromosome number exists, we are aware that these two animals will cross and produce a very vigorous hybrid, the mule.

Although this offspring is usually sterile several cases of fertile female mules are known. [3] This situation of cross fertility, even though the chromosome number is different, is not uncommon in varieties of the same kind of plant. This is illustrated in the genus *Crepis*, hawkweed, where numbers of different species, such as 6, 8, and 10 are accompanied by different morphologies, [4] and in the genus *Poa*, bluegrass, where strains of one species, *P. alpina*, have the numbers, 28, 33, 34, 35, 36, 37, 38, 39, 41, 45, 49, 52, 64, 66, 67, 72, 73, and 74. [5]

In many plant genera and in a relatively few animals the half (haploid) chromosome numbers of the species of a genus form a series of simple multiples of the minimum, or basic, number, e.g., 7, 14, and 21, in species of wheat. It appears very probable that such cases have developed by natural methods since creation. In other instances, as the horse-ass situation, the difference in chromosome count is such as to suggest no common blood ancestry. However, the fact of cross fertility indicates very similar protoplasms, and I believe, indicates membership in the same kind.

Identical chromosome number apparently is no indication of membership in a kind. To illustrate, the chimpanzee and the man both have twenty-four pairs of chromosomes in their cells, and some species of hydra, cyclops, aphids, beetles, and the housefly, all have six as a haploid number. Again, the mouse and the ox both have a half number of eighteen chromosomes. [6] Hernandez and Darlington report a half chromosome number of twelve to be the modal point with a total of 391 different species out of a list of 2,413 different species of flowering plants. [7] It would thus appear that the chromosome number, as such, has no significance in determining membership in a particular kind.

In rounding up this very brief discussion of the Genesis kind (in an earlier book, which is now out of print, I suggested the term baramin for these original units built from the Hebrew words *bara*, created, and *min*, kind), [8] I will picture my conception of this basic unit in nature as follows. There were two general groups of original units, (1) the monotypic kind, and (2) the polytypic kind.

In the former there were no original varieties, merely a single physiological-morphological unit. Man would be an illustration here. Such a baramin would be quite uncommon; in fact, I believe it possible that man constituted the only monotypic baramin. Other animals and also the plants were formed into polytypic baramins. In each case these units were made up of two or more original varieties. To illustrate, the horse kind possibly consisted of the horse like variety (nineteen chromosome pairs) and the ass like

variety (thirty-three pairs of chromosomes). Again, the dog kind possibly consisted of an original fox like variety, a dog like variety, and a hyena like variety. These modern dogs, with the possible exception of the hyena, are all cross fertile. [9]

The protoplasms of the varieties of each baramin were of the same general type-a type which differed sufficiently in its chemistry to prevent any crossing of kinds. However, the protoplasms of a kind were sufficiently similar to permit hybridization, or amalgamation, of its varieties. It is likely the hybrids would commonly be sterile; or their offspring would, through segregation of complete chromosome sets in the formation of gametes (germ cells), revert back to one or the other original variety. An actual situation in which such segregation of whole parental sets of chromosomes in gamete formation apparently occurs, is found in the unusual cases of fertile female mules which give birth to fertile horse colts when bred to stallions, and to sterile mule colts when bred to jacks. [10] Such a mechanism would tend, in cases of hybridization, to preserve the purity of the original varieties of each baramin. However, I would assume that in that original state the varieties of a kind were distributed upon the earth's surface in such a way that each variety of a kind was isolated from other varieties of the same kind. Many kinds would occupy the same areas, but original varieties of a single kind would form a discontinuous mosaic pattern in their geographical distribution. How could varieties of a kind cross? Simply because all members of a baramin were created with protoplasms sufficiently similar to make crossing possible. If original varieties of a kind did contact each other in their distribution in the original state, it is possible that crossing did not occur for psychological reasons; i.e., there was no will to mate with any except members of their particular variety.

What are my reasons for drawing such a picture of the created kinds? They are as follows: (1) Logical reasons: It would be absurd to form plants and animals after their kinds and yet make them morphologically and physiologically so that they could cross and immediately erase the original pattern completely. (2) Morphological and physiological reasons: The existence of biologically discontinuous groups today. All forms that can hybridize today or have ever been known to hybridize are always sufficiently alike to be easily placed into a single basic taxonomic group. (3) Paleontological reasons: (a) The fossil record shows the same clear-cut discontinuity of groups, and among these discrete groups can be recognized the ancestors of the kinds which live today, possessing the same distinguishing morphological characters which their descendants display. (b) The absence of any fossil forms which must be considered hybrids between kinds.

The creationist believes that when biological scientists recognize these physiologically isolated groups, they will have discovered one of the most evident, and at the same time most important, facts in the world of living things. Finally, the demarcation of these basic units in nature and the proclamation of their identity with the kinds of Genesis will deliver the creationist from the stigma of preaching a philosophy of science for which he can offer no concrete proof in nature.

(In the revised edition of the author's book *Evolution, Creation, and Science*, page 179, is a diagram illustrating the explanation of the original kind contained in this chapter. The discussion in chapter 10 of that book should be read in this connection to further clarify this concept.)

15. The Crowning Act of Creation

THE SIXTH DAY (CONTINUED).

"And God said: Let us make man in our image, after our likeness, and let them have dominion over the fish of the sea and over the birds of the heavens and over the domestic animals and over the whole earth and over every thing that moves about upon the earth. So God created man in His image, in the image of God He created him, male and female He created them. . . . And God said: Behold, I have given you all herbs yielding seed which are upon the face of all the earth, and every tree upon which there is seed-bearing fruit-to you it shall be for food. And to all the wild beasts of the earth, and to all the birds of the heavens, and to all the land reptiles in which there is a living soul (I have given) all the green herbs for food. And it was so. And God saw all that He had made and behold it was very good. Then came evening, then came morning-the sixth day." Genesis 1:26-31.

The singular dignity of man and his position as the crowning work of creation is evidenced, first, by the divine counsel held before his formation; second, by the fact that he alone of the entire creation was closely patterned after his Maker. The narration rises to a solemn chant in the words, "So God created man in His image, in the image of God He created him, male and female He created them." The threefold use of *bara*, "create," is significant here. *Bara* is appropriate first, because, as in verse I, something is brought into

being which did not formerly exist; second, because, as in verse 21, something is being endowed with life and a soul. And third, because a creature with the endowments of man formed in God's image is entirely new.

In the Image of God.-"Let us [plural, i.e., the Trinity] make fasab] man in our image. . . . So God [Elohim, Gods, plural form) created [bara) man in his [singular form, indicating the oneness of the Trinity) own image." Genesis 1:26, 27. The interchangeable use of *asak* and *bara* is suggested here. However, man was both made and created. The fact of greatest importance is that, with his kingdom prepared from largest to smallest detail, the king of the earth was now brought into being, formed in the image of God (Elohim, "Gods," i.e., the Trinity), and shaped by the hands of the Gods-"Let us make man." In the creation of plants and of animals other than man God is described as having caused these various organisms to appear, shall we say, in a more or less impersonal way, though the fact of God as the Creator stands without question. The expressions employed are: "Let the earth bring forth grass" (Genesis 2:11), "Let the waters swarm with swarms of living souls" (verse 20), and, "Let the earth bring forth living creatures" (verse 24). But as we come to the account of the origin of man, we observe that God came forth after consultation and crowned all His marvelous work of the week by personally making man in His image and setting him as absolute ruler over the entire circle of the globe with its teeming host of living things.

However, it is proper to note here that many of the physical characteristics of man are practically identical with those of the higher beasts. When examined part with part it is found that the members of the body of man are identical with those of the higher apes. The same laboratory directions can be followed in working out the minute anatomy of the muscular, skeletal, nervous, digestive and other systems of the chimpanzee, the gorilla, the gibbon, and orangutan that are used in studying these systems in man. In no lessened degree whatsoever, the bodies of the lower animals are as truly the physical basis of food taking, digestion, absorption, respiration, assimilation, excretion, and reproduction as is the body of man. The same phenomena of life are enacted in all protoplasms by the operation of physiochemical laws.

The chemical substances formed in the body of man are frequently duplicated in the bodies of the lower forms. To illustrate, the insulin prepared for a diabetic, whose pancreas has ceased to function normally, is secured from the pancreases of calves. It appears to be identical in nature with that produced by man. In innumerable ways man is part and parcel with the beasts. His life is maintained as is theirs, and when he dies he dies in the same way. Solomon expresses it thus: "For that which befalls the sons of men befalls beasts; even one thing befalls them; as the one dies, so dies the other; yea, they have all one breath; so that a man hath no preeminence above a beast: for all is vanity. All go unto one place; all are of the dust, and all turn to dust again." Ecclesiastes 3: 19, 20. Thus, as far as building materials and life processes are concerned, man and beast share alike and neither has the advantage.

In the matter of intelligence, where the word is used in the sense of the sum of the abilities of an animal to deal with various types of situations, the distinction between man and beast is not so clear cut as we might first imagine. Even earthworms can be trained to do simple things, such as always turning to the left in a "T" tube instead of to the right. Some of the most highly complex animals, for example, crows, dogs, cats, horses, and apes, amaze us with their intelligence. We have these animals around us because they can be trained to fit into our manner of living.

Many complex things that animals do are not the result of intelligence but merely a combination of environmental influences and the operation of complicated instincts which were created in them. Such acts frequently have the appearance of intelligent procedures. But the degree of actual intelligence shown by certain of the higher animals very nearly spans the gap between man and beast in this particular characteristic.

However, interesting as the similarities of man and beast may be, in this discussion we are primarily concerned with the differences. The fact of the creation of man in God's image apparently determines at least four basic physical differences from the beasts. These are (1) the erect carriage of man, (2) the size of his brain, (3) the hand of man with its distinctive thumb and fingers, and (4) the features of man with peculiar proportion of parts. Man is the only animal which naturally and normally walks in an upright position. This gives him the dignity and commanding posture befitting the king of the earth.

Man's brain is about twice as large as that of the highest ape and has a proportionately larger cerebrum than the apes. This means a much greater capacity for the higher faculties of the brain, such as intelligence, will, and memory; and in the case of man the brain is the seat of the power to reason and to choose, a power which actually constitutes the greatest difference between man and the highest animals. It is the complex mechanism of this portion of the brain which constitutes the physical basis by which man can be godlike.

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The combination of man's marvelous brain and his incomparable hand with its facile thumb opposed to its equally facile fingers has made it possible for man to be physically superior to the beasts. Finally, the beauty of the features, the mobile countenance with the changing expression of the eyes and the flashing light of the smile, mark man as distinct from the beasts.

Turning from the fact of the resemblance of man to his Creator in certain physical characteristics, we come to that realm of the abstract, where the fact of man's creation in his Maker's image largely applies. It would appear that such conceptions as those of time, space, and self-determination and of the various abstractions are beyond the reach of the highest animals. Only man is self-conscious. He is capable of plumbing the immensities of space and the biases of his own soul. He can yield himself to the power of the Spirit, and have produced within him love, joy, peace, long-suffering, gentleness, goodness, faith, meekness, and temperance. If an animal appears to manifest anything approaching these abstract qualities, it is merely a mechanical manifestation of some ingrained instinct. The possibility of the willful bearing of such fruits in the life is present because man was formed in the image of his Maker. The physical characteristics of man which are in the image of God come to him through heredity. He has no choice regarding them. But those spiritual characteristics which make him godlike come only as he desires them and puts himself in position to receive them.

In the spiritual aspect man resembles his Maker in the peculiar, holy character of his life when he links with the Divine. This union, never conceivable by or possible to even the highest beasts, makes possible in the present life of man the bearing of the fruits of the Spirit. Furthermore, again in sharp distinction with the beasts, man can look forward to a future life of everlasting bliss; first, because of the fact that he was formed in the image of God; and second, because he was later redeemed from eternal death by his loving Creator.

The Relationship of the King to His Subjects.-Man's authority in the earth was to be complete. Genesis 1:26, after referring specifically to certain groups of animals which were under man's dominion, used the word *remes* in its broadest application, "everything that moves about upon the earth," so that nothing alive can be considered an exception. Likewise, man was to rule over "the whole earth," an expression which, in its simplest meaning, must include the subjection of such forces as water power, electricity, wind, and the like.

The picture of man we see here presented is that of a being that was formed at a very high level, having true nobility and possessing powers and attributes which cause him to tower high above all other animal forms. He was well suited to be their king.

This position of man on the earth as well as his rank in the universe is described by David in these words:

"When I consider thy heavens, the work of thy fingers, the moon and the stars, which thou has ordained; what is man, that thou art mindful of him? And the son of man, that thou visits him? For thou has made him a little lower than the angels, and has crowned him with glory and honor. Thou made him to have dominion over the works of thy hands; thou has put all things under his feet." Psalms 8:3-6.

The great power over other animals which this kingship entrusted to man, is revealed in the expression *radhak*, used in Genesis 1:26, which means "to trample down" or "to master." It was the purpose of God that this man should exercise unlimited control over the earth and living things as long as he remained loyal to Heaven. As long as he maintained this loyalty all nature was in subjection to him. The lower orders of being cannot understand or acknowledge the sovereignty of God, but they were created in such a way as to be able to love and serve man.

A correct appreciation of this law of creation in animate nature is of importance to man in at least two ways. First, it deepens his feeling of gratitude to the Creator for unselfishly filling our world with organisms which could only be aware of man and could serve and love him only, without having the ability to grasp the fact that a supernatural Being was their author. Second, this requires that man treat the subjects at levels beneath him with thoughtfulness and kindness. It is logical and fair that any acts of tyranny on his part will be charged against him.

This law of creation is one which all should contemplate thoughtfully. Such contemplation should lead us to treat animals with consideration, and should surely lead us to doubt seriously the matter of impunity in murdering God's creatures so that they may appear in our diet in lands where our tables may be bountifully supplied without bringing death to animals. There are many good reasons from a health standpoint for choosing our food from the Heaven-appointed sources, "grains, fruits, nuts, and vegetables," but this responsibility, the responsibility of man before Heaven, will always stand as the first reason against unnecessarily taking animal life.

The original administrative position of man on this earth as we as his present state has been aptly portrayed by Ellen G. White in the following words:

"When Satan declared to Christ, The kingdom and glory of the world are delivered unto me, and to whomsoever I will give it, he stated what was true only in part, and he declared it to serve his own purpose of deception. Satan's dominion was that wrested from Adam, but Adam was the vicegerent of the Creator. His was not an independent rule. The earth is God's, and He has committed all things to His Son. Adam was to reign subject to Christ. When Adam betrayed his sovereignty into Satan's hands, Christ still remained the rightful king." Ellen G. White, *The Desire of Ages*, page 129.

Thus with relation to Heaven, man was appointed vicegerent of the Creator. With respect to the lower orders of being on this earth he was absolute monarch and king. But he lost this stewardship to Satan through indiscretion, and is now nothing more than a favored tenant living on the kind providence of God, his host. Man's vice regency will be restored to him in the final restitution of all things.

"Be Fruitful, and Multiply." Genesis 1:28. It is sometimes argued that woman was left out of the story of the first chapter and that this omission constitutes a vital conflict between the records of the first and the second chapter. However, Genesis 1:27 states clearly, "Male and female created he them [man]."

We have no indication that death of animal life occurred on the earth before sin entered. The question is occasionally asked, "If creation were to stand for eternity, as it would have if sin had not entered, and no animals died, and if they continued to be fruitful and to multiply, would the earth not eventually be overcrowded?" Most certainly, if increase went on without end, a serious state of overcrowding would develop. However, it should be observed that the object of multiplication was to fill the waters in the sea, to replenish the earth and subdue it. When these objectives were accomplished in each case, it seems reasonable to assume that reproduction would cease.

The fact that man and all animals on our earth were given the power of reproduction is one which is most thought provoking. We learn from the reading of Isaiah 45:18 that one of God's purposes in creating the earth was that it should be inhabited. We may ask the question, "If God wished the earth to be inhabited by man and animals, why did He not furnish it completely with non reproducing individuals, in that respect as we understand angels to be?" Speculation on this point is possibly profitless. However, it occurs to the biologist that this may be one more provision in advance by an omniscient God to offset the effects of sin when it came. A population which sinned and yet which could not reproduce would be largely doomed, because "the wages of sin is death." Romans 6:23. But with reproduction possible the peopling of the earth with righteous can yet be accomplished.

Man's Original Diet. The food of man was to be obtained from "herbs yielding seed," and fruit "trees upon which there is seed-bearing fruits." This includes two of the three general groups of all plants listed in verse 11, *esebh*, "herbage," and *ets peri*, "trees of fruit." However, seeds of the second group are particularly indicated before sin. In our language we would say that the diet assigned man at his creation consisted in a general way of grains, fruits, and nuts. Genesis 1:29 in connection with Genesis 9:3 makes it very clear that man's original diet was entirely vegetable. Some maintain that the placing of man in dominion over all other animals (Genesis 1: 26) permitted him to eat their flesh as food. However, verse 29 leaves no question but that flesh was not to be included in his diet.

In the original, undegenerated condition grains, fruits, and nuts, including the fruit of the tree of life, furnished man with all the nutrients necessary to keep him in a state of eternal youth and health. After his fall, man's diet is described in Genesis 3:18 by the words, *esebb hassadheb*, "herb of the field," an expression which is evidently intended to cover in a comprehensive way the whole diet of man. Rather than to assume that God was, at that time, changing the diet of man, it may be reasonably concluded that He was merely again making clear to man that his diet was still to be purely vegetable. However, it is also perfectly admissible to conclude because any reference to the seed-producing quality of herbs is omitted here, and because, instead, *esebh* is here followed by *hassadhek*, "of the field," that the permission for eating certain plants was extended to "all the green plants," in other words, to vegetables. This would apparently make the ideal post-fall, antediluvian diet of man grains, fruits, nuts, and vegetables.

In our day, after sixty centuries of degenerative changes, all seed-bearing plants are not fit for food. This fact is illustrated by such forms as tobacco, coffee, tea, cocoa, the opium poppy, the nightshade, *Strychnos nux-vomica* (strychnine), poison sumac, and poison ivy. Furthermore, because of the very general nature of the words used in outlining the diet of man, it cannot be proved from Genesis that fungi (edible mushrooms) or any other. nutritious plants which contain no poisons, fall under divine prohibition. The words used in Genesis which relate to plants are not scientific words, and can only with very general and somewhat unsure meanings be translated. Certainly the word seed in our versions is not entirely

synonymous with the modern botanical definition of a seed. We cannot say with certainty that any of the algae, fungi, mosses, lichens, liverworts, or ferns (non seed-bearing plants) are proscribed. The one fact which does stand out clearly in the diet given to man is that it was to be entirely vegetarian. In our day, after the degeneration of sixty centuries has had its full effect upon our food materials, it is possible that in many places such non flesh foods as eggs, butter, and milk should be added to the diet to furnish the body with its requisite building and maintenance materials.

In assigning to animals their diet, Moses, it is interesting to observe, omitted the diet given to water animals. But it is made very clear that to all land forms “in which there is a living soul,” “all the green plants” were given. Their food is taken from the second class of plants named in verse 11, *esebh*; and this original diet appears to have largely included the “green plants” rather than their seeds; i.e., the emphasis here is the same for beasts before the fall of man as it was for man, as pertained to this class of plants, after the fall.

These verses dealing with the diet of man and animals indicate in a most effective way the condition of harmony which existed in the Edenic state. There was no feeding of one animal upon another. Not so much as an aphid was eaten by a bird. Plants only, organisms devoid of the “soul of life,” living and yet possessing no feeling or intelligence, served to furnish all the delicious nutrient materials for man and beast in that world of complete harmony.

16. Genesis 2

The Origin and Establishment of the Sabbath.

“Thus the heavens and the earth were finished and all their host. And on the seventh day God declared His work on which He was engaged, finished, and He desisted on the seventh day from all the work on which He had been engaged. And God blessed the seventh day and sanctified it, for on it He desisted from all His work which He had created by making.” Genesis 2:1-3.

The primary meaning of the important verb here, *shabbath* (verse 2), is “to cease,” or “to desist.” Thus, because God desisted from work on the seventh day, no work was done by Him upon it. The thought is not, as it might seem in reading the Authorized Version, that God ended His work on the seventh day, and because the work had made Him tired He rested. Rather, on that day He desisted from *melakhak*, “the special task,” that He had set for Himself in the creation of our solar system and the inhabitants on our earth. It should be clear from this passage that the seventh day, the day of rest, was not the Jewish Sabbath but the creation Sabbath. This is the same day referred to in Exodus 20: 8-11, and is the day of rest which was observed by the Jews.

The significance of the seventh day of the week is clearly set forth in the following statement:

“In Eden, God set up the memorial of his work of creation, in placing his blessing upon the seventh day. The Sabbath was committed to Adam, the father and representative of the whole human family. Its observance was to be an act of grateful acknowledgment, on the part of all who should dwell upon the earth, that God was their Creator and their rightful sovereign; that they were the work of his hands, and the subjects of his authority. Thus the institution was wholly commemorative, and given to all mankind. There was nothing in it shadowy, or of restricted application to any people.” Ellen G. White, *Patriarchs and Prophets*, page 48.

The institution of the Sabbath by the Creator was an act of extreme importance for man. “The Sabbath was made for man, and not man for the Sabbath.” Mark 2:27. Having completed His great creation and having placed man as king over the whole earth, the Creator looked down the stream of time and saw that man would continually need to have his thoughts brought back to the fact that God was the maker of the heavens and earth. Man could never fulfill his mission on this earth unless he remembered his origin. “Though formed from the dust, Adam was the Son of God.”

Therefore, in recognition of the true ground of all divine worship, i.e., the distinction between the Creator and the works of His hands, and in recognition of the fact that this great truth dare not be passed from mind, God established the seventh day of each weekly cycle as sacred time, when all men are to turn their thoughts in reverence and worship to their Maker. Had man not forgotten to observe this divine institution, there would never have been an idolater, an atheist, or an infidel.

Genesis 2:4-25.

“This is the story of the heavens and the earth at the time of their creation.” Genesis 2:4.

Studies In Creationism

In the first chapter of Genesis, Moses draws in quick, comprehensive strokes the larger facts of creation week. In that chapter he always refers to the Creator as plural, Elohim. In the second chapter the Creator is always referred to as being singular, Yahweh Elohim, that is, "Jehovah God." The specific designation in this chapter of one member of the Trinity is evidently in keeping with the fact that the treatment of this chapter is of finer details, and, as made clear in John 1: 1-3, Jehovah, the Word, was the one who did the actual creating. A number of words which are new to the creation story appear in Genesis 2, but the obvious reason for this is not that the story is written by some other author, but rather, new words appear because of a change of subject matter. In Genesis 2 Moses does not aim to present a complete creation story or follow the same time sequence as in chapter 1. The actual purpose of verses 4-25 appears to be to supply those supplementary facts which are essential to a correct evaluation of the events recorded in chapter 3.

"At the time when Yahweh God made earth and heaven, then no shrub of the field was as yet in the earth, and no plant of the field was as yet sprouting forth; for Yahweh God had not caused rain to descend upon the earth, nor did man exist to till the ground. So a mist kept rising from the earth and kept watering all the surface of the ground." Genesis 2:4b-6.

Two smaller groups of plants not named in chapter 1 appear here, *siach hassadhelg*, "shrub of the field," and *esebb hassadlgelg*, "plant of the field." It is possible that when the earth on the third day was sending forth mature plants bearing fruit, those varieties which particularly required the care of man were held back in their development until a man was on hand to cultivate them. The fact that the whole vegetable kingdom is not meant here is indicated by the use of these new, less inclusive terms. In view of the fact that the details of chapter 2 center in the Garden of Eden, the home of man, it may be that these plants grew only in Paradise.

The watering of the ground was accomplished by the rising of moisture clouds from the surface of the regularly distributed bodies of water and the condensing of this water over the ground at night in the form of mist or a very heavy dew. There is nothing in the record to indicate that rain, as we know it, fell before the time the Noah's Flood. With soil-moisture conditions ideal at creation it would not require the addition of much water each night to keep the soil in a condition of good health.

"And Yahweh Elohim molded man out of the dust of the ground and breathed into his nostrils the breath of life, and man became a living being." Genesis 2:7.

When Moses wrote the story of Genesis, according to the details given him by God, he wrote the story for the common man. Scientists often wish that he had written specifically enough on this subject of making Adam alive so that we could get a clearer picture of what life is. Moses states the fact that man was not formed of angelic substance but rather was molded from the materials of the earth. The word translated "dust" is *aphar*, which does not necessarily mean dry, pulverized earth. We would say that without doubt a damp lump of the very finest earth was used. This fact of the origin of man should tend to prevent any undue feeling of pride on man's part which might come as he recalled that he was made in the image of God.

