

**Rescuing Science
from
Preconceived
Beliefs**

**Religious Beliefs
at the
Interface of Science and Faith**

2nd EDITION

by

Dr. R. Gary Chiang, Ph.D.

Foreword by
Dr. J. Douglas Oliver, Ph.D.

*Rescuing Science from Preconceived Beliefs:
religious beliefs at the interface of science and faith.*
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I would also like to acknowledge the late Dr. Arthur Custance (1910-1985) for his many works that bring Scripture and Science together in ways that are both insightful and scientifically logical. Although our paths never crossed, and some of our opinions may differ, we share a common vision to fully integrate fundamental Christian Theology with the established scientific facts, and to show that redemption through Jesus the Christ is a reality that logically fits into a modern understanding of our physical world.

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Foreword

Some years ago, Gary Chiang and I did our Bachelor and Master of Science degrees at the same time and in the very same place, the Department of Zoology at the University of Toronto – but we never met. Now, decades later, we have been led to cross paths because of another common interest and concern – the evidence regarding Origins. In fact, we have independently come to the same conclusion that the modern world, and especially science, is too dogmatic in belief regarding the evidence concerning the teaching of evolution versus creation. We think that more of the scientific case for both sides needs to be heard in public as well as in private forums, schools and universities. We have also taught about this controversy in our university biology classes in Canada and the United States, respectively. (I have taught about this at government/secular and Christian universities.) Far from being uninteresting and unreasonable, addressing this conflict is an approach that actually helps the secular and religious students and others to think more rationally and critically. This approach has helped my understanding of this topic, and I believe it can help you.

Dr. Chiang's book is also a much needed addition for the teaching of origins because it provides new and revised information relating to worldviews within this debate. Gary highlights the need for scientific openness, as well as "good science" that recognizes the influence of such variables as a scientist's worldview upon the interpretation of data. He clarifies several *scientific challenges to evolutionary thinking* including the lack of transitional organisms, the "evolution of evolutionism," and homeostasis and geology. He and I also consider the theory of evolution to be *religious* in nature, forming the basis of a number of belief systems, such as the New Age Theology embraced by James Redfield's best-selling novel, *The Celestine Prophecy*. In addition, his book compares and discusses scientific evidence for old-earth/young-earth models; genetic engineering and biblical revelation; the Shroud of Turin and nuclear radiation; etc.! Yet such topics, diverse as they are, have a compelling unity, namely the incorporation of the effects of worldviews and religious beliefs on the interpretation of scientific information.

Another advantage to Gary's mind-freeing approach is that it allows us to consider theories that bring together biblical and scientific data. In one instance, Gary reminds us of the view of the late Dr. Arthur Custance who had an intriguing idea about a possible divine "genetic engineering" by which God prepared the physical body of Christ from the "seed of the woman [Eve]." Did you ever wonder why the Saviour had to be born of a virgin? Using Scripture and facts from the science of embryology, Custance (and Chiang) indicate that a woman's normal egg had to be used for Jesus to inherit His true humanity. Yet to be perfect and without sin, this Saviour also had to avoid inheriting the "sin" nature from the father of all sinners [Adam]. This condition could only be met by the theological concept and physical reality of a virgin birth.

In another instance, have you ever wondered how God created the first pair of animals of a kind? Chiang suggests that the cloning of Eve from Adam not only produced a single line of humans that could be redeemed by a single sacrifice, it also placed the biological limits on sexual reproduction. When this theological principle is applied to the creation of animals, then only those creatures that are descended from the same original mating pair (or kind) have the biology to interbreed because the first female was cloned from the first male. This explains why animals cannot breed outside their own kind, and it poses yet another major obstacle for theistic evolutionists who believe that God used evolution to create different species of animals from a common ancestor.

These and other possible answers to Origins issues can be yours, as you take in this fine and understandable book by Dr. Chiang – *“Rescuing Science from Preconceived Beliefs...”*

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Chapter 1

RESCUING SCIENCE

In his response to the tales of human atrocities that were occurring during the Vietnam war, Albert Szent-Györgyi (1893-1986) lamented,

There can be little doubt that mankind is going through the most critical period of its history, a period which can very well end with his extinction in the not too distant future.¹

Szent-Györgyi was the discoverer of vitamin C and a Nobel Laureate for Medicine, and like most other American scientists, he firmly believed that humans had a long evolutionary history in which the struggle to survive gave rise to our species. Assuming an evolutionary past, he hoped we humans could put aside our inherent nature to out-compete our neighbour, and to evolve toward

a sunlit, peaceful and clean world, marked by good will, human solidarity, decency and equity,

1. A. Szent-Györgyi, *The Crazy Ape* (New York: The Philosophical Library, 1971), 9.

and free of hunger and disease, with a place for everyone.²

He saw the cruelty and immorality in humans as a vestige of our evolutionary history, a vestige that had to be discarded in order to lead to a better world.

