SCIENCE AND THE BIBLE

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SCIENCE AND THE BIBLE I

The History of Science - From the Primitives to Newton

Since the beginning of time, there has been a connection between the way man thought about God, the way man thought about nature, and the way man thought about himself. Science and religion have therefore always been closely connected. In fact, it is only our own materialistic age that has conceived of the possibility of separating science from religion, and that has occurred simply because science has *become* the religion of our time for many. If we are to understand the relationship between science and the Bible, we must therefore trace at least briefly the history of the relationship between scientific and religious thought.

THE PRE-SCIENTIFIC AGE

The pre-scientific age is known as such, not because men made no observations or drew no conclusions about their environment, but because those conclusions involved no generalizations on the observations that had been made. The mathematics of the Egyptians and Babylonians was used to accomplish amazing things such as the pyramids, but it was purely practical rather than theoretical in nature. Men could use triangles to measure the pyramids, but they knew nothing about the properties of triangles *as triangles*. Science can only exist when men generalize upon their observations - induction is at the heart of science, and until men learned to think inductively, there could be no science as we know it.

We should also note that the pre-scientific era was one in which men clearly recognized the close relationship that exists between God and the world. In fact, most of the explanations given for natural phenomena involved certain supernatural components. There was little need to seek explanations for what happened when everything was ascribed to the power of the gods. The clarity with which the Bible speaks of the involvement of God in nature is characteristic of, and at the same time vastly nobler than, the typical thought of this era.

ANCIENT GREECE

The major contribution of the Greeks to scientific thought was the concept of generalization. They made a real effort to draw general conclusions about how things worked, though their conclusions were often wildly off-target. When Thales concluded that everything was water, you could understand where he got his idea. There is also some value in Pythagoras' assertion that everything can be reduced to numbers; he certainly laid the groundwork for the deterministic scientists of the Enlightenment. The major philosophers among the Greeks tended to inhibit scientific development rather than furthering it, however.

Socrates rejected the study of nature altogether as being irrelevant, while his pupil Plato saw in the world nothing more than a pale reflection of the eternal world of Ideas, which was the only true reality. Aristotle, on the other hand, had a genuine respect for the world of nature, but approached it in a way that did not in the long run stimulate science. His approach to truth was primarily deductive - the logical syllogism that drew certain conclusions from accepted premises by means of airtight reasoning. Such an approach to understanding nature simply does not require

experimentation. After all, if the basic premises are correct and the logic is airtight, why should the conclusions need testing?

Such an approach works nicely, of course, except when the basic assumptions upon which the deductions are based are themselves flawed. Two examples of such faulty assumptions common in the ancient world were the belief that motion on earth is qualitatively different from motion in the heavens, and that the natural, fundamental form of motion in the heavens is motion in a circle. Aristotle, and the Egyptian astronomer Ptolemy after him, had taught that the heavens are naturally in motion (circular, of course, revolving about the earth), while in the earthly realm, objects are naturally at rest. All motion on earth therefore had to be explained by the continuous exertion of forces of some kind, while the movements of planets in the heavens always had to be explained in terms of the constant motion of transparent spheres upon which the planets and stars were believed to be mounted. The more observations people made, the more complicated the explanations became, but no one thought to question the basic assumptions.

THE MEDIEVAL CONSENSUS

There are two common misunderstandings people frequently have about the science of the Middle Ages. The first is that there was none. Most scientific knowledge was lost during the so-called Dark Ages, but many classical texts were reintroduced to Western Europe as a result of the Crusades. While it is true that Europeans in the Middle Ages had little interest in experimentation, they did spend quite a bit of time thinking about the world around them. That thinking, however, was guided by two basic principles - authority and deduction. The philosophers of the ancient world, particularly Plato and Aristotle, had provided a way of thinking about the created universe. Few men in the Middle Ages thought to challenge that way of thinking. When they did make observations of the natural world, those observations were always interpreted in the light of the basic framework provided by the philosophers of the classical era, whose authority was unquestioned. With the rise of Scholasticism, the logic of Aristotle gained special prominence in Western Europe. Thomas Aquinas had used Aristotle's principles of logic to expound in great detail a system of Christian theology, and the church's acceptance of Aquinas' work meant also an acceptance of the logic of Aristotle.

The second common misunderstanding about science in the Middle Ages is that there was very little disagreement among thinkers in the medieval era. This was true neither in the realm of theology nor in that of science. The disagreements, however, centered around competing explanations that were rooted in the same fundamental assumptions about the nature of reality. Medieval men differed in their understanding of science, but their differences were about conclusions, not presuppositions.

THE SCIENTIFIC REVOLUTION

The Italian Renaissance did not produce much of a change in the medieval pattern at first. The Renaissance was initially a conservative movement in the sense that it was an attempt to get back to the ancient texts and classical writings of the Greek and Roman era and reproduce and interpret them with greater fidelity. The great Polish astronomer Nicholas Copernicus (1473-1543) fits precisely this pattern. He really was not an innovator, though his work had revolutionary results.

Copernicus accepted without question the astronomical observations made by Ptolemy and added a few of his own to them. He applied to those observations the medieval philosophical doctrine of simplicity, namely, that a simple explanation of any event is naturally superior to a complicated one (known as Ockham's Razor). By the time of Copernicus, the accepted explanation of planetary motion had become complicated indeed. In order to explain the motion of the planets, which from the perspective of the earth is quite irregular, on the basis of solid transparent spheres, astronomers had been forced to introduce dozens of extra spheres, some of which were mounted a bit off-center, and other smaller ones that rolled around the outside of larger spheres. Copernicus discovered that the calculations for these odd spheres all had something in common - they all depended in one way or another on the "motion" of the sun. This led him to suspect that an alternative explanation might be a lot simpler, and indeed he found that, if he placed the sun at the center of the planetary system, the need for all those extra spheres suddenly disappeared. While his system did have some bugs in it, it also had the virtue of simplicity. Though some within the Catholic Church apparently supported his work, Copernicus had the good sense to have his findings published posthumously. Not surprisingly, they quickly appeared on the Index, where they remained for hundreds of years. While Luther, who was a contemporary of Copernicus, thought the heliocentric theory to be so much hogwash and in his inimitable way referred to the Polish scientist as "the fool who would overturn the whole science of astronomy," he never suggested that Copernicus be burned at the stake or that his works be banned.

The Renaissance only became a threat to the Catholic Church and a stimulus to scientific development when scientists started challenging those cherished medieval assumptions about the nature of the universe. In the same way that the Renaissance had helped to stimulate the Reformation by encouraging people to think for themselves about the Bible, it contributed to the growth of science by opening up the world of nature to new ways of thinking. Not surprisingly, the Protestant countries of Europe tended to be open to this new kind of thinking about nature, while the Catholic countries opposed the new science almost as much as they opposed the new Christian churches of the Reformation. Galileo was persecuted in Italy, while Isaac Newton was knighted in England.

Another aspect of Protestantism that tended to encourage scientific inquiry was the emphasis, especially among Calvinists, on the Cultural Mandate (Genesis 1:28). The Reformed churches taught that, in the same way that the Church was to conform completely to the teachings of Scripture, the Christian was to bring every aspect of society under submission to the Kingdom of God. Thus no human endeavor could rightly be viewed as secular, since everything was to be done to the glory of God. Men thus turned their attention to gaining dominion over the natural world. Science was not a threat to the Church, but a way of bringing the world under subjection to God.

Perhaps the greatest examples of the typical Protestant approach to science are Isaac Newton, who revolutionized physics and mathematics, and Robert Boyle, the Irish chemist. Both men were devout Christians (though Newton was by all accounts a rather disagreeable man personally, and his theology was anything but orthodox), and spent much of their later lives writing devotional literature (Boyle) and Bible commentaries (Newton). They viewed their pursuit of science as an effort on their part to know God better through gaining a better understanding of the world He made. Newton's numerous contributions included the law of gravitation, the three laws of motion, discoveries in

optics, and the invention of calculus, while Boyle is best known for Boyle's Law, which describes the behavior of a gas exposed to changes in pressure or volume.

In what ways, then, did the new scientific thinking challenge the medieval consensus? What was this new way of thinking that the Catholic Church considered to be such a threat? In order to see how people's thinking was reoriented by the scientific revolution, we need go no further than the four basic rules of reasoning outlined by Isaac Newton in his *Principia Mathematica*.

The first principle states that "we are to admit no more causes of natural things than such as are both true and sufficient to explain their appearance." This is no more than a restatement of the notion of simplicity that had stimulated the thinking of Copernicus, yet it has revolutionary implications. Specifically, the doctrine of simplicity states that if a natural explanation for a natural phenomenon exists, then a supernatural explanation is not required. Many of the events that had been explained supernaturally in the Middle Ages no longer required the intervention of God, angels, or demons. The supernatural seemed in danger of shrinking into a corner in the face of ever-expanding knowledge of the natural world. As we will see, this kind of thinking proved to be, not only a threat to the authority of the Catholic Church, but also a stimulus to the eventual exaltation of science itself to a position formerly occupied by God in the minds of many.

Newton's second principle was that, "to the same natural effects we must, as far as possible, assign the same natural causes." Newton succeeded in doing what Copernicus and Galileo had been unable to do. Copernicus proposed the heliocentric theory with no thought of questioning the medieval notion of the uniqueness of the earth in the universal scheme of things. Galileo suspected that earthly and heavenly motion could be explained in the same way, but was unable to formulate such an explanation mathematically. Newton's law of universal gravitation, however, tied together in mathematical form the motion of the planets in space and the behavior of an apple as it falls from a tree on earth. The medieval belief in the uniqueness of the earth was dead. [NOTE: Newton also successfully challenged the medieval notion that circular motion was "natural." His laws of motion stated that the fundamental natural motion was motion in a straight line at constant velocity.]

The third principle outlined by Newton states that, "the qualities . . . which are found to belong to all bodies within the reach of our experiments, are to be esteemed the universal qualities of all bodies . . . ." In other words, observations may be extrapolated and applied to other phenomena outside the reach of experimentation. Behind this principle is the assumption that we live in an orderly universe, and that this universe is susceptible to explanation. The fact that this is God's world means that it *can* be understood, not that man is presumptuous to attempt to probe into divine mysteries.

Finally, Newton asserted that "we are to look upon propositions collected by general induction from phenomena as accurately or very nearly true, notwithstanding any contrary hypotheses that may be imagined, till such time as other phenomena occur, by which they may be made more accurate, or liable to exceptions." Newton here alludes to the scientific method previously proposed by Francis Bacon, by which scientific hypotheses are formed through observation and experimentation. Newton goes on to argue that the only effective way to challenge a scientific theory is to provide evidence to the contrary. The experimental evidence, then, becomes the final arbiter of scientific truth. While Newton, as mentioned above, saw this principle as leading

to a deeper understanding of God through the study of His world, later scientists used the same principle to rule out biblical authority altogether, arguing that the teachings of Scripture were to be given no weight whatsoever unless they could be supported by experimental evidence.

SCIENCE AND THE BIBLE II

The History of Science - From Deism to Indeterminism

THE TRIUMPH OF SCIENTISM

While Newton saw science as opening the door wide for a deeper human understanding of God and His ways, later scientists used Newton's work to shove God out that same door and slam it in His face. Science became scientism when it arrogated to itself the role of final arbiter of truth. To understand how that came to pass, we need to look at the contributions to scientific thought made by the French mathematician Rene Descartes and the English Deists.

Descartes was educated in a Jesuit school, but was monumentally bored by his educational experience and considered that his professors had been able to teach him little of value. The constant appeal to authority by his Jesuit teachers frustrated him no end. He finally decided that the only way to come to any certain knowledge was to tear down everything and start from the beginning. Descartes therefore resolved to doubt everything that could reasonably be doubted and rebuild a rational system of belief from what was left. He quickly found that it is relatively easy to doubt almost anything if one puts one's mind to it. He could easily doubt the reality of his own perceptions, for instance. How could he be sure he was not at that very moment dreaming? One thing, he concluded, could never be doubted, however, and that was the existence of the person doing the doubting. One could not doubt if he did not exist. Descartes thus reduced his level of certainty to the famous *cogito ergo sum* - "I think, therefore I am!" Starting with his certain knowledge of his own existence, Descartes then proceeded to build upon that foundation. He used the Ontological Argument devised by Anselm to prove the existence of God, and then used the existence of God to prove the general reliability of our sense perceptions. The result of this approach was that Descartes effectively divided human knowledge into two realms - the realm of experience, where the senses reign supreme, and the realm of faith, where God is our only source of knowledge. Unfortunately, there is no real correspondence between the two realms. Faith is every bit as unnecessary in the natural realm as the senses are in the realm of the supernatural. God is thus pushed out the door of the natural world like an unnecessary appendage. While Descartes left the door open, leaving God to reign over that realm that is beyond human experience, many soon began to question the need for such a realm at all. Indeed, some of Descartes' critics, such as the Jansenist Blaise Pascal, suspected that he had included God in his argument largely for the purpose of avoiding the attentions of the Inquisition.