A chemical analysis of the human body shows us that such constituents of the dust are present as the elements carbon, hydrogen, oxygen, nitrogen, sodium, magnesium, potassium, calcium, iodine, iron, chlorine, phosphorus, sulfur, silicon, copper, and fluorine. According to Seifriz, [1] these elements are present in the form of such organic compounds as amino acids, globulin, lipoprotein, fat, phytosterin, and phosphatids, which constitute 95 per cent of the dry weight of protoplasm. The remaining 5 per cent of the dry weight of protoplasm is made up of inorganic materials. For example, the chief constituent of bone is calcium phosphate. However, when we study the multiplicity of known chemical compounds in the body of man we are very sure that, in writing for the common man, Moses did very well and sensibly merely to state that man was made of "the dust of the earth."

When Adam [2] was formed of the dust and in his Maker's image, he lay as a dead man, in fact, he was a dead man. The act which was performed to make his dead protoplasm living protoplasm is what we wish we better understood.

A. R. Moore [3] found that if the plasmodium of slime mold is allowed to flow through a sieve, even though it be a very fine one, it will accomplish the feat unharmed. However, if forced through even a moderately fine sieve, it will be found on the other side apparently unchanged physically and chemically, but dead. The individual who can explain the results of this simple experiment will be able to explain the difference between living and nonliving systems.

After Adam was formed and before he was made alive his body possessed all the elements and possibly most of the compounds that were present after he became alive. It seems reasonable that before he

was made alive his protoplasm was in the condition of that of the slime mold after it had been forced through the screen. Then the record says, "And the Lord God . . . breathed into his nostrils the breath of life; and man became a living soul." This "breath" apparently accomplished a change in Adam's protoplasm which was the reverse of the change which occurred in the slime mold as it was forced through the screen.

We may assume that the plasmodium died because its intricately balanced physiochemical system was disorganized when pushed through the screen. We may likewise assume that Adam's protoplasm changed from a condition of death to one of life because it became, under the power of the "breath of life," an intricately balanced physiochemical system. If we are correct in our assumption here, living protoplasm is a system of nonliving substances possessing a very peculiar organization. In other words, it is its organization which makes it alive. In the light of the failure of innumerable attempts on the part of man to synthesize living protoplasm, I would assume that only God (and not even the devil) can establish that intricately balanced, dynamic system which we call living protoplasm. Until man is able to take the dead slime mold, which was alive only a moment before and which possibly has all its chemical elements and substances present, and make it alive again, he stands no chance whatsoever of synthesizing living protoplasm by mingling substances from the bottles in his chemical laboratory.

We have concluded that Moses in making his record was very sensible merely to say that man was formed of dust. We may conclude that he was again wise in describing how man became alive, to say merely that God breathed into man's nostrils the breath of life, and he became a living soul. Most certainly the fact could not be recorded in more understandable language. The common man knew what the breath was. It was an evidence of life. As long as a person or an animal was breathing, he was alive. When he stopped breathing his breath was no longer in him, and he died. The breath was the sign of inward existing life, and God was the author and maintainer of that life.

It is obvious that the breathing of the "breath of life" into man's nostrils accomplished nothing in man which was not accomplished in the bodies of the beasts as they became "souls of life." The expression used in verse 7 is *nishmath chayyim*, an expression which is practically the same as that used in Genesis 7:22, *nishmath ruach chayyim*, "the breath of the spirit of life," where reference is made to all life that perished in the Flood. Thus it was not the receiving of the "breath of life" that gave any particular distinguishing glory to man, but rather the fact that he was made in both the moral and physical image of his Creator.

The Bible refers to the similarity between the protoplasm of man and that of beast in these words: "For that which befalls the sons of men befalls beasts; even one thing befalls them: as the one dies, so dies the other. Yea, they have all one breath; so that a man hath no preeminence above a beast: for all is vanity. All go unto one place; all are of the dust, and all turn to dust again." Ecclesiastes 3:19, 20.

Job, in speaking of God, says, "If he set his heart upon man, if he gather unto himself his spirit and his breath. All flesh shall perish together, and man shall turn again unto dust." Job 34:14, 15. Depriving man of his spirit, God calls gathering it to Himself, an expression fully as strong as, "The spirit shall return unto God who gave it." Ecclesiastes 12:7. When protoplasm dies, that which God gave it returns to Him. It returns in the same way in which it comes from Him.

Man can prepare and has prepared many mixtures of dust, but he cannot do what is necessary to quicken them into life. Life comes only from God, because He is the only one who can impart to protoplasm the necessary organization. This, I would assume, is the sense in which the breath of life is said to come from God.

"And Yahweh God planted a garden in Eden toward the east and put there the man whom He had molded. And Yahweh God caused to spring forth all manner of trees pleasant to the sight and good for food, and in particular the tree of life in the midst of the garden and the tree of the knowing of good and evil." Genesis 2:8, 9.

The setting and the sufficient background of details are being supplied here to make the third chapter understandable. The expression *gan* is translated "garden" here. It means literally an "enclosure," that is, a protected, sheltered spot. The "paradise" of the Septuagint translators also is applicable here. It suggests a royal park. The author says this garden was located toward the east in Eden. Eden doubtless comes from the corresponding noun meaning "delight." The exact location of the garden in Eden is not referred to in any further instances, but rather the garden takes the name Eden to itself.

Regarding the trees which grew in the garden, the expression used is the strongest possible, *kol* etc., "the whole of trees," or "every tree." The attractiveness of the garden is indicated by the fact that God selected these trees especially for beauty and superior quality of fruit for eating. The fruit of the tree of life was of such a nature as to supply those parts of man's food needs which would enable him to live forever.

The tree of the knowing of good and evil was set in the garden to serve as a test of man's obedience and love to God. Its fruit later proved to possess a pleasing flavor.

"There was a river going forth from Eden to water the garden; leaving there it divided and became four branches. The name of the first is Pishon. This is the one which encircles all the land of Havilah, where there is gold; and the gold of that land is good; there is bdellium and the onyx stone. And the name of the second river is Gilion. This is the one that encircles all the land of Cush. The name of the third river is Hiddekel. This is the one that goes eastward of Ashshur. And the fourth river is the Euphrates." Genesis 2:10-14.

The participle, *yotse*, "goes forth," or "going forth," emphasizes the continuousness of the act when the river which watered Eden was in existence. But obviously it cannot be translated as a present "goes forth," because (1) the garden was not on the earth in Moses' day, and (2) during the terrific cataclysm of the Noachian Flood the entire surface of the earth was plowed to an average depth of almost a mile. No river could maintain its identity when the terrain where its bed lay was so completely disturbed. This is a fact which creationists commonly overlook as they insist that the present location of the Euphrates and Tigris (Hiddekel) rivers quite definitely locate the Garden of Eden. The presence of fossil bearing strata beneath these rivers definitely shows they have existed only since the Flood. The identity of modern names with the antediluvian rivers is either coincidental or a carrying over of pre-Flood names by Flood survivors. There appears to be no way of locating the position of the Garden of Eden on the present surface of our earth.

"And Yahweh God took the man and put him into the garden of Eden to till it and to look after it. And Yahweh God laid a charge upon the man, saying: From any tree of the garden thou may freely eat; but from the tree of the knowing of good and evil thou must not eat, for in the day of thy eating of it thou shall certainly die." Genesis 2:15-17.

It would appear that even in the perfect state work and duty are necessary. The two verbs used here to describe Adam's work are *abbadb*, literally "to serve, and *shamar*, "to watch" or "to guard." The latter verb, because of the absence of necessity to guard against invasion by an enemy, is taken in the milder sense of "to have charge of," "to look after." Without doubt Adam's work was very real, occasioned by the necessity of keeping the plants from growing in exuberant disorder.

It must not be concluded from verses 16 and 17 that man's full diet was the fruit of trees. This direction given by the Creator was merely to make very clear to man of what trees he might eat. This record reveals that man was not created with no opportunity of choice. Rather, he was endowed with absolute freedom of will. It was not necessary for him first to develop a sense of right and wrong; this he received as an original heritage.

In verse 17 *beyom* is to be taken very literally; that is, "in the day." Apparently Moses wishes here to say that the threatened penalty will occur instantaneously, a thought again expressed in the term rendered "certainly die," which literally means "dying, thou shall die." That the penalty was actually carried out as threatened is understood when we recall that the Biblical concept of dying is separation from God. This separation occurred at the very moment that man through disobedience broke the bond of love. This inner spiritual separation is more serious in the ultimate than physical death. On this point Ochler rightly concludes: "For a fact, after the commission of sin man at once stepped upon the road of death." [4]

"And Yahweh God said, It is not good for the man to be alone; I will make him a helper like him. And Yahweh God molded out of the ground all the wild beasts of the field and all the birds of the heavens and brought them to the man to see what he would call them; and whatever man called each living creature, that was its name. So the man gave names to all the domestic animals and to the birds of the heavens and to all the wild beasts of the field; but a helper worthy of a man was not found corresponding to him. And Yahweh God caused a deep sleep to fall upon the man; and when he slept, He took one of his ribs and closed the place with flesh. And Yahweh God built the rib which He had taken from man into a woman and brought her unto the man. And the man said: This now at length is bone of my bone and flesh of my flesh; she shall be called woman, because she was taken from man. (For this reason a, man leaves his father and his mother, and they become one flesh.) And they were both naked, the man and his wife, but they felt no shame." Genesis 2:18-25.

The origin of woman has not yet been related, nor her status defined, and therefore, the reader is not ready for Genesis 3. The necessary details are now added, additional details of the work done on the sixth day. Verse 18 states that man was created a social being. It is the normal thing for him to go through life with the companionship of a wife. Her influence in his life is necessary if he is to achieve his objectives. Man's Creator recognized man's needs of *ezer*, "a help," a being which the expression *keneghdo*

indicates is “his counterpart,” one who is equal to him and suited to him physically, mentally, and spiritually.

This second chapter reveals to us the interesting detail that the animals were formed instantaneously, male and female, but Adam was formed a few hours before his mate. Man, the only animal that could reason, was permitted to discover first his need of a life partner, and then, after getting really lonesome and after deeply sensing his want of a companion who would be his equal, he was supplied with a mate who was flesh of his flesh and bone of his bone, in every way his equal, one whom he could cherish as his own body. Truly, the Creator understood the mental processes of the man He had formed of the dust and in His image. On this subject we read:

“God Himself gave Adam. a companion. He provided 'an help meet for him, a helper corresponding to him, one who was fitted to be his companion, and who could be one with him in love and sympathy. Eve was created from a rib taken from the side of Adam, signifying that she was not to control him as the head, nor to be trampled under his feet as an inferior, but to stand by his side as an equal, to be loved and protected by him. A part of man, bone of his bone, and flesh of his flesh, she was his second self. Showing the close union and the affectionate attachment that should exist in this relation. 'For no man ever yet hated his own flesh, but nourishes and cherishes it. 'Therefore shall a man leave his father and his mother, and shall cleave unto his wife; and they shall be one.” [5]

In the statement made by Adam when Eve was brought to him (verse 23) the expression, bappaam, is used. The meaning of this is “now at length.” In free translation Adam. said, “Finally, that for which I have been looking for some time, a being who is my physical mate.” The plan of the Creator to prepare the mind of Adam for the companionship of a wife before producing her was successful. With regard to the expression used in verse 19, yatsar, which above is translated “molded,” it would be perfectly proper to use the translation “had molded.” Chapter 1 makes it very plain that in time sequence these animals actually were created before man.

A careful attention to the wording of verses 19 and 20 shows that there is a limitation of the number of creatures brought before Adam for naming. In this case only chayyath bassadheb, “beasts of the field,” are brought, not beasts of the earth.” The “winged creatures” are brought and also the “domestic animals,” belgemah, which were included in verse 19 in “beasts of the field.” Thus all water animals and the creeping things (remes) were not included in those forms named by Adam on the sixth day. There is good reason also to consider that not all the wild beasts of the dry land or all the flying forms were included in those named before the creation of Eve. The Garden of Eden, being a garden, could scarcely admit all the land animals. Neither would Adam find time to review and name all land and winged forms. Therefore, it is possible that the forms Adam named on Friday were only those which normally lived in the garden. These were sufficient to demonstrate to Adam that he alone lacked a mate.

In the Hebrew the use of the word name in assigning names involves the designation of a term expressive of the true nature of the one named. The intelligence and great powers of observation possessed by Adam are indicated in the fact that he was able to name these animals so accurately that the name he gave was kept because it was a correct one. Without doubt Adam continued his naming of the animals during succeeding weeks and years until he had named all the originally created kinds with their varieties. The task of naming all the different varieties at that time was doubtless not so great as it is today. Our present-day taxonomists list about 600,000 “species” of insects in the world. [6] If Adam named a new species each second, it would take more than 166 hours to name our present-day insect species alone. Again, systematists list about 8,500 “species” of birds in the world. [7] If Adam were to name a new species of bird every second, more than twenty-three hours would be required to name all modern species of birds. A sage conclusion is that the original kinds of animals were not the same as our modern species, but were basic groups from which great numbers of modern species (not kinds) have developed through natural processes of variation.

The statement at the conclusion of this chapter depicts in a very forceful way the fact of the innocence of man before sin. He had done nothing to develop within him a sense of guilt. Man was in complete harmony with himself and with his Creator.

17. The Creator-Sustainer and His Works

The Instruments of God. It appears that God employs two general ways of upholding and directing His universe. These lines of maintenance are (1) through the agency of the Holy Spirit and the angels and

(2) through the agency of natural laws.

Concerning the first type of operation, one writer presents the Biblical picture of the functioning of these agents in the following accurate words:

“The Bible shows us God in His high and holy place, not in a state of inactivity, not in silence and solitude, but surrounded by ten thousand times ten thousand and thousands of thousands of holy beings, all waiting to do His will. Through these messengers He is in active communication with every part of His dominion. By His Spirit He is everywhere present. Through the agency of His Spirit and His angels, He ministers to the children of men. Above the distractions of the earth He sits enthroned; all things are open to His divine survey; and from His great and calm eternity He orders that which His providence sees best.” [1]

With regard to the second type of operation, this same writer sums up the teaching of the Bible in these words:

“God is constantly employed in upholding and using as His servants the things that He has made. He works through the laws of nature, using them as His instruments. They are not self-acting. Nature in her work testifies of the intelligent presence and active agency of a Being who moves in all things according to His will.” [2]

This writer aptly says that the laws of nature are used by God “as His instruments.” The first of the two quotations refers to that type of agency employed by God in carrying on the supernatural acts on our earth. This operation of His power is just as real as the natural laws, but we would refer to it more as miraculous, simply because it occurs differently from, and out of the regular order of, the natural laws. In a way, as they are manifested in behalf of individuals, they are more personal and specific in their action than are the natural laws, which often seem to ignore the individual in order to keep the general principle straight, and thus maintain the law and order of the universe.

There are individuals in the world-in fact, scientists in general may be included here-who try to make distinct cleavage between the natural and the supernatural. They would accept as real, and therefore existent, the natural things and laws which can be worked with in the laboratory and demonstrated to the senses to be real, but they rule out the supernatural as merely a figment of the individual's imagination. There seems to be a tendency in the minds of certain individuals to adapt themselves to the more obvious and to ignore and even to consider as non existent that which they cannot fathom. This evasion of unnatural facts-that is, the supernatural-becomes still easier when the moral and spiritual responsibilities accompanying the acceptance of the supernatural are distasteful to the individual.

The scientists of the Middle Ages accepted quite unanimously the fact of the supernatural working to accomplish natural processes. To illustrate, the circulation of the blood was thought to result from the effect of the “vital spirit” which the blood was considered to receive in the heart. Thus the important function of the heart was dilatation, because, by its receiving the blood, more of the spirits could be imparted so that the blood could be empowered to make the circuit once more. When William Harvey, of England, demonstrated in 1628 that the blood did not circulate by the action of the vital spirit but rather because it was simply a liquid confined in tubes, which was kept in a one-way motion by means of the contraction of the heart and the action of valves, scientists began to display an unexplainable, or at least unnatural, about-face.

As more and more of the vital processes were shown to result from the operation of the laws of physics and chemistry, men turned from the unjustifiable assumption that the supernatural Power carried on these processes in unnatural ways which men could never understand to the opposite extreme and equally unjustifiable assumption that vital processes were the result of the operation of physiochemical laws in the protoplasm of plants and animals, and therefore no higher Power was necessary.

In the earlier part of the present century this purely mechanistic opinion of a universe which operated without any need of a supernatural power was widespread. We are encouraged today to see here and there among scientists a revival of the conception of a higher power, but there is still a general opinion that the two ideas of natural and supernatural are antagonistic. Particularly among creationists there appears to be confusion as to where one ends and the other begins. We may well raise the question, Is there a clear line of demarcation between natural law and supernatural manifestation?”

It is rather astonishing to learn that during the late Middle Ages students of nature considered that a natural process was the result of the action of a higher power if it could not be explained in terms of physics and chemistry; that is, if it could not be understood. But as soon as the process was found to be explainable by natural laws, understandable, then it was concluded that God had no part in it. This is working on the assumption that God is a mere magician or wonder worker who purposely tries to mystify

and befuddle man in the operations of the natural world.

Even in our day we find creationists who have a huge cache of superstitious illusions regarding the unnatural way in which they think God maintains His universe. By such individuals the investigations of science are thought to be largely irreverent procedures, and each additional process explained in a natural way appears to give them increased pain and also adds to their suspicion regarding the honesty of scientists. Such a philosophy is wrong. We need to picture God as an honest worker, who placed a reasonable man in a reasonable and understandable universe. With such a philosophy we see that true science has as its function the changing of gaping wonder into intelligent delight, the conversion of superstition into rational worship.

It appears to trouble some people that God's servants are subject to natural laws in the same way that sinners are subject to them. They seem to expect a servant of God to be immune to being run down by a car or a train, or to death in an airplane accident. But in the same way that God makes His "sun to rise on the evil and on the good," and sends His "rain on the just and on the unjust" (Matthew 5:45), He continues to express impartially His power in all the regular, natural ways which we call natural processes. Any individual, godly or godless, who is momentarily out of harmony with these natural laws must suffer the consequences which come to lawbreakers. The effect may be immediate, as when we step in front of a car or off a roof, or the effect may be delayed, as when we neglect the inclusion of essential vitamins in our diet.

The necessity of natural processes occurring in regular ways becomes apparent as we think how things would be in our universe if this regularity were not present. For instance, if gravity worked only part of the time or in different directions at different times, we would not know what to expect. We might retire at night, resting on the top of the bed; but if gravity reversed its direction during the night, we would experience a hard fall against the ceiling. Needless to say, if natural forces did not work in regular ways, we would find ourselves in a chaos. But as a result of their regular behavior we live in a cosmos.

Before they think into the situation some exclaim, "How can the cold, mechanical, heartless, impersonal laws of physics and chemistry be expressions of a God of love?" But even a brief consideration will show that a reasonable universe must be just this kind, where things occur in certain set ways, and this fact makes it possible for us to learn the laws and to harmonize ourselves with them. We suffer injury in this cosmos when we do what we could have known better than to do. These very ways of the natural world, with all their regularity and impartiality, make it possible for us to steer our course with impunity as regards physical mishap so long as we plan in harmony with natural law. If we are familiar with nature, for every result, happy or sad, we may find a cause. We read in Proverbs 26:2, "The curse causeless shall not come." This is true only because we live in a universe of law-bound power.

This conception of natural law being an expression of God's power and character [3] causes us to see that in actuality there are no essential differences between the natural and the supernatural. As Ellen G. White has expressed it:

"In dwelling upon the laws of matter and the laws of nature, many lose sight of, if they do not deny, the continual and direct agency of God. They convey the idea that nature acts independently of God, having in and of itself its own limits and its own powers wherewith to work. In their minds there is a marked distinction between the natural and the supernatural.... This is false science; there is nothing in the word of God to sustain it. God does not annul His laws, but He is continually working through them, using them as His instruments." [4]

It is not uncommon to find Christians who expect God to upset His regular way of doing things just for them. But such an expectation is not being fair with God. This attitude of mind develops within the individual a type of smugness which may result in a fatal discouragement when he or his loved ones suffer in the course of natural events. We live in a universe where effect must follow cause in order to produce a harmonious whole. It is not often that God chooses to perform a miracle. We cannot require this of Him in the world of natural things.

God's blessing will naturally fall upon those who study the rules and regulations in the natural world, and place themselves in harmony with them. Any time God chooses He may perform an unnatural act, such as healing someone of a hereditary disease, but we must recognize that such occurrences are definitely unusual. If God does not choose to work the miracle for us, it will be because of one of two things: either God sees that it is not best in the light of His entire plan, or we do not have enough faith.

As inhabitants of the earth, we ought to recognize that "God is as truly the author of physical laws as He is the author of the moral law." [5] God has set these natural laws in our earth for the good of man. Our work is to "show that the laws of nature, being the laws of God, are designed for our good; that

obedience to them promotes happiness in this life, and aids in the preparation for the life to come. [6]

Processes of Maintenance. Did death and decomposition of living materials occur in the Edenic state? Were wastes eliminated from the bodies of animals?

These are questions of considerable importance to biologists who seek to unravel the story of living things. The fact that plants had been appointed as food for animals makes it very obvious that death did occur in the Garden of Eden, death of plants. Every grain and every nut that was eaten meant death to an entire organism in its embryonic state. Every fleshy-rooted vegetable consumed for food meant the life of an adult plant. Here was death without the shadow of death. Death, as known before the fall of man, merely meant that the living protoplasm of fruits, nuts, grains, vegetables, and herbs was appropriated by some animal to serve as a toothsome meal. The living substance of the plant died, was broken up into simpler substances, i.e., was decomposed, and then used in the synthesis of animal tissues, in the regulation of body processes or as energy sources.

Apparently, there was no death of animals in that original state. We might wonder how Adam, in his care of the garden, could avoid stepping on an ant or crushing the tiny larva of some insect, but as far as we can discover there is no Biblical ground for the assumption that death of individual animals occurred. Thus, the answer to our first question is yes; death and decomposition of living materials did occur in the Edenic state, but this death was only in the plant kingdom.

With regard to the elimination of wastes by animals we have no direct statement in the Bible. As far back as the Flood, only 1656 years after creation, animals eliminated wastes as do modern animals. This fact is established by fossil remains.

But were such substances as feces and urine produced by animals in the Edenic state? Let us assume that animals originally possessed digestive tracts so constituted as to digest completely all parts of the grains, fruits, nuts, vegetables, and herbs which composed their diet. This would require additional digestive enzymes to those man now possesses. It would furnish a digestive system the like of which is found nowhere in the animal kingdom today. In considering this question, it is very necessary that we bear in mind the profound bodily changes which would be required to change a system constructed to handle no refuse into one such as animals possess today. In the case of man the colon with its vent, the kidneys, the ureters, and the bladder would have to be added, not to list such structures as the blood vessels and nerves which would have to be provided. The modern digestive tube itself is constructed in every feature to handle indigestible matter, i.e., to work it over and to pass it along. In fact, the bulk of such indigestible parts of our food as cellulose is almost as important to health as are the foodstuffs themselves. The significance of our present digestive and excretory systems is that if they were not originally created with their present structures, a second creation some time after sin entered would have been necessary.

But we read in Genesis 2: 1, "Thus the heavens and the earth were finished." Again in Hebrews 4:3 we read, "The works were finished from the foundation of the world." The teaching of these verses seems to express the thought that after that first original creation was finished on Friday there was no second creation so profound as that which would be, required to repattern the bodies of all animals in order to make the handling of a large bulk of indigestible materials possible and to install a system for the extraction and elimination of solid and liquid wastes. The diet was physically the same before the fall as is the same diet today. Therefore, it seems reasonable to assume that the basic pattern of Adam's body was the same in its equipment of organ systems as is that of our bodies.

The student of living things today finds three most vital cycles of chemical substances intimately associated with the lives of plants and animals. These are the oxygen cycle, the carbon cycle, and the nitrogen cycle. The agencies producing these curved series of compounds make it possible for materials which have been used to be put into condition to be used again. We shall pause here to notice briefly the last of these three cycles. In the nitrogen cycle the green plant takes water from the soil and carbon dioxide from the air, and by means of light energy and the catalytic action of chlorophyll, manufactures simple sugar. This sugar is then combined with nitrates from the soil in the plant to form amino acids. These amino acids are used by the plant for the construction of new protoplasms and for the replacement of portions of the living substance which have been oxidized. Some of these acids are also built into proteins, for example, in the ripening seeds of legumes. The animal eats these proteins, digests them to amino acids, and then rebuilds them into the protoplasm of its own tissues. Nitrogenous wastes from the animal's body as well as plant residues are decomposed by certain bacteria and fungi. Then nitrifying bacteria build these simplified substances into nitrites and eventually into nitrates which are ready to go around the cycle again. The extreme importance of this cycle lies in the fact that it is the source of all growth and repair materials for living things.