This belief in the continual improvement of our species until we reach a state of biological 'bliss' is the driving hope of many who see that humans are basically good. By chance, or divinely directed evolution, we have struggled to evolve to where, and what, we are today. And as our species continues on its random course into the future, we shall overcome those primitive animal characteristics needed in the evolutionary process to get us to where we are, so that we can proceed unhindered to where we ought to go.

But in direct contrast to this belief, the Bible provides another explanation for the origin and nature of the human being, and with it, a completely different reason for man's inhumanity to mankind.

According to the first two chapters of the book of Genesis, the first man, Adam, was created as a perfect being in the image of God. The first man ate only plants (Gen. 1:29), and lived in complete harmony with nature and with God. From a piece of his body came the first woman, Eve, formed by a process that could be described in modern terms as divine genetic engineering. Her creation gave human beings the ability to procreate, to produce children as perfect as the original parents. Yet before they were able to produce perfect offspring, the entire created order was turned upside down by the first couple's decision not to follow the laws of God. This defiance placed an obstacle between God and His creation. From this initial rebellion, humans began to regress, spiralling downward into the depths of hate and misery.

2. Szent-Györgyi, 83.

These are two divergent views of the history of mankind, evolution and creation, but each view is thought to represent a true account of our origins. Evolutionists base their belief on scientific evidence that shows life arising by the process of natural selection over millions of years. This view is considered to be a scientific view, and is adhered to by the vast majority of scientists in North America. Creationists who believe that God created Adam as a perfect organism, and from Adam made Eve, base their belief on the origin story found in the first book of the Bible. This view is considered to be a religious view, and although rejected by most scientists, it is adhered to by the majority of adults in North America.

These two views are diametrically opposed, and are clearly antagonistic. This antagonism has given rise to a major conflict at the interface between science and faith—evolution versus creationism. Today, it is common to find proponents on either side of this conflict interpreting the scientific facts to support their own view, and insisting that their view represents reality. Some religious organizations discount any form of evolution in their explanation of the world, and employ science textbooks that are anti-evolution and pro-creation. Evolutionists have been able to ban the teaching of creationism from the public school classroom. For these Evolutionists, knowledge based on the Bible, such as the six days of creation, or Noah's flood, is considered to be no more valid than information gained from crystal ball gazing, Ouija boards, or tarot cards.

As a consequence of this conflict, an intellectual barrier exists between Science and Christianity. This barrier has left some Christians wondering if there is any real benefit to pursuing studies in science, since science seems to invalidate or supersede any knowledge revealed by the Bible. Other Christians have accepted that the popular theories of science are true, and maintain their confidence in the Bible by reinterpreting Scripture to agree with the tenets of modern science. Science becomes the

pillar of truth, and biblical knowledge, although still very important for religious reasons, is not considered in any way to be applicable to science.

This book has been written for the reader who would like to understand the root cause of this conflict between science and faith, a conflict that is best exemplified in the origins debate on evolution and creation. This conflict is not due to the discovery of scientific facts, nor to how science is done, but it is due to our religiously held beliefs which affect how we develop theories to explain the scientific facts. It results from what we *choose* to believe, and not from what the scientific facts are *forcing* us to believe. In a practical sense, these beliefs are not beliefs in a religion or dogma, but beliefs that are religiously adhered to, and sometimes go unnoticed to the person holding onto them. Such beliefs, when hidden, can give rise to prejudices causing us to make biased judgements prior to appreciating the full merit of any scientific or biblical fact.

In our modern scientific world, religion and science are generally thought to be mutually exclusive. Many scientists who are religious people as well have testified that their faith and their science pertain to different forms of reality. Religion and science function in a particular way in their own fields of influence; neither ought to weaken the importance of the other. They should maintain an 'arm's length' between them. Yet, when viewed in light of the enormity of the conflict between science and faith, this sentiment, although admirable, may be somewhat naïve. Religious beliefs have always influenced human thinking and action. To believe that science, a human process, is immune to any shortfalls in human reasoning is an unrealistic assessment of science.