It was the Deists, however, who built upon Newton's foundation an edifice he would have found appalling, and in so doing shut God out of the universe completely. The Deists had argued that Newton had proved the world to be a great machine, capable of being explained entirely in mathematical terms. The fact that scientists could not explain everything mathematically did not mean that everything was not capable of mathematical explanation; it simply meant that the proper formulas had not yet been devised. The Deists maintained that the Bible was no more than a republication of the Book of Nature. Those truths that Descartes relegated to the realm beyond experience were rejected entirely by the Deists as nothing more than the superstitions foisted upon the gullible population by priests seeking to enhance their own power over men. Even religion, they argued, could be derived from nature. Such religion told us that the world had been created by an orderly God who had endowed man with the capacities to determine his own fate. He was to do this

by learning about and controlling his world for the good of himself and others. True religion is thus an attitude of benevolence toward all mankind. Any talk of doctrine is divisive and should be banned for the good of society. Thus the Deists dismissed, in one fell swoop, every major teaching of the Christian religion except for the doctrine of creation - miracles, providence, the Incarnation, the deity of Christ, the resurrection - and left man with a religion that consisted almost solely of ethical principles. Such thinking was supported by the voyages of discovery, which gave many Europeans a new awareness of non-Christian cultures and religions. They came to believe that all religions had a core of ethical behavior in common and, once stripped of all doctrinal peculiarities, would correspond to the universal religion of nature proposed by the Deists.

Science thus shifted, in the century following Newton, from being the handmaiden of theology to becoming the replacement for theology. Any knowledge that did not come by way of science was not worth having, nor was it worthy of the name of knowledge. Such an attitude, of course, has dominated the thinking of many down to our own day. In the same way that the theologians of the sixteenth century often scoffed at science as irrelevant nonsense, the scientists of the twenty-first century frequently dismiss religion out of hand.

THE DARWINIAN REVOLUTION

The worst was still to come, of course. If Newton had undermined the medieval belief in the uniqueness of the earth by showing that the same natural laws were in operation throughout the universe, there remained, even in the eyes of the Deists, one thing that could not be denied, and that was the uniqueness of man. The Deists may have been ready to banish God from the contemporary world, but they continued to cling to God as Creator, both to explain the orderliness of the universe and to support their belief in the dignity of man as God's greatest creation. All of that changed, however, with the coming of Charles Darwin (1809-1882).

Somewhat ironically, Darwin had as a young man aspired to a career in the church, but he was deflected from his purpose by his interest in the natural world. The turning point was an invitation to accompany a ship called the *Beagle* in a voyage around the tip of South America; on this voyage Darwin served as volunteer naturalist. A man with a keen eye for observation, Darwin kept voluminous records of bird, animal, and plant life, as well as fossil remains encountered by the company. He was most interested in the peculiar life forms found to exist in the Galapagos Islands in the Pacific Ocean off the coast of Ecuador. His observations became the basis for a theory of organic evolution expounded in his two major works, *The Origin of Species* and *The Descent of Man*. In these, he argued that complex organisms, including man, had developed from simpler life forms over millions of years by means of gradual adaptation and genetic variation. Those variants better suited to their environment had survived to reproduce and pass on their characteristics. By these means, the variety of living beings on the face of the earth had developed from primitive organisms in the planet's distant past.

Such a blatant denial of biblical teaching was quickly rejected by most churches in the nineteenth century, though some of the more liberal church bodies soon adapted their teaching to the new science. The world at large, however, embraced Darwin's theory enthusiastically. The nineteenth century was an era when belief in the inevitability of progress and the perfectibility of man dominated the popular mind. The popular revolutions in the middle of the century had brought

a measure of liberty to many who had never known it before, and Europe had been spared major wars of any consequence since the Napoleonic Wars of the early eighteen hundreds. The optimists now had scientific evidence to support their optimism. Man, the pinnacle of evolution, was himself destined to advance to ever greater heights.

Darwin's theory thus had a marked influence on areas of human thought only tangentially related to biology. A group of people called Social Darwinists justified European imperialism by citing Darwin's doctrine of the survival of the fittest. Adaptation to and domination of the environment had allowed European civilization to advance, and therefore it either had the right to dominate the clearly "backward" cultures of Asia, Africa, and the Americas, or had the duty to bring those peoples into the glorious light of Western civilization. Some even argued for social policies at home that would allow the unfit to die out through "benign" neglect. Aid for the poor would only allow them to survive and multiply. This is clearly against nature. For the good of the nation, social policy should be directed toward encouraging the fit, not the unfit. Similarly, Karl Marx argued that the evolution of society was determined by economic factors to follow a certain inevitable progression. Though progress would require conflict and even bloody revolution, the end result would be a classless society where all were equal.

A few men in the nineteenth century realized, however, that Darwin's theory of evolution did not necessarily imply an optimistic view of human history in which everything inevitably progressed onward to a peaceful and prosperous future. German philosopher Friedrich Nietzsche understood the implications of Darwin's theory better than most men of his age. He realized that, if man is not a unique organism, but an animal like all other animals, then the entire Judeo-Christian ethical system is a fraud. If only the fittest survive, then the only fundamental determiner of right is power. Nietzsche even went so far as to advocate the creation of a super race - a suggestion later implemented by a German madman named Adolf Hitler.

Though few have cared to follow the implications of evolutionary theory in the direction taken by Nietzsche, contemporary evolutionists have in general lost their optimism. The perfectibility of man is no longer taken seriously, nor do men believe in the inevitability of human progress. The horrible wars of the twentieth century demonstrated that optimism is unwarranted, and many have even begun to question the kind of "progress" that destroys the natural environment for the sake of human consumption. Many evolutionists have become pessimists, seeing the entire process as at best pointless, having no meaning, and at worst a cruel joke perpetrated on the human race by a mindless, faceless Mother Nature.

THE CRUMBLING FOUNDATIONS

The optimism about man and society encouraged by Darwin's work in biology was being echoed by the physicists of the era. Ever since Newton had shown that natural phenomena could be reduced to universally applicable mathematical equations, physicists and chemists had been busy describing one discipline after another in mathematical terms, from astronomy to mechanics to light to electricity to magnetism. Their success had been such that some reluctantly concluded toward the end of the nineteenth century that the science of physics had almost completed its work. All the major discoveries had been made, all the fundamental questions had been answered, so that all that remained was technology - finding new ways to put this knowledge to use. Some even suggested

that the mathematics of the universe might someday be fine-tuned to the extent that a man equipped with all the necessary data could predict infallibly the entire course of human history that lay ahead.

It was technology, however, that soon led to the overthrow of any such pretensions to completeness. Improved instruments allowed scientists to observe in greater detail than ever before the movements of the heavenly bodies and the elementary building blocks of matter. In both realms, the very small and the very large and distant, disturbing new observations appeared that brought into question the foundation of all physics - Newton's laws, the formulas that were believed to describe all motion, both celestial and terrestrial.

One man who realized that Newton's laws were applicable only within certain frames of reference, and who first devised a theory that accurately predicted the forms of behavior observed by scientists in contradiction to Newton's laws, was a German scientist named Albert Einstein. His theory of relativity destroyed the popular notion of a universe where space and time were constants. Later scientists who worked in the field of quantum mechanics demonstrated that all scientific measurements must involve a certain degree of uncertainty, since the very act of measurement alters the behavior that is being measured. Furthermore, scientists found that the most fundamental behavior of matter - the movement of electrons, for instance - could only be described in terms of probability. Some theorists today are suggesting that some things, such as weather patterns and earthquakes, by their very nature are incapable of prediction, and that we must recognize that chaos is at the very heart of certain natural phenomena. Thus the twentieth century, with its recognition of indeterminism and the limitations of science, brought an end to the pride that characterized much of scientific inquiry in the years that preceded (or at least should have done so).

People who had learned to throw off the superstitions of religion for the certainties of science have responded to this development in a number of ways. Some have continued to cling to the outmoded notion that science has all the answers and that only that which can be shown to have scientific validity may be regarded as true. Such an approach smacks of desperation. Having rejected all other alternatives, these people cling to science because it is all they have left.

Others have taken the short-sighted approach of ignoring ultimate issues in favor of concentrating on matters of application. For them, ultimate questions about the meaning of life and the role of man in the universe can be left for others to discuss. They instead occupy themselves with technology, immersing themselves in one narrow field of endeavor and refusing to think about the broader applications of the changes wrought by the crumbling of the foundations.

Many of those who have taken the time to think through the implications of modern science have gazed into the face of an empty universe and have been unable to live with the nothingness they have seen there. They thus leap into mysticism, a modern version of the dualism of Descartes, where the facts of this life are totally divorced from some reality beyond the realm of experience. The growth of Eastern religious groups such as Hare Krishna, the widespread use of Transcendental Meditation, and the recent New Age movement in its various forms are all examples of the flight from reason when the rational foundations of science proved inadequate and the unfilled void was too much to bear.

CONCLUSION

Christians, of course, do not need to focus with tunnel vision on technology or throw themselves into some otherworldly mysticism. Christians realize that science can never provide a total understanding of the world, since it deals only with what is seen. If it is wrong to see science as the key to all knowledge, it is also wrong to divide knowledge into two realms, as Descartes attempted to do. The history of science clearly shows that, when science is left in control of the natural realm, God is soon pushed into an increasingly small portion of reality and quickly becomes redundant.

Instead, the Christian is one who views all knowledge as one. All we know comes from God, whether that knowledge pertains to the natural world that He has both created and given us the senses and minds to perceive and understand, or whether that knowledge has been directly revealed to us through His Word. The Christian thus is able to benefit from science because he puts science in its proper place, as a God-given tool by which God's world may be better understood, but never as a source of ultimate knowledge.

How, then, is a Christian to deal with conflicts between the Bible and science? What about differing views of Creation, the Flood, or the age of the earth? First of all, we must recognize that, because the Bible and the natural world both have the same origin - God - they can never be in conflict with one another. The conflicts come in the interpretation of the Bible and nature. There is always, of course, a temptation to twist either the Bible or science to produce an unnatural harmony between the two. Someone who does that is not being intellectually honest. Others attempt to impose a popular understanding, whether scientific or biblical, and soon find themselves with egg on their faces when that popular interpretation changes. Those who wed themselves to popular interpretations run the risk of going the way of the Catholic Church in the time of Galileo, which went down in history as identifying geocentrism with Christian truth.

In conclusion, the Christian approach must be one of caution. While the Christian may without shame insist loudly on the total reliability of God's Word, he must cultivate humility in recognizing that his own sinful limitations allow for the possibility of misunderstanding the infallible Word. Christians who insist they have all the answers on the relationship of Scripture to the natural world all too often embarrass the cause of Christ. We must combine complete trust in God with a healthy skepticism about our own opinions.

SCIENCE AND THE BIBLE III

The Age of the Earth - Scientific Evidence

Any discussion of the age of the earth from a Christian perspective must take account of both the scientific and biblical data that relate to the issue. From the outset, however, we should note that "young earth" advocates essentially start with the biblical evidence and attempt to fit the scientific data into the framework it provides, while "old earth" advocates normally begin with the scientific data and interpret Scripture accordingly. This week, we will survey the scientific data, which admittedly favors almost exclusively the "old earth" position, and note how "young earth" advocates treat it; next week, we will examine the biblical data, which to a large extent works in the opposite direction.

ASTRONOMICAL EVIDENCE

A. THE SPEED OF LIGHT

Light travels at a speed of about 186,000 miles per second. A light year is thus the distance light travels in a year (somewhere in the neighborhood of six trillion miles). From the data gathered on the distance of the most distant stellar bodies (quasars), the universe is calculated to be at least 10 billion years old. Of course, the method for calculating the distance of these stars is significant. The closest stars are measured by the parallax method (essentially triangulation from a fixed point). These near stars (less than 100 light years away) are then classified according to brightness and chemical composition, the former using a sophisticated type of light meter and the second by spectroscopy. The same calculations are then applied to more distant stars. The chemical composition of these stars is determined by spectroscopic methods, and the brightness is then calculated based on the relationship between composition and brightness in nearby stars. The inverse square law of light intensity is then applied to determine the distance of these stars from the earth.

B. THE EXPANDING UNIVERSE

Everyone is familiar with the change in pitch of a train whistle as it travels past the observer on the tracks. This observed change in pitch is known as the Doppler Effect, and may be calculated according to a known formula. Distant stars emit spectral lines whose frequencies are slightly less than what would be expected from the elements that make up the stars, leading scientists to apply the Doppler Effect formula and conclude that these stars are moving rapidly away from the center of the universe. It is this notion of an expanding universe that provides one of the major pieces of evidence for the Big Bang Theory. Extrapolating backward to a time when the entire universe consisted of one unified mass would give an age for the universe of approximately 15-20 billion years.

C. THE LIFE CYCLES OF STARS

Scientists believe stars go through life cycles, beginning as huge whirling masses of gas, condensing into hot, gaseous bodies inside of which enormous energy is given off through the conversion of hydrogen to helium, finally condensing further into "white dwarfs" or expanding and

cooling into "red giants," then ultimately collapsing into "black holes." Knowledge of the rate of hydrogen-helium conversion within our own sun leads to an estimate for its age of 5-10 billion years.