Studies In Creationism

These organisms of decay and the nitrifying bacteria, in cooperation with nitrogen-fixing bacteria in the soil and on the roots of legumes, are responsible for the constant renewal of the fertility of the soil, i.e., its fertility as regards the all-important nitrates. Without them and their products plants would no longer be able to grow. In the light of these facts it seems reasonable to assume that the nitrogen cycle was instituted by the Creator in the beginning. If such were not the case, it would have been necessary for the Creator continually to reach into the nitrate barrel and replenish, by a supernatural process, the constantly dwindling supply of nitrates—a type of sustaining action that the Creator does not manifest in His conduct of life processes on this earth. In a world designed to last forever the institution of a nitrogen cycle would be still more important.

Another aspect of the question of whether or not there was decomposition of materials outside of living bodies in the original state, is the fate of parts of organisms which have served their purposes. For example, what became of husks and shells of such dry fruits as grains and nuts? What became of egg shells? What became of deer horns that are shed each year? What became of the petals and stamens of flowers as they fell off to make way for the development of fruit? What became of whole leaves as young plants developed and the earlier leaves came to be out of advantageous position as a result of growth? What became of remnants of leaves where a portion had been eaten by some insect, its larva, or by some other animal?

We could go on and on in this manner; but perhaps this is enough to illustrate the need of organisms of decay, such as yeasts, molds, and bacteria, to break these materials up into simpler substances so that they could go around again and again. Matter appears to be indestructible; but if no such reconversion system existed, the available materials would be fixed in non available form before any great period of eternity had passed. It seems very necessary to conclude that in order to keep the earth uncluttered from the products of its own undying organic forms, the Creator must have instituted the nitrogen cycle at creation. Without decomposition the heavily bearing fruit trees in even a few seasons would be banked up beneath with petals that had served their function. Adam's discarded apple cores and nut shells would eventually block his way through the garden. In fact, how could Adam eat the apple if the petals and stamens did not fall? These practical problems find their solution in a nitrogen cycle even in the Garden of Eden. Thus the Creator could sustain the earth in His usual way, i.e., through the establishment of natural laws.

In recapitulation let it be said that accumulation of ripened flower parts, of bud scales, of the husks of fruits, of outgrown leaves, of structures useful only in immature stages, such as the tender epidermis of young woody shoots, of discarded egg shells of egg-laying animals, of the exoskeletons of insects as they discarded them during their life cycles, or dead epidermal cells, of fluid and solid wastes of animals, of such structures as antlers, etcetera, as the centuries passed would become mechanical obstructions to living organisms, and in that form would be unsuited to the nutrient demands of the luxuriant flora. To break up these materials into simpler compounds which could be used again by the plants as they acted their part in this nitrogen cycle, was the work of multitudinous bacteria in the soil. Without doubt many insects and other more simply constructed animals played important parts in reducing larger solid wastes as well as litter and duff to a form which could be readily acted upon by bacteria. These essential materials were quickly disposed of under the prevailing semitropical climate. Today a single gram of loam from the surface soil may contain fourteen to fifty-eight million bacteria, and in some soils even at a depth of three feet, as many as thirty-seven thousand per gram have been found. [7] These bacteria are almost unanimously beneficial today. Where have they come from? They are blood descendants of the original soil bacteria and are still largely employed in the same occupation that engrossed the energies of their ancestors as they simplified the complex wastes and fitted them into chemical compounds which could again ascend in the form of plants and once more serve as sources of energy and growth materials for plant and animal life.

Objection is occasionally raised to the suggestion that animals produced wastes in the original state because, it is said, such a philosophy would require a sewage system in the New Jerusalem—apparently a loathsome idea. Even if there is any connection here, I would not wish to make many assumptions regarding the kinds of bodies the redeemed will have after the change to an immortal state. We can possibly imagine fairly accurately what the original state was because this is the same earth, and mortal is still mortal. The human body in the new earth may differ from its present state, and even from its original state, in many ways. However, it would appear reasonable to assume that the restored state of man and animals will be analogous to that in which they were originally created. At least this appears to be the case in the matter of food. (See Isaiah 65:21, 22, 25)

The disposal of wastes need not spoil an Eden. We see many animals today possessed of cleanly habits of waste disposal. Possibly this is a shadow of a well-developed instinct which was possessed by animals in Eden. In the subtropical climate of the earth at its beginning bacterial activity and the activities of such insects as scavenger beetles would quickly dispose of these materials and change them back into simpler chemical substances.

The simplicity of the daily lives of Adam and Eve and their closeness to the earth and its products are hard for us to grasp in our day of great complexity and artificiality. We often find individuals who think the redeemed will spend eternity sitting on a cloud playing a harp. Contrariwise, we know the saints will build and inhabit, sow and reap, work in the garden and eat the fruits of the activity of their own hands. Likewise, some are prone to assume that the original state was some ethereal existence far removed from the actualities of life. Still, we know that our first parents were builders, using, as materials living trees and vines. Their work was that of gardeners; they dressed and kept the garden. They ate the fruits of the garden and slept on Mother Earth's bosom beneath her goodly trees-and without a doubt were dinged by her fertile soil and found bathing necessary. It was an extremely real existence and very close to nature. And their lives were lived on the same earth upon which we walk, an earth whose processes were, if judged in the light of the present situation, quite entirely carried on by natural laws, the instruments of God. It seems very reasonable, in fact, quite necessary, to assume that the sustaining power of the Creator was manifested then in the same vital cycles which in our day still keep the essential chemical substances ever renewed so that life can continue.

18. Changes Accompanying the Entrance of Sin

Satan the Destroyer. Satan was one of the created, supernatural beings which we call angels. He was the highest ranking and most powerful angel in heaven. Through the indulgence of a desire for self-exaltation, Satan's nature was changed from that of the most powerful and capable of angels, and one who loved God, to a being who was still as powerful but whose every thought was bitter hatred of God and whose ambition was to confuse, pervert, mar, or destroy every work of his envied superior, Christ. In our study of the changes in the biological world which accompanied the entrance of sin, it is important to discover just how much power was and is still possessed by this individual who is responsible for the derangement we see about us in the natural world.

Because the following statements on this subject are so completely Biblical, they will be quoted here. The first, discussing the apparent conversion of the rods of the Egyptian magicians into serpents when Moses and Aaron appeared before Pharaoh, refers to both the power and the limitations of power at Satan's command. The second statement describes his manner of working. We read:

"The magicians did not really cause their rods to become serpents; but by magic, aided by the great deceiver, they were able to produce this appearance. It was beyond the power of Satan to change the rods to living serpents. The prince of evil, though possessing all the wisdom and might of an angel fallen, has not the power to create, or to give life; this is the prerogative of God alone. But all that was in Satan's power to do, he did; he produced a counterfeit. To human sight the rods were changed to serpents." [1]

"Satan works through the elements also to garner his harvest of unprepared souls. He has studied the secrets of the laboratories of nature, and he uses all his power to control the elements as far as God allows. When he was suffered to afflict job, how quickly flocks and herds, servants, houses, children, were swept away, one trouble succeeding another as in a moment. It is God that shields His creatures, and hedges them in from the power of the destroyer." [2]

Satan has great power. He can perform miracles, he can heal the sick, he can use the elements, he can control certain forms of organic life to bring death to other organisms. His limitations are those set for him by God's permission, and he cannot create. He has studied the secrets of the laboratories of nature, and accomplishes his effects through the manipulation of the physiochemical and biological laws. Being unable to create, he must perform his miracles through speeding up, slowing down, or by some other perversion of the normally orderly processes of nature. His abilities, in connection with his desire and his application, have resulted in an accumulation of the most intricate and detailed knowledge of the laws governing the lives of plants and animals.

As long as man was obedient to God's laws, Satan could accomplish nothing in the way of perversion or change in the natural world. He was present on the earth but only as a tempter. However, when man chose to disobey God and set his own judgment above his Creator's advice, he lost his

stewardship. Satan seized it, and thus took over man's claim to the ruler ship of this earth. This placed Satan in a position where he could use his power to hurt and destroy. This he proceeded to do with avidity and alacrity; and this profanation by means of degeneration, perversion, and confusion through amalgamation has proceeded continuously for six thousand years.

Curses Are Pronounced. The record of the first curses, with a few comments on this record, is as follows:

“Now the serpent was the most clever of all the beasts of the field which Yahweh God had made.” “And Yahweh God said unto the serpent: Because thou has done this, cursed art thou from out of the number of all the animals and of all the wild beasts; upon thy belly thou shall go and dust shall thou eat all the days of thy life.” Genesis 3:1, 14.

The following comment by Dr. Adam Clarke regarding what kind of animal the “serpent” may have been is particularly interesting to biologists. “No person can suppose that any of the snake or serpent kind can be intended here: and we see from the various acceptations of the word, and the different senses which it bears in various places in the sacred writings, that it appears to be a sort of general term, confined to no one sense. [3] The term translated “serpent” is nachash. In the Bible it has been accepted to mean snake, crocodile, hippopotamus, fornication, chain, pair of fetters, piece of brass, and piece of steel.

To translators who have furnished us with the various versions of the Bible, modern equivalents for names for specific animals appear hard to settle upon. This can be illustrated by the term *tinshemeth* (Leviticus 11: 18; Deuteronomy 14:16) which is translated “ibis” in the Septuagint, “swan” in the Authorized Version, and “horned owl” in the American Revised Version. Although more likeness of opinion prevails regarding the equivalent of *nachash*, still there is nothing in the Bible to assure us that it was a snake as we know the animal today. We can merely infer from Genesis 3:14 that before the curse it moved from place to place in some other way than by going upon its belly. Whether it walked on legs or flew through the air is neither stated nor implied. Furthermore, after the curse fell upon it the fact that it went upon its belly does not necessarily mean that it had no legs. Many turtles and lizards literally go upon their bellies even though they have legs. Consensus of modern opinion notwithstanding, it still is very possible that the “serpent” used by Satan was not the ancestor of all our modern snakes. If she (the term is feminine) were, which of our modern snakes have descended from her? Not all modern snakes could have come from one pair of ancestors unless evolution has occurred, and we have not real proof to substantiate such a notion. It is even possible that the descendants of the serpent” became extinct some time after the Flood.

The translation of this verse in the Authorized Version might lead one to conclude that of all the animals which had been cursed, the “serpent” was cursed the most severely. However, at this time no animal had been cursed. The foregoing translation more accurately expresses what is evidently the idea of the Hebrew text.

It is known to all biologists that snakes do not eat dust. However, this fact is no argument against some of our modern snakes being descendants of the “serpent.” The pronouncement, “Dust shall thou eat all the days of thy life,” does not necessarily mean that the “serpent” was actually to eat soil as earthworms do today. Parallel to the expression “eat dust” is the one “lick the dust” which is used in several places in the Bible. (See Psalms 72:9; Isaiah 49:23; and Micah 7:17.) In each case this expression means “to suffer defeat” or “to be humbled.” In the case of the “serpent” she not only was to move in the dust but was to be humiliated all the days of her existence. In the days of Israel anything that crawled upon its belly was an abomination. (Leviticus 11:42.) In our day, as a result of universal training from birth onward, mankind seeks immediately either to kill or to flee from any beast which crawls upon its belly.

The Curse Upon Woman.

“To the woman He said: I will increase very greatly thy pain and thy conception; in pain thou shall bring forth children; unto thy husband thou shall be attracted, and he shall rule over thee.” Genesis 3:16.

Itstebbon includes both “pain” and “sorrow,” all that is hard to bear. The conjunction before “conception” indicates the meaning “and in particular.” Although, because of the pain it portended, woman might seek to escape it, still her lot would be to experience a frequent recurrence of it. Also the bringing of the new being into the world was to be accompanied with pain. The unexplainable yearning of woman for man, not necessarily sexual, was to be her normal lot, a desire which might become degraded into an unhealthy attraction or obsession. The position of equality with her husband was lost. He was to rule her. This curse upon woman placed the privilege before man of proving himself a Christian gentleman by encouraging and insisting upon the original equality.

The Curse Upon Man,

“And unto the man He said: Because thou has hearkened unto the voice of thy wife and has eaten of the tree of which I commanded thee saying: Thou shall not eat of it, cursed be the ground on thy account. In misery shall thou eat of it all the days of thy life. Thorns also and thistles shall it cause to spring forth for thee and thou shall eat the herb of the field. In the sweat of thy face shall thou eat bread until thou return unto the ground, for from it thou was taken; for dust thou art and unto dust thou must return.” Genesis 3:17-19.

The expression in verse 17 is *laadham*, “unto the man” rather than “unto Adam.” The significance of this is that a curse was being pronounced which would affect all mankind.

Before his sin man had control over the earth, but because of his -sin he now loses that control. The soil becomes insubordinate, and it is only with difficulty that man can gain his living. As with woman, so with man -he was to experience *istsebbon*, “misery,” “sorrow,” toil.”

The explanatory phrase to the man was “on thy account.” For man's sake he was to work hard. Under the changed conditions of a sinful state it would be necessary for him to fill his days with real labor, labor that would bring sweat to his brow. To our very day it is the sleep of the laboring man that is sweetest; the heart of the man who works knows what real contentment is.

With regard to man's diet, the principal thought in verse 18 appears to be the fact that although his state had changed, still he was to continue with his diet of plant products.

The fact that man was dust and must now, because of having sinned, return to dust again, was a result which falls with tremendous force upon us every time we see the fulfillment of these solemn words.

Naming of the First Woman

“And the man called his wife's name Eve (Life) because she was the mother of all living.” Genesis 3:20.

Although we have referred to the woman as Eve before this, still in fact, the name was not given her until after the fall. (The first unquestionably clear use of *adham* as the proper noun “Adam” does not occur until Genesis 4:25.) The giving of this name by the man in his darkest hour shows his vision of and faith in the future when, through the generations born by woman, life in its fullest sense would again return.

The Coat of Skins

“And Yahweh God made garments of skin for the man and for his wife and so clothed them.” Genesis 3:21.

In assisting man in the covering of his nakedness the Creator gave His approval to the sense of shame. He likewise taught man how to protect himself against the excessively high and low temperatures he would now experience in the earth outside the garden.

It would appear from this necessity for the provision of clothing that climatic changes were the first effects of sin in nature. Although, even after sin entered, subtropical temperatures apparently prevailed, as evidenced in the kind of fossils which show that organisms requiring such a climate lived over the whole earth even at the time of the Flood, still it may be gathered that temperatures, here and there, occasionally fell low enough to permit frosts.

The coat of skins prepared for Adam, although a necessity under the new condition of extremes of heat and cold, was doubtless not welcomed as heartily by him as we might at first imagine it was. Its preparation cost Adam the lives of some of those animals which he loved and for which he was consciously responsible. They were his stewardship and his pets. Instead of being a badge of his prowess as a hunter, and an object he could display with pride, this coat was a continual reminder to him of his sad mistake in yielding to Satan-a mistake which had not only brought sorrow to him and to his descendants, but which also ushered in for his adoring servants, the animals, that abnormal situation which would cause all nature to groan and travail in pain. In his state of tender conscience toward the suffering animals Adam was quite certain to be overly solicitous for them. God showed him that under the changed condition man was going to find it necessary to hold his life to be better than that of the beasts. In times of emergency unnatural conditions would lead to the necessity of taking the lives of the animals. Adam's first sorrowful lesson on this new situation was given him in the coat of skins.

The new relationship between man and animals, which partook of the nature of a blood feud and which was symbolized by the coat of skins worn by Adam, is described by one writer in the following

words:

“Under the curse of sin, all nature was to witness to man of the character and results of rebellion against God- When God made man, he made him ruler over the earth and all living creatures. So long as Adam remained loyal to Heaven, all nature was in subjection to him. But when he rebelled against the divine law, the inferior creatures were in rebellion against his rule. Thus the Lord, in his great mercy, would show men the sacredness of his law, and lead them, by their own experience, to see the danger of setting it aside, even in the slightest degree.” [4]

It is possible that this changed attitude toward man on the part of the animals was not a direct act of God but followed as a natural result of the change in man's nature and disposition which accompanied his fall into sin. As God's permission has been extended Satan's perversion of the original subjection of animals to man has increased with the centuries. It is all too natural now for man, when afflicted with beasts, from chiggers to elephants, to curse his Creator for so persecuting him. He does not recall as often as he should that this lack of respect from the animal creation is the natural result of his choosing to follow his own wisdom instead of doing that which God advised him to do. Each such affliction should remind us of the shortsightedness of man's unaided wisdom.

The Curse of God. After the earth was brought into existence it received the Creator's full blessing. This blessing assured the organic forms that Satan could in no way harm them. When man chose to sin, it became necessary for his best good that his life be not too easy and luxurious. At the first meeting of man and his Creator after sin had been committed by man, two specific curses and one general one were pronounced by the Creator. The curse upon Eve changed her status from a position of equality with her husband to one of subjection to him; and physical suffering, particularly in connection with childbirth, became her peculiar portion. The curse upon the “serpent” resulted in that particular individual and his descendants, at least, being changed from one which locomoted in some respectable way to a beast which crawled upon its belly. The general curse was upon the whole surface of the earth for man's sake. The curse of God may be manifested in various ways, but in this case it is clear that in cursing the earth God did not change it by His own power. He merely, to a certain degree, removed His blessing from it to the extent of permitting Satan to exert his evil influences within certain limits through manipulation of biological and physiochemical laws.

In commenting on this subject, Ellen G. White at two different times has made these accurate observations:

“The same God who guides the planets works in the fruit orchard and in the vegetable garden. He never made a thorn, a thistle, or a tare. These are Satan's work, the result of degeneration, introduced by him among the precious things; but it is through God's immediate agency that every bud bursts into blossom.” [5]

“Not one noxious plant was placed in the Lord's great garden, but after Adam and Eve sinned, poisonous herbs sprang up. In the parable of the sower the question was asked the Master, 'Did not thou sow good seed in thy field? How then hath it tares?' The Master answered, 'An enemy hath done this.' All tares are sown by the evil one. Every noxious herb is of his sowing, and by his ingenious methods of amalgamation [hybridization] he has corrupted the earth with tares.” [6]

It is in harmony with the Bible to assume that all effects of the first curse upon the earth were not brought about by direct acts of God, but rather were accomplished directly or indirectly through Satan's improvement of every opportunity and permission granted him in changing nature from its ideal state to one of deterioration and confusion. The nature of this curse, as regards man, consisted of affliction by Satan, not affliction by his Creator. The wisdom and the initiative of the Creator are manifested again in His skillful use of these changed conditions as the best environment for man under his self-chosen deviation from the divine plan for his life.

The nature of the curse of God in these first cases in the history of our earth seems to be well illustrated in the experience of job. We read in Job 1:10 that job first enjoyed the blessing of God. Then in order to test job, God let his own curse fall upon him to the extent of his possessions. Rapidly everything job possessed was swept away, because God no longer protected them. The person of job was not harmed, because God had not yet permitted Satan to go that far. But no sooner had God let his curse include even the person of job, exclusive of the taking of his life (Job 2:6), than job became afflicted with terrible boils.

The curse of God upon job was not worked out through any act of God other than to remove His protecting care. Satan immediately, through the employment and manipulation of natural agencies and laws, accomplished the curse of God to its last bitter letter. In this very same way it appears that the curses were accomplished upon Eve, upon the “serpent,” and then the threefold curse upon the earth, first for

Adam's sake, then for Cain's sake, and then at least in part for the sake of all wicked humans at the time of the Flood. Satan goes to the very limit of his permission in working havoc in the earth, and he accomplishes his diabolical deeds through the exploitation of natural processes.

The Reign of Tooth and Claw. As long as the animals looked to Adam as their superior and one whom they could worship and love in their limited way, their relationships one with another were entirely friendly and peaceable. But when the floodgates of derangement were opened by man's transgression, the attitude of animals was changed toward man; and at the same time, in innumerable cases, the interrelationships between animals became definitely unfriendly. The reign of tooth and claw began. As perversion of instinct began to develop under Satan's fiendish manipulations, individuals appeared which were killers of other animals. Destruction of life through perverted instincts led to the devouring of the bodies of their victims for food.

This adoption of a flesh diet was not possible for all animals. Only those whose equipment in the matter of teeth, feet, and digestive tracts was adapted to the securing or taking and digesting of flesh, became the ancestors of our modern carnivores. The influence of the theory of organic evolution has so warped our thinking as to lead us unconsciously to assume that the flesh eater got his carnassial teeth gradually as a result of having acquired the flesh habit. We have no scientific proof that such was the case. If we remain scientists and abide by the testimony of nature, we must admit that dietary habits do not change the Pattern of the teeth. The ancestors of our modern dogs and cats, for example, became carnivorous because they were in possession of a dentition which enabled them to use flesh in their diet. Previous to that time they doubtless gathered various adequate fruits and herbaceous shoots. The ancestors of our eagles, hawks, and owls became flesh caters because their feet and beaks were adapted to such a diet. Previously they no doubt fed on nuts, seeds, and fruits. It is most likely that before the Flood fruits were produced by certain plants that contained protein concentrates that could nourish those animals whose digestive tracts were shortened in length. Most modern parrots still abide by their original diet although equipped to be carnivores. Such herbivores as the cow stay by their herbs because neither feet, teeth, nor digestive tract is adapted to handle flesh. No doubt mutations and variation under the influence of natural selection, both now under Satan's guidance, have resulted in minor changes which have developed these organs into more efficient instruments for the use of flesh.

We cannot for a moment entertain the idea that use or disuse has resulted in fundamental changes in dietary equipment. Natural law in the realm of biology does not operate that way. Our knowledge of what actually occurs in nature shows us that mutations are never so great as to change the fundamental pattern of the dentition. That leaves as the only possibility for such a change, a miracle. Satan could not perform such a miracle. The only logical conclusion is that set forth at the beginning of the last paragraph; namely, those animals which built up the new group that we designate as flesh caters were individuals who were in possession of teeth and feet that could secure flesh, and digestive tracts that could use it.

The fact that God was still in control after this order of peaceful compatibility in interrelationships changed to a reign of tooth and claw is evidenced everywhere today in the marvelous balance which exists in nature. Satan, in all his diabolical work, is still limited by the extent of God's permission. Where he had planned to destroy all animal life through a perversion of instinct, God controlled the situation in such a way as to make earthly life for man as well as other animals a possibility only because of the feeding of one animal upon another. Satan's perversion of the reproductive act so as to produce hundreds of thousands of individuals in excess of the original plan, and thus destroy other forms, was countered by the act of the Creator in using the devil's own perversion in diet as a means of checking the results of his perversion in reproduction and disposition. Nature stands before us, a witness to the power of God in holding these forces in check sufficiently to accomplish a dynamic balance of life against life in so marvelous a way as to make the life of man on this earth after six thousand years still a pleasure.

The Origin of Disease Germs. Not only upon the larger animals and plants was the curse manifested. God's blessing was also withdrawn in part from the microscopic forms. Certain of the minute plants which we now call bacteria became changed in their instincts, and left the soil where they had previously had a part in changing organic materials back into simple chemical compounds which could be used again by the larger plants, and took up their abode in the bodies of larger animals. Other forms which were probably normally present in the alimentary tract of man in a helpful way, e.g., such as those in the intestine of modern man which appear to make vitamin K, likewise became perverted in their habits. These microscopic forms produced various diseases in the body, which we know today as diphtheria, septicemia, boils, typhoid fever, tuberculosis, etcetera. Satan also changed the instincts of microscopic animals which had taken part in maintaining soil fertility, or in symbiotic relationships, and they gave rise to such diseases

as tropical dysentery and malaria. Not uncommonly it is thought that Satan creates disease-producing organisms. But such cannot be true, for he cannot create. All our diseases which are caused by invasion of our bodies by plants or animals are results of Satan's direct derangement of native instinct. How he could accomplish this change in instinct is beyond our solution at present. But his detailed knowledge of various strains and races of each kind and of their intricate chromatin complement made it possible for him to develop lethal strains among the previously harmless varieties.

The whole picture of the vital part played by the chromatin material that is scattered throughout the protoplasm of some one-celled forms and that is gathered into chromosomes in the nuclei of most cells, which has been partially brought to light through the vast amount of research in that field in recent years, was well understood by Satan. He appears to have known how to accomplish chemical changes in this form of protoplasm which would result in different external characteristics in behavior in the members of succeeding generations. In this way body organs would change into inadequate groups of tissues, and abnormal proliferations of cells would even at times have lethal effects. Through such perversion of natural processes the body would fail and die through organic change. That Satan has not rested from his efforts along this line is shown in the new diseases of today, diseases caused by newly perverted microscopic and ultramicroscopic forms and filterable viruses gaining entrance to the body, or through new chromatin abnormalities in the body cells.

The appearance of extremes in the climate seems to have come quite soon after Satan began to work in the earth. However, most of the derangements in the biological world previously referred to came about gradually. If the devil had not been confined to the mere exploitation of natural laws, he would soon have accomplished his work of devastation; but being confined to these laws, his work was built up slowly through succeeding generations.