In this book I have listed numerous examples of the role of religiously held preconceived beliefs in the construction of scientific theories, especially those theories that impinge on biblical revelation. By doing so, I hope to persuade the reader to

recognize that a theory deduced from the established facts of science is no more or less valid than a theory based on biblical revelation. Indeed, both are religious in nature, as both require a certain degree of faith. Once this similarity is realized, the major obstacle that separates Science and Christianity disappears. It becomes far easier for enthusiastic young-earth creationists to engage in a logical scientific discussion of evolution or geology when they have gained enough knowledge about science to know that evolution and the concept of an ancient earth are not *facts* of science, but are *theories* of science. As theories of science, constructed from the available scientific evidence, these concepts can be discussed based on their logic. That is to say, a scientific knowledge of the theory of evolution can be used by the creationist to clarify this theory for the evolutionist who often considers it a fact without actually knowing what the facts are.

Moreover, by recognizing the preconceived beliefs at the interface of science and faith, this book encourages the integration of scientifically established facts with biblical revelation. Bringing science and Christianity together will provide valuable insights into our understanding of reality. As the late Arthur C. Custance observed, truth does not reside

only in Science nor only in Scripture but[...] both [are] necessary, each contributing *to* and receiving light *from* the other.³

By understanding the role that our own beliefs play in the interpretation of the scientific facts, I hope to encourage Christians to look beyond any of the conflicts between science and faith, and to combine Science and Christianity into a mutually beneficial relationship. Such a relationship is possible when the facts of science are rescued from preconceived beliefs based on religion,

3. E. M. White, "Biography of Arthur C. Custance (1910-1985)," <http://www.custance.org/insight.html> (April 2001).

a human invention, and applied directly to Scripture, the revelation of God.

Our religious beliefs have always influenced science, but unfortunately, such beliefs have tended to go unnoticed or ignored. This ignorance has had detrimental effects. It has altered the course of scientific discovery, and can retard spiritual growth. To fully appreciate what Science can tell us about the world around us, we need to recognize how beliefs have hindered, and continue to hinder, scientific discovery. We need to rescue science from preconceived beliefs, and to allow the facts, established by the scientific method, to truly speak for themselves.



Chapter 2

RELIGIOUS BELIEFS AND WORLDVIEWS

A young war bride, a few months married and excited about the new life growing inside of her, waited anxiously for her love to return to England from the dreadful battle fields of Europe ravaged by World War II. Her beau, not much older than herself, fought valiantly for his country, his home, and his girl, to protect the right to raise their family in a world free of oppression. The horrors of war brought their dreams to a sudden end. Her husband was killed, slain by the guns of a German army.

Over half a century later, time *has* healed many wounds. The young widow remarried, possibly out of love, or maybe to ensure that their son had a father. And her son, the child the young soldier never got to hold, now has a son of his own. Although this soldier's widow has since retired from a very successful career, has been actively involved in many volunteer organizations, and is well respected in the community for her many acts of kindness, she still harbours, within herself, a strong feeling against the German people. This feeling arises from a religious-like belief that fosters a prejudice preventing her from becoming involved with anyone responsible for the death of her husband.

While time has healed many wounds, her negative attitude toward Germans, even toward those who opposed Hitler's policies, has not changed. Such is the nature of a religious-like belief that underlies a prejudice. Our allegiance to a particular belief may be clearly justified, but once it becomes rooted in our subconscious, it affects our opinion of, and attitude toward, people, places and things.

The Winston Dictionary defines prejudice as "(1) a hasty and premature judgement; (2) a bias, favourable or unfavourable, usually an unreasoning objection to a person or thing; (3) injury or harm as a result of hasty or unfair judgment." In today's world, prejudice is used to describe relationships between individuals or between ethnic groups, referring to situations where a person's attitude is predetermined by events that are not directly associated with that situation. A young mother left a widow by a German army finds it difficult to accept anyone or anything that is related to Germany or the German culture, regardless of how such people or things could be of benefit to her. Today, more than 50 years since the loss of her first husband, this woman still avoids developing any friendships with German people even if these people have interests very similar to her own. Her negative attitude arises from something that is much stronger than a premise, or a presupposition she may have about this group. The loss of her husband was a tremendous tragedy, and although in her mind she may have been able to deal with this loss, it touched her very soul. Its memory has instilled in her a religious-like belief that causes her to make "a hasty and premature judgement" about the value of a friendship with someone of German descent.