GEOLOGICAL EVIDENCE

Having moved from the universe to the sun, we now come "down to earth" and look at the evidence for the age of our own planet.

A. RADIOMETRIC EVIDENCE

Radioactive decay rates have been used frequently by scientists in recent years to date everything from fossils and artifacts to meteorites and moon rocks. Radioactive materials are unstable and decay into "daughter elements" randomly, but with a known average half-life. While the carbon 14-nitrogen cycle is perhaps the most well-known because of its use for organic matter, others such as potassium-argon, rubidium-strontium, and uranium-lead also have yielded much data. Using these techniques, moon rocks and meteorites have been dated at about 4.5 billion years old, while various types of rocks from the earth itself have been placed at the somewhat younger age of 3.6 billion years. Any radiometric evidence is rooted in certain assumptions, of course. These assumptions include the idea that the half-life of a radioactive element has remained constant throughout the earth's history, that no catastrophic changes have altered the relative composition of the samples involved, and that no traces of the daughter element were present in the sample at its origin. Needless to say, these assumptions cannot possibly be scientifically verified, but must be accepted by faith.

B. NON-RADIOMETRIC EVIDENCE

While the non-radiometric evidence has not produced the mind-boggling estimates of antiquity derived from the radiometric sources, it nonetheless uniformly points to an earth much older than a few thousand years. Geological evidence of the rate of limestone deposit, the formation of stalagmites and stalactites, the rate of formation of coral reefs, and the rate of cooling of volcanic deposits all point to a history varying from hundreds of thousands to millions of years. Scientists in this field rule out catastrophism on the basis that the known deposits evidence thousands of lengthy cycles of change; in one case, about 200,000 cycles of limestone-anhydrite deposits.

THE FUNDAMENTAL ASSUMPTION OF "OLD EARTH" ADVOCATES

While various secondary assumptions have been enumerated throughout today's study, the underlying assumption of "old earth" advocates is uniformitarianism - the belief that the natural processes observable today may be extrapolated backward in time indefinitely because they have operated continuously at a constant rate throughout the history of the universe. Obviously, this assumption is impossible either to prove or disprove, since no observer was present in the alleged eons prior to human observation.

RESPONSE OF "YOUNG EARTH" ADVOCATES

"Young earth" advocates often find themselves in a peculiar predicament when dealing with the scientific evidence covered today. One obvious response is the negative one: saying that the evidence does not necessarily mean what it seems to mean, and that it is equally compatible with a "young earth" interpretation. Heavy weight is often placed on the Flood to explain much of the terrestrial evidence of stratification and deposits. "Young earth" people also make considerable use of the concept of created age, which states that God created a mature, functioning universe in the same way that He created mature, functioning human beings. Since the first approach is defensive and the second incapable of scientific proof, "young earth" advocates also search diligently for positive scientific evidence to support their hypothesis. One of the most common of such evidences is the rate of decay of the earth's magnetic field. The field is demonstrably weakening, and "young earth" people argue that extrapolation backward would produce an impossibly large magnetic field in the course of a few thousand years. "Old earth" people respond that the past history of the earth indicates, not a steady progression of the magnetic field in one direction, but a cyclical variation encompassing not only increases and decreases, but even switches in polarity. Such debates are fundamentally irrelevant. Those who take a "young earth" position by the very nature of the case cannot argue from scientific evidence, since they have assumed that God created a mature universe. If such is the case, why would there be evidence of relative youth? Did God leave something out?

SCIENCE AND THE BIBLE IV

The Age of the Earth - Interpretations of Genesis 1

We spoke last week about the various types of scientific evidence presented by those who argue that the universe is somewhere in the neighborhood of 15 billion years old, while the earth is about 4.5 billion years old. We noted that the "young earth" argument, by the very nature of the case, lacks direct scientific support because of its necessary presumption of created age. This week we will examine the subject of created age more closely. But first we want to take time to look at some of the leading alternatives developed over the years for the interpretation of the creation account in Genesis 1. The interpretations fall into three general categories: (1) Scripture teaches a young earth, so the scientific evidence must be interpreted in a way that fits that teaching [A below]; (2) Science demonstrates that the earth is very old, so Scripture must be interpreted in a way that fits the scientific evidence [B-D]; (3) Scripture says nothing at all about the age of the earth, so we are free to rely on the scientific evidence with regard to the issue [E-H].

INTERPRETATIONS OF GENESIS 1

A. THE TWENTY-FOUR HOUR DAY THEORY

This one very simply views the days of Genesis 1 as normal 24-hour periods and is clearly the most straightforward approach to the passage. It is supported not only by the repeated assertions of "evening and morning," but also by the reference to the creative week in Exodus 20:11. Interestingly enough, this interpretation is not only supported by many evangelicals, but also by a significant number of liberal scholars, who unfortunately go on to argue that the passage is therefore simply wrong. Obviously, the twenty-four hour day theory completely contradicts all of the evidence discussed last week and requires massive use of the idea of created age. Those who believe that God created the universe in six literal days must also believe that He created it in a mature state. We will discuss the viability of this interpretation at the end of today's class.

B. THE GAP THEORY

The gap theory also asserts a literal creation week, but inserts between the first two verses of Genesis 1 an indeterminately long period of time. Gap theorists believe that verse 2 should be translated to say that "the earth became formless and empty," implying a previous creation that God destroyed. Usually this destruction is connected by gap theorists with the fall from heaven of Satan. Scriptural support is derived from the possibility of translating the verb in question as "became" - possible, yes, but far less likely than the simple "was" - and passages such as Isaiah 45:18 and Jeremiah 4:23. To read into the prophetic passages statements about the early history of the earth is to stretch them far beyond what their contexts permit. In short, the gap theory, while certainly possible, allows for no scriptural support whatever. On the other hand, no positive scriptural evidence may be marshaled against it. It is pure speculation - an attempt to be biblical and leave room for the findings of modern science by, for instance, locating the dinosaurs in the gap.

C. THE DAY-AGE THEORY

The basic idea behind the day-age theory is the notion that the creative days of Genesis 1 are long periods of time rather than 24-hour days. In support of such an interpretation, scholars note that the Hebrew word for "day" has much the same semantic range as the English word and is susceptible to such a meaning (e.g., "the day of the Lord"). Opponents point out that the numbering of days in Scripture always refers to 24-hour periods. Proponents also argue that the biblical evidence for the sixth and seventh days points to periods longer than 24 hours (the description of the activity of the sixth day in Genesis 2 seems difficult to squeeze into such a short period of time, while the seventh day continues to the present, since believers are invited in Hebrews 4 to enter into God's rest).

Obviously, this approach leaves room, not only for the astronomical and geological evidence discussed last week, but also for the evolutionary process. Many theistic evolutionists follow some form of this argument. A serious problem with the argument arises, however, when one notes that the existence of plants (third day) for long ages prior to the creation of animals (fifth and sixth days) is impossible because of the interdependence that exists between the plant and animal kingdoms. While the 24-hour day approach is often criticized for having light and evenings and mornings before the creation of the sun, it must be noted that the problem is even more severe for the day-age theorist. Most respond to this by arguing that the fourth day represents the time at which the sun became visible from the earth because of atmospheric changes caused by plant photosynthesis.

D. THE PROGRESSIVE CREATION THEORY

The theory of progressive creation is similar in most respects to the older day-age theory except that it sees the days of Genesis 1 as specific creative acts of God separated by long periods of time. This is somewhat less evolutionary in character than the day-age theory, but susceptible to the same criticisms. Some who take this approach argue that, while the creative days are separated by many eons, the ages following those creative days overlap. While this does not completely solve the interdependence problem mentioned above, it does make things flow a bit more smoothly.

E. THE VISION THEORY

This theory completely denies that any scientific conclusions may be drawn from the account of creation in Genesis 1. It is argued instead that the account recorded here is the result of six nights of visions given to a chosen man in which God revealed the scope of His creative activity. The six days are not thus a chronology of how God created the world, but instead a chronology of how He revealed His handiwork to His chosen servant. When this approach is taken, it clearly leaves people free to adopt any scientific explanation currently in favor without fear of facing contradiction from Scripture.

F. THE FRAMEWORK THEORY

The framework theory also denies that Genesis 1 makes any statements that can be taken as scientific in nature. It views the passage as poetic and points out that the events of the days exhibit a curious parallelism, as follows:

DAY 1 - light	DAY 4 - light bearers
DAY 2 - sea and sky	DAY 5 - fish and birds
DAY 3 - dry land	DAY 6 - animals and man

The parallels are interesting, though incomplete - plants are left out, for instance. On the other hand, the chapter completely lacks all characteristics of Hebrew poetry. When the Bible does give a poetic account of creation (e.g., Psalm 104), it is very different from Genesis 1.

G. THE LITURGICAL THEORY

Very similar to the framework theory, this approach views Genesis 1 as a worship text that somehow found its way into the Bible out of its original context. Again, the implication would be that the passage is useless for scientific purposes.

H. THE TEMPLE THEORY

This approach suggests that Genesis 1 is a description of the creative labors of God that was deliberately modeled on man's work week. God thus completes the work of building a temple He wishes to inhabit in a work week of six days, then on the seventh day enters and inhabits that temple. Though Isaiah 66:1-2 pictures heaven as God's throne and the earth as His footstool, several problems exist with this approach. The first is that Genesis 1 pictures the creation as made for man rather than for God. After all, God needs no material dwelling place. Furthermore, the temple theory makes the seventh day the climax of the creative week. Though it is true that God's rest is that toward which all things move (Hebrews 4), the extended description of the sixth day in Genesis 2 would seem to indicate that the climax of God's work is the creation of man, for whose habitation the entire universe was assembled.

THE CONCEPT OF CREATED AGE

Anyone who takes the Genesis account of creation at all seriously must to some extent accept the notion of created age, simply because Adam and Eve were created by God as adults rather than infants (the only exception to this is those progressive creationists who would argue that the creation of Adam involved God granting a soul to some already-existing hominid, thus making him "man" in the full sense of the word; advocates of the temple theory sometimes make the same argument). The objection to created age therefore cannot be that the Bible does not support the idea. The issue is one of degree.

Secondly, our concept of the power of God enters into the discussion. There can be no question that God has the power to create a mature universe. Since the Bible pictures man as the pinnacle of creation, should we be surprised if God created a world that was fully prepared for human habitation, complete not only with natural resources but also with the light from the stars already reaching the earth?

The obvious criticism that is often raised here is that the concept of created age makes God a deceiver. This is true only if we assume that God intended the universe to be studied and interpreted in purely naturalistic terms. When the psalmist said that the heavens declare the glory

of God, he did not mean that the eye of the natural man would find God in the study of the stars. In fact, Romans 1 indicates clearly that sinful man perverts whatever evidence of God's power is to be found in nature. Man's efforts to understand the universe apart from God are sinful in themselves. How can we expect them to yield truth? Furthermore, the truth is discernible only to the eyes of faith. We face the same problem when dealing with evidence for the existence of God or the inspiration of Scripture.

SCIENCE AND THE BIBLE V

The Theory of Evolution - Presuppositions and Implications

At the heart of any consideration of the relationship between the Bible and science in the modern era lies the theory of evolution. Are evolution and the Bible contradictory, or is harmonization possible or even unnecessary? In the next three weeks, we will examine various aspects of this issue. Our focus today will be, not on the scientific aspects of evolutionary theory, but on the philosophical presuppositions underlying evolutionary thought, the relationship of these presuppositions to biblical teaching, and the practical implications of the theory of evolution for modern life.

PRESUPPOSITIONS UNDERLYING THE THEORY OF EVOLUTION

The assumptions about the natural world underlying the theory of evolution are the same as those behind some of the interpretations we encountered in discussing the age of the earth. The first of these is naturalism - the idea that the world as we know it has come into being through purely natural causes. For the evolutionist, the idea of God is no longer a "necessary hypothesis." Though Darwin declined to speculate about the origins of life and was quite willing to allow for the supernatural creation of the primitive life form or forms (since science is clearly incapable of pontificating on the matter of origins), he believed that the development of all present forms of life from those primitive organisms was capable of a purely natural explanation. This assumption lies at the root of the incompatibility of Christianity and evolution; the latter explicitly denies the doctrine of divine providence and virtually renders God superfluous. We should also note that those who have adopted evolution as a worldview depend on naturalistic mechanisms, not only to produce man from non-man and thus the personal from the impersonal, but also to produce life from non-life (which is much harder, and relies on the assumption that life itself may be defined chemically) and diversity from unity (which is the hardest of all, but which starting with the Big Bang necessitates).

A second assumption is that of uniformitarianism. Evidence of past events must be interpreted in terms of presently observable processes if science is to have anything to say about these past events at all. The uniformitarian assumption is particularly critical in the interpretation of fossil evidence, for instance, as we will see in coming weeks. II Peter 3:4, however, disparages those who believe that "everything goes on as it has since the beginning of creation." This places creationism automatically beyond the pale of scientific verification in the same way that the "young earth" view must be - an uncomfortable position for Christians to occupy in an age where something is not true unless it bears the imprimatur of science.