19. The Third and Greatest Curse

The Family of Cain. In Genesis 4 and 5 we are furnished with the background of details necessary for an understanding of the exceedingly wicked condition which made it necessary for God to destroy the earth. Cain murdered his brother Abel, and was immediately questioned by Jehovah and punished with a curse which was worded as follows:

“And now cursed shall thou be, driven away from the ground which has opened its mouth to receive thy brother's blood from thy hand. When thou tilled the soil, it shall not in the future yield its produce to thee; thou shall be shifting and straying about in the earth.” Genesis 4:11, 12.

This was heavy punishment for Cain the agriculturalist. To succeed in farming, he would have to stay on his acres, but instead, in the future he would be a “wanderer” (A.R.V.), and that type of life would make it impossible to be successful in the cultivation of the soil. His future was portrayed to him as an unhappy wretch straying from place to place, finding no peace or rest. Furthermore, when he did till the soil it would not produce as abundantly for him as for others.

“And Cain said unto Yahweh: My punishment is greater than I can bear. Behold, Thou has this day driven me forth off the ground and I must stay hidden from Thee, and I must be shifting and straying about in the earth, and it will happen that whoever finds me will slay me. And Yahweh said to him: Wherefore, if anyone slays Cain, vengeance shall be exacted sevenfold. And Yahweh gave Cain a sign that whoever found him would not murder him. And Cain went forth from the presence of the Lord and dwelt in the land of wandering east of Eden.” Genesis 4:13-16.

God had appeared to man in the garden, and there man considered the presence of God was to be found. To be driven from God's presence meant to Cain that he would have to seek some other land. This prospect of isolation gave Cain, murderer that he was, a feeling of fright. The Authorized Version says that a mark was set upon Cain lest any finding him should kill him. However, the Hebrew does not say that God set a mark (oth) in or on Cain (be) but for Cain (/c). Furthermore, oth does not mean “mark.” This use of the dative would lead us to conclude that God gave Cain a sign of some kind as a token, or pledge, that his life would be spared. Thus there seems to be no ground for assuming that Cain received some physical mark upon his person.

Why did God spare Cain's life? It seems probable that the unhappy, even tragic, existence that Cain was forced to lead was a more powerful lesson to his fellow men of the enormity of the curse of murder than would be the more or less indistinct remembrance that a man, some time in the past, had been killed for murder.

Cain, through his own choice, became shut away from God. The Authorized Version says that he dwelt on the east of Eden in the land of Nod. However, *erets nodh* indicates rather “the land of wandering or straying,” and probably refers to no particular country, merely a general region east of Eden in which he wandered. Without doubt, when Cain went out from the presence of the Lord he was accompanied by a sympathizing sister. According to Genesis 5:3, Adam had sons and daughters. At that time in human history it was correct and natural to marry one's sister. Genesis 4: 17-24 lists the generations of Cain as follows: Adam, Cain, Enoch, Irad, Mehujael, Methusael, and Lamech, who had three sons, Jabal, Jubal, and Tubal-cain.

It is interesting to note that civilization, as we know it, made more rapid progress among the godless children of Cain than among the children of Seth. (Genesis 5.) In the parable of the unjust steward Christ remarked, “The children of this world are in their generation wiser than the children of light.” Luke 16:8. It is natural for those who are devoted completely to the things of this world to do all in their power to attempt to satisfy their hollow dissatisfaction by developing earth's natural resources.

The statement in Genesis 4:17 that Cain “built a city” appears to conflict with the statement of God that he should wander. However, the original for this reads, “*waybi boneh*,” “he was building”; that is, he was engaged in building a city which he called Enoch. The text does not say that he ever finished it, and a city in the time of Cain would doubtless be no more than a walled enclosure containing a few houses. It would appear that notwithstanding the promise of God to him, he still lived a life of fear and insecurity. Nevertheless, “men began to multiply on the face of the earth, and daughters were born unto them.” Genesis 6: 1.

The Family of Seth. In Genesis 4:25, 26; 5:1-32 is traced the history of the children of Seth, those who in chapter 6 are called “the sons of God.” The generations of the Sethites were as follows: Adam, Seth, Enos, Cainan, Mahalaleel, Jared, Enoch, Methuselah, Lamech, and Noah with his three sons, Shem, Ham, and Japheth. The similarity of these names with those composing the Cainites is most apparent. It is impossible, however, to tell who did the borrowing. This group was in marked contrast with the children of Cain. No mention is made of their deeds in the way of developing a “civilized” community. Instead, it is remarked of them that they began public worship (Genesis 4:26), they walked with God (Genesis 5:22), and they looked for higher comfort than this world offers (verse 29). This group is characterized by simplicity in their ways of living and by devotion to God and His plans for them.

The Reasons for the Flood

“And it came to pass when mankind began to multiply upon the face of the earth, and daughters were born to them, that the sons of God saw the daughters of men that they were fair and they took to themselves wives, whichever they liked best.” Genesis 6:1, 2.

A question may arise here, Who are the “sons of God”? The original wording is *bene elohim*. Can such an expression be applied to man, or does it belong exclusively to angels? That it can refer to angels is made clear in Job 1:6; 2:1; 38:7, where the same expression appears in reference to angels. In Daniel 3: 2 5 it occurs in the singular, referring to Christ. Reference to angels may also be made in the closely similar expression, *bene elim*, sons of the mighty, in Psalms 29: 1; 89:7.

That *bene elohim* may also refer to men is indicated in such texts as Psalms 73: 15, where the psalmist refers to righteous men by using the very same word *bene* when, in addressing God, he describes God's servants as “the generation of thy children.” In Deuteronomy 32:5 the same word appears in reference to Israel. A still stronger passage is Hosea 1:10, where it is said of Israel, “You are sons of the living God” (*bene el chay*). From these references it is clear that, as regards the meaning of the expression, elsewhere in the Old Testament men have been referred to as sons of God.

Of these two uses of the title, which should be chosen here? In view of the fact that angels have not been mentioned in the story so far, it is perfectly logical to assume that the same beings are referred to which have been described in the chapter immediately preceding Genesis 6:1,2, that is, the men who walked with God, His “sons.” In the Genesis story up to this point the Cainites are observed to be going one direction in their development, and the Sethites are seen to be developing in an entirely different direction. With these two separate streams of mankind so utterly divergent in character, the one so godly, the other so earthy, the names “sons of God” and “daughters of men” appear most appropriate.

The record reveals that the “sons of God” “took to themselves wives.” This assertion, *wayyiqechu nashim*, is the standing expression for marriage. The statement does not refer to irregular adulterous acts but to permanent union. That these “sons of God” could not have been angels is made clear in another part of the Bible where it is stated that angels do not marry. We read the statement of Christ in Matthew 22:30,

“For in the resurrection they neither marry, nor are given in marriage, but are as angels of God in heaven.”

Furthermore, if the sons of God were angels, an incongruity appears in the sequence of thought: verse 2, angels sin; verse 3, men are punished. If it were a case of rape of the antediluvian women by angels, pre-Flood men could not be blamed, but the record makes it very clear that men, as well as women, were involved in this fusion of the righteous with the wicked which made the destruction of the earth necessary. Also, if this were a case of angels' marrying in sin, then there would have been a twofold fall of angels, but the Bible knows of but one such fall. (See 2 Peter 2:4 and Jude 6) Thus it is that, when viewed from all angles, the “sons of God” can be none other than the descendants of Seth, which are described in chapter 5.

After ten or more centuries had passed, the separation between the Sethites and the Cainites, which had been guarded so jealously on the part of the former, began to show less distinctly. The open rebellion of the Cainites against God looked less and less objectionable to many of the Sethites, and they began to intermarry with Cain's descendants. This constituted a most deplorable act. The moral decay of the sons of God, who prior to this had steadfastly refused to be allured by the daughters of the ungodly race of Cain, now became manifest in the fact that their sole standard for the selection of a wife was merely a pretty face and a shapely form.

“And Yahweh said: My spirit shall not judge among mankind forever, because they also are flesh. Yet shall their days be one hundred and twenty years.” Genesis 6:3. The degeneration of man had reached its lowest possible level. He was no longer simply sinful. As a being he had sunk to the level of basar, or “flesh.” He gave himself over so completely to carnal pursuits that there no longer existed any hope with regard to his future. God's grace was obviously no longer of any use to man. And yet to give mankind every possible opportunity, God declared that He would give them an additional period of grace lasting for 120 years.

“The Nephilim were in the earth in those days and also afterwards when the sons of God went in unto the daughters of men and they bore unto them. They were the heroes, which in olden days were renowned men.” Genesis 6:4.

The translation in the Authorized Version of the term nephilim as “giants” does not appear justified. The only other use of nephilim is in Numbers 13:33. In that reference the spies first call all Canaanites “men of stature,” and then they add the declaration that nephilim (“sons of Anak”) were there. “Sons of Anak” means “sons of the long-necked one.” These could be giants. But it seems more reasonable to assume that the term nephilim is taken from the Hebrew root naphal, “fall upon” or “attack,” a verb from which the noun nephilim could be used in the sense of “attackers,” “robbers,” or “bandits.”

It is observed that Leupold is of the opinion that verse 4 does not say that “men of renown” resulted from the fusion of the sons of God with the daughters of men. I personally would prefer here the translation in the Authorized Version which states that “when the sons of God came in unto the daughters of men, and they bare children to them, the same became mighty men which were of old, men of renown.” However, the term here translated “renown” merely means “men of the name.” A better translation would be “notorious men,” because the reputation they achieved in the ancient world was one of violence and tyranny.

The conclusion to which God came regarding the wicked inhabitants of the earth was as follows:

“And Yahweh saw that the wickedness of mankind was great upon the earth, and that every imagination of the thoughts of his heart was only evil continually. And it repented Yahweh that He had made mankind upon the earth and it grieved Him at His heart. And Yahweh said: I will wipe out mankind which I have created from the face of the ground, from man to animals, to creepers, and to the birds of the heaven; for it repents Me that I made them. But Noah found grace in the eyes of Yahweh.” Genesis 6:5-8.

The repentance of God in this instance was not a change of purpose but rather a change of feeling which leads to the development of a new course of action. All except the water animals are included in the beasts listed here. Because of the method of destruction to be employed, aquatic animals were excluded from annihilation. This universal destruction of land animals along with man served to impress him with the seriousness of his sin. However, verses 11 and 12 indicate in the following words that the destruction of animals was justified on their own part:

“But the earth was corrupt before God and the earth was filled with violence; and God beheld the earth and behold it was corrupt, for all flesh had corrupted its way upon the earth.” Genesis 6:11, 12.

The term here translated “violence” is *chamas*, which means “high-handed dealing” and “violation of the rights of others,” and thus would apply principally to the dealings of man. However, the expression “all flesh had corrupted its way” may also include the beasts, who, it would appear, had perverted their

way, following a course which the Creator had not planned for them.

It is sometimes suggested that the extreme depravity of man which led to the Flood was largely the result of his hybridization with beasts. However, it is seen from a close study of these verses describing the cause for the Flood that no man-beast fusion is even intimated. The amalgamation which is clearly delineated is that of the two human races, the fusion of the sons of God (the Sethites) with the daughters of men (the Cainites).

The Sethites, as long as they remained a distinct race which was true to God, exerted an influence that tended to hold in check the spread of depravity which accompanied the abandoned acts of the Cainites. But when this godly race began to allow themselves to be attracted by the idolatrous pleasures of the wicked Cainites, sin spread rapidly among them, and culminated in the unrestrained intermarriage of the two races and in plurality of wives. Under the leprous influence of their wicked mates the Sethites soon reached that deplorable state of morality where "every imagination of the thoughts of his heart was only evil continually." There was no longer any reason why God should permit that antediluvian depravity to continue to lower and still lower depths. Through the fusion of the godly race of Seth with the utterly abandoned race of Cain, Satan very nearly achieved the complete destruction of mankind from the face of the earth.

The statement is that "all flesh" had perverted its way. Indication that this cannot refer to the hybridization of man with beast is found in the fact that man could not even cohabit with very many animal forms. Furthermore, there is no scientific proof, past or present, which indicates that man ever crossed with a beast to produce a hybrid. But hybridization has apparently occurred among the original races or varieties of each created kind. It would seem that God had assigned each variety of a kind to the habitat for which it was best suited, thus producing a mosaic pattern of geographic distribution as regards the units comprising each kind. It would appear that the devil had, through perversion of instincts and disturbances of the climate, brought about complete confusion of this original pattern.

A question which it appears impossible to solve at the present time is how many races, varieties, or strains of the Genesis kinds were created. In the case of man it was only one. A second race had to be developed before amalgamation could occur. This may have been true with others of the original kinds. However, it seems very possible that more than one race of most of the kinds may have been created. The surface of the earth at creation was delightfully varied with mountains, valleys, rivers, lakes, and plains. This variation allowed for considerable range in temperature from valley to mountaintop or plateau. It is not impossible that some peaks were at least near snow line and were covered with vegetation of hardy stocks. It provided for some comparatively dry areas and areas where water was in abundance. Sunlight would be quite intense on the open plains and greatly subdued in the forests. In other words, it is in keeping with the evidence to assume the earth's surface a veritable mosaic of ecological niches. With such wealth of environmental variation it seems reasonable to conclude that various races of the same kind of animal were created in these various niches.

It may be difficult today, because of the technique required, to determine just which of our modern "species" constitute the original Genesis kinds. Our only recourse is, I believe, to the reproduction test, i.e., if two individuals will hybridize, then they are members of the same basic kind. As an illustration, most of our modern rabbits and hares, be they Arizona jack rabbits, common jack rabbits, arctic hares, varying hares, Belgian hares, swamp rabbits, or cottontails, cross easily and usually produce fertile offspring. [1] It seems sensible to consider them members of a single original kind. We might logically assume that the rabbit kind at creation time occupied various ecological niches, occupying as races the varying habitats from mountaintops to spreading plains. With climatic conditions existing without great change, and with seasons less extreme, it is easy to picture one race or variety always occupying the mountaintops and not migrating from that environment, while another race likewise would be confined to the valleys. In a similar way with other animals some races could occupy islands, others the mainland. Some this river system, others a river system somewhere else; some could bask in the sunshine of the plains, other races might dwell in the shaded aisles of the forest; some races would stay on one side of a mountain chain, others on the other side; some races would occupy drier areas, others would inhabit those more hygienic, et cetera.

With environmental factors uniform, whether cool or hot, moist or dry, light or shaded, throughout the year, and with each race adapted to its particular niche, no confusion across these natural boundaries would occur. Adam would know which fixed spot to visit at any time of the year to study the habits of a particular animal. In this setup not only would each kind, as a large family, reproduce after its kind, but also each race would reproduce after its race. Because of the fact that races of a kind would have very similar morphologies and physiologies, it would be possible for them to hybridize. But original psychological

differences may have existed which would prevent amalgamation in instances where the members of two races occupied the same or adjacent territories. For example, today we find that foxes and dogs usually will not cross even though occupying the same area. Psychologically they do not seem to attract one another. Still they are obviously of the same basic kind of animal.

The broad adaptability of man for various environments was doubtless an exception to the general finer adaptation for specific environments present in other animals. This may explain why he was created a single race of the man kind. This situation was a necessary physical characteristic for the steward king or vicegerent of the Creator to possess. Presenting this mosaic picture as to distribution, nature would have remained more or less static as regards races and kinds. The line of separation between ecotypes would be refreshingly distinct. But into this clear-cut and orderly picture stepped the father of confusion. It appears that one of the first changes he accomplished after gaining control was the introduction of rather extreme temperature fluctuations in each niche. The effect of a change in this single factor would be profound. It would affect all other environmental factors more or less. Those ecotypes of the kinds which could survive would wander from their niches under a restlessness which would not be satisfied until they found the environment which was best suited to their peculiar instincts or natural nervous patterns. Without doubt the devil was able to accomplish chromosomal mutations which were of an undesirable nature. New races would build up that would join with migrating races in producing, through change in geographical distribution and through hybridization of races within the kinds, a condition of disorder which, after sixteen centuries, presented so confused a picture as to cause God to repent that He had created the world. Through fusion of races this confusion evidently became so complete as to make it almost impossible to find representatives of the original races. Confused morphology very likely was accompanied by the development of unfriendly dispositions. This is apparently the reason why God had to collect at least some of the primitive races of each kind into the ark and then destroy the remainder so that the original harmony could be restored in the earth.

Many of these animals which found a berth in the ark may have been stamped with the results of Satan's degrading influence. Fierce dispositions were doubtless accomplished in at least two ways. Mutational changes in the chromosomal apparatus could produce the fierce from the gentle. Coalescence of two races in some cases has been known to produce hybrids so fiery as to be impracticable. When races were developed within other races or when they began to cross the boundaries of their former habitats, it is likely that Satan knew which particular amalgamations would result in such dispositions. Although originally instinct might have served to prevent crossbreeding in certain cases, under the stress of changed environment, this instinct could become warped from its original purity.

The Ark. The larger points in the description of the ark are given in the following words:

"Make thyself an ark of gopher-wood; make the ark with cells; and smear it with pitch within and without. And this is how thou shall make it: three hundred cubits is to be the length of the ark, fifty cubits its width, and thirty cubits its height. An opening for light shall thou make for the ark and to a cubit shall thou make it complete toward the top; the door of the ark thou shall put in its side; with lower, second, and third stories thou shall make it." Genesis 6:14-16.

The "gopher-wood" used in the ark is not definitely identifiable in the Hebrew, but the term probably comes from the root for "cypress." Rather than a ship, this structure was a huge floating box divided into qinnim, "cells" or "nests." Each pair of beasts possibly had a nest made according to the size demands. There were no sailing or navigating devices of any kind, merely a simple box mounted, possibly, on a huge scowl-like base.

The size of the ark in feet is naturally dependent upon what dimension is taken for the cubit. The fact that Moses wrote this description after spending forty years in Egypt possibly indicates that he used the Egyptian cubit of 20.625 inches. If this large cubit is used, the length of the ark would be about 515 feet, its width 86 feet, and the height 52 feet. If the short cubit of 18 inches is used, the measurements in the same order would be 450 by 75 by 45 feet.

The window of the ark is referred to by the term *tsobar*, "an opening toward the light." With *tsohar* the expression *teklgallennalg* is used which means, "make it complete," and which may also be translated, "run it completely around." It is difficult to obtain a clear idea of just what sort of window this opening which extended to a cubit would be, but it is possible that it extended entirely around under the eaves of the house-like structure. This window was the only source of light and fresh air. The "nests" would have to be arranged so as to permit light from this window to reach all three floors. In the absence of glass it would seem that the opening must have been fitted with deep louver boards, so slanted as to admit light and air but exclude rain.

In Genesis 8:6 we read that Noah opened the window of the ark. In this place the window is referred to as *challon*, meaning “to piece.” An interesting situation exists here in that, although having opened the window, still Noah could not see whether the ground was dry. Because of either the overhanging caves or the lay of the ground immediately surrounding the ark, or both, he was apparently not able to command a view of things at a distance. He used the raven and the dove in an effort to discover the stage of the Flood. It was not until he had finally removed the covering of the ark (Genesis 8: 13) that he could see the surface of the earth.

The Loading of the Ark

“Of all living things, of all flesh, two of each thou shall bring into the ark to keep them alive with thee; male and female shall they be. Of the birds after their kind, and of the animals after their kind, of all creeping things after their kind, two of each shall come to thee, to be kept alive. And do thou for thy part take for thyself from all manner of eatable things, which are wont to be eaten, and store it by thee, to serve as food for thee and for them.” “Of all clean animals take to thyself seven of each, a male and his mate. But of all animals which are not clean, two of each, a male and his mate; also of the birds of the heavens, seven each, male and female, to preserve seed alive upon the face of all the earth.” Genesis 6:19-21; 7:2, 3.

Verse 19 uses the term *tabbi*, “thou shall bring,” and verse 20 says, “they shall come” (*yabhou*). The animals came to the ark, doubtless under the guidance of angels, and after they arrived Noah and his sons arranged them in their respective “nests.” The general rule of number was one pair of each kind. Only one exception to this general statement is cited, the clean beasts and birds by sevens. (Genesis 7:2, *M* Hebrew parallels support the fact that the expression “take seven sevens” means “seven each.” The extra one above three pairs was to be used in the sacrifice offered after the Flood. In Genesis 7:3 the adjective “clean” must be supplied to “the birds of the heavens” in the light of the principle laid down in verse 2, and in the light of the statement in Genesis 6:20.

Noah's most difficult task was very likely the collecting and storing of food for all land animals. It is not stated whether the animals were active all the time they were in the ark, or whether many of them at least were in a state of suspended animation much as in hibernation and estivation. If awake and active, the different kinds must have been made capable and willing to adapt to their needs that food which was supplied. The hand of the Supernatural is seen in this ability of all land animals to receive suitable nourishment during this period of more than a year of close confinement. In a situation in which the miraculous figures so largely, there is little point in conjecturing over the manner of accomplishment of the details.

The “clean” and the “unclean” are mentioned so casually it would seem that Noah must previously have been familiar with the distinction. What the unclean were before the Flood we do not know. After the Flood the principle of cleanliness illustrated by the lists in Leviticus 11 and Deuteronomy 14, is shown to turn upon the food habits quite largely. Except for a very few special cases, the “unclean” were the carrion and flesh and fish eaters and those which crawled on their bellies. It would seem that a certain distinction between the “clean” and the “unclean” had been set before the Flood, and it seems possible that the basis of differentiation was suitability for offerings. Even Cain and Abel knew that lambs were appropriate for sacrifices.

The Flood

“And it came to pass after the seven days that the waters of the Flood came upon the earth. In the six hundredth year of the life of Noah, in the second month, on the seventeenth day of the month, on that very day all the fountains of the great deep were broken open, and the windows of the heavens were opened. And the rain was upon the earth forty days and forty nights.” Genesis 7:10-12.

There were two main sources of the water of the Flood—the fountains of the great deep and rain from above. In 2 Peter 3:5, 6, our attention is directed to the conclusion that the destruction of the earth by the Flood was accomplished by a return over the dry land of that same “resounding deep” from which the dry land arose on the third day of creation week. The use here of the Hebrew expression *nibhqueu*, from *baqa*, “to cleave,” would suggest that terrific earthquakes not only broke up the surface of the earth and caused subterranean rivers to gush forth, but also changed the relation of the dry land and the bodies of water in such a way as to cause the “deep” to overflow the land.

The rain from above came with such volume and force that it seemed to be pouring through windows in the sky. It is impossible, in the light of what we now know of natural forces, to explain how it

would be possible to rain all around the earth continuously for forty days and forty nights. It is here that some invoke the vapor envelope theory (see chapter 12) and assume that at this time the water in this vapor layer condensed and fell upon the earth.

“And the Flood came upon the earth forty days, and the waters mounted and lifted up the ark and it went along high above the earth. The waters grew mighty and mounted greatly over the earth and the ark floated along upon the face of the waters. But the waters grew extremely mighty upon the earth, and all the high mountains which are under all the heavens were covered. Fifteen cubits and upwards did the waters grow mighty so that the mountains were covered.” Genesis 7:17-20.

It is likely that the number “forty” is not a mere chance here. In the Biblical use of numbers forty describes a period of trial terminating in the victory of good over evil. (See Exodus 24:18; Numbers 14:33; 1 Kings 19:8; Jonah 3:4; Matthew 4:2; and Acts 1:3.

In view of the statement in verse 24—that the waters prevailed upon the earth for 150 days, it would appear that the Authorized Version is in error when it states that “the flood was forty days upon the earth.” The original meaning of hayah, “it became,” applies here. Therefore, Leupold is correct when he translates “the Flood came upon the earth forty days.” It would appear from this that the Flood waters continued to rise for forty days.

From the choice of words and by the repetition of expressions it becomes very clear that tremendous power was manifested by the raging, surging waters. Little wonder that the earth's surface was plowed to a depth of six miles in some spots and over its entire surface to an average depth of almost one mile. Vast geologic changes took place. The ark could be preserved in the midst of such titanic forces only by miraculous power. From the original of verse 20 we may conclude that by the end of the forty days the waters stood fifteen cubits above the highest antediluvian mountain peaks. This does not necessarily mean that the waters stood fifteen cubits above the twenty-nine thousand-foot top of Mount Everest, a postdiluvian mountain. The depth of fossil deposits can tell us today how deep the Flood gouged into the earth's surface. But we have no idea how high the waters actually rose above the earth. The modern mountain peaks apparently were pushed up during the latter part of the Flood.

As regards the territory covered by the Flood, verse 19 leaves no doubt whatsoever as to what Moses intended to say. His statement is that “all the high mountains [antediluvian] which are under the heavens” were covered. The statement “all the high mountains” would give the impression of universality, but when Moses says, “All the high mountains which are under all the heavens,” no other conclusion is possible except that of absolute universality. A double “all” is practically equivalent to a Hebrew superlative, and leaves no room to doubt that the Flood covered the entire surface of our earth.