By contrast, the term "science" is defined by the Winston Dictionary as knowledge of "general truths or particular facts, obtained and shown to be correct by accurate observation and thinking." The "accurate observation and thinking" should preclude religious beliefs from science. In science, our judgements should depend on the facts of the situation. We should reserve

judgement until we have knowledge of the facts, whether these facts arise from a reproducible scientific experiment or a historical event. And the facts established by science ought to be accepted by all intelligent people even if that science was carried out by Nazis in Germany, or Creationists in North America. But science is a human endeavour, and we humans are not totally devoid of feelings. None of us, including the scientist, can avoid harbouring a religious-like preconceived belief, whether favourable or unfavourable, for well-established scientific or historical facts, such as the movement of the planets, or the existence of viruses. These preconceived beliefs are unavoidable. They simply become part of our character from the experiences we encounter as we are growing up. And once developed, each has the potential to give rise to a strong prejudice.

I was raised in a rural Canadian environment during the end of the postwar baby boom. My religious beliefs were shaped by my nurturing and supportive family, by what I read, by what I listened to on the radio or watched on television, and by my schooling. Although my father was a war veteran, he joined the Canadian army near the end of WWII, and he never saw active duty. The war with Germany did not directly affect me, and I feel no animosity toward German people. Yet I did develop beliefs which encouraged me to accept, among other things, that the best political system was democracy, and that the only true religion was Christianity. Through the years, my understanding of religion has broadened and my personal commitment to Christ has strengthened, but my attitude toward politics and ethnicity has been tempered. I began to believe that American-style democracy has its flaws considering the assassinations of a president and his brother, and the highly unsuccessful American venture into Vietnam. Nonetheless, I believed without hesitation that the US involvement in global affairs was justified, and that the use of force in the name of democracy was really an act of self defence.

My tendency to accept US military action without question came to light when I had a conversation with an Islamic Arab graduate student at the time of the first Persian Gulf War. Many of us in the "West" believed that the Americans had no choice but to enter a war against Iraq in order to free Kuwait from Iraq's forcible take over. The Arab student saw this quite differently. First of all, he was more aware than I was of the events leading up to this war, noting that Iraq had given many warnings of its impending invasion of Kuwait, yet the US said nothing to oppose this action. In fact, it appeared to the Arab student that the US encouraged Iraq to attack Kuwait by not voicing any objections to Iraq's intentions. Then after Kuwait had been invaded, the Americans attacked Iraq with the excuse that Iraq showed aggression. In other words, what we in the West were regarding as the "right" or "just" thing to do because Iraq invaded Kuwait, the Arab student saw the attack by the US quite differently. He believed that the US had encouraged Iraq to take over Kuwait, and then used Iraq's invasion of Kuwait as an excuse to attack Iraq. This action led to the establishment of an US army base in the heart of those countries which produce the oil upon which much of the US economy depends. We in the West viewed the military action by the US as a necessary step to correct an injustice; the Islamic Arab student, in his view of the very same actions, judged the US to be dishonest, deceitful and aggressive. Hence, the same facts viewed through a different set of religious-like beliefs can lead to very different "truths."

Regardless of what might be closer to the *real* truth in this incident, how we deal with *any* situation is greatly affected by our preconceived beliefs. These beliefs can give rise to prejudices causing us to form opinions long before we have a full understanding of the facts. A young mother made a widow during WWII finds it difficult to accommodate or embrace anyone or anything of German origin. My upbringing in a democratic Christian environment, heavily influenced by American culture,

predisposed how I would respond to the US-led invasion of Kuwait and Iraq. Being raised in an Islamic, anti-American culture, the Arab student condemned the US-action in Kuwait. We each have our own set of preconceived beliefs. Simply by being raised a human among humans, we have acquired, and continue to foster, a number of deeply held beliefs which influence how we respond to the world.

2.1 Worldview

Since we bring our own preconceived beliefs into any scenario, these beliefs become just as important in determining what we think “to be correct by accurate observation and thinking” as the facts themselves. The importance of preconceived beliefs leading to prejudice as an element of human nature is well recognized in professions which require just decisions to be made, decisions that depend entirely on the observed facts. In professional sports, referees must be impartial to the competing teams, and in a court of law the jurors are chosen according to well-established principles that serve to weed out those persons more likely to be prejudiced against the accused.

For some reason, however, it appears that the role of beliefs in influencing human reasoning has been put aside for the professional scientist. Preconceived beliefs are considered to play little or no role in collecting scientific facts or developing scientific theories because we are taught that science is a rational activity wherein judgements are made by the logical deduction of the available facts. The objective scientific knowledge gleaned from experimentation and observation should not be influenced by emotions associated with