A third assumption upon which the theory of evolution rests is the fundamental nature of change. Evolution is based on the idea that the only constant in the universe is change - a rather peculiar assumption in the light of presupposition #2. In fact, evolutionists take it as an article of faith that, while processes do not change, the products of those processes are in a constant state of flux. The driving mechanisms behind this change, which lie at the heart of the purely naturalistic processes that are assumed to be constant, are the forces of time and chance. Because the observed processes produce change only at a very slow rate, evolutionary theory demands enormous periods of time in order to explain the dramatic changes that have allegedly occurred. And because God is left out of the picture, the direction of change must be left to chance, though as we shall see, some

early evolutionists harbored an inconsistent optimism, while even those today who recognize the incompatibility of evolution and any concept of purpose nonetheless flee to mysticism to find comfort in the future of man.

Clearly, all three of these assumptions are incompatible with biblical teaching. The theory of evolution, while it may theoretically allow for the doctrine of creation in a very truncated form, completely denies the doctrine of providence. It leaves God out of the world in which we live.

VIEWS OF MAN AND HISTORY IMPLICIT IN THE THEORY OF EVOLUTION

To put it simply, evolution makes man an animal and renders history purposeless and directionless. These inevitable conclusions have been seen clearly by some scientists, especially in the field of the social sciences, while others have strenuously sought to avoid them. One of the most clear-sighted early interpreters of Darwin was the German philosopher Friedrich Nietzsche, who recognized that the theory of evolution rendered the entire Judeo-Christian ethical system obsolete. There is no room for morals in a system of constant change fueled only by time and chance. If the survival of the fittest is true, the only true ethic is that of power. For Nietzsche, the only "purpose" behind the evolutionary process was to produce the "supermen," those exceptional men who changed the course of human history - men like Julius Caesar and Napoleon. For Hitler, that evolutionary goal was something to be pursued actively by producing a whole race of "supermen," and in the process seeing that the unfit did not survive to pollute the emerging race.

As far as history is concerned, the early evolutionists believed in progress. They saw evolution as a process moving ever upward, and their vision was underscored by the relative peace and growing prosperity of the nineteenth century. This optimism was destroyed by two world wars and a global depression in the twentieth century, however, and modern evolutionists have to a large extent come to realize that the assumption of chance as a motivating force is incompatible with the conclusion of progress as a result of the action of that force. Thus some today conclude that it is not man, but the insects, who will survive, as man, an aberration on the evolutionary scale, finally destroys himself, either by war or by the destruction of his own environment, and the truly fit and adaptable species finally inherit the earth. In addition, it should be noted that evolutionary assumptions lead to the conclusion that nothing is to be learned from history - for the optimists, because the past is inferior to the present; for the pessimists, because chance eliminates the possibility of any discernible pattern in human events.

Those who find such pessimism unpalatable often branch off into mysticism to find support for their optimism concerning man. The most notable example of this tendency was the French Roman Catholic philosopher and theologian Pierre Teilhard de Chardin, who saw evolution as progressing from the physical to the spiritual, so that man, the conscious being, could now take the process of evolution into his own hands, bringing himself through his own capacity for knowledge to an expansion of mind and spirit that would ultimately lead to the Omega Point, where man and God would merge into one.

PRACTICAL OUTGROWTHS OF THE THEORY OF EVOLUTION

Here we may speak briefly of the implications of the theory of evolution for religion, morals and society. In the area of religion, scholars have concluded both that individual religions are the result of the evolution of man's consciousness within the environments provided by diverse societies, and that religion itself is an evolutionary stage from which man is gradually extricating himself. Like an appendix, religion is something man really doesn't need anymore.

As far as morals are concerned, the theory of evolution makes it clear that the notion of an absolute morality imposed from without by divine revelation is absurd. Furthermore, evolution also undermines the Deist teaching of natural law, since nature itself is in a state of constant flux. The impact of such teaching on our modern world is both undeniable and disastrous.

In the social sciences, evolution has had a major impact on the development of both sociology and psychology. In psychology, the persistent use of animal experimentation to draw conclusions concerning human behavior has long been fueled by evolutionary assumptions, along with the prevailing materialism in the field; Freud's concept of the id also was grounded in an evolutionary view of man. In sociology, cultural relativism has evolutionary roots. In fact, the nineteenth century saw some rather extreme attempts to apply Darwinism to society (e.g. Social Darwinism, theories of imperialism as being justified by natural selection or else benevolent uses of natural Western superiority, theories of racial supremacy, opposition to social welfare, etc.).

CONCLUSION - "THEISTIC EVOLUTION" AS AN OXYMORON

The simple fact is that the theory of evolution has no need (or indeed no room) for God, while the biblical doctrine of creation has no need for evolution. Theistic evolutionists are evolutionists who cannot bear to omit God from their thinking, and who therefore seek some place in the evolutionary scheme to shoehorn Him in. He is an intrusion in a philosophy incompatible with the fundamental teachings of His Word. It should come as no surprise to us that, while secular evolutionists and biblical creationists have no time for one another, theistic evolutionists please no one - their approach is neither sound biblical exegesis nor satisfying science.

SCIENCE AND THE BIBLE VI

The Theory of Evolution - Mechanisms and Supporting Evidence

This week we will take a look at some of the scientific evidence alleged to support the theory of evolution, both by Darwin and later supporters. Next week, we will evaluate this evidence and examine other evidence that points in a different direction.

FOUNDATIONAL OBSERVATIONS

Darwin was a keen observer of the natural world, and these observations initially caused him to question the prevailing views of life on earth. His observations may seem to us self-evident, but in his day many had not thought through their implications in quite the way Darwin did.

He first noted that change unquestionably occurs in the natural world. Fossils preserve plant and animal forms that are observable nowhere in the present day, while no fossil remains exist of many current life forms. To Darwin, this fact became foundational. In opposition to the static view of life on earth, Darwin postulated one of constant change.

Secondly, Darwin noticed that most species produce far more offspring than are necessary for the maintenance of the organism. Instead of producing the two children needed for equilibrium, some species routinely lay millions of eggs, for instance. The vast majority of these never survive to reproduce themselves, of course. Darwin then began to wonder if something other than chance determined which of these millions of offspring would survive to perpetuate the species.

Thirdly, Darwin observed considerable variety within the individuals of a given organism. Just like individual human beings display a wide variety of secondary characteristics, so do the individuals of every species. Darwin concluded that these variations contained the key to the development, not only of individual species, but the totality of life on earth.

In the fourth place, Darwin noted the close relationship between organisms and their habitats. Certain varieties of a particular type of animal differed from others living in a different location in ways that seemed suited uniquely to the location in question (protective coloration, for instance). Furthermore, some isolated localities, such as Australia and the Galapagos Islands off the coast of Ecuador, seemed to have a large number of unique organisms that differed significantly from those found elsewhere in the world. Did habitat play a role in the development of an organism? Darwin came to believe that it did.

All of these observations led Darwin to postulate his theory of organic macroevolution. As far as the mechanisms by which this change had occurred, however, he was originally at a loss. He eventually proposed four fundamental mechanisms, two of which have since been almost completely discredited, while serious questions have rightly been raised about the other two.

EVOLUTIONARY MECHANISMS

The first and most important evolutionary mechanism proposed by Darwin was that of natural selection, sometimes known as the survival of the fittest. Darwin suggested that, among the

minor variations naturally produced by any organism, certain variants would give the organism a slightly greater chance of survival, and thus over the course of many generations would gradually become more numerous in the population. In this way, organisms change. Of course, all the examples of change by natural selection (even those used by evolutionists) involve microevolution, yet this continues to be the fundamental mechanism relied upon by evolutionary theorists as the basis for their view of the development of life on earth.

Darwin also proposed something called sexual selection. He believed that certain secondary characteristics made members of one gender more attractive to the opposite sex of the same species, and that these characteristics therefore tended to be passed on more readily, since individuals who had these characteristics would be more likely to mate and reproduce. The patent anthropomorphism involved in suggesting that a bird seeks out a mate and rejects others on the basis of the brightness of the other's plumage is dubious at best (after all, wouldn't bright plumage make a bird more visible to predators?), as are the ludicrous comments that could readily be conceived about the application of such a theory to human evolution (Darwin actually suggested that man became a "hairless ape" because women found smooth males more attractive!).

Clearly, the mechanisms discussed so far are insufficient to produce the broad spectrum of changes necessary to support a theory of organic macroevolution. Something was needed to explain radical change. The first, and still the most popular, explanation proposed by Darwin for this was mutation. Sudden, radical changes in an organism can come about through genetic freaks (though Darwin knew nothing of genetics, nor of the radioactivity that is relied upon by scientists today as the major producer of mutations). Darwin suggested that such mutations, if they proved to enhance the ability of the organism to survive in its environment, would be passed on and produce major changes in the population. There are clearly major problems with such an hypothesis, but we will consider these next week.

The other major mechanism for significant change was borrowed by Darwin from an older colleague named Lamarck, who had proposed that certain types of acquired characteristics could be passed on to one's offspring. The classic example given was the neck of the giraffe. Lamarck, and Darwin after him, assumed that an animal that was constantly stretching its neck to reach for food would elongate it slightly, and that this characteristic would then be passed on through a technique known as *pangenesis* (scientists in those days believed that the sperm and egg were made up of components collected from cells all over the body, so that elongated neck bones, for instance, would become part of the genetic makeup of the offspring). Clearly, such a mechanism is no longer part of the arsenal of evolutionary theorists, but Darwin cited it frequently.

SUPPORTING EVIDENCE

Much of the supporting evidence used by Darwin and those who followed him is by now quite familiar. He started by citing the obvious changes that could be brought about in organisms through selective breeding (for some reason he liked to use the breeding of racing pigeons by fanciers in Britain). He then noted that the same thing happened in nature, except much more slowly, under the influence of natural selection.

He then argued that the greatest obstacle to survival faced by any organism was itself - i.e., overpopulation. Competition between members of the same species drove the weaker ones to starvation and kept them from reproducing, while the stronger - those better equipped to survive in the competition for scarce resources - lived to reproduce themselves, and thus passed on their superior qualities.

The key evidence could never come from the present, of course; it had to come from the past. The theory of vast changes in life forms on earth required substantiation. The only knowledge we have of life on the earth in ages past comes from fossils. Though Darwin bewailed the paucity of fossil evidence (he recognized the problem of missing links more clearly than some of his followers have done), he nonetheless was convinced that the available evidence pointed to a long and varied developmental process that slowly moved from simplicity to complexity over eons of time. He also was certain that sufficient fossil evidence would be discovered in the future.

Darwin also postulated that certain characteristics of contemporary organisms pointed to a history of evolutionary development. The evidence most frequently cited comes from comparative morphology - comparison of the physical structures of organisms is believed by evolutionists to point to a common history. Whether the structures involved are skeletal (flippers of whales and hands of people) or relating to soft tissue (see below), evolutionists uniformly assume that similarity of structure implies commonality of origin.

Several other pieces of evidence have developed along the same lines. For instance, the study of serology has led evolutionists to postulate developmental affinities in organisms whose blood reacts similarly to certain foreign substances. For instance, if the blood of a horse is known to respond adversely to the injection of a certain substance, evolutionists believe that, if the blood of other animals reacts similarly, the two must be closely related on the evolutionary scale. While difficulties here are numerous, perhaps the two clearest are the wide variety of individual differences (some horses appear to be closely linked to humans, for instance, while others show more affinity to sheep than they do to other horses) and the extent to which the evidence of serology contradicts that of morphology (would you believe that pigeons are more closely allied to cats on the evolutionary scale than they are to chickens?).

Evidence for evolutionary development was also seen by Darwin in the existence of vestigial organs such as the human appendix. While Darwin believed that such organs had useful purposes in earlier stages of development but had now become valueless, he could never quite explain why they were still to be found, or why intermediate forms of the organs did not exist in supposedly intermediate organisms.

A final piece of evidence cited by Darwin involved that provided by embryology. He firmly believed that ontogeny recapitulated phylogeny (that the early developmental progress of the individual organism repeated the evolutionary development of the species). For instance, human embryos in their early stages have openings that look very much like gills; to Darwin, this proved that humans evolved from fish. Such evidence is no longer credited by the scientific community (for instance, though Darwin asserted that birds evolved from reptiles, examination of penguin eggs has proved that the developing birds grow feathers on their bodies before they grow scales on their feet).

Although we will look at some of the problems associated with this evidence next week, we should note before closing today that the only firm evidence evolutionists have at their disposal is evidence of microevolution. Macroevolution rests entirely upon unsubstantiated assumptions and discredited lines of argument. What it boils down to in the end is that, although evolutionists recognize the weaknesses in their own theory, they continue to espouse it because the alternative - divine creation - is unthinkable.