“All flesh that moved upon the earth expired, including birds and domestic animals and wild beasts and all swarms that swarmed upon the earth, as well as all mankind. Everything that had the breath of the spirit of life in its nostrils, of everything that was on the dry land died. And He blotted out everything that existed upon the face of the ground, from man to beast and creeping thing and to the bird of the heavens, and they were wiped out from the earth. And there was left only Noah and those that were with him in the ark. And the waters prevailed upon the earth one hundred and fifty days.” Genesis 7:21-24.

In the face of such a comprehensive and clearly worded statement with regard to land animals, there is no opportunity left to assume that animals survived in certain areas of the earth which escaped the Flood, or that terrestrial animal life in some instances continued through the Flood in the form of eggs—all “that had the breath of the spirit of life ... died,” smothered by the waters of the Flood or smashed by its terrific force.

The same term, gabbar, “be mighty,” is used in verse 24 that was used in verse 18 to picture the mounting waters as the Flood came on. This would indicate two things regarding this 150-day period: First, the Flood waters were not in a state of quiet, but continued to plow and to move the materials of the earth's surface; second, this 150-day period must include the forty days and forty nights during which the Flood reached its high-water mark. In Genesis 8:3a the statement is made that the waters halokb washobb, literally, “they subsided going and returning.” Leupold has translated this, “subsided from upon the earth more and more.” But it is also very likely that this statement means that there was a tidal action, “going and coming,” as the waters began to subside. This would explain the laying down of successive strata whose fossil content alternate between land forms and aquatic forms of plants and animals.

“The waters declined after the expiration of one hundred and fifty days, so that the ark came to rest upon the mountains of Ararat in the seventh month, on the seventeenth day of the month.” Genesis 8:3b, 4.

The ark apparently grounded quite soon after the Flood waters began to abate. It must have been

an immense relief to the passengers in the ark, after five weary months of being tossed about on the Flood, finally to come to rest on solid ground. It is commonly thought that the ark grounded on one of the mountains of Ararat. Sometimes the highest peak in these mountains, Masis, is called "Ararat" and is suggested as the probable landing place, but its altitude of 16,916 feet and its nearly precipitous sides make it a height down from which the animals could have come only with considerable difficulty. The Targum (Aramaic) offers the traditional view that the ark came to rest on a mountain in Kurdistan, which commanded a view of the whole Mesopotamian plain. The Hebrew text merely states that the ark rested upon the mountains (haryy-plural) of Ararat. This could indicate that it finally grounded in a valley some distance up in the mountains.

Verse 1 says God caused a wind to pass over the earth as the waters were lessening. The force of the great waves driven by this wind would have tremendous effect in molding the soft surface of the earth. At first it would level heights with driven water; and then, after the soil dried, great quantities would be carried in terrific dust storms.

"And it came to pass by the first day of the first month of the six hundred and first year of Noah's life that the waters were dried up from off the earth; so Noah removed the covering of the ark and looked abroad and, lo, the face of the ground was dry. But by the twenty-seventh day of the second month the earth was dry." Genesis 8:13, 14.

On the first day of the first month the Flood waters had vanished from view but an additional six and a half weeks were required for the ground to dry at deeper levels and for the remnants of vegetation which had survived the water to get established to serve as food for the herbivorous dry-land animals when they should come from the ark. Thus the surface of the earth had been covered by the Flood waters for eleven lunar months and seventeen days. Noah had been confined in the ark one lunar year and seventeen days, or just about one week longer than a solar year.

"And Noah went forth, also his sons and his wife and his sons' wives with him. Also all the animals, every creeping thing and every bird, in fact, everything that moves upon the earth went forth from the ark according to their species [kinds]. And Noah built an altar to Yahweh, and he took of all clean cattle and of all clean birds and offered a burnt offering upon the altar. When Yahweh smelled the tranquilizing odor, He said within His heart: Never again will I curse the ground for man's sake, because the imagination of man's heart is evil from his youth; never again will I smite all living things as I have done. As long as the earth shall stand, seedtime and harvest, cold and heat, summer and winter, day and night shall not cease." Genesis 8:18-22.

The expression "he took of" could well be translated, "he took one of." The reason God gave for sparing the earth is much the same as the one He gave for destroying it. (Genesis 6:5.) Man's sin was ample cause for destroying the earth, and this destruction provided a lesson for all time. However, if we consider the fact that man was now weak and depraved, another Flood would accomplish nothing in the way of a lesson; hence never again would God curse the earth. The regular occurrence of times and seasons is obviously to be considered as resulting from God's specific promise rather than as a mere result of natural processes.

A Ruined World. It is difficult for us to imagine the feelings of Noah and his family as they viewed the destroyed earth. A few months before, the door of the ark had shut from their view a world almost perfect in its physical beauty, but now as it slid back they recoiled from the scene of desolation which met their gaze. The earth lay destroyed under the effects of the dreadful curse. Of these one writer has said:

"The earth presented an appearance of confusion and desolation impossible to describe. The mountains, once so beautiful in their perfect symmetry, had become broken and irregular. Stones, ledges, and ragged rocks were now scattered upon the surface of the earth. In many places, hills and mountains had disappeared, leaving no trace where they once stood; and plains had given place to mountain ranges. These changes were more marked in some places than in others. Where once had been earth's richest treasures of gold, silver, and precious stones, were seen the heaviest marks of the curse. And upon countries that were not inhabited, and those where there had been the least crime, the curse rested more lightly." [2]

Owing to the undeveloped state of the vegetation at that time. The ragged surface of the earth lay starkly before their gaze. During the nearly forty-three centuries since that time plants have become established again, and now more or less cover most of the dry land. During these centuries, however, soil erosion has occurred in almost unbelievable degrees. In places whole mountain ranges have been washed and weathered down, with the exception of only a few jagged remnants. It is possible that much of this erosion took place during the first few years when vapor clouds from the cooling waters of the vast inner

seas, in addition to that in the oceans, would cause torrential rains to pour upon the comparatively soft, bare surface of the dry land.

Appearance of Temperature Extremes. Concurrently with the destruction of the earth's surface occurred a marked temperature change from the prevailing "mantle of spring like loveliness," which had a tremendous effect on living organisms. Concerning this change, one geologist says:

"But suddenly an awful change took place. The exact details of how it occurred may still be somewhat uncertain; but that it was astonishingly sudden, and that it must have been a change affecting the entire world, seems as certain as man's own existence. As a well-known geologist remarks, this genial climate in which these animals lived 'was abruptly terminated. For carcasses of the Siberian elephants were frozen so suddenly and so completely at the change, that the flesh has remained untainted' (Dana). And this author emphasized the word 'abruptly,' as I have done.

In concluding this topic of climate, we need only to summarize by saying that the fossils, both of plants and of animals, uniformly and with absolute consistency, testify that a surprisingly mild and uniform climate prevailed over the entire globe while these plants and animals were living. . . . If we listen to the unequivocal testimony of tropical plants and animals found away to the north and even within the arctic regions, we must declare that geology knows only one climate until this sudden change came. And this astonishing climate seems to have been practically uniform over the entire globe. This sudden and world-wide change of climate is somehow intimately connected with the geological exchange of land and water and the formation of we know not how much of the geological deposits, and serves to mark, in the words of Howorth, the 'great dividing line' between that old world, with its perpetual summer, and our present world, with its terrific extremes of heat and cold.

"This radical and world-wide change of climate, therefore, demands ample consideration when we seek to frame a true and scientific induction as to how the geological changes took place. That it was no secular or gradual affair, but that the climate 'became suddenly extreme, as of a single winter's night' (Dana, 'Manual,' p. 1007), the Siberian elephant 'mummies' are unanswerable arguments, and arguments whose true meaning can not be understood. That this change occurred within the human epoch is conceded by every scientist." [3]

The great vitality which organisms still possessed after the Flood and their presence, in the case of the animals at least, in all the original created kinds would have permitted the development again of much the same beauty and magnificence of antediluvian days except for this new, direct, and mighty environmental factor of "terrific extremes of heat and cold." This is probably one of the chief agents in producing the stunted, asymmetrical, and "degenerated" appearance of our modern flora and fauna. The grotesque trees at timber line have all the hereditary potentialities of the forest monarchs in the valley below, but under the extremes of temperature at timber line, with their accompanying effects upon the water relations of the tree, a form results which would scarcely be recognized as part and parcel with those growing magnificently at lower levels.

Plants Since the Flood. The postdiluvian plants in a few cases escaped the Flood by being preserved as seeds in the ark. But in most cases they have descended from individuals which, as mature plants, or as some form of reproductive structure as roots, modified stems, or seeds, resisted the effects of the waters, and sprang forth in new life after the waters dried.

These various propagules were mixed with the surface materials of the earth. When buried too deeply some contributed to our present-day coals, whereas others decayed and returned to the soil or had their substances replaced by silicon, calcium, pyrites, et cetera, and are found today as scattering fossils, or in greater concentrations compose our petrified forests. Those left lying on the surface of the earth dried up and furnished Noah with firewood. But those buried at proper depths, where the postdiluvian climate was neither too cold nor too hot, too wet nor too dry, put forth their sprouts or leaves and established themselves, probably in many cases, no great distance from where they had grown before the Deluge. It is very likely that our present-day flora is extremely meager as regards kinds when compared with that of antediluvian days.

During the ensuing forty-three centuries plants have been migrating out over the surface of the earth from their various primary areas of Flood survival. That such migration of plants can occur rather rapidly in favorable areas in the cases of highly mobile "species" is illustrated by the Russian thistle (*Salsola pestifer*), which was introduced into South Dakota in 1874 with flaxseed from Europe. By 1898 it had covered all the area east of the Rocky Mountains from the Gulf to Saskatchewan, and today ranges over the whole country. [4] That Wide distribution from areas may, in some cases, not be stopped by oceans, is illustrated by the floras of the two types of mangrove forests. The Eastern mangrove has a rich

flora, very uniform along the coasts of East Africa, India, and Malaya. The Western mangrove has a poor flora, the important "species" being the same on the western coast of Africa and the east coast of tropical America. The two types have no "species" in common. Distribution throughout the two regions appears to have been entirely by ocean currents. It has been shown that the mangroves and their associates of the Western region are all capable of floating in the ocean for at least two months, and that all could be carried by the main equatorial currents from West Africa to South America, a distance of more than three thousand miles. In mangroves the fruits are viviparous, and it is the seedling which is carried. [5]

The island of Krakatau, whose organic life was entirely destroyed by a volcanic eruption in 1883, furnished us with an additional illustration of the manner in which plants bridge water gaps. The first plants to appear after the eruption were thallophytes (algae and fungi) and bryophytes (mosses) from wind-blown spores. The first vascular plants to appear in abundance were ferns, whose spores are readily scattered by the wind. The distance to the nearest island not affected by the eruption is over twelve miles, and the distance to the coast of Java is about twenty-five miles. Fifteen years after the eruption fifty-three "species" of seed-bearing plants had reached the island. Of those it was estimated that 60 per cent, chiefly shore forms, were brought by ocean currents, 32 per cent by wind, and 8 per cent by animals. [6]

Sufficient time has elapsed since the Flood to permit the various disseminules, such as spores, seeds, fruits, offshoots, or whole plants, to be acted upon by the various distributing agents-water, wind, animals, man, gravity, growth, and propulsion-and thereby bring about, in many cases, long migrations from primitive, postdiluvian areas. The distribution has apparently been a matter of trial and error under the influences of the various distributing agents; and ecesis, or making themselves at home, in the new regions, apparently has been a matter of survival of the fittest. Any one of these plants in establishing itself in a new area has to migrate there, make itself at home, increase in number, and contend successfully with plants already there. And having so done, it has successfully invaded the new area, and is ready to send its disseminules to still-more-advanced areas.

While our present-day vegetation was developing after the Flood, any given area has become successively occupied by different plant communities. This process is termed plant succession. Succession can be observed in any field which has been cleared of its natural vegetation and then permitted to lie fallow. Various types of vegetation will follow for several years. Each stage profits by the vegetation which has gone before, and in turn prepares the area for the stage which will replace it. In this way, through the centuries, horizontal rock surfaces become covered with vegetation through the agency of crustose, lichens, foliose lichens, moss, and herbaceous plants in building up a soil which will support the typical vegetation in that climate.

Open areas of water are eventually changed to fully vegetated areas through the successive reactions of submerged water plants, floating plants, rushes and reeds and cattails, shrubs, and finally trees. The interesting point here is that vegetation is constantly tending to change areas which are either excessively dry or excessively wet to ones in which moderate conditions of temperature and moisture prevail. The combined effect of plants in changing the surface of the earth during these forty-three centuries is considerable. It is alluded to rather poetically by an English scientist, viewing it through the excessively long-ranged glasses of evolution, in the following words:

"The hand of life has been working upon the earth for untold ages. Take plants, for instance. The sea weeds lessen the force of the waves, the lichens eat into the rocks, the mosses form huge sponges on the moors which keep the streams flowing in days of drought. Many little plants are forever smoothing away the wrinkles on the earth's-their mother's-face, and they adorn her with jewels. Others that have formed coal have enriched her with ages of entrapped sunlight. The grass-which began to appear in tertiary ages-protects the earth like a garment; the forests affect rainfall and temper climate, besides sheltering multitudes of living things, to many of whom every blow of the axe is a death knell. No plant, from bacterium to oak-tree, lives or dies to itself, or is without its influence upon the earth." [7]

The activities of plants with their various reactions upon their environments under the major controlling factor, climate, have resulted in what is termed climax vegetation. Such a flora is the highest type of vegetation which can live on that area under the existing climate. Thus, by our day, viewed in a large way, plant succession has come to a halt in its climax stage, and will remain there until climatic conditions change sufficiently to bring about the replacement of the existing vegetation by one which is better suited to live under the new conditions. Thus the descendants of the pitiful remnants of the magnificent antediluvian flora have taken possession of the earth and hold the ground gained until such time as some more hardy or prolific foreign, hybridized, or mutated form shall displace them.

Animals Since the Flood.-Returning to the subject of the disembarkation of the animals from the

ark, we recall this occurred in the mountains of Ararat in Armenia. From this single point the dry-land animals started out on -a trek over the uneven surface of the earth to distant points. The command of the Creator to disperse and replenish, which was written into their instincts, has been, and is still being, faithfully followed by the animals. The urge is ever to pass beyond the horizon into new territory as long as physically possible. This urge may be spontaneous, from within the individual himself, or it may be from his parents who crowd him out of the home area because of the pressure within the community which results from reproduction.

In some animals this instinct is poorly developed, but in others, as illustrated by the European lemming, it is very strong. These small mouse like animals live in the mountains of Scandinavia, and at intervals of from five to twenty years suddenly move forth in vast numbers with no visible leader but always in the same direction, swimming rivers and lakes, overcoming all sorts of obstacles, and eventually ending their journey in the ocean. On reaching the coast they appear to consider it just one more river to cross, and plunge in, thus bringing their trek to a fatal termination. Under less curtailed condition of space this exaggerated instinct would accomplish their rapid dispersion.

In contrast to the habit in lemmings, the tendency in most animals is to spread in all directions. The presence of tapirs today only in tropical America and the Malayan Islands, opposite sides of the earth, is illustrative of the probable migration of each kind of animal in several directions through succeeding generations. Of course, it is self evident that the individual kangaroos from the ark did not reach Australia any more than the anacondas arrived at the Amazon in one long, wriggling swim around the coasts. Rather, it took place as a relay race in which succeeding generations covered the successive stages in the journey to the most distant points of land. Along this route only those environments that were suitable became "permanent" homes of the expanding fauna.

In this way the postdiluvian ecological niches became inhabited with animal life. Ever since the vanguard reached these niches there has been more or less constant fluctuation and replacement of preceding forms with new "species" from a distance or with new varieties which have arisen in the vicinity. Survival of the fittest is seen on every hand in the fauna as well as in the flora. This is very likely in definite contrast to the more or less static character of the inhabitants of the antediluvian niches.

In the case of birds, distribution from Armenia would be a small problem. Right in our day, for example, the arctic tern flies about eleven thousand miles and back again every year, in making its yearly migratory flights. But in the case of some of the insects and such mammals as the fossorial or subterranean forms, re-population of the earth would be a much slower process. Migration of animals out over the earth is still taking place. Lack of uniformity in distribution of kinds is, of course, very manifest. Many of the Genesis kinds have become extinct since they left the ark. The death of the last moas, dodo, great auk, quagga, passenger pigeon, and heath hen is historical fact. Without doubt many animals who are known now only as fossils were in the ark and lived even for centuries after the Flood.

It seems very reasonable to assume that during the first few postdiluvian centuries all the continents, possibly with the exception of Australia, were connected with land bridges. In fact, this would be the case today if Bering Strait alone were bridged. With an isthmus connecting North America and Asia, the cold waters of the Arctic would be held back, permitting the warm Kuroshio, or Japan Current, to flow farther north and bathe the south coast of the isthmus. Until the time the isthmus was eroded through, it would constitute a suitable highway for tropical as well as for temperate forms of animal life.

The fact that terrestrial animals were not entirely dependent upon earthen paths in their distribution is illustrated by the re-population of the fauna of the island of Krakatau, which has been referred to already. At the same time this is a specific illustration that scattering of animals, whether deliberate on the part of the animal or otherwise, is still going on actively today. Six years after the volcano exploded on this island and totally annihilated all life a collector found a "species" of lizard present and a whole list of arthropods, including spiders, flies, bugs, beetles, butterflies, and moths, which had crossed at least the twelve miles from the nearest land. A visit twenty-five years after the eruption yielded a collection of 263 "species," of which 240 were arthropods; four "species" of land snails were found; two "species" of reptiles, and sixteen birds composed the vertebrate element. Investigations in 1920-1921, thirty-eight years after the eruption, yielded 573 "species" of animals, among which were one snake, twenty-six breeding birds, two bats, and one rat. [8]

As mentioned previously, dispersal, although tending to proceed in all directions, does not take place with equal success in all directions, and in different organisms the capacity for dispersal is also very unequal. Definite limits are set not only by the physical and organic environments but also by the constitution of the organisms themselves. For instance, amphibians are killed by salt water. By contrast,

some pelagic sea birds require salt water for drinking. Some reptiles and mammals are able to swim wide stretches of salt water. Crocodiles are the best swimmers and have been known to cross 558 miles of open ocean. A few snakes have also survived this same length of journey. The hippopotamus swims the strait between the African mainland and Zanzibar, a distance of nearly seventeen miles. Polar bears have been seen swimming in the open sea sixteen miles from land. Reindeer enter the water easily and have been captured by ships on frequent occasions far from land. The red deer has been known to cross twelve miles of water.

Passive distribution of terrestrial animals takes place in various ways. Storms carry dust and leaves and twigs many miles, and thus transport not only resting stages of protozoa and small metazoa but also small snails, myriapods, insects, and spiders, and their eggs. Evidence of the effect of the prevailing westerly winds of the North Atlantic is found in the five "accidental species" of European birds on the North American list, and fourteen land birds and twenty-five aquatic American "species" occur on the list of British birds. The efficiency of rafting as a means of dispersal of animals is a debated subject, but there can be no question that branches of trees and large rafts, under the influence of current and wind, have aided materially in distribution. It is a recognized fact that man with his vehicles has served as an effective agent in dispersal.

From the standpoint of interest we might pause here to note that in problems relating to geographical distribution evolutionists and creationists see quite eye to eye. For that reason evolutionary literature dealing with distribution contains much of value to creationists in understanding how the dispersion of animals occurred. Of course, the evolutionist, in many cases, considers that there were many centers of distribution. But as regards ways and means in distribution, both persuasions have the same problems.

With regard to plants it may, at first thought, seem a far cry from a plant with harmless or even nutritious juices to one in which the sap in its roots, shoot, fruit, or seed contains some extremely poisonous alkaloid. But we find today that accepted botanical taxonomists, largely on the basis of flower similarity, group into the nightshade family (Solanaceae) along with some of the world's most valuable plants economically, such as Irish potato, eggplant, tomato, and ground cherry, decidedly poisonous plants among which may be listed tobacco, belladonna, henbane, Jimson weed, and nettles. With the comparatively few poisonous plants among the two thousand "species" of the nightshade family are also listed the perfectly harmless and delightful garden flowers, petunia, salpiglossis, and matrimony vine. Coffee, the natural source of caffeine, and the Peruvian bark tree from which the alkaloid quinine is obtained, are members of the 4,500 "species" described for the madder family (Rubiaceae). In this same family belongs our glossy-leaved and perfectly harmless button bush. Opium is the source of a score of alkaloids as poisonous as its most commonly known member, morphine, and is obtained from the opium poppy, *Papaver somniferum*. The opium poppy is one member of the poppy family (Papaveraceae) which contains 150 "species" mostly not poisonous. The bean family (Leguminosae), with its economically valuable peas, beans, peanuts, lentils, clover, alfalfa, wisteria, and locust, produces among its many valuable forage plants for livestock an occasional rogue member, such as the loco weed, which is very poisonous to stock.

Thus we find that the poisonous plants are not removed from harmless ones into a group by themselves but rather occur somewhat sporadically here and there among the various families. It appears that Satan had recognized within Genesis kinds those strains which, upon crossing, would build up within their juices, usually in combination with organic acids, these alkaloids, such as nicotine, caffeine, theobromine, quinine, morphine, et cetera.

Scientific data is now available showing that the percentage of poisonous alkaloid in a plant can be controlled by making certain crosses between strains. Some strains of tobacco have a high percentage of nicotine, and in other strains it is practically absent. Hybridization among the Peruvian bark trees has revealed that the percentage of quinine in the plant can be increased several times by fusion of certain races of *Cinchona* and by the production of ploidy (increasing of complete sets of chromosomes within a single cell).

The fact that God has revealed to man the possibility that many of these poisonous alkaloids possess medicinal and other beneficial economic values is one of the numerous side lights upon the marvelous way in which the Creator has continuously turned the products of Satan's work back upon him to hold in check his endeavor completely to destroy life from the earth. The alkaloid designated as colchicine, which is extracted from the seeds of the meadow saffron, an autumnal lily or crocus (*Colchicum autumnale*), is being employed among other ways as an agent to make possible the development of blight and drought-resistant strains of economically valuable plants, thus combating effects of a deranged climate

or of a parasitic organism by turning against it a product of deranged physiological processes.

It seems very reasonable to assume that the original kinds possessed habits of growth and reproduction which resulted in a fauna and flora which did not crowd and compete lethally among their members. For example, today we find "tares," such as dandelions and crabgrass, which continually encroach upon and crowd out more desirable "species" by the respective methods of superabundant seeds and rhizome invasion. The same principle of excessive expansion is true with the very prolific animals, such as English sparrows, starlings, and Norway rats. It seems very logical that in the original state plants and animals did not have these perniciously abnormal habits of growth and reproduction. But the devil, through processes of mutation and amalgamation, depraved primitive capacity and instinct to such an extent that today we are well aware that we live in a world of excessive reproduction and of depraved habits of conduct until all nature is locked in a lethal struggle of survival of the fittest. The role of amalgamation in bringing in this change probably far exceeds even our imagination. The accomplishments of our modern plant-breeding stations in producing new strains of plants, many of them with greatly increased reproductive powers, give us a glimpse of the very thing that Satan has been doing in nature for thousands of years. This is not a condemnation of the splendid work being done in these experimental stations, but merely a recognition of the obvious fact that if man can increase reproductive powers of plants and animals by employing natural processes, the devil could likewise do the same thing, but to our hurt instead of for our benefit.

Although hybridization is being employed in numerous ways to build up superior stocks among our domestic plants and animals, still it always carries the possibility of development of inferior and even dangerous stocks. The group of very large animals which perished at the Flood possibly contained many mongrels, some likely sterile and some fertile, which, through the phenomenon of hybrid vigor working upon the protoplasms of great vitality of that day, produced huge, ungainly individuals which were often of surly disposition. Doubtless many of the fossils uncovered today had their origin in this hybridization process within the Genesis kinds. It is possible that some of the restrictions of the Mosaic law had their basis in the possibility of development of inferior or positively dangerous strains. We read, "Thou shalt not let thy cattle gender with a diverse kind: thou shalt not sow thy field with mingled seed." Leviticus 19:19. Without proper understanding of correct crosses and how to carry them out, the results are more frequently inferior to the original stock.

The fact of possibility of hybridization within the Genesis kind would seem to indicate that this mechanism was placed in nature for a purpose. It seems to have been a law of creation. At least, it is of sufficiently fundamental nature to be beyond the power of Satan to introduce into the characteristics of protoplasm. He can divert and degenerate, but he cannot originate new basic capabilities in "the physical basis of life." When hybridization is considered from this angle, it seems not impossible that the Creator placed this mechanism within the kind to permit the development of even better strains and varieties, or at least new ones. There can be no question that Luther Burbank's work along this line and the vast amount of work of this nature being conducted at agricultural experiment stations are a proper use of a biological process established in living organisms in the beginning. That the process can be perverted and result in degeneration and depravity is being all too well demonstrated before our eyes at the hands of Satan.

Relationships Between Man and Animals After the Flood. After disembarking from the ark and comprehending the terrible differences between this world and the antediluvian one, Noah had a feeling of vast loneliness, and he began to sense keenly the dangerous situation of his small family, surrounded as they were by mighty beasts of prey. In the original state these beasts had loved and served man. Under Satan's influence their love had, in many cases, been changed to hate; still they had no fear of man. Before the Flood man had some security from them because of his numbers, but now there were but four men alive upon the whole earth. God gave a special assurance to man that a certain degree of safety would be had from these dangerous creatures. One writer, in commenting on this situation, most correctly observes:

"As Noah looked upon the powerful beasts of prey that came forth with him from the ark, he feared that his family, numbering only eight persons, would be destroyed by them. But the Lord sent an angel to his servant with the assuring message: 'The fear of you and the dread of you shall be upon every beast of the earth, and upon every fowl of the air, upon all that moves upon the earth, and upon all the fishes of the sea; into your hand are they delivered. Every moving thing that lives shall be meat for you; even as the green herb have I given you all things.' (Genesis 9:2, 3.) Before this time God had given man no permission to eat animal food. He intended that the race should subsist wholly upon the productions of the earth; but now that every green herb had been destroyed, he allowed them to eat the flesh of the clean beasts that had been preserved in the ark." [9]

Thus the blood feud between man and animals was greatly intensified as a result of the third curse. God placed a special fear of man in the heart of animals. The larger animals tend to avoid man today. This appears to have been brought about through a deepening of the instinct of self-preservation in animals which made them more alert to danger and caused them to cautiously avoid any strange creature. This was necessary for survival in the intensifying severe reign of tooth and claw. God's expression to Noah was, "The fear of you and the dread of you shall be upon every beast of the earth." This knowledge at that time was most reassuring to Noah. Man's difficulties with wild animals, except in the few cases of abnormal rogue individuals or killers, come when the beasts, in defense of their very lives, fight an aggressor.

Although God in His wisdom saw it necessary to destroy the earth under the third curse, still we find that that destruction was accomplished by the hand of a Divine Artist. Through the warring elements He shaped countless scenes of beauty for the refreshment of postdiluvian man. The destruction of "the world that then was" was accomplished in such a way as to prepare a more fitting home for the human race as the degeneration of succeeding centuries should leave their mark. The antediluvian world was too bounteous, too rich, to serve as the best environment for man in his fallen state. Therefore, the Creator refitted it. Riches were hidden away beneath the mountains, and universal bounty was exchanged for a stubborn and penurious soil which must be worked under strenuous climatic conditions. Again the devil's own accomplishments were used to circumvent his desired ends. It became a world of hard and constant toil, and thus more fitting for man who can resist the influences of evil best while earning his bread in the sweat of his face.

20. Early Postdiluvian Man

The Confusion of Tongues

"And all the inhabitants of the earth had one language and one and the same vocabulary. And it came to pass as they journeyed eastward that they discovered a broad plain in the land of Shinar and settled down there." Genesis 11:1, 2.

Being all descended from Noah, these peoples naturally spoke the same language. The term translated language is saphak, literally "lip," indicating that as they spoke their lips followed the same pattern. Some scholars have thought that the expression, debbarim ackadhim, here translated "one and the same vocabulary," means "few words," as though the language were in a crude state of development. However, although ackadkim in some instances does mean "few," that cannot be true in this case where eckchad, "one," appears in parallel use in the same sentence. The expression here evidently means the same vocabulary."

The term nasa literally means "to pull up stakes." Miqqedem, which really says, "From the east," evidently means "eastward," and that would include southeast, the direction of Shinar (Babylon) from the mountains of Ararat. Here lay the broad plain which the ancients praised so highly because of its fertility. A land of such fertility invites men yashabb, "to sit down."

The question naturally rises, "Did all men then on the earth travel in this eastward migration?" The answer is quite obviously, "No." The naming of Peleg ("division"), the great-great-grandson of Shem, indicates that the confusion of tongues with resultant scattering of mankind occurred 101 years after the Flood (1656), that is, in 1757. Noah did not die until 1956, and Shem lived until 2,154 years after creation. It will be recalled that in blessing his three sons Noah indicated that the favor of God was to rest upon the descendants of Shem and Japheth because of their reverence of God and of their will to obey Him. Most certainly Noah, Shem, and Japheth were not in Shinar with the builders of Babel. Instead they remained for a time in the mountains where the ark had rested. Thus, quite soon after the Flood two distinct groups were developed, those who chose to serve God, and the Babel builders who attempted to cast off the restraints of God's law, and to forget their Creator.

"And they said, one to another: Come, let us make bricks and let us burn them well. And they used brick in place of stone and bitumen in place of mortar. And they said: Come, let us build for ourselves a city and especially a tower whose top shall reach to heaven, and let us make for ourselves a name, lest we be scattered abroad upon the face of the whole earth." Genesis 11:3, 4.

Based upon the reasonable assumption that the families at that time ordinarily had about eight children, Keil has estimated that there were possibly thirty thousand human beings by 1,757 years after creation. These in Shinar came together in a common agreement to perform an act which would be in direct conflict with God's purpose for man. Verse 4 states that they planned to build a city with a tower "whose

top shall reach to heaven.” This very ambition was irreverent. The reason given for such a plan was to “make ... a name.” This was to be achieved by the tower. They coveted fame. They were willing to make the bricks and bake them for long lasting qualities (and these joined with pitch last to our very day). This city and tower, according to their plan, was to prevent them from becoming “scattered abroad upon the face of the whole earth.” This last was in direct defiance of God who had commanded them “to replenish the earth.” Thus the city and the tower were to constitute a symbol of defiance to God.

“And Yahweh came down to see the city and particularly the tower which the children of men built. And Yahweh said: Behold, the people are one and they all have one language, and this is merely the beginning of what they do, and now from nothing that they devise to do will they desist. Come, let us go down and there confuse their language so that one man will not be able to understand another's speech. So Yahweh scattered them abroad from thence all over the earth and they left off building the city. Wherefore its name is called Babel because there Yahweh made a babble of the languages of all the earth, and from thence Yahweh scattered them abroad all over the earth.” Genesis 11:5-9.

A significant point in this account is the use of the name Yahweh. It is clear from this that Moses regarded the whole transaction to be a demonstration of the mercy of God. God defeated man's plan so as to prevent man from injuring himself further. The inability to understand one another's speech naturally brought the building of the tower to a sudden halt. Differences in language broke up the confederacy; groups whose members spoke the same language drew apart from the others and scattered out over the earth. This accomplished indirectly the dispersion of the descendants of Ham. Of this group Canaan received the most severe curse of God for filial irreverence. Any further mention of the Hamites in the Bible is merely incidental.

Persistent and Extinct Breeds of the Eastern Hemisphere. From the reading of Genesis 9:20-29; 10; and 11 it would appear that the descendants of both Shem and Japheth, as long as they followed God's plan, enjoyed His special favor. As they cooperated with God's plan they doubtless followed His command to scatter out over the earth. The Japhetics soon vanished from the Bible record because of the focus of the record on the Semites.

The children of Japheth also receive little attention in the Scriptures. They apparently scattered northward. Some of these later reached the civilized world again in the form of the Gauls, who came down from the northern wilds of Europe and sacked Rome.

Apparently among the family groups ' which dispersed over the earth some developed into nations which appear in the earliest records of profane history, and some of these still continue as nations in our day. Other groups that penetrated wilderness wastes did not, in all cases, maintain their civilization in the new isolated environment, but, as generations passed, became more and more savage and depraved.

It seems possible that the Neanderthal man (*Homo neanderthalensis*) is an illustration of this latter group. This is the race which is commonly called the “cave man” today. He was a cave dweller. His skeletons have been found in Western Asia, in all Europe, and in Northern Africa. The degraded state of the people of this breed gave them an almost apelike appearance. The head was massive, with heavy brow ridges, a receding forehead and chin, and a low vault to the brain case. However, the backward extension of the case provided for a brain which on the average was as large as, or larger than, that found in the “highest” of living races. This type was short in stature, the average height of males being about five feet, four inches. The body was powerfully built, the chest barrel shaped. The reality of this breed is confirmed by the unearthing of more than one hundred skeletons, almost all of which were buried in caves.

The Peking man (*Sinanthropus pekingensis*) is constructed upon a series of three dozen remains found in a cave thirty-five miles south of Peking, China. Although not given the same genus name as modern man, still these remains are described as “essentially human.” These relics do not appear to be Mongoloid. All the brain cases were broken open from below, suggesting a possibility of cannibalism.

The Rhodesian man (*Homo rhodesiensis*) has been named from a single skull found in a cave in Rhodesia, Africa. As is the usual story with any such apparently old specimen, it was assumed to have “primitive and specialized” features. Solo man (*Homo soloensis*) has been named from eleven partial skulls found in the bank of the Solo River in Java. The brow ridges in these specimens are suggestive of Neanderthal relationships. The Cro-Magnon man (*Homo sapiens*), known from numerous associated skeletal finds, was so similar in appearance to modern man as to be given the same species name. They were a race of men often reaching more than six feet in height. They lived in the same caves in Europe in which the Neanderthal man had lived, and the evidence seems to indicate that they replaced the latter race. The Cro-Magnons were associated with the same animals as were the Neanderthals and drew pictures of the woolly mammoth, reindeer, horses, and bison. [1]

Studies In Creationism

An important point for the creationist to notice is that these various breeds of men all lived since the Flood. The homes of these men were caves which were formed either during or since that world catastrophe. Our knowledge of them depends largely upon the fact that they did live in caves. There is a great possibility that the blood of both Neanderthals and Cro-Magnons constitute a large proportion of European blood today. It is very possible that these were some of the descendants of the Babel builders, breeds which may have developed under the curse of God among the Hamites, or of certain degenerated breeds of the pioneering descendants of Japheth.

It becomes almost amusing to the creationist to see with what serious industry evolutionist archaeologists endeavor to discover apelike characteristics in all these fossil human remains. There are human beings alive on the earth whose skulls, if greatly aged and imperfect, would with great certainty be listed as connecting links between man and his supposed apelike ancestors—so strong is the influence of a theory upon a man's judgment. I have studied skulls of modern men from certain islands in the South Pacific which were set up on museum shelves near to "restorations" of the fabled *Pithecanthropus erectus* (the Java "ape man"); and these skulls were every bit as, or more, "apelike" than were those of the synthetic "ape man." And yet there is not an authoritative zoologist in the world today who is presumptuous enough to say that the specimens from the South Pacific were other than completely human. To see a "fossil man" alive appears to dispel any notion that he is even remotely related to the apes.

With regard to these fossil humans, it would appear that they, as well as many primitive breeds of men on earth today, suffered severely under the cunning devices of Satan for the accomplishment of human deterioration.

Early Human Breeds in the Western Hemisphere. According to evolutionists, few skeletal remains have been found in North America which can lay claim to any great antiquity. Of those few which have been found none appears to them to be in any way "primitive." This matter of primitiveness is an interesting point. Evolutionists appear to have small interest in any human remains which does not show some markedly degraded appearance. So firmly are "apelike" characters associated in their minds with antiquity that many remains which may have been really old have been brushed aside because the characters were identical with modern man. Man is said to have been well along in his development, in fact, to have reached the *Homo sapiens* stage, before he reached North America.

As to how man reached America, there is quite general agreement that he came across from what is now Siberia into what is now Alaska. If the ocean between these two land masses were lowered one hundred feet today, there would be a dry-land path between them. A lower level to the ocean during the first centuries after the Flood is most reasonable to assume in view of the fact that the Flood waters were warm, and the fact that the extremely low air temperatures in the polar regions came on suddenly. This situation would result in excessively heavy precipitation. These heavy snows of succeeding years would tie up vast amounts of distilled ocean water in glacier form on most uplands of the Northern Hemisphere.

Evidences exist that these snow accumulations (glaciers) came in some points as far south in North America as the Ohio and Missouri rivers. The Bering land path would be kept open by the constant presence of the warm waters of the Japanese Current, which washed the southern coast of the isthmus. The cold waters of the north would be held back by the isthmus. Even during the peak of glaciation it is evident that considerable portions of Alaska and British Columbia were free of ice. A corridor existed down the west flank of the Rockies through which men and animals could find their way to more hospitable lands to the south. No doubt America was peopled by waves of Asiatics who drifted slowly south and spread out over the temperate and tropical regions. The peopling of North America by both men and animals apparently took place amazingly soon after the Flood.

The Mayas, of Yucatan, and the Incas, of Peru, breeds which were once thought to be very old, recently have been shown to be rather young. Dr. A. E. Douglas, of Arizona, has assisted greatly in accurately placing these civilizations in the valley of Mexico, in Central and South America, and the Mound Builders of the United States as at their peaks around AD 1000, and that antecedents of these civilizations could not possibly be dated back much before the time of the Christian Era. Thus the Mayan ruins are only hundreds of years old, and the civilization of Peru has developed and flourished only within the Christian Era.

When the Europeans reached the Americas they found aborigines everywhere, in all states of civilization, from the simple Ona and the Yahgan of the southern tip of Tierra del Fuego and the Eskimo of the far north, to the complex Aztecs in the valley of Mexico.

That all these breeds of men were most evidently rather recent comers to the Americas is evidenced by the superficial position that their remains hold in the crust of the earth. Interestingly, corn, a

plant whose very life is dependent upon the care of man, was already highly developed when the Europeans arrived. Hundreds of varieties were in the possession of the red man, ranging from popcorn through sweet corn and dent corn (field corn) to flint corn; and still, the red man was a recent comer to North America. Where was the original home of corn? How much time was required in the development of its varieties? The red man in whose possession maize was first found was obviously but a comparatively recent breed to reach America. Did he find maize in the care of some earlier American race? There are no evidences that any race of sufficient stability to develop corn lived here longer ago than shortly before the time of Christ. Or did the red man bring corn to America with him? The difficulty with this explanation lies in the total absence of any traces of maize elsewhere than in the Americas. Either maize was developed in America from some wild variety in a comparatively few centuries (quite an impossible thing in view of the evident shortness of man's occupation of North America), or it was a precious possession of one of the early, agriculturally-minded groups of men who came eastward from Ararat.

However, all the breeds of men already referred to were newcomers to North America when compared with the earliest human inhabitants, known at the present time only by artifacts of their making, as arrow points, spearheads, flint knives, scrapers, gravers, et cetera. These artifacts are never found in other than superficial layers of the earth and in caves-layers which are all under laid with fossil-bearing rocks. Fifty feet down beneath wind-blown and water-borne earth is as deep as any of these have been found.

In order to illustrate the situation here, let us review briefly a few of the outstanding evidences of these earliest Americans. One such find was near Folsom, New Mexico, where in 1925 a number of fossil skeletons of the extinct Taylor's bison were found twenty feet beneath the surface in the hard adobe bank of an arroyo. Excavation of these revealed that while drinking from a small lake these bison had evidently been surprised by a band of hunters.

Flint spearheads were found shattered against heavy leg bones, embedded between vertebrae, and resting between ribs. Most interestingly, these skeletons were all minus their tails. The hunters had taken the hides, including the tails. These remains became covered with wind-blown soil and by out washes from the bank.

In 1934-40 in Lindenmeir Valley, in northeast Colorado, the skeleton of a Taylor's bison was found with a Folsom point buried between vertebrae, and a Folsom campsite was uncovered twenty feet beneath the surface of a sloping plateau near by. In this site a fairly large variety of Folsom implements were found along with bison bones. At Clovis, New Mexico, Folsom points were found at the surface associated with the tusks of hairy mammoths and their bones with those of extinct bison, horses, and camels.

Various discoveries have now revealed that the Folsom breed of man, long before the day of the red man, hunted on the eastern slope of the Rocky Mountains, in eastern New Mexico, in the panhandles of Texas and Oklahoma, in eastern Colorado, in western Kansas, in Nebraska northward through Wyoming and the Dakotas into Canada. In the 1920's as much as twenty feet of dirt was blown away in ten years in areas in Texas and eastern Colorado. In shallow pits in these areas tusks of woolly mammoths, bones of extinct bison, brass buttons from the coats of soldiers killed in Indian battles, and pop bottle caps have all been found lying together. This suggests that caution must be used in drawing conclusions merely from propinquity. However, when flint points are found embedded in the bones of extinct bison (Taylor's) and behind the scapula of the large woolly mammoth (as occurred at Angus, Nebraska, in 1931), there can be no doubt that the earliest Americans were associated with these extinct beasts and did their hunting with stone artifacts.

The discoveries in the late 1930's in Sandia Cave, located high in a limestone wall of the Sandia Mountains in New Mexico, are most important in this connection. This cave runs back and somewhat down from the opening two hundred feet. The top layer on the floor of this cave, about six feet deep, consisted of wind-blown dust, bat guano, and pack rat dung mixed with rock fragments from the ceiling. It contained broken pottery, a metate and a deer horn cut with a steel edge-all of late date, showing an intermittent occupation by modern Indians. Beneath this dry dust was found a three- to six-inch crust of calcium carbonate which sealed off the lower levels.

Breaking away this crust, the excavators came to what they named the "Folsom layer," because of the stone spearheads and other artifacts of the Folsom pattern. Pieces of charcoal were in this layer, and also large stone blades, scrapers, and small gravers. Animals represented in this layer by skeletal remains were the horse, woolly mammoth, mastodon, camel, bison, ground sloth, wolf, and cat. Below the Folsom layer in this cave was a water-laid layer of from two inches to two feet of yellow ochre. This contained no

artifacts or bones. Beneath the ochre was another layer of cave debris scarcely consolidated. In this debris were the bones of the same animals as in the Folsom layer, but a number of stone implements were found which were less skillfully done. The makers of these were called Sandia men.

The situation in this cave gives an opportunity to surmise on a changing climate in that area in the past. The dust at the top represents the dryness of recent centuries. The crust over the Folsom layer indicates a wet period. Preceding that was a dry period when Folsom man lived in the cave. Preceding the Folsom occupation was another wet period marked by the ochre layer. Preceding that in turn was a period of dryness when Sandia man lived there. Campfire stones were found in the bottom layer arranged in a circle, and back from these lay piles of cracked bones just where they had landed when Sandia man tossed them over his shoulder after sucking out the marrow.

The Gypsum cave finds are also an outstanding contribution to an understanding of the earliest Americans. This is a large limestone cavern, located sixteen miles east of Las Vegas, Nevada. It is 300 feet long and 120 feet wide at its widest point. On the floor of this cave is a layer of dung of the huge extinct ground sloth. Above this layer were found artifacts of Basket Maker, Pueblo, and modern Indians. Fragments of cane burnt at one end were found beneath an undisturbed layer of sloth dung-evidently an early torch. A wooden atlatl fore shaft (the atlatl was used for throwing spears) was found beneath sloth dung over which gypsum had formed, and pieces of painted dart shafts were under a layer of dung and sloth hair. A fragment of polished dart shaft and a dart point were embedded in sloth dung. Another dart point was uncovered in partially consolidated gypsum, with burnt sloth dung lying above and below it. A few feet away was found a camel bone. Remains of campfires were found eight feet below the surface of the cave floor under a layer of sloth dung. For good summaries of the details of the numerous finds of ancient human artifacts the reader is referred to the books by Wormington [2] and Hibben. [3] The great puzzle connected with all these finds is that not one human skeletal part, not even a front tooth, has been found in all the excavations.

In 1927 in a small, extinct volcano near Las Cruces, New Mexico, under an overhanging ledge at the bottom of the crater, the mummified remains of a giant ground sloth was found lying on the floor of the solidified lava. According to geologists, this kind of sloth became extinct at least ten thousand years ago. Yet here was a specimen in as good condition as a cow that had died last year, with dried skin covered with long yellow hair, and with tissues well preserved by drying. At the most, it must have tumbled into the crater not many centuries ago. This is the same kind of animal which was occupying Gypsum cave alternately with Gypsum cave man.

There seems to be but one conclusion from these data. Apparently these extinct varieties of animals, the woolly mammoth, the mastodon, several species of bison, horses, wolves, camels, cats, and the giant ground sloth came across into North America a few centuries after the Flood. Along with them came several breeds of men who appeared to live largely upon these animals. Regarding these men, the mystery lies in the total absence of any skeletal remains. And regarding the large animals which constituted their food supply, there is also a great puzzle as to why those particular forms should have vanished from the earth during the centuries following the Flood and possibly before the Christian Era. It is very possible that these early Americans were living concurrently with Neanderthals and Cro-Magnons. It will be recalled that the latter drew pictures of extinct horses, bison, and woolly mammoths which were evidently identical with those animals in America. The fact that these human artifacts are only in the surface layer and are always under laid by fossil-bearing rock layers shows that these races lived in America after the Noachian Flood.

The obvious dating of these human remains as post-diluvial at once reveals the fact that considerable numbers of fossils, at least of the larger vertebrates, have developed in the thin surface layer of the earth since the Flood. The part of the American continent where these fossils and human artifacts are found gives abundant evidence of postdiluvian wind, water, and even ice action to a considerable degree in local areas.

Remains of Antediluvian Man and His Artifacts.-At the close of this chapter we might pause just a moment to recognize that, to the present moment, skeletal remains of antediluvian man apparently are very few. It is possible that some of the small fragments which appear to be parts of human skeletons and which have been uncovered in such situations as that of the Heidelberg jaw discovered eighty feet below the surface in a sand deposit near Heidelberg, Germany, [4] which contained numerous animal bones, including ancient elephants, rhinoceroses, and lions, may be a remnant of pre-Flood man. It is possible that the large teeth recognized recently in China [5] may be from antediluvian man.

It likewise seems possible that the fist ax found in France in 1830 beneath fifty feet of laminated

sands and gravels many feet above high-water mark on the shoulder of a valley [6] may be an artifact of pre-Flood man.

Again, it would appear that an artifact of pre-Flood man is involved in a description given by Hibben of a find made in Alaska. It will be recalled by readers in geology that all across northern Siberia and northern North America the frozen soil is literally filled with the broken bodies of extinct vertebrates. It has been estimated that along the rivers of north Siberia the remains of some ten million animals of extinct varieties lie buried in the frozen mud. Of the situation in Alaska Hibben says:

“It looks as though in the middle of some cataclysmic catastrophe of ten thousand years ago the whole Alaskan world of living animals and plants was suddenly frozen in mid-motion in a grim charade.” [7]

The Alaskan deposits are a continuation of the Siberian deposits and the species are the same. After watching the operations of bulldozers working in these frozen body-filled mucks for several weeks near Fairbanks, Alaska, Dr. Hibben writes the following description:

“Throughout the Alaskan mucks, too, there is evidence of atmospheric disturbances of unparalleled violence. Mammoth and bison alike were torn and twisted as though by a cosmic hand in godly rage. In one place, we can find the foreleg and shoulder of a mammoth with portions of the flesh and the toenails and the hair still clinging to the blackened bones. Close by is the neck and skull of a bison with the vertebrae clinging together with tendons and ligaments and the chidnous covering of the horns intact. There is no mark of a knife or cutting implement. The animals were simply torn apart and scattered over the landscape like things of straw and string even though some of them weighed several tons. Mixed with the piles of bones are trees, also twisted and torn and piled in tangled groups; and the whole is covered with the fine sifting muck, then frozen solid.” [8]

There is no question in the mind of the creationist that this situation was produced by the Noachian Flood. At Fairbanks the bulldozers gradually worked this material away until a depth of ninety feet was reached, and there, beneath the bones of a lion, and touching them, was a flint arrowhead, “of pink stone, finely chipped and gracefully shaped.” Its pattern was suggestive of that of a postdiluvian Yuma point.

It is thus observed that the very varieties of animals which populated the areas in North America in antediluvian times returned to the same areas in the early centuries after the Flood, and were still pursued by man armed with missiles of sharpened stone very similar to those used by the race that was overwhelmed in the Flood. Of that annihilated race God had said, I will destroy man whom I have created from the face of the earth” (Genesis 6:7), and in the light of the sparsity of remains of that race we would say that God accomplished a thorough work.

21. Jacob and the Flocks of Laban

Exhibit A. While I was attending a class in advanced physiology at a certain university once upon a time, the professor, one day without provocation, went out of his way to show us how the Bible could not possibly be an inspired book. As exhibit A in his selection of evidence to prove his point, he cited the experience of Jacob with Laban's flocks. He informed us that the Bible taught the doctrine of prenatal influence of the sort which enabled the expectant mother to mark her offspring by looking at some object. But, he reminded us, science has demonstrated that that type of prenatal influence does not exist. Therefore to him this story was conclusive proof that the Bible was not an inspired book.