SCIENCE AND THE BIBLE VII

The Theory of Evolution - Gaps and Questions

Last week we looked at some of the scientific evidence used by evolutionists to support their theory. This week we will look more carefully at some of the problems associated with that evidence, and also consider some key scientific data that pose major problems for evolutionists. Our study today will follow the same general categories considered last week.

FOUNDATIONAL OBSERVATIONS

No one could seriously question the observations made by Darwin that led him to produce his theory of evolution - the existence of change, the production of abundant offspring leading to competition for scarce resources, the existence of variety in almost every organism, and the relationship between organisms and their habitats. We should note, however, that all of these are totally coherent with belief in a Creator who endowed His creatures with microevolutionary adaptive capacity. Also we should note that change is to be expected in a world that is by its very nature transitory rather than permanent; the production of abundant offspring is a necessary part of the food chain by which all creatures sustain themselves (note that man, told by God to "be fruitful and multiply," is the only organism that does *not* produce far more offspring than can possibly hope to survive, because man, made in God's image, is uniquely precious to Him); variety is evidence of God's marvelous creation in that He endowed His creatures with the capacity to adapt to their environments to some extent, while the relationship between organisms and their habitats shows the marvels of God's design; if these characteristics had to evolve over long centuries, the organisms never would have survived long enough for the adaptive features to develop!

EVOLUTIONARY MECHANISMS

Of the four fundamental evolutionary mechanisms proposed by Darwin, we noted last week that two have been completely discredited by scientists and are no longer used by supporters of evolution - the ideas of sexual selection and the inheritance of acquired characteristics. As far as natural selection is concerned, we noted last week that all the concrete evidence presented by evolutionists involves microevolution. Any use of natural selection to argue for macroevolution requires unsupported extrapolation, which leads us back to the scientifically unverifiable assumptions we talked about two weeks ago. Furthermore, we should note that the study of extinct organisms shows that adaptations have just as frequently led to the destruction of organisms as they have led to their survival; many life forms have actually adapted themselves to death. Such evidence has led modern evolutionists to abandon the concept of evolutionary progress in favor of a view of evolution that sees it as a sort of cosmic crap-shoot. While this may be more congenial to the assumption of chance as a driving force that is part and parcel of evolutionary theory, it certainly undermines the theory of evolution in its traditional form and destroys what has always been the major evolutionary mechanism postulated by the supporters of the theory.

As far as mutations are concerned, scientists have long realized that the vast majority of mutations are harmful to the organism (we call them "birth defects" in humans). This is why Darwin himself was reluctant to rely heavily on mutation as an evolutionary mechanism, though he did mention it. The really important thing to note about mutations, however, is that they can only be

derived from the genetic material already present in the organism. In most cases, mutations involve the *absence* of something the organism normally possesses - an arm, pigmentation, etc. Occasionally, mutations produce an extra "something" - a sixth finger, for instance. But birds do not grow arms, nor do men grow wings. Mutation is thus incapable of explaining change on a macroevolutionary scale.

EVIDENCE FOR EVOLUTION

Here we will look again at some of the evidence we considered last week. As far as selective breeding is concerned, we should note that this is purely microevolutionary. Though significant changes in features may be obtained by breeding pigeons, dogs, or corn, they remain pigeons, dogs, and corn, still able to interbreed with the original organisms. Even using the telescoped time frame possible with selective breeding (even with something as "breedable" as fruit flies), no evidence of macroevolution has ever been produced.

As far as fossils are concerned, Darwin wisely refused to put more weight on this evidence than it could bear. While the fossil evidence does indicate change, it does not show the continuum of change required by evolutionary theory. There is not one "missing link," but millions. The sudden appearance of a multiplicity of organisms without transitional forms has led many modern evolutionists to postulate change in quantum leaps (Steven Jay Gould, Harvard biologist and leading modern evolutionist, postulated just such a system, known as *punctuated equilibrium*, which is virtually equivalent to admitting that the entire theory simply does not hold up to evidential scrutiny). We should also note that the fossil "record" contained in many science textbooks is an amalgamation of remains found in small fragments in locations all over the world. The entire column pictured in most books would need to be miles high, while in most locations fossil records extend for little more than a few hundred feet at most. The arrangement of the scattered evidence to produce a coherent "table" depends entirely upon the evolutionary presuppositions of those who interpret the evidence. We should also note that famous fossil evidences of evolution, such as that of the horse, are not only taken from widely scattered geographical locations, but also mask an inconvenient time sequence (for instance, the number of toes appears to have changed directions in time instead of decreasing steadily).

In the area of comparative morphology, we simply need to notice that similarity of structure suited to similarity of function is totally compatible with design by an intelligent Creator. It should not surprise us that God equipped different organisms with similar structures in order to enable them to deal with certain requirements of their lives. Furthermore, the uniqueness of certain complex features of some organisms provides a stronger argument against evolution than the similarities do for it.

We already saw last week that the study of serological evidence provides more of a problem for evolutionists than a help because it so often contradicts morphological evidence. This has led to a great deal of uncertainty about the details of the evolutionary chain on the part of those who would support such an idea. There are as many different theories about what evolved from what as there are scientists.

We also touched on the weakness of the vestigial organ argument last week. Not only is there a lack of transitional forms to show the organ in question becoming vestigial, but also new evidence keeps coming to light that seems to show that the organ in question has a useful purpose after all.

The final piece of evidence we considered, that derived from embryology, is now recognized as useless, as noted last week. All of these problems have in many ways brought chaos into the evolutionary camp. Some have opted for the quantum leaps approach, supposedly motivated by natural catastrophes (the dinosaurs became extinct when a comet passed close to the earth?), while others have clung to the general shape of Darwin's theory despite its serious problems. The bottom line for modern scientists is that the theory of evolution must be true because the alternative is unthinkable.

EVIDENCE AGAINST EVOLUTION

The theory of evolution requires the violation of several fundamental laws of science. The first of these has to do with the impossibility of the spontaneous generation of life, proved by Louis Pasteur in his famous experiments in the 1860s. He disproved abiogenesis, leading to the conclusion that *omne vivum ex vivo* ("all life from life"). The response of evolutionists is simply that, since the Big Bang began with non-living matter and life exists today, abiogenesis *must* have occurred, though they can provide no evidence to support such an assertion. We should note even further that evolution requires, not only the spontaneous generation of life, but the spontaneous generation of the *entire universe* (physicist Stephen Hawking has actually made this claim).

Perhaps the strongest piece of scientific evidence that may be cited in opposition to the theory of evolution comes, not from biology, but from physics. The second law of thermodynamics, sometimes called the law of entropy, states that in any natural reaction in a closed system, the total entropy of the system tends to increase. Entropy is a measure of the orderliness and complexity of the system, and it relates to the amount of heat energy in the system. While the first law of thermodynamics tells us that energy can be neither created nor destroyed (the law of conservation of energy), the second law tells us, not only that it changes form, but something about the direction of that change. Put simply, the second law indicates that a perpetual motion machine is impossible. One cannot produce work without expending an amount of energy greater than the work generated. While some of the energy is converted into "useful" forms (work), other energy will always be dissipated in the form of heat. Scientists have on the basis of this fundamental law of physics postulated the eventual "heat death" of the universe.

As far as the implications of this law for the theory of evolution are concerned, it tells us that things when left to themselves tend to decay, moving from complexity to simplicity rather than the other way around. A car left in an open field in a junkyard for twenty years turns into a pile of rust; if you leave a pile of rust in an open field, it will not turn into a car. The theory of evolution, on the other hand, tells us that, for millions upon millions of years, things "left to themselves" progressed from simplicity to a high order of complexity. Evolutionists argue that this is possible because the earth is not a closed system, but instead an open one that receives a continual influx of energy from the sun. Increasing complexity requires more than energy input, however. A box of watch parts may be assembled through hours of labor by a trained watchmaker, but years of shaking the box will not

combine the parts into a watch. Energy must be coupled with intelligence, skill, and purpose in order to produce complexity from simplicity. The theory of evolution, on the other hand, requires a massive long-term violation of one of the most fundamental laws of the universe - one to which no exception has ever been discovered.

SCIENCE AND THE BIBLE VIII

Intelligent Design, Part One

Since the well-publicized trial in Dover, Pennsylvania in 2005, the question of Intelligent Design has been much in the news. Sadly, that news has reflected a serious lack of understanding of the real issues involved. Christians ought to be able to discuss this subject knowledgeably and biblically. Consequently, we will be spending the next two weeks dealing with the major questions surrounding the matter of Intelligent Design (ID).

WHAT IS INTELLIGENT DESIGN?

At the simplest level, Intelligent Design means simply what the name implies - that the world in which we live is such that a designing intelligence must have produced it rather than some impersonal chance mechanism. Though advocates of the position do their best to emphasize that they are drawing no conclusions about the source of this intelligence, simply affirming that, given the scientific evidence, it must exist, they are almost without exception theists who believe that God is the intelligence behind the natural world. This somewhat disingenuous approach is at the heart of much of the criticism the movement has received, both from Christians and non-Christians alike.

HISTORICAL ANTECEDENTS

Many have noted that Intelligent Design is in many ways a more sophisticated version of the Teleological Argument, which has been advanced by Christians for at least 750 years. It is worthwhile for us to note, however, how these approaches really relate to one another. The Teleological Argument makes its first appearance in the middle of the thirteenth century in the *Summa Theologica* of Thomas Aquinas. The great medieval Catholic theologian wrote:

> The fifth proof arises from the ordering of things, for we see that some things which lack reason, such as natural bodies, are operated in accordance with a plan. It appears from this that they are operated always or the more frequently in this same way the closer they follow what is the Highest; whence it is clear that they do not arrive at the result by chance but because of a purpose. The things, moreover, that do not have intelligence do not tend toward a result unless directed by some one knowing and intelligent; just as an arrow is sent by an archer. Therefore there is something intelligent by which all natural things are arranged in accordance with a plan - and this we call God.

In 1800, Anglican clergyman William Paley penned a more familiar version of the same argument:

> In crossing a heath, suppose I pitched my foot against a *stone* and were asked how the stone came to be there, I might possibly answer that for anything I knew to the contrary it had lain there forever; nor would it, perhaps, be very easy to show the absurdity of this answer. But suppose I had found a *watch* upon the ground, and it should be inquired how the watch happened to be in that place, I should hardly think of the answer which I had before given, that for anything I knew the watch might have always been there. Yet why should not this answer serve for the watch as well as for the stone? Why is it not as admissible in the second case as in the first? For this reason, and for no other, namely, that when we come to inspect the watch, we perceive - what we could not discover in the stone - that its several parts are framed and put together for a purpose, e.g., that they are so formed and adjusted as to produce motion, and that motion so regulated as to point out the hour of the day; that if the different parts had been differently shaped from what they are, of a different size from what they are, or placed after any other manner or in any other order than that in which they are placed, either no motion at all

> would have been carried on in the machine, or none which would have answered the use that is now served by it. To reckon up a few of the plainest of these parts and of their offices, all tending to one result; we see a cylindrical box containing a coiled elastic spring, which, by its endeavor to relax itself, turns round the box. We next observe a flexible chain - artificially wrought for the sake of flexure - communicating the action of the spring from the box to the fusee. We then find a series of wheels, the teeth of which catch in and apply to each other, conducting the motion from the fusee to the balance and from the balance to the pointer, and at the same time, by the size and shape of those wheels, so regulating that motion as to terminate in causing an index, by an equable and measured progression, to pass over a given space in a given time. We take notice that the wheels are made of brass, in order to keep them from rust; the springs of steel, no other metal being so elastic; that over the face of the watch there is placed a glass, a material employed in no other part of the work, but in the room of which, if there had been any other than a transparent substance, the hour could not be seen without opening the case. This mechanism being observed - it requires indeed an examination of the instrument, and perhaps some previous knowledge of the subject, to perceive and understand it; but being once, as we have said, observed and understood - the inference we think is inevitable, that the watch must have had a maker - that there must have existed, at some time and at some place or other, an artificer or artificers who formed it for the purpose which we find it actually to answer, who comprehended its construction and designed its use.

Paley goes on to say that our conclusions would not be altered if we had never seen the construction of a watch, nor would we arrive at a different conclusion if the watch were broken. He then uses a biological example, the human eye, and concludes that the designer of such a complex mechanism could only have been God.

We ought to note, however, that significant differences exist between the classical teleological argument presented by Aquinas and Paley, among others, and the argument set forth by those who favor Intelligent Design. The major difference is that the purpose for which Aquinas and Paley propounded their arguments was to prove God's existence to unbelievers. Proponents of ID make no such claim. Instead, they make no effort to go beyond the assertion of design in the cosmos, arguing that such speculations are beyond the realm of science. In other words, their desire is not so much to prove God as it is to disprove a materialistic, naturalistic view of the universe grounded in matter, time and chance and nothing more. The two sets of arguments, though very similar, thus have different purposes. These different purposes will influence how we evaluate the arguments.

MAJOR ARGUMENTS FOR INTELLIGENT DESIGN

I noted above that ID is in some ways a more sophisticated version of the teleological argument. It is more sophisticated because of the complexity of the science used to promote the position. Today we will examine three major scientific arguments used by the proponents of ID to advance their position.

The first of these is the concept of *irreducible complexity*. This idea has come primarily to be associated with the work of Michael Behe, Professor of Biochemistry at Lehigh University. Behe's book, *Darwin's Black Box*, argues rightly that Darwin knew nothing of cellular biology, but assumed that the cell was a relatively uncomplicated mass of protoplasm. Thus when later evolutionists sought to extend Darwin's theory (Darwin never tried to explain the origin of life, but started with a living cell in the primordial ooze), they made the same assumption, believing that the simplest form of life could result, given enough time and the right mix of chemicals, from an electrical discharge into the "soup" that produced the first living organism. Behe argues, very

convincingly in my opinion, that such an event is scientifically impossible. He speaks of complex cellular mechanisms and functions, such as the bacterial flagellum, that could not have come into existence gradually under evolutionary assumptions. After all, the theory of evolution teaches that minute changes are produced constantly by organisms, and that these changes either enhance the chances for survival, in which case they are passed on, or decrease the chances for survival, in which case they die out. But how, Behe argues, could a complex mechanism such as a bacterial flagellum have evolved *gradually*, if each piece is required for the mechanism to work at all? Would not the individual pieces, which are useless without the whole, have been rejected by the process of natural selection before the mechanism got close to completion? Using the simple example of a mousetrap, Behe shows that the machine would not work if even one of its parts were missing. Yet the "simple" cell contains hundreds of much more complex structures and processes, none of which would work without all of its component parts. Thus the chance development of what Darwin and his followers perceived to be simple - the basic building block of life - is seen as scientifically impossible.

The second major argument used by advocates of Intelligent Design is what is often called the Anthropic Principle. The basic idea here is that the nature of the cosmos is such that, were it any different from what it actually is, human life could not exist. In other words, the cosmos seems to have been purposefully designed as an environment for the development of human life. This argument can take at least two forms. The first has to do with the conditions necessary for complex life to exist on a planet. Intelligent Design advocates point out that dozens of relatively improbable conditions are required for the development of complex life, from the size and age of the sun to the earth's distance from the sun to the existence of large planets in the far reaches of the solar system to the composition of the earth's atmosphere, the thickness of the earth's crust, and the molten iron in the earth's core that produces a magnetic field allowing the earth to deflect harmful radiation. Combining the probabilities of each of these characteristics (and there are at least twenty such) leads to the conclusion that, contrary to Carl Sagan, the scientists at SETI, and other such enthusiasts, such planets conducive to the development of complex life are extremely rare, and that perhaps the earth is even unique in this respect. A similar argument is based on the fundamental constants of nature - gravity, strong and weak nuclear forces, Planck's constant, the speed of light, etc. ID advocates note that, should any of these constants deviate from their present values to the slightest degree, complex life could not exist; in fact, neither could the universe as we know it. Furthermore, the earth is perfectly positioned to allow its inhabitants to observe the universe, enabling intelligent creatures to engage in scientific observation and experimentation. Clearly, then, the universe must have been designed with human beings in mind by an intelligent and purposeful designer.

A third argument, associated with William Dembski, is derived from information theory. Dembski argues that our knowledge of the role of DNA in the transmission of information in living organisms and the role of binary codes in the transmission of information through computers has demonstrated that information, like older concepts of matter and energy, cannot be created in a closed system, but can only remain the same or decrease (cf. Second Law of Thermodynamics - the concept of entropy is treated in a similar fashion). Computers can only use the information you give them; they cannot generate new information. Similarly, DNA can only transmit what is already encoded there; it is incapable of producing new information. Dembski rightly sees this Law of Conservation of Information as fatal to evolutionary theory. Evolution presupposes that complex specified information comes from time, chance, and necessity, but such causes cannot produce increases in information, particularly if that information follows a pattern (specificity). He thus

argues that evolution as an explanation for the origins of life rests on a mathematical impossibility. He also relates information theory to the concepts of irreducible complexity and the anthropic principle.

Next week, we will look at secular and Christian critiques of Intelligent Design.

SCIENCE AND THE BIBLE IX

Intelligent Design, Part Two

Last week we looked at the basic ideas surrounding the Intelligent Design movement. Today we will look at significant critiques of the movement, both secular and Christian.

SECULAR CRITIQUE OF INTELLIGENT DESIGN

To a large extent, the scientific and secular responses to ID take two forms. The first of these involves a response to the specific arguments presented by ID proponents. For the most part, these take the following form:

ID Advocate:	Naturalistic science can't explain X.
Secular Scientist:	Can too!

For instance, in responding to specific arguments, we find Richard Dawkins, author of *The Blind Watchmaker* and rabid advocate of naturalistic evolution, answering Michael Behe by suggesting that perhaps the pieces of these complex structures had other uses before being incorporated into something like a bacterial flagellum. In other words, maybe the cell evolved by inventing new uses for old parts (sounds vaguely like *intelligence* to me . . .). No evidence exists for such an adaptation on the cellular level, of course.

More often, secular thinkers try to use burden-of-proof arguments to bolster their case. In other words, in the absence of clear scientific proof for either approach, the naturalistic one must be assumed to be correct; the burden of proof always lies on the side of those who would argue design (Paley would clearly disagree). Consequently, those who argue against Dembski's approach based on information theory would say that he never succeeds in proving that information can never be created in a closed system. The fact that they can give not a single instance of information increasing in a closed system does not seem to bother them; if Dembski cannot prove his case beyond a shadow of a doubt, their conclusions must be assumed to be correct.

In response to the anthropic principle, secular scientists simply argue that ID advocates are defining life in an arbitrary fashion that corresponds to life as we know it. What, after all, is to prevent "life" of a completely different sort from evolving elsewhere in the universe? And who is to say that, had the constants of the universe evolved differently than they have, that a different kind of life may have appeared? ID proponents are thus accused of making what exists the standard and then speaking of design in terms of the probabilities of that particular outcome; to use Dembski's illustration in order to explain his opponents' argument, they say that ID involves nothing more than an archer shooting at a blank wall at random, then going to the wall and painting a bull's eye around his arrow! But such an argument really begs the question. As ID proponents note, we must somehow explain not only what we observe, but also our capacity to observe it. Thus they respond that the conditions under which we live are ideally suited, not only for the development of complex life, but also for the observation and comprehension of the environment in which that life exists. The one doing the explaining must explain *himself*, not some hypothetical alien race whose principle of life is totally different from anything in our experience.

But perhaps the most serious and frequently-heard critique of Intelligent Design from a secular perspective is that ID is not science, but religion in disguise - a Trojan Horse intended to get Creationism back into the public schools, from which it has been so thoroughly excluded. We will look first at the idea that ID is not science, then move on to the legal component of the argument.

In claiming that Intelligent Design is not science but religion in disguise, secular thinkers essentially insist on making up the rules of the game in such a way that any view but their own is excluded by definition from the discussion. They rightly assert that science must be restricted to what is observable to the senses and their man-made mechanical extensions. They rightly argue that anything beyond this realm is not really the province of science. But when they insist that the conclusions drawn from scientific endeavor must operate within the same restrictive sphere, they seriously err. The origins of the universe and of life are as hidden from observation to secular scientists as they are to Christians. The beginning of the universe and the beginning of life are events that are neither observable nor replicable. Thus, they are outside the province of science by the limitations asserted above. Why, then, do secular scientists insist on their right to proclaim the Big Bang and naturalistic evolution as explanations for the origins of the universe and of life, while denying the validity of competing explanations that are every bit as reasonable in dealing with the evidence the right to be heard? In such an argument, we see on display the truth of Romans 1:18-23; the refusal to glorify God for His work of creation is not the result of a lack of evidence, but of the sinful rebellion of men's hearts against their Creator.

In short, while there is some truth in the assertion that ID is not science because its conclusions are beyond the scope of scientific verification, the same can and ought to be said of evolutionary theory and naturalism in general. By all means, let us restrict ourselves to the observable, but apply the rules even-handedly, not just to one set of presuppositions.

BIBLICAL CRITIQUE OF INTELLIGENT DESIGN

Secular scientists and materialists are not the only ones who have questions about Intelligent Design, however. Some Christians doubt the value of the approach for a number of reasons.

First of all, ID's disingenuous approach to its conclusions - arguing that there is an intelligent designer without identifying that Intelligence - is rightfully mocked as hypocritical. ID proponents are trying to play the game by their critics' rules - "just the (scientific) facts, ma'am" - but fool no one in doing so. While the typical ID approach would leave the door open for loonies like Erich von Daniken (*Chariots of the Gods*), who claimed that inexplicable phenomena on earth should be attributed to visits by aliens, no reputable ID advocate would really seriously consider such claims. They are, without exception, theists, and most of them are Christians. They *know* who the Designer is, but won't say so. On the one hand, they are more honest than their critics in the sense that they try to observe the technical limitations of science and be silent where science must be silent, but they are not thus being faithful as Christians, who must affirm that "the heavens declare the glory of God."

The second problem with Intelligent Design is that it incorporates the basic fallacy characteristic of all evidential approaches to apologetics; it tries to generate support for biblical teachings through the use of commonly-understood objective facts. The problem here, of course,

is that the facts are not commonly understood, nor are they objective. Romans 1, as noted before, shows us that all facts are subject to interpretation, and that interpretation comes from the heart of the interpreter. A man with a heart in rebellion against God can look at the clearest evidence imaginable for "divine power and godhead" and conclude that it all came from matter, time, and chance, and only a change of heart - regeneration by the power of the Holy Spirit - can convince him otherwise.

The difficulty of playing the game by your opponents' rules is illustrated by the work of Joseph Butler, whose *Analogy of Religion*, written in the middle of the eighteenth century, was an apologetic against Deism. Though popular in Christian seminaries for over a century, Butler's work failed in a key respect. He argued that, though the critics asserted the improbability of the miracles recorded in Scripture, the evidence for the truth of the events of the Bible has as high a degree of probability as the conclusions of science. On the one hand, the existence of five hundred eyewitnesses to the Resurrection, cited by Paul twenty-five years later in I Corinthians 15, makes the truth of the account highly probable. On the other hand, scientific conclusions, because of their empirical source, can never be certain, but always must be considered probable and open to revision in the light of new evidence. Thus the believer is not a fool because what he believes is at least as probable as what the scientist believes. As an attack on Deism, Butler's work was rather effective, but it does not get to the heart of the issue - unbelief as the cause for denial of biblical truth rather than skepticism about biblical narratives being the cause of unbelief. Intelligent Design shares the same flaw. The role of probability can be seen most clearly in the Anthropic Principle, which clearly leaves the door open for perhaps a *few* more planets on which life may have evolved.

Thirdly, ID proponents do not go far enough in drawing the logical conclusions of their position. While someone like Michael Behe, for example, argues that the irreducible complexity of the basic building block of life - the cell - requires an intelligent designer, he then goes on to argue that, once the design had been put into place, evolution could legitimately explain what happened next. In other words, he leaves the door open for a modern form of Deism (a criticism rightly directed against earlier forms of the Teleological Argument, especially the one developed by Paley), in which God created the cell, then left it to evolve on its own into more complex forms of life. He thus fails to acknowledge the existence of irreducible complexity in countless structures and functions at all levels of life. How many unique structures exist in the realms of animal and plant life, let alone in the marvelous structure we call the human body? Failure to insist that life in all its marvelous complexity is the result of divine purpose and initiative makes Intelligent Design less than Christian in both what it affirms and what it allows.

LEGAL CRITIQUE OF INTELLIGENT DESIGN

Proponents of Intelligent Design have been remarkably timid in their efforts to change the legal environment. In Georgia, they tried to get stickers pasted into the front of biology textbooks affirming that evolution was simply one theory among many. In Dover, PA, the bold initiative took the form of a statement of one or two paragraphs that teachers were required to read to their students before beginning the study of evolution. Again, it asserted that evolution was a theory and not to be understood as scientific fact. Even these mild attempts to introduce something contrary to the evolutionary consensus have been met with ridicule and scorn by the scientific community and the media.

The loss of the Dover case was a public-relations disaster. The result was the identification of Intelligent Design with Creationism, which the courts had long ago excluded from the public schools as an unconstitutional intrusion of religion in the public square. Thus, the current legal environment is such that naturalistic conclusions about origins are welcome in the public schools, but theistic ones are not. The religion of Secularism is established, while Theism is banned.

Again, the point to be noted here is that the ID proponents have simply not gone far enough in carrying out their ideas to their logical conclusions. If evolutionary theory is as much a religion as Christianity - and to the extent that it has become a worldview, it certainly is - then either evolution should be excluded from the science classroom as an unconstitutional intrusion of religion, or else theistic explanations should be welcome alongside non-theistic ones, since all are equally scientific (or unscientific, as the case may be). Only when ID proponents stop asking for crumbs from the table of the secularists and start demanding equal time will the debate move onto the ground on which it rightly belongs - a dispute between competing worldviews, neither of which is scientifically provable, but both of which offer alternative interpretations of the cosmos.