This sally came as somewhat of a shock to me. I was acquainted with scientific findings on this point, but I had not been aware that it was contrary to the Biblical statements. At my first opportunity I turned to Genesis 30 and studied the story carefully. The longer I studied it the more certain it seemed that the professor was correct; scientific fact and Biblical teachings apparently came into direct conflict. My perplexity continued until I chanced to read around the edges of the story. Behold, in Genesis 31:10-12 was the solution of the whole problem. In these verses we learn that the angel of the Lord made clear to Jacob in a dream that the reason the ring streaked and spotted and speckled goats and the brown sheep were so numerous was not because they had looked at Jacob's rods but rather because the fathers of the flock were, in their heredity, ring streaked, speckled, spotted, and brown. In other words, the flocks were merely producing according to the Mendelian principles under the blessing of God, and not according to any prenatal influence produced by Jacob's mottled sticks. Both the professor, if he had ever read the story for himself, and I had stopped reading before the story was finished.

Prenatal Influences. There can be no doubt but that the expectant mother has ways of affecting her offspring other than through the hereditary factors which she gives to it in the chromosomes of the egg. The only two known avenues of influence are (1) through the nutrition of the mother, and (2) through the hormones in her blood. As an illustration, poor nutrition in the mother due to an inadequate diet or to an unhappy state of mind, and an unfavorable hormone state due to worry, without question have their unfavorable influences on the development of the young.

However, all marking of the offspring such as that which Jacob thought he was accomplishing in Laban's flocks, is completely impossible. It is possible that in the experience of the large majority of expectant mothers sights are viewed and / or frights experienced which would cause the marking of the offspring. But in most such cases, no marks are observable in the young. This alone should make us suspect that there is no mechanism for carrying such experiences across to the fetus. Where markings do occur, the mother has to think hard to associate the mark with some fright she had. Naturally, purely coincidental frights and marks occur. These chance occurrences have caused many individuals to feel absolutely sure that the mother can mark her offspring. But the fact stands that controlled experimentation has shown no true connection between frights and marks.

A study of the embryology of mammals shows clearly why there can be no transference of sights to marks. We find that in the placenta and umbilical cord, which constitute the only connection between the mother and the fetus, there are no nerves. Not even the blood stream of the fetus and the mother are connected directly. [1] Thus absolutely no mechanism exists whereby the mother can mark her offspring in the way that Jacob thought he was accomplishing the marking.

The Animals Involved. The text of Genesis 30:25-43 makes it very clear that sheep and goats were in the flocks of Laban, possibly composing most of the flocks, but verse 32 speaks of sheep, goats, and "cattle." In Genesis 32:5, 15, we learn that Jacob had cows and bulls in his flocks. So it is possible that sheep, goats, and cows were all involved in this experience. The common sheep of ancient Palestine belonged to the fat- or broad-tailed variety. (See Exodus 29:22 and Leviticus 3:9.) These sheep occur in two colors, the majority being white, which is a simple dominant character in sheep; [2] the remainder are entirely brown or are brown blotched. Brown acts as a simple recessive character.

Laban's goats are thought by Bible scholars to have been of the Mambrian breed, so called after Mamre near Hebron. This goat is still the most numerous breed in modern Palestine. [3] They are distinguished by large size, drooping ears, usually long, dense, black, glossy hair, and short beards. According to Lush, [4] who investigated Toggenburg goats, but whose finding would, in harmony with the general rule, apply to all varieties of the same animal, white in goats is dominant to black, and black is dominant to spotting. This, according to Lush, is a case of epistasis, by which geneticists mean one of several different factors not members of the same pair but affecting the same trait, which masks or prevents the expression of the other factors. Lush believes about five factors are involved in the primary colors and patterns. The small spot pattern (grizzled?) is hypostatic-that is, recessive to all others.

Concerning the color of the cattle, which may also have been involved in Jacob's breeding experiments, we know little. Tristram described the half-wild cattle of southern Palestine as small in size, shaggy, short-legged, and small in the hams, but deep in the forequarters. Their color was black or brown, sometimes red, but rarely piebald, and very seldom with any white. [5] According to Snyder, [6] spotting in cattle is recessive to solid color. The degree of spotting is determined by a set of multiple factors.

Jacob's Results and the Science of Genetics. Returning once more to Jacob's experience at the time that Jacob bargained with Laban to take the ring streaked, speckled, and spotted goats and oxen and the brown sheep that appeared in Laban's flocks as his pay for caring for the flocks, these off colors were few and scattering. That is why Laban agreed to Jacob's proposition. But as time passed, those color patterns which had been so comparatively few became, under Jacob's care, considerably more abundant than the plain colors. Jacob's flocks increased rapidly, and Laban's only slowly. Why was this the case? Jacob was an industrious and careful shepherd. He did everything in his power to increase his own flocks and still abide by his agreement with Laban. That Jacob was of the opinion that prenatal influence of the sight transfer type really occurred, of course is very obvious in the story. He displayed his spotted and ringed rods and the spotted and ring streaked increased in Laban's flocks. He thought he was certainly working a trick on his father-in-law. But one would think Jacob would have suspected that the rods actually had no effect, because, although the sheep looked at them along with the goats and cattle, still the lambs were predominantly plain brown and not ring streaked and spotted like the sticks.

God did not permit Jacob to continue in his inaccurate conclusion. Genesis 31:10-12 states that God sent His angel to Jacob to set him right in the matter of why the flocks were predominantly Jacob's. It

was because God was blessing him and directing the breeding, so that the functional fathers were those who were, in their inheritance, of the type which was Jacob's.

To illustrate this fact, as noted above, color in sheep is due to a single pair of factors, one member of which, the one for white (W) is dominant and the one for brown (w) is recessive. An individual of the genotype W W would be white, and all its lambs would be white, because all its germ cells would carry a W. However, in individuals which were of the genotype Ww, the color would be white, but half the germ cells would carry W and the other half would carry a w. Jacob was fair with Laban and separated the white sheep from the brown sheep. But sheep having the genotype Ww would look just like sheep having the genotype WW—they would all be white. Individuals containing both factors of a pair, Ww in this case, are said to be heterozygous. These white individuals in Laban's flocks which were heterozygous were those the Lord used quite entirely to increase the flocks.

That God manipulated this natural process to Jacob's advantage, i.e., performed a miracle, is evident in the fact that more brown sheep were born than white. Normally one fourth of the lambs from heterozygous parents (Ww) would be homozygous white (WW), one half would be heterozygous white (Ww), and one fourth would be brown (ww). In other words, Jacob would have gotten only one third as many as Laban. Under God's blessing the ratio was distorted in Jacob's favor, so that more ww (brown) lambs were born than W W (white) or Ww (white) lambs.

In the case of the goats, again we would have factors for the white spots and streaks covered by the factor for black—the black color of the Mambrian breed indicates that the factor for pure white does not occur in its heredity. Thus many of Laban's black goats were mixed in their heredity, carrying factors for spotting and streaking which would be able to find expression in the new combinations occurring at fertilization of the egg. Here again, under normal ratios, there would be more black goats than spotted ones; but under God's special direction in Jacob's behalf there occurred more combinations that resulted in spotting and streaking than resulted in solid black.

The same situation which held with the heredity of the sheep existed with regard to the cattle. A cow with the genotype Ss would appear in the same solid color as would a cow of the SS genotype. Thus although Jacob faithfully separated the plain colored ones from the spotted ones, still these heterozygous individuals (Ss) would exist in Laban's flocks and become the source of the spotted individuals, which predominated. Again God would have to act in Jacob's behalf to cause the recessive individuals to be more numerous than the dominant ones.

It thus becomes evident that the appearance of the ring streaked, speckled, spotted, and the brown was not due to anything other than the operation of Mendelian laws under the special direction of the Author of the laws. Mendel's first law states that segregation of the members of a factor pair, Ww for example, occurs in the formation of the mature eggs and sperms. Thus in the heterozygous white sheep the W would go to one sperm and the w to another. The same would be true in the eggs. Thus half the sperms would contain W and the other half would contain w; likewise with the eggs. The union of a w sperm with a w egg would result in a brown sheep (ww) although the parents were white. This mechanism explains the appearance, among the pure colors of Laban's flocks, of those off-colored individuals which belonged to Jacob. Genesis 31:10-12 makes clear that Mendelian principles operated, because it tells us that the fathers were ring streaked, speckled, and grised. This could not have been according to the external appearance, because such animals were found only in Jacob's flocks. Therefore, the angel's description could apply only to the genotype of the animals; i.e., to the factors they carried instead of to their outward appearance.

Harmony of the Bible Record With Scientific Facts. Thus an examination of the story of Jacob's experience with Laban's flocks reveals that the Scriptures do not teach that the type of prenatal influence exists which makes it possible for expectant mothers to mark their offspring according to things they see. Indeed, Jacob was of that opinion at first and worked very industriously to make use of the supposed mechanism. But the university professor and everyone else who cares to read the whole story will learn that the Lord took special pains to send an angel from heaven to correct his misinformation. The Scriptures teach that such markings among domestic stock are the result of hereditary factors in both parents working according to Mendelian principles and are not due to maternal impressions. A fair reading of the text thus shows that that incident in the Scriptures, which is so often cited as proof that the Bible is a book of fables, is in actuality one of the important reasons for believing that it is indeed an inspired volume.

22. Clean and Unclean Animals

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Classification of Animals in the Bible (Authorized Version). For practical purposes, and that is the point of view of the Biblical grouping, animals are classified as follows:

A. At Creation. (1) Creatures of the sea; (2) fowl of the air, including all winged forms, such as pterodactyls, bats, and possibly even insects; (3) cattle, including the domestic mammals. (4) Beasts of the earth, including the forms which have freedom of movement; and (5) creeping things, including all forms which slide over the ground on their bellies, or have short legs.

B. At the Time of the Flood.-In Genesis 6 and 7 (Authorized Version) only the land animals are referred to. Their classification is referred to in four different groupings in the Flood story as follows: (1) Genesis 6:20; 7:23-fowl, cattle, and creeping things; (2) Genesis 7:2, 3-clean beasts, beasts that are not clean, and fowls. (3) Genesis 7:8-clean beasts, beasts that are not clean, fowls, and everything that creeps. (4) Genesis 7:14, 21 -beasts, cattle, creeping things, and fowl. This last classification of land animals is the same as the one in Genesis 1; that is, the animals which were taken into the ark (Genesis 7:14) and the animals which came out of the ark (Genesis 7, 2 1) were identical in kind with those which were created.

C. At Sinai. Leviticus 11; Deuteronomy 14. [1]

1. Beasts (mammals, that is, hairy animals).

a. Clean: All ruminants (cud chewers) that part the hoof.

b. Not clean: All ruminants that do not part the hoof.

(1) Camel: Chews the cud, but its hoof is only partially divided.

(2) Coney: Moses, speaking according to appearances, said it chewed the cud but did not part the hoof. However, the coney is not a

ruminant. The instinctive working of its jaws to grind down its rapidly growing teeth gives an appearance of cud chewing.

(3) Hare: Likewise stated to be unclean because it chewed the cud but did not part the hoof. Like the coney it is not a ruminant but the

habit of continually grinding its teeth gives the appearance of cud chewer.

(4) Swine: Parts the hoof but does not chew the cud.

2. All that are in the waters.

a. Clean: All that have fins and scales.

b. An abomination: All that lack fins, or scales, or both.

3. Fowls (flying animals).

a. Shall not be eaten-an abomination.

(1) Eagle (nesher). This term includes both eagles and vultures. Specifically, the griffon-vulture or great vulture is doubtless the bird referred to here.

(2) Ossifrage (peres) (American Revised Version: Gier eagle). The lammergeier, largest vulture of the Holy Land.

(3) Ospray (asniyeh). The fish eagle.

(4) Vulture (dayah) (American Revised Version: Kite) after his kind. The kite, a small bird of prey.

(5) Kite (ayah) (American Revised Version: Falcon) after his kind. May be one of several kites or falcons.

(6) Raven after his kind. The whole crow family, including crows, rooks, jackdaws, et cetera.

(7) Owl (bath hayd anah) (American Revised Version: Ostrich). Probably the ostrich.

(8) Night hawk (tachmas). May be the goat sucker; may be a screech owl.

(9) Cuckow (American Revised Version: Sea mew). Any of the sea gulls.

(10) Hawk after his kind. All the smaller birds of prey.

(11) Little owl (koce). A small owl.

(12) Cormorant. Common cormorant.

(13) Great owl (kippoze). An owl.

(14) Swan (tinshemeth) (American Revised Version: Horned owl). "Swan" is apparently an incorrect translation. In the Septuagint and

other versions it is translated "ibis." However, it may refer to the purple gallinule.

(15) Pelican. The white pelican and the Dalmatian pelican.

(16) Gier eagle (rackam). Pharaoh's hen or vulture.

(17) Stork. The stork.

(18) Heron after its kind. All the herons.

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(19) Lapwing (dookeefath). More likely the hoopoe, a carrion feeder.

(20) Bat. All bats, described in Leviticus 11: 20 as “fowls that creep, going upon all four.”

b. May be eaten: Apparently any flying animal which is not named on this list, and which does not itself eat fish, flesh, or carrion might be eaten with impunity. Into this group would fall all ducks who are not fish eaters, all geese, all scratching birds as quail, grouse, and pheasant, and all song and insectivorous birds.

4. Creeping things. Insects and all other invertebrate land forms as well as amphibians and reptiles. Even a few mammals are included here.

a. Clean: The flying, creeping things which have jumping legs.

(1) Locust (arbeh) after his kind. The migratory locust.

(2) Bald locust (salam). Bald locust.

(3) Beetle (chargol). This is obviously a mistranslation because no Holy Land beetles have jumping legs. Some locust is evidently intended here.

(4) Grasshopper (chagab). Small grass hoppers.

b. Unclean: All invertebrates without jumping legs and every creeping vertebrate and those that go on their bellies. A few mammals are also included here.

(1) Weasel. Probably used as a group name to include the weasel and such forms as martin, ichneumon, genet, and polecat.

(2) Mouse. Probably used in the group sense to include all small rodents, such as rats, mice, marmots, jerboas, dormice, and hamsters.

(3) Tortoise (zab) (American Revised Version: Great lizard) after his kind. Some think zab can refer to none of the sea or land tortoises of

the Holy Land. They suggest the monitor lizard or some other large lizard. Tristram accepts the tortoise here.

(4) Ferret (anakah) (American Revised Version: Gecko). This cannot possibly be the mammal ferret. The name, anakah, “that which sighs

and groans,” and the association here indicates the gecko, which continually utters a mournful low cry or wail.

(5) Chameleon (American Revised Version: Land crocodile). Probably some other lizard than the chameleon.

(6) Snail (American Revised Version: Sand lizard). Not the snail but some small species of lizard.

(7) Mole (American Revised Version: Chameleon). Tristram thinks the chameleon is intended here. Others think burrowing mammals are meant.

Clean and Unclean-a Summary. The clean animals were those which are acceptable for sacrifice or suitable for food or both. The clean animals would be as follows:

A. Ruminants or cud-chewing mammals. In North America included here would be as follows:

(1) The deer family (Cervidae), containing the elk, white-tailed deer, black-tailed deer, mule deer, moose, woodland caribou, Barren Ground caribou, and reindeer.

(2) The antelope family (Antilocapridae), containing the prong-horned antelope.

(3) The ox, sheep, and goat family (Bovidae), containing the bison, or buffalo, musk ox, Rocky Mountain goat, and Rocky Mountain sheep-and, of course, our domestic bovids.

B. Birds. The clean birds included the passerine birds (song and insectivorous birds of today), game and poultry groups, the duck family, containing the river ducks and sea ducks (the fish eating mergansers would doubtless be omitted), geese, swans, and the waders excepting only the herons and storks. In fact, the eating of all birds was permitted except birds of prey, carrion, and fish feeders. Thus the Mosaic law but sanctioned those birds which the instinct of civilized man has in all ages approved.

C. Creatures of the sea. Only those which had both fins and scales were clean. Included here would be such kinds as carp, suckers, tarpon, herring, salmon, trout, whitefish, pike, true eel (not lamprey eel or conger eel), perch, bass, crappie, sunfish, mackerel, tuna, flounder, and cod.

D. Creeping things. The only clean invertebrates were those which had posterior legs of sufficient length and strength to enable them to move by leaps. This would include the short-horned grasshoppers such as the locust, and the long-horned grasshoppers such as the katydid and crickets.

The “Swan.” As noted previously, the “swan” is included among the unclean birds (Leviticus 11:18, Deuteronomy 14:16). However, the American Revised Version uses horned owl and puts “swan” in the margin. Tristram, Mrs. Porter, and Bible encyclopedias are sure that the bird we know today as the swan is not meant here. We read:

“Among the list of unclean birds in Leviticus 11:18, Deuteronomy 14:18, Deuteronomy 14:16, occurs the word *tinshemeth*, rendered 'Swan' in our version. In the Septuagint and other versions, it translated Pophyrio, Ibis. It is scarcely probable that the Swan was intended by Moses.... There is, moreover, no reason for making the Swan unclean.” [2]

“As for the swan, there is no probability that it was designated among the birds of abomination. Geese, ducks, and swans are older than any historical record. They are water birds whose food is not in any way objectionable to the most fastidious palate. They always have been eaten, and when young and tender are considered great delicacies. Swans were not very plentiful, but they did exist at the time and in the land of Moses, and no doubt were among the fatted fowl served at great feasts in Bible lands.” [3]

It is interesting to learn that the Jewish people today regard the duck and goose as lawful but do not eat the swan. It is not uncommon to find creationists today who, to their shame of face, try to argue that chickens are clean but that ducks and geese are unclean. This erroneous opinion is apparently based on the mistaken idea that the texts above, referring to the “swan,” say “the swan after his kind.” Then believing that “swan” means swan, and knowing that ducks, geese, and swans all belong to the same family, they conclude that ducks and geese are likewise unclean. However, reference to Leviticus 11:18 and to Deuteronomy 14:16 reveals that it does not say, “The swan after his kind.”

There is not the slightest ground upon which to assume that, according to the Mosaic law, the duck, the goose, and the swan are unclean. Any insistence that the chicken is clean and the duck is unclean is greatly to be deplored.

Stories About the Pig. Various “reasons” have been advanced from the pulpit why the pig is an unclean animal. We must honestly say that many of these “reasons” are ridiculous in the extreme. One that came to me not long ago was as follows: “Proof that the flesh of the pig is full of poison is furnished in the fact that if the side of the animal is gashed deeply, the wound will gap open but never bleed.” This condition will hold in any clean animal also, provided enough adipose (fatty) tissue is present. Adipose tissue is not abundantly supplied with blood. This does not mean that poisons exist in fat. Actually, more excretory products, e.g., urea and uric acid, exist where there is more vigorous circulation. The more blood, the more poison. Poisons are not stored in animal tissues.

Again, it is frequently asserted, “The eating of pork makes many people sick.” This is also true of the eating of peanuts, white flour, and strawberries, for example. Not one food can be named which does not make individuals who have an allergy for it sick. Therefore, the fact that pork sometimes makes people sick does not in any way furnish us with a scientific reason for the fact that it is “unclean.”

A very frequently repeated untruth about the pig is that it has an opening on the posterior side of each front leg just above the hoof which drains poisons from the pig's body. The reason for the story is apparently to convey the impression to pig eaters that the pig is so very full of poison that it must ooze out of these openings continually or the pig will die very soon of autointoxication. I have dissected the legs of a number of pigs most carefully, and have conducted laboratory studies where dozens of pigs were dissected, but in no case were these fabled poison glands found. The true situation here is as follows: The pig, in common with all mammals, has skin glands scattered here and there over its body. [4] The words of the noted anatomist Sisson are: “At the medial side of the carpus of the pig) there are small cutaneous diverticula, the so-called carpal glands, into which numerous compound coil glands open. Large glands also occur in the skin of the digits and interdigital space.” [5] These are modified sweat glands which produce small amounts of an oily substance which is no more poisonous than that produced by similar compound, coil glands at the hock and at the flexion surface of the fetlock in the ox, or the oil secreted by the oil gland of the chicken. The products of such glands in mammals serve to soften the hair and hoofs and are possibly of value in intercommunication between members of a herd. A fact always omitted when the untruths regarding the “poison glands” of pigs are proclaimed by pen and voice is that the deer, a very “clean” ruminant, has the pedal glands developed to a much greater degree than does the pig. It is hardly necessary to say that an evangelist, of all persons, should flee with the greatest care from all untruths, even when he is

endeavoring to put some point across which appears to be very dear to his heart.

Why Are Unclean Animals Unclean? Such stories about unclean animals as those cited previously are evidently the result of a rather heroic effort to show how unclean animals are unclean. But that is a field into which the layman in science should venture only with great caution in his public or private utterances. As a biologist, I have studied this subject of the clean and unclean animals at great length and am forced to say that the only consistent, good reason I know for considering all unclean animals unclean is that God who made them has said that they are unclean, and I believe He has good reasons, unknown to us in most cases, for so classifying them.

We hear it said that the pig is unclean because he is a filth and garbage feeder. Yet many of the individuals who are so sure they know scientifically why the pig is unclean, greedily devour the flesh of the chicken and pick its bones deliciously, apparently oblivious of the fact that, if given equal chances with the pig, the chicken is every bit as filthy in its eating habits as is the pig.

We hear it said that the pig is extremely susceptible to disease and parasitism, therefore, it is unclean. But the cow suffers just as many diseases as the hog and is likewise subject to parasites that will live in the bodies of human beings. And although the chicken does not harbor any parasites that can be passed on to man, still it is so subject to disease as to make the discovery of a perfectly healthy specimen, free from tumors, a rare find.

We hear it said that the filthy diet of the hog fills its system with poisons which make it unclean. We apparently overlook the fact that the digestive tracts of scavengers are constructed in such a way as to handle filth efficiently so that we cannot demonstrate scientifically one single poison in the blood and flesh of a pig that is not also found in the blood and flesh of the chicken and cow. The digestive tracts of all animals, clean and unclean, break down the foods they eat into simple sugar, amino acids, fatty acids, glycerine, and other essential biological substances.

Poisonous substances in the diet do not get into the blood stream as such. If they did, the scavengers would die. This general biological fact was referred to indirectly by Christ at one time when drawing a spiritual lesson. Regarding this natural fact, we read: "He said unto them, Are you so without understanding also? Do you not perceive, that whatsoever thing from without enters into the man, it cannot defile him; because it enters not into his heart, but into the belly, and goes out into the draught, purging all meats [foods]?" Mark 7:18, 19.

We recognize the fact that in a large percentage of the cases unclean animals do develop in their bodies certain unsavory oils which cause civilized man naturally to shun them. Even some clean animals, e.g., certain ducks, are said to be very palatable in the fall when feeding on a vegetable diet, but very unsavory in the spring when feeding on aquatic animal life. The kind of diet also affects the flavor of the flesh of chickens, cows, et cetera. But these unsavory flavors are not poisonous, merely unpalatable substances to civilized folk. Evidence of this fact is seen in the ability of certain individuals and groups of men to eat these very articles and do it with apparent impunity.

The anatomical structure is said by some to indicate why one animal is clean and another unclean. As an example, I was once told, "Chickens have gizzards, hence are clean; ducks do not have gizzards, hence are unclean." The fact is, many ducks have the gizzard as well developed as has the chicken. Commonly in flesh-eating birds (unclean birds) the stomach shows relatively little musculature and a strong development of glandular tubules secreting the digestive juices. In grain-eating birds (clean birds) the musculature is particularly strong, and instead of the soft mucous membrane there is in the posterior region a strong brown lining in a thick-walled structure called the gizzard. The two types of stomachs are converted by intergrades as well as by modifications. Many carnivorous birds (unclean) have as much gizzard as a pigeon or a hen. Illustrations here are the grebe, crow, and kingfisher. [6]

I would repeat, scientifically speaking, I believe it is impossible to elucidate why one animal is clean and another unclean. Ignoring the psychological reasons for not eating horse meat (these change with geographical distribution and with the varying conditions in any one place), we can see no reason why a cow should be clean and a horse unclean. The cow is easily a garbage feeder; the horse never is. In fact, the horse is very particular about having a clean diet. The cow is subject to just as many (or more) diseases as is the horse. Immature man can contract tuberculosis from the cow, and all human beings, undulant fever and parasites; the horse can pass none of these to man. Every excretory product that is found in the blood of the horse (urea, some of the purine bodies, creatine, creatinine, hippuric acid, indol, skatol, phenol, cresol, etc. [7]) is also found in the blood of the cow. Scientifically, as far as we can learn, horse meat is in every way as nutritious as cow meat.