VALUE OF INTELLIGENT DESIGN

Finally, then, what must we conclude about the value of Intelligent Design? We have seen that ID has flaws, both as a scientific theory and as an apologetic approach. But is it therefore without value? Not at all. We must see that the chief benefit of Intelligent Design is a negative one; it very effectively demonstrates the untenable nature of Darwinian evolution. While it cannot prove the God of the Bible (and does not claim to do so), it very effectively shoots holes in the Darwinian consensus. Behe's concept of irreducible complexity and Dembski's argument from information theory blow holes in Darwinism big enough to destroy the theory completely were it not so deeply ingrained in the thought processes of our society. Increasingly, the work of ID theorists will continue to raise questions and make it increasingly difficult for serious thinkers to espouse Darwinism. Does that mean that scientists will turn *en masse* to the God of the Bible? Of course not. As we have already seen, unbelief always manages to find a way to rebel against God. But Intelligent Design is performing a valuable service nonetheless in helping to bring down one Tower of Babel that has been erected against the True and Living God.

SCIENCE AND THE BIBLE X

The Age of Man - Scientific Evidence

While the issue of the age of the earth with which we began the course is certainly of interest in any discussion of the Bible and science, any thoughtful person must admit that a variety of interpretations of Genesis 1 are possible that do not in any way undermine the theological significance of the passage nor the authority of the Word of God. Many of those who take differing positions on Genesis 1 nonetheless agree completely on the absolute authority and divine inspiration of the Scriptures. When we get to the issue of the age of man, however, we arrive at something about which differences in understanding almost inevitably lead to questions of biblical authority. There can be little doubt that any reading of Scripture that produces anything other than a relatively brief human history on this planet takes the biblical data with less than total seriousness. This, of course, has serious implications.

CAVE MEN AND FOSSIL REMAINS

Ever since the advent of the theory of evolution, scientists have been diligently searching for "missing links" between apes and men. Newspapers, magazines such as *National Geographic*, and other mass media dutifully publicize each discovery, trumpeting the tentative conclusions of the lucky finder as established scientific fact. A quick survey will give some idea of the nature of the available evidence.

RAMAPITHECUS

This hominid, believed by many anthropologists to be a common ancestor of modern men and apes, allegedly roamed the earth over three million years ago. He was reconstructed from a few teeth and a jaw fragment. Unfortunately, a modern species of baboon in Ethiopia possesses the identical skeletal characteristics.

AUSTRALOPITHECUS

Among the most famous of the human-ancestor fossils, Australopithecus was first discovered in 1924 in East Africa. The creature stood about four feet tall and supposedly lived about 2.6 million years ago. Believed by many anthropologists to be the oldest fossil remains that could be described as human, the most complete Australopithecene fossil, a 25-year-old female, has been nicknamed "Lucy." Other anthropologists argue, however, that Lucy is simply an extinct ape.

PEKING MAN

Bone fragments, including pieces of skulls, teeth, and jaws (but no limbs) were discovered in China in the 1920s. The discoverer hypothesized that these were fossil remains of early man, or possibly missing links between man and apes. Other researchers later found stone tools and the evidence of fire on the site. Though the fossils were lost during World War II, later anthropologists have speculated that "Peking Man" was really a large ape, and that the tools discovered at the site were probably used *on* him rather than *by* him.

JAVA MAN

Reconstructed from a leg bone, a skull fragment, and three teeth, the discoverer finally admitted thirty years after the fact that he had also found human remains in the same location and on the same level. Again, Java Man turned out to be modern man's food rather than his father.

NEANDERTHAL MAN

The original Neanderthal discovery took place in Germany in 1856. The typical picture of the hairy, stooped, and stupid biped was constructed through the active application of imagination to this fossil find. Even though it was known at the time that the original fossil was that of a deformed creature, the caricature of the grunting humanoid with the stone axe has been perpetuated for over a century. In point of fact, Neanderthals differed little from modern men, while their cranial capacities tended to be *larger*.

CRO-MAGNON MAN

Scientists have always agreed that Cro-Magnon Man, the famous cave-dweller, was structurally identical to modern man. As one writer put it, if you met either the Cro-Magnon or the Neanderthal on the subway dressed in modern clothing, you wouldn't give him a second glance.

THE INFAMOUS PILTDOWN AND NEBRASKA HOAXES

Evolutionists have been embarrassed by several notorious hoaxes. The Piltdown Man, presented by Charles Dawson in 1912, was reconstructed from a skull fragment, a piece of jawbone, and several teeth. The find was dated as being half a million years old (dating apparently was more conservative then), and was hailed by evolutionists as support for their theory. The hoax was exposed in 1953 when the jawbone was proved to be that of a modern man that had been dyed to give the appearance of age, while the teeth were animal teeth that had been filed down to appear human.

Nebraska Man was reconstructed from a single tooth dated about a million years old. Later research demonstrated that the tooth belonged to a prehistoric pig.

THE CURIOUS PALUXY RIVER FOSSILS

The fossil find most frequently cited by creationists to refute the theory of evolution is found in the bed of the Paluxy River in Texas. Fossilized dinosaur footprints abound in the region, but in one particular area, a track with many human characteristics crosses the dinosaur track - the two even overlap at one point. While evolutionists theorize that the track had been left by another dinosaur, they admit that no dinosaur has ever been discovered that would have either the gait or foot structure required to leave such a print. Because of the uncertainty in identifying the footprint, however, it would be unwise to put too much weight on it as evidence.

ANTHROPOLOGICAL DATING METHODS

When scientists date these fossil remains, how do they do it? How do they determine the age of these supposed ancestors of man?

RADIOACTIVE DATING

Surely the most common method is radioactive dating, which depends upon the time required for radioactive elements to decay. We have already noted that such a technique assumes uniformity both in the rate of decomposition and in the cosmic-ray content of the atmosphere, along with continuity of conditions on the surface of the earth. Such uniformitarian assumptions are clearly beyond the pale of scientific proof. Scientists who rely on these methods also face other problems, however. They must assume that the radioactive material has not been leeched out by other means, that none of the daughter element was present originally or has been added by other means, and that none of the daughter element has escaped in gaseous form (a real problem with the potassium-argon method, for instance).

We should also note that the dating method is rarely applied to the fossil remains themselves, but usually to the surrounding rock. This produces some wild inconsistencies. One fossil was dated at a million years of age until a fossilized boat was discovered in the next stratum below. Another sample was dated at 22 million years in one test and at 2.6 million years in the next; needless to say, the second date was publicized, while the first was conveniently ignored. Often, modern remains are found in strata lower than the allegedly prehistoric ones, but are blithely explained away as the result of "intrusive burials."

STRUCTURAL METHODS

When scientists date remains by comparing structural features, two problems arise. The first is that the remains are generally quite paltry. The pictures in newspapers and museums are highly imaginative reconstructions derived from a few bone fragments (no soft tissue has been preserved, of course). The second is that the sequencing is entirely dependent upon the presuppositions of the scientist concerning the process of human development. It should not surprise us that reconstructions show a steady progression from ape to man, since that is what scientists assume happened. Even scientists, however, put little stock in dates derived from structural considerations alone.

DNA SAMPLING

An interesting theory about the development of man has come about in recent years through the increasing ability of scientists to study the structure of DNA. A study in which DNA samples from women all over the world were compared showed that certain key features of that DNA were identical in women of all kinds. This led the researcher to conclude that the entire human race had descended from a single couple - the ballyhooed "Eve" theory. Most evolutionists have rejected this evidence because it contradicts the long-cherished conclusions drawn from fossil discoveries. They assert that the human race as we know it did not come from a single ancestor, but evolved separately in a variety of locales. This genetic evidence will prove difficult to refute, however. It is important

to note that those who are promoting it continue to believe that man has evolved, even though it may be from a single branch of the evolutionary tree.

INTERPRETING THE EVIDENCE

Christians deal with this material in a variety of ways, as we will see next week. Some accept the fossil finds at face value and either assign them to a pre-Adamic race or place them in some pre-human phase of a theistic evolutionary scheme (such people usually assert that "Adam" was a hominid who was singled out by God and invested with a soul that distinguished him from his fellows). Next week, we will look at the evidence provided by the biblical teachings about the origin of man and spend some time discussing the significance of the Genesis genealogies.

SCIENCE AND THE BIBLE XI

The Age of Man - The Biblical Genealogies

Last week we looked at some of the evidence used by paleontologists to establish the commonly-accepted age of two to three million years for the human race on earth. This week, we want to look at the biblical evidence for the age of man, focusing particularly on the genealogies in Genesis 5 and Genesis 11.

THEOLOGICAL FOUNDATIONS - THE UNITY OF THE HUMAN RACE

It is important from the beginning to recognize what is at stake in this discussion. We have already noted that the question of the age of man is far more crucial theologically than that of the age of the earth. The main reason lies not only in the importance of affirming the authority of Scripture in our reading of the biblical genealogies, but also in the implications of the teachings of the early chapters of Genesis for our understanding of sin and redemption. We already saw last week that evolutionists scoff at the idea of the unity of the human race, despite the genetic evidence uncovered in recent years. They have no time for a literal Adam and Eve. Yet when the Bible teaches that the entire race is united, both in God's image and in bearing the imputed sin of Adam, it presupposes a literal First Family. To deny the literal existence of Adam and Eve, an original couple from whom the entire human race is descended, is to undermine both the doctrine of original sin and that of the federal headship of Christ over His people as taught by Paul in Romans 5.

THE GENEALOGIES AS CHRONOLOGICAL INDICATORS

The most famous attempt to use the biblical genealogies to calculate chronology was that of Irish Archbishop James Ussher, who in the seventeenth century calculated that Creation occurred in the year 4004 B.C. He began with a generally accepted date for Abraham (about 2000 B.C.), then simply used the numbers in the genealogies and worked backwards. A slightly later contemporary of Ussher, John Lightfoot, actually taught that creation had occurred on October 23rd, 4004 B.C., at 9:00 in the morning - Greenwich Mean Time! Ussher's dates were included in Bibles for several hundred years following his studies, including the enormously influential Scofield Reference Bible, which popularized both Ussher's dates and the Gap Theory in our own country. Most scholars today, however, believe that the genealogies cannot be used for calculating purposes, at least not in any specific or detailed way.

GENEALOGICAL DISCONTINUITIES

The groundbreaking work in this area was done by William Henry Green, professor at Princeton Theological Seminary back in the latter years of the nineteenth century when Princeton was still evangelical. He demonstrated conclusively that the biblical genealogies were not intended to be complete records of every generation, but rather were selective, including only those ancestors considered to be important, and structured, often following a predesigned mathematical pattern.

A few examples should suffice, though many could be given. To begin with, the genealogy of Jesus given in Matthew 1:1-17 clearly reveals these characteristics. Not only does the first verse summarize the genealogy that follows by giving the three most crucial names, but verse 8 leaves out

the names of three kings of Judah (Ahaziah, Joash, and Amaziah) between Joram and Uzziah. The intended mathematical structure is given explicitly in verse 17 - could this have been to put Jesus at the head of the seventh seven? The omissions are not errors, nor are they attempts to deceive, but they do tell us something about the Jewish practice in constructing genealogies.

That the same thing is going on in Genesis 5 and 11 is clear. A comparison of Luke 3:36 and Genesis 11:12 shows that the earlier genealogy omits the name of Cainan (though the name does appear in the Septuagint version), showing that some selectivity was at work. Furthermore, the mathematical structure appears in that both Genesis genealogies contain ten names, the last of which has three sons.

Whatever the purpose of the genealogies, then, it was not to permit calculation of the age of the human race. The old joke, "How did Methuselah die?" simply will not work (the answer was "He drowned" because calculations based on the genealogies and assuming them to be complete and consecutive would lead to the conclusion that Methuselah died in the Flood, or at least in the year of the Flood). The most likely explanation is that the genealogies were intended to teach both the unity of the human race and the universality of the sin of man and its resultant curse; after all, the great refrain of the genealogies is ". . . and he died."

DID PEOPLE REALLY LIVE ALMOST A THOUSAND YEARS?

At one time, scholars attempted to argue that the ages of the antediluvians listed in Genesis 5 were based on a lunar calendar; in other words, the ages were given in months rather than years. This might make some sense if one looks at the ages at death - 960 years thus becomes 80 and seems rather reasonable - but is absurd when one looks at the ages at which these men conceived children. Some would have been reproducing at the age of five and a half! Modern scientists simply write off the ages given for the antediluvian patriarchs as being beyond belief. If we take the authority of Scripture seriously, however, we must also take these ages seriously. It should be noted that other ancient records show even longer lifespans. The king lists of Sumer and the old Babylonian civilization include men who lived tens of thousands of years. Is the genealogy of Genesis 5 simply a more conservative version of one of these ancient myths of the god-kings? In fact, there is evidence that indicates that the Sumerian and Babylonian records may be corruptions of an earlier list that is faithfully recorded in Genesis. The early civilizations of Mesopotamia used a sexigesimal number system (base 60, as opposed to our decimal system - base 10). By the time the records were set down, however, they had switched to a decimal system, but were still using the old sexigesimal symbols. If the numbers on the old cuneiform records are read as sexigesimal rather than decimal, however, they bear a remarkable resemblance (as do the names, in fact) to those given in Genesis 5. If, indeed, one assumes that the scribes in the declining days of Ur wrote down an old sexigesimal record under the assumption that its numbers were in the decimal system (i.e., they made a mistake in reading their own ancient records), what they left behind corroborates the account of Genesis 5 to a remarkable degree.

In addition, the decline in lifespan after the Flood corresponds closely to what scientists have shown would occur when an organism was exposed to a dramatically increased amount of radioactivity. If, in fact, the Flood involved the collapse of a water canopy surrounding the earth (an hypothesis for which no concrete evidence exists), the increase in cosmic radiation penetrating the

atmosphere, combined with the watering down of the gene pool through increased population, would contribute to a significant decrease in the average lifespan. Whatever the reason, increased radioactivity in the atmosphere appears to have occurred as a result of the Flood.

CONCLUSIONS

Some Christians choose to deal with inconvenient scientific evidence by placing it into a supposed gap between the first two verses of Genesis. This is far too facile to be satisfying, and lacks one shred of concrete biblical support. Other Christians accept the scientific evidence at face value, but then are forced to relegate the Genesis account of the creation of man to the realm of myth or allegory. In addition, the doctrine of original sin must be jettisoned, but few who have gone so far seem to regret its loss.

While we may not be able to use the biblical genealogies to establish a specific date for creation or a concrete age for the human race, we must affirm that the biblical account, while leaving room for perhaps as much as twenty thousand years of human history, certainly cannot accommodate two or three million years without reducing the genealogies of Genesis, and some basic biblical doctrine along with them, to meaninglessness.

SCIENCE AND THE BIBLE XII

The Flood - Scientific Evidence

The issue of the Flood is closely related to many of the matters we have already covered. It is a major source of alternative explanations for those who reject the popular scientific conclusions about prehistory and certainly brings into question the uniformitarian assumptions upon which so much scientific thinking depends. Though few geologists in the last century have taken the idea of a universal flood seriously, the discipline itself has moved more and more in the direction of catastrophism as uniformitarian assumptions have failed to explain observable conditions.

The Flood is also important in refuting evolutionary interpretations of fossil evidence. Fossil strata are interpreted by scientists using evolutionary assumptions, while many Christians see that same fossil evidence as pointing toward a catastrophic cause. In the next two weeks, we will look both at the biblical and scientific evidence surrounding the idea of a universal flood.

THE FLOOD AND THE FOSSILS

We have already seen that the reasoning used by evolutionists to interpret fossil evidence is essentially circular in nature, in addition to being highly synthetic (with evidence from widely separated sites being combined to form the "geologic table"). Evidence that contradicts the accepted interpretation is explained away as some sort of "inversion."

We should note, however, that an explanation of fossils that depends on the Flood as a fossil-forming mechanism would on the whole anticipate findings very similar to those expected by evolutionists. For instance, in a flood of the kind described in Genesis, sea creatures would be buried first, followed by amphibians, who lived near the seas where the waters first began to rise. As the waters covered the land, the slow-moving reptiles would be the next to go, then the birds, who, though mobile, would quickly run out of food, lacking the stamina to fight the elements. The larger mammals would be able to flee to higher ground more effectively, and would be the last to be overtaken by the flood waters. Unlike the evolutionists, however, flood geologists would have no difficulty with finds that included fossil layers "out of order," of which there are legion.

An important but often overlooked point is that the very existence of fossils points to a sudden catastrophe. Fish very rarely die a natural death, but when they do, they are quickly devoured by other sea creatures. Fossils of sea life could only occur as a result of a sudden catastrophe that either buried them under the water or else beached them and then buried them quickly. Similarly, land animals who die do not usually remain intact long enough to fossilize. Thus fossils support catastrophism by their very existence, especially in the large numbers in which they are to be found.

EVIDENCE AGAINST A UNIVERSAL FLOOD

A variety of evidence in addition to that provided by fossils is used by those who oppose the idea of a universal flood. For one thing, certain delicate volcanic formations have apparently existed undisturbed for millennia, but would certainly have shown the signs of the magnitude of flooding described in Scripture. Of course, the issue of dating such formations falls under an earlier discussion.

Another problem that is often raised has to do with the distribution of wildlife on the surface of the earth. Why, for instance, do kangaroos and other marsupials occur only in Australia, with no evidence of any migration having brought them there? How could they have gotten there in the first place? Of course, such questions can't be answered by evolutionists any more than they can be answered by flood geologists. Evolutionists, too, would expect some evidence of migration from elsewhere.

Another problem of a biological nature has to do with the mixing of salt and fresh water that would clearly have to occur in a universal flood. How could fish, which depend so much on the saline content of the water in which they live in order to survive, outlive the kind of disruption that mixed salt and fresh water together for months at the least? The only response to this is that they didn't - at least not most of them. In the same way that most of the land animals perished, we should understand that most of the life in the seas did also.

Another question that always arises concerns the capacity of the Ark. Is it possible for samples of all living creatures to be preserved on a boat, even if it was twice the size of a football field? First of all, we should note that the Bible does not say that the animals who came to Noah (he didn't have to collect them) were *adults*. Young animals would have taken up less space, eaten less, and had a better chance of surviving the transition period after the Flood. Furthermore, if God could supernaturally gather the animals in order to preserve them, He could also theoretically place them in a state of suspended animation for the duration - a sort of universal hibernation, perhaps. Young Earth Creationists Whitcomb and Morris have calculated the space necessary to hold however many "kinds" existed at the time, and found that the Ark was sufficient - even for some baby dinosaurs, though if they were around at the time, they clearly couldn't stand the altered conditions of the earth after the Flood.

EVIDENCE FOR A UNIVERSAL FLOOD

Geologists have espoused uniformitarianism since the time of Lyell in the early part of the nineteenth century, but it has never been easy. The problem works in two different ways. In the first place, some types of geological formations could never have formed by processes observable today, even given the millions of years postulated by evolutionists. Such characteristics of the earth's crust as mountain ranges must have come into being as a result of catastrophic disruptions. Erosion and deposition simply could not have produced such phenomena unaided.

On the other side of the picture, certain phenomena that clearly resulted from natural processes such as erosion and deposition do not indicate an age anywhere near that postulated by geologists. Sedimentary deposits at the mouths of major rivers and the saline content of the seas would both indicate an age much less than that required by uniformitarians.

Human population is another factor that needs to be considered. We saw last week that the evidence of genetics points to a unified origin of the human race at a time no more than 150,000 years ago (the "Eve" theory). Scientists have noted that, within the span of history during which such things can be measured, human population has increased at such a rate as to double approximately every 150 years. Given that the rate has increased slightly as health conditions have improved, and noting that wars, plagues, and famines could adversely affect population growth, but

also noting that growth should have been *faster* in the early years if the biblical data about lifespans and climatic conditions is to be taken seriously, working backwards from a current population of seven billion would yield an approximation of 4500 years of human history, at least since the time of Noah. On the other hand, the typical evolutionary estimate of 2.6 million years of human history would require the human population to double at the ridiculous rate of once every 87,000 years (even the relatively conservative "Eve" theory would require a 5000-year rate)!

We should also take note of the canopy theory that is frequently associated with Flood geology. When the Bible speaks of the "windows of heaven" being opened, some believe it to refer to a canopy of water vapor high in the earth's atmosphere that came down in the form of a six-week rainstorm. Biblical descriptions of conditions before the Flood (no rain - Genesis 2:5; the great lifespans of the antediluvians) as well as after it (the rainbow, which could not have appeared without rain, is given as a sign after the Flood that God would never again destroy the earth by water; it would have been impossible with the water canopy gone anyway) are compatible with the canopy theory. There are problems here, of course. For one thing, no positive evidence exists to support the water canopy theory; for another, the rotation of the earth would tend to gather a cloud of water vapor into a ring around the equator resembling the rings of Saturn rather than allowing it to remain uniformly distributed throughout the upper atmosphere.

Other evidence does point to a time in the past when conditions on earth were radically different, however. The existence of coal in Antarctica and well-preserved remains of woolly mammoths in Siberia (so well-preserved that they still have the remains of tropical grasses in their stomachs!) indicate that at one time the climate of the entire earth must have been subtropical. Furthermore, the water that makes up the polar icecaps could do a very nice job of flooding the earth, thank you, especially if the features of the earth's crust were less pronounced than they are today.

Finally, we should note that some attempt to relate the continental drift theory to the Flood. The evidence indicates that the continents once fit together like a great jigsaw puzzle and broke apart some time in the distant past. Could the Flood, with its associated disruptions of the earth's crust, have produced this phenomenon? It certainly would make the marsupials easier to explain!

SCIENCE AND THE BIBLE XIII

The Flood - Biblical and Archaeological Issues

Last week we looked at some of the scientific evidence associated with the biblical teaching of a universal flood. Today, we will conclude our study of the Bible and science by addressing some of the issues connected with the Bible itself, namely, the question of whether the Flood was universal or local and the relationship of the biblical account to other flood accounts found in the records of other cultures.

UNIVERSAL OR LOCAL?

A straightforward reading of the account of Genesis 6-9 clearly gives an impression of a universal deluge. Inclusive language is used numerous times in the passage. Furthermore, from the standpoint of biblical authority, we must at least understand it to be universal in terms of human life. It must be acknowledged, of course, that the Bible often uses universal language in a restricted sense that is not all-inclusive. For instance, when Augustus declared that "all the world" should be taxed, he really meant the entire Roman Empire. When men from the uttermost parts of the earth came to see the wisdom of Solomon, Sheba in the southern part of the Arabian peninsula appears to be about as "uttermost" as it got. Even in theological terms, we recognize that "all" doesn't always mean "all" in a universal or all-inclusive sense with regard to salvation.

Several aspects of the biblical account point to a universal understanding of the Flood, however. First of all, the comment that the mountain peaks were covered is physically impossible for a local flood. Not only that, but the final deposition of the Ark on Mount Ararat points in the same direction - a local flood would not deposit the Ark on the highest mountain in the region (noting that the correct reading is "the mountains of Ararat" does not improve the picture significantly).

Secondly, the idea that the "fountains of the great deep" were broken up conjures up a picture of something much more extensive than Mesopotamia - clearly this is talking about something more drastic than earthquakes in the floors of the Red and Mediterranean Seas.

Thirdly, the provisions made by God for the preservation of life would have been totally unnecessary in the case of a local flood. God could have simply told Noah to move, and the animals could have done the same (if God brought them to Noah, He also could have sent them to India or Africa). Especially with 120 years to prepare, moving would have been the obvious solution.

Fourthly, a local flood would have made God's promise in Genesis 9 meaningless; even if the local flood to which some think these chapters refer were a real "whopper," there certainly have been other bad floods in the history of mankind.

Lastly, the analogy made by Peter in II Peter 3 loses its significance if the flood in the days of Noah was not universal. There can certainly be no question that the destruction of the Last Days to which Peter compares the Flood will be universal in scope.

THE EPIC OF GILGAMESH AND OTHER MYTHS

Another piece of evidence that supports the idea of a universal flood is the existence of myths in many cultures all over the world concerning such a flood. These stories compare in many surprising details to the Genesis account despite the fact that the overall picture presented in these legends is vastly inferior to the biblical narrative. What is important is that they exist at all; a consciousness of a universal flood in the distant past seems to permeate all cultures.

Scoffers, of course, will point to some of these accounts and argue that the Genesis story is simply a somewhat elevated version of the same pagan myth. The Epic of Gilgamesh is perhaps the best known of these flood stories. It came from ancient Mesopotamia, the land of Abraham's forebears, and told of a universal flood survived by an ancient hero and his wife and family. Though similar to the Genesis account in many details - the number of people, the use of the raven and dove, the sacrifice after the flood, etc. - it differs in its picture of the gods. It contains a crass form of polytheism; not only are the gods fighting one another, but they are terrified of the flood over which none of them seems to have control. Furthermore, when the flood ends, the gods swarm around the sacrifice "like flies" - the poor souls had not been fed for months! To see such a tale as the source of the Genesis account is ludicrous; it is far better to recognize in the Gilgamesh epic a corrupted form of the truth recorded accurately by divine inspiration in Scripture.

Similarly, the tales of peoples from China to Hawaii to Fiji to America to Australia speak of a great flood. While corruptions like those found in Gilgamesh are present in these as well, the existence of these myths in widely separated cultures argues for the universality of the event upon which they are based (note that local flood advocates among Christians argue that the descendants of Noah simply passed the stories of the Great [local] Flood on to their children, who passed them on for generations as they migrated to places around the globe).

Thus both the historicity and universality of the flood are supported in God's Word. It is portrayed as an example of the seriousness of man's rebellion against God, the reality of God's judgment in the past, and the reality of His judgment in the future.