I have a point in calling attention to these facts. My point is this, for some reason God has in

many cases not revealed 6) us scientifically why unclean animals are unclean. In the light of this fact, my plea to creationists is to cease attempting to justify God's pronouncement "scientifically" when in truth we have at the present time no scientific way of telling why this animal is clean and that one is not. Most certainly God had a reason for drawing the line. I believe this reason is more often connected with the ceremonial law than with suitability for food. We recall that Noah's first act on coming out of the ark was to offer one each of every clean animal as a sacrifice. But whether the basis of clean and unclean is ceremonial, dietary, or both, if God has once stated that an animal is unclean, I believe that that is the way we are to consider it till time runs out, even though we cannot justify the cleavage scientifically.

The story comes to us of Dr. Adam Clarke who, while calling on a family, was invited to ask the blessing on the meal. As the chief part of the menu that day they had some kind of pork. It is said his prayer was something like this, "God, if thou can bless under the new covenant what thou did curse under the old, please bless this food." The distinction between clean and unclean animals is not merely Mosaic. It was in existence before the time of the Flood. There is no reason to believe that the distinction has ever been done away. This is one of those cases where a "Thus said the Lord" stands clearly delineated, even though at the present time we cannot offer any scientific reason for it. The clarity of Scripture on this point designates that the difference between "clean" and unclean" meats is a justifiable inclusion of dogma.

Is Today the Time to Shun the Unclean and to Eat the Clean? It is common for the Christian to read the permission of God to eat properly bled animal flesh as recorded in Genesis 9:3,4, and consider this permission more or less a command by God to eat flesh even down to our very day. The facts here are that this permission was extended to Noah to keep him alive until the vegetable kingdom could recover from the effects of the Flood and again furnish man with all necessary nutrients. Originally God had given only plants to man, and the family of Noah had remained true to this instruction. After the Flood a permission had to be extended to Noah before he would kill and eat. This extension was merely to provide for an emergency situation. Flesh foods were not so suitable for man as plant foods, else God would have given flesh to man from the very first.

The following most logical statements by the religious writer Ellen G. White are well worth pondering in this connection:

"God gave our first parents the food he designed that the race should eat. It was contrary to his plan to have the life of any creature taken. There was to be no death in Eden. The fruit of the trees in the garden, was the food man's wants required. God gave man no permission to eat animal food until after the flood. Every thing had been destroyed upon which man could subsist, and therefore the Lord in their necessity gave Noah permission to eat of the clean animals which he had taken with him into the ark. But animal food was not the most healthy article of food for man.

"The people who lived before the flood ate animal food, and gratified their lusts until their cup of iniquity was full, and God cleansed the earth of its moral pollution by a flood. Then the third dreadful curse rested upon the earth. The first curse was pronounced upon the posterity of Adam and upon the earth, because of disobedience. The second curse came upon the ground after Cain slew his brother Abel. The third most dreadful curse from God, came upon the earth at the flood.

"After the flood the people ate largely of animal food. God saw that the ways of man were corrupt, and that he was disposed to exalt himself proudly against his Creator, and to follow the inclinations of his own heart. And he permitted that long-lived race to eat animal food to shorten their sinful lives. Soon after the flood the race began to rapidly decrease in size, and in length of years." [8]

In the light of the less suitable nature of all flesh foods as compared with the original diet of plants, is it reasonable today to bend our efforts in an attempt doomed to failure to show scientifically why cow meat is entirely healthful and pork entirely dangerous, or why chicken is all good and rabbit is all bad?

Too frequently the truth of the first of the two statements which follow is recognized by Christians but the equal truth of the second statement is ignored.

"Pork, although one of the most common articles of diet, is one of the most injurious. God did not prohibit the Hebrews from eating swine's flesh merely to show His authority, but because it is not a proper article of food for man. God never created the swine to be eaten under any circumstances. It is impossible for the flesh of any living creature to be healthful [as an article of diet for man] when filth is its natural element, and when it feeds upon every detestable thing." [9]

"Flesh food has a tendency to animalize the nature, to rob men and woman of that love and sympathy which they should feel for every one, and to give the lower passions control over the higher powers of the being. If meat-eating was ever healthful, it is not safe now." [10]

Because God has indicated in the original diet of man that flesh foods are less healthful for man

than are plant foods, and because man is held responsible before Heaven for the unnecessary destruction of animal life, and because the likelihood does exist that flesh foods unfavorably affect the spiritual and moral nature of man, and because of the dangers which do exist of parasites and disease germs being passed over to man through animal flesh, it would appear to be a most reasonable course of action for man to study how to become properly nourished and still omit even the clean flesh foods from his diet. We read in 1 Corinthians 3:16, 17: "Know you not that you are the temple of God, and that the Spirit of God dwells in you? If any man defile the temple of God, him shall God destroy; for the temple of God is holy, which temple you are." In the face of this solemn fact, the Christian most surely cannot let the selection of the articles of his diet hinge upon mere taste, inclination, and convenience.

It is important to observe in the last paragraph that of the four reasons presented for not eating clean meat, the first three, the most important of the four, are hardly capable of scientific proof or disproof. They must be accepted through processes of reason and faith. For that reason verbal blasts against meat eating delivered before a mixed multitude are definitely questionable. Often more harm is done in driving interested individuals away from a further study of the truths of God's Word than good is accomplished by such procedure. The omission of flesh from the diet comes as the result of advanced study into the requirements of God for His worshipers. It is one of those developmental marks which will be seen in believers as they rise continually upon higher planes of Christian living.

"Among those who are waiting for the coming of the Lord, meat eating will eventually be done away; flesh will cease to form a part of their diet. We should ever keep this end in view, and endeavor to work steadily toward it." [11]

23. A Fair Consideration of Man's Diet for Today

The question, "What is the proper diet for man?" is one that cannot be answered by science until the study of one of our younger sciences, that of nutrition, is quite complete. As it relates to human beings, nutrition is a study that does not lend itself too easily to laboratory conditions. First of all, no harmful experimentation is done upon human beings. Second, scientific observations relating to human nutrition is expensive in both time and money. Third, the answers come slowly because the period of growth and life cycle is long. Suppose a biochemist should set out to determine directly the effect of a fixed level of a certain type of protein upon the life cycle of human beings for six successive generations. To do so, unless his work is financed in such a way that other scientists could continue the research he started, he would have to depend upon his son and grandson to continue his work. Historians might later note that a brilliant study in nutrition was begun but not completed because the son became a literary scholar, and the grandson did not continue his education beyond the elementary grades. Even though direct and conclusive evidence in nutritional science is rare, still there is much to be learned through indirect methods, short studies on human beings, animal experimentation, case histories, and observation.

Commanding worldwide interest today is the problem of the efficiency of the vegetarian diet. It has always been used and advocated by a few; but by the most it is considered a diet that is faddish, uninteresting, and debilitating. On close analysis, it is quite evident that the vegetarian diet as used consistently through the ages by vegetarians is not a fad. A diet that does not include flesh meats has been used consistently by a minority who have lived useful and long lives. A fad is a current interest adopted quickly by many, spreading in epidemic fashion, and then as the wave of interest levels down is as quickly dropped. Disinterest in food cannot be assigned to vegetarians. As long as meals are eaten with relish and satisfaction, the diet cannot be uninteresting to the eater. Doubtless the arctic Eskimo and the Californian would both label each other's lunch "uninteresting" if they should mutually agree to exchange their meals of blubber and raw viseral organs, and of salad, sandwiches, fresh orange juice, and pie, respectively. But whether or not the vegetarian diet is debilitating-or any other diet for that matter-is a question that is receiving the interest and thought of our best nutritional workers today. The question might better be asked, "Which type of diet will ensure the best growth and development of the young, and the longest period of active physical and mental life for the mature, with the greatest freedom from disease and degeneration?"

In the countries where food is plentiful all nutritionists and many lay people would like to know the exact answer to this question. In countries where there is not enough food to nourish its peoples the answer to the question becomes still more vital. Because plant foods can be produced less expensively than animal foods, the whole world is honestly interested in the efficiency of the all vegetable diet. If the available plant food can be used directly to nourish man, much food can be saved, because the farmer must

burn up 75 to 97 per cent of his food grain to support the stock in their life processes in order to produce a small residue of roast beef, pork, or mutton. [1] And although these figures were determined when nutritional science was young, and have not been verified for many decades, they have never received the notice and concern of economists that they are receiving today, when a world food shortage is an imminent reality.

The creationist can logically reason that the fruits, grains, and nuts were correct foods for man in his sinless condition. They were suited to the upkeep of the human body that knew no degeneration and death. Either God instructed man how much and what proportions of these foods he was to take, or else man's wisdom and unspoiled appetite were then a perfect guide to his eating habits. Since the fall of man death is his portion, and food has become a weapon of ever increasing value with which man has tried to stay death off. A man knows that he has but a few days without food, so it seems right that he can hope to use this necessity to prolong life and to decrease disease and deterioration.

For a scientific approach in an attempt to find the best type of diet we can turn to the recommendations that we now have for the food requirement of man. The Food and Nutrition Board of the National Research Council, Washington, DC, [2] has pooled reliable research findings and dietary observations in order to recommend certain dietary standards for the various ages and conditions of men, women, and children. Although these standards have received much study and some criticism, they stand today as our guide in planning dietaries. By using this standard as a guide, the possibilities of different types of diets can be evaluated.

The greatest question regarding the vegetarian diet is whether it can give enough of the right kind of protein. Impartial calculation shows that it is possible to obtain enough protein on a strictly vegetarian diet and that the protein can be of a very high biologic value. This standard, "biologic value," indicates the nutritional usefulness of a protein. [3] But as McCollum says, in speaking of strict vegetarianism, which would allow the use of no animal products such as milk and eggs, "if strictly adhered to, is fraught with grave danger unless the diet is planned by one who has extensive and exact knowledge of the special properties of the various foodstuffs employed." [4]

As compared with animal food sources, the proteins of plant foods are less concentrated and are of lower biologic value. Added to this, one may conjecture that the human body is not so efficient as it was in its perfect condition, and that the catabolic, or tearing down, processes of the body have become more rapid. If together these reasons make animal proteins seem necessary additions to the fruit-grain-nut-vegetable diet given to man, it is still not necessary to turn to the use of flesh foods.

Animal food products, as milk and eggs, that were intended for the nourishment of the young animal, yield many important nutrients, some of which are proteins of the very highest biologic value. Over and over again experimentation shows that there are no other proteins so efficient as these. The vegetarian diet that is most commonly endorsed today is, exactly speaking, a lacto-ovo-vegetarian diet; a diet that lends itself easily to filling all the dietary requirements recommended by the National Research Council. In fact, the common American diet which includes liberal amounts of meat but excludes milk as a beverage because of a fondness for coffee and tea is much more difficult to bring up to our dietary standards in all respects than is the lacto-ovo-vegetarian diet.

After the protein requirements are filled in quantity, good nutrition cannot be maintained without the right quality of proteins. Certain proteins are "complete," or of "very high biologic value." These terms mean that proteins of such description are capable of maintaining life and supporting growth to its fullest extent. Other proteins, although they can maintain life, cannot give the young life all the necessary growth materials.

A third class of proteins can neither maintain life nor support growth by themselves. These are the "incomplete" proteins, or proteins of "low biologic value." All three types of protein can be used by the body in keeping up its general nutrition; but many nutritionists agree that to be safe, the human body should receive two thirds of its protein requirement in the form of complete proteins when growth must be considered. This rule would hold during childhood, adolescence, pregnancy, lactation, during periods of muscle development, and after wasting illness. The mature body, in order to supply proper materials for body upkeep, should have at least one third of its protein supplied from complete proteins.

It is no more difficult to supply complete proteins on the lacto-ovo-vegetarian diet than it is on the common meat diet. A man who includes in his daily diet three cups of milk, one egg, a very small serving of cottage cheese or other concentrated milk product, or one serving of a legume, or nuts, or a gluten dish, will with the bread, cereals, vegetables, and fruits eaten during the day easily reach the seventy grams of protein he should have each day. Of these seventy grams of protein, at least forty grams will be proteins

that are of the highest biologic value. A woman's need for sixty grams will be met on slightly lesser amounts of the same foods.

The protein requirement in grams is even greater for adolescent boys and girls and for the pregnant and lactating woman. Would it not be necessary to add meat to their diets? Meat would increase the protein intake, and it is of high biologic value. If meat should be added to increase the protein of this dietary, the diet would still be deficient in calcium, for the relative demand for calcium during these periods of rapid growth and development is even greater than that of protein. Milk and certain milk products are the only excellent and reliable sources of calcium. Calcium is poorly absorbed from most foods. Milk is the one food that has calcium in the amount and the form that can be depended upon for human nutrition.

So, although the diet is adjusted to take care of the much increased calcium requirement for growth by giving the necessary milk to meet this demand, the somewhat higher protein requirements are automatically reached. Little children who need much protein in proportion to size also need much calcium. The lacto-ovo-vegetarian diet is again very well suited to their needs. Both calcium and protein requirements are easily met with such a diet.

Criticism is often made that the liberal vegetarian diet cannot furnish enough vitamins, especially the B complex vitamins. It is refinement of food, especially the cereals, that is largely responsible for the lack of the B vitamins in any diet. Whole-grain foods in any good diet will usually assure the needed B vitamins. Milk, as well as certain meats, is another outstanding source of this group of vitamins.

It is difficult to meet the criticism that vegetarians are weak, anemic, have a low basal energy metabolism rate, and lack stamina. Only extensive scientific investigation would produce enough data to present proof as basis for the criticism or proof to disprove the criticism. The vegetarian diet is often the satisfactory dietary haven for the food faddist, and in turn the food faddist seldom eats a balanced diet. Evidence of poor nutrition can often be observed in any of the various sorts of food faddists; and if he is a vegetarian, he gives to many people rapid and conclusive testimony against the general type of dietary he has adopted as a means to attract public attention. Nutritional studies in which all extraneous variables are controlled, that have used as subjects normally nourished people on various types of diets, do not show any measurable differences regarding strength, blood condition, and basal energy metabolism rates. Either there are no differences or else it will require larger studies to show up small differences.

Basically, meat as food is generally liked. Most people want it above all foods, and would miss it almost beyond tolerance should they not be able to get it. Furthermore, meat is a "whole" food; and although not a perfect single food for man, it will support life and growth over long periods. It is an easy food upon which to subsist. When plenty of meat is available the race can continue over generations with a minimum of nutritional knowledge. So one would expect that only a few would care to eat a diet that does not include meat. Only those who enjoy non flesh foods exclusively and those who feel, for sentimental or religious reasons, that they do not care to rely upon the slaughter of animals for their food would have a natural tendency to live without them. There are also those who feel that God has prepared a dietary program for them that is nutritionally superior to the one allowed Noah as an "emergency" diet, and desire to use that diet in a sensible way so that sound nutritional standards are not violated.

The study of the dietaries of the world quickly proves that strong people have lived and continue to live on diets that are vastly different one from another. The study also shows that diets of a few peoples of the world are poor as evidenced by small stature, poor stamina, short life spans, dietary deficiency diseases, and deformities. There is every reason to believe that a vegetarian diet may be nutritionally poor or it may be good; likewise a meat diet may be poor or may be nutritionally good. The choice is usually a personal one; whether it is a good diet depends upon the availability of the food, the eating habits of the individual, and his nutritional knowledge. Whether an individual grows to his maximum growth and development, maintains a good body, and preserves all his powers to a ripe old age depends upon many factors, of which diet is probably the most important.

Were it possible to give various long-time tests directly upon human beings, we have many reasons to believe the lacto-ovo-vegetarian diet would prove to be an excellent one, and the one best fitted to human needs and to the economic condition of a large area of our world.

24. The Balance in Nature

When God equipped our earth with its materials, with its natural laws and processes, and with its living organisms, He did not establish a system which was intended to be short-lived. He formed our earth

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with the purpose and with the possibility that it continue throughout eternity in its harmonious original state.

Instead of electing to accomplish the phenomena which constitute the lives of plants and animals in mysterious ways which man could not study or understand, God chose to sustain His creation through natural laws. These natural processes are amenable to laboratory proof, and therefore challenge man to careful investigation because they are capable of being understood. As the student of nature studies the operation of these natural laws in the lives of plants and animals, he is literally thinking the thoughts of God after Him.

It would appear that important aids in maintaining the balance in nature existed in the three vitally necessary cycles which we call the oxygen cycle, the carbon cycle, and the nitrogen cycle. The oxygen cycle, which occurs in connection with the manufacture of food by the green plant, consists of the taking in by the plant of the gas, carbon dioxide, which animals exhale, and the giving off of oxygen. Thus, ever since creation the green plant has been pouring out into the air the all-important oxygen which the animal must have in its cellular respiration. In the animal the oxygen unites with food materials to release energy for the use of animal tissues. Carbon dioxide is one of the end products that is returned to the air to be taken up by the plant, and thus it starts around the circle again.

The carbon cycle depends in part upon food manufactured by the green plant. In this cycle carbon dioxide from the air and water from the soil, in the presence of a green pigment in the leaf, are combined with light energy to form simple sugar. The animal eats this energy food in various plant products, and, by its oxidation in its tissue cells, receives the free energy by which its gland cells secrete, its muscle cells contract, and its nerve cells transmit impulses. The animal exhales carbon dioxide and water, which are again taken up by the plant, and the cycle continues its function.

In the nitrogen cycle the green plant combines the sugar it has manufactured, with nitrogen compounds absorbed from the soil, and builds molecules of amino acids, which are in turn built into plant proteins. The animal eats these proteins, hydrolizes them into amino acids again, and then builds these into its own brand of protoplasm. The processes of living continually break a portion of this living substance down into simpler nitrogen compounds, which leave the animal body as wastes. These wastes supply the nitrates used by the plants in building more amino acids. This ceaseless round of nitrogen compounds has furnished the building materials from which the individuals of all past and present time have been erected.

God maintains His world of living things by natural means. And "since first the flight of years began" about fourteen of the ninety-odd elements which make up the dust of the earth have appeared again and again in the bodies of succeeding individuals. These three cycles could have kept a deathless Eden, deathless with regard to animal life, going throughout eternity with no necessity of creation of new materials. The immediate supply of energy used in the functioning of these cycles comes directly or indirectly from the sun; the sun receives its energy in turn directly or indirectly from the Great Sustainer.

Before the day in which man disobeyed God and sold this earth, his kingdom, to Satan, the protection of God so completely enveloped the globe that Satan could do nothing to mar the harmony which existed among the living forms below man. His field of activity was confined to the psychic realm; hence man was the only organism subject to his harmful influence, and that influence could be felt only in the realm of his mind. However, when that terrible moment arrived in which man sold out to Satan, while Satan defiantly boasted that he could operate the universe in a wiser way than God could-in that day God, with characteristic long-suffering and with consummate fairness, gave Satan an opportunity to prove his claims. As a result of man's feeling of self-sufficiency, which led to his disloyalty to God, this earth became the battleground of the universe, where the forces of light and of darkness were to demonstrate beyond the shadow of a doubt which was best suited to maintain a joyous universe.

Man's new master soon revealed that he did not have man's best interests at heart. Because of his influence the first child born on earth grew to become a murderer and the second died a martyr. But God never left this earth to Satan's complete control. He had created man in love, and in love He shielded this willful son and tempered the cruel blasts of the enemy to whom man had sold himself.

Limitation of the power of Satan is revealed in the fact that he cannot create, or give life. But as soon as Satan gained access to this earth through the fall of man, he began at once to make his influence felt through his manipulation of natural forces. Man could use the natural processes and forces; so could Satan. And he bent every energy and cunning art to accomplish the deterioration and spoiling of nature.

Some hold that because God told Adam that as a result of his sin the ground was cursed and that "thorns also and thistles shall it bring forth to thee" (Genesis 3:18), God is the author of thorns and thistles. But it appears that such was not the true case. Rather, it appears that the first curse upon the earth, that for

Adam's sake, consisted of God's granting certain liberties to Satan's destructive ambitions. A second curse fell upon the ground for Cain's sake, and was accomplished through the extension by God of further liberty to Satan in spoiling the earth.

That Satan, not God, was responsible for the effects of the curse is a fact discussed clearly in the following statements:

"He [God] never made a thorn, a thistle, or a tare. These are Satan's work, the result of degeneration, introduced by him among the precious things." [1] "Not one noxious plant was placed in the Lord's great garden, but after Adam and Eve sinned, poisonous herbs sprang up. In the parable of the sower the question was asked the Master, 'Did not thou sow good seed in thy field? How then hath it tares?' The Master answered, 'An enemy hath done this.' All tares are sown by the evil one. Every noxious herb is of his sowing, and by his ingenious methods of amalgamation he has corrupted the earth with tares." [2]

These statements correctly portray Satan as the author of all deterioration, and he has accomplished it through the wrong use of natural processes. As in the case of Job, Satan works in nature only as God grants him permission. In Job's case Satan used erring human beings, lightning, wind, and finally, with Job personally, boil-producing bacteria and a wife given to discouragement. He is always limited to natural laws and processes, but his complete knowledge of the laws of nature enables him to manipulate things in such a way as to produce great deterioration and change from the original pattern.

True, as we behold the peaceful scene of plain or mountain valley under the magic spell of evening, we see an appearance of harmony that is almost Edenic. But the student of nature knows only too well that beneath that veil of peace the grim struggle of fang and claw is being waged. Where plants originally grew harmoniously together, as in a well-arranged garden, many forms now encroach upon and crowd out other more desirable forms. Where reproduction in animals was originally well ordered and under restraint, now abnormally prolific strains have appeared which threaten to eat up every green thing.

One biologist has estimated that the rate of reproduction in the little plant aphids alone is so great that if no balancing agents were present, the descendants from one aphid in the spring would have a bulk by August equal to the volume of all human beings in the United States and that is a most conservative estimate. The grass, the herb, the shrub, and the tree are being devoured and often laid low through unceasing activity of innumerable weaker animals. The reproduction of new individuals is occurring at fabulous rates, with the resulting deadly struggle for a place in the sun. Overproduction of individuals terminates in epidemics and scourges of numerous sorts.

I once reached out of my kitchen window and picked a cocoon of the large cecropia moth. In it was a dead cecropia larva. Inside the dried larval skin were several puparia of a tachinid fly, the destroyer of the moth larva. But these also were dead. On opening them I found inside each several living pupa cases of a chalcid fly. One wonders how any organism can escape the almost certain annihilation which ever hovers so near. Although the universe was formed and is being sustained by a God of love, we find that in our small corner the god of hate has too frequently all but obliterated the evidences of love. It is very possible that the student of nature will not infrequently have the hasty question wrung from him, "Where is the God of love?"

But we must not lose sight of the fact that the earth does not merely present a picture of gradually increasing and unrestrained activity of Satan. For example, where Satan increased the reproductive capacity of an insect with the evident intent of destroying vegetation, the Creator adapted certain birds and insects to act as balances. The birds began to eat the insect and even to show a preference for it; and other insects, such as certain chalcid flies, tachina flies, and ichneumon wasps, began to prefer it as a host. Each balance is controlled in turn by other factors. All nature is in this state of dynamic balance. No one organism increases for any length of time, because it is eventually brought under control by other organisms which prey upon it. These in turn are held in check by others, and on and on almost ad infinitum.

In this way Satan's changes have been continually checkmated through adaptation of other forms by the Creator. The Creator has interfered only where necessary to keep destructive forces from operating too rapidly and too violently. The biological world is filled with illustrations of this conflict being waged between Christ and Satan. It is not a conflict in which the contestants are equally matched, for in this contest the One is eternal and all-powerful, and the other is merely a being created by the former, who rebelled against his Creator and who lives moment by moment by the power of his Creator, and who performs his acts only to the extent that power is extended to him and only so far as he is granted permission. In the natural world God chooses to contend with Satan in natural ways. To illustrate this again: Satan developed poisonous alkaloids in plants, such as morphine, quinine, caffeine, and strychnine, but God revealed to man how these substances can be used in some ways to counteract Satan's destructive

acts.

A knowledge of this dynamic balance in nature fortifies the confidence of man in the providence and care of God. He sees the workings of an all-wise and all-powerful Being who permits disobedience to demonstrate its insufficiency and futility, but who cares for His own while that demonstration is in progress, and makes life for His worshipers still sweet though they be living in the closing hours of a fearfully marred and deranged world.

In the evidences of an omnipotent Hand which maintains an equilibrium in nature irrespective of the accomplishments of a mighty destroyer, man already tastes the fruition of his longings for that day when all traces of the destroyer will have vanished from the face of a renewed nature. "Though sin has marred the form and beauty of the things of nature, though on them may be seen traces of the work of the prince of the power of the air, yet they still speak of God. In the briars, the thistles, the thorns, the tares, we may read the law of condemnation. But from the beauty of natural things, and from their wonderful adaptation to our needs and our happiness, we may learn that God still loves us, that His mercy is yet manifested to the world." [3]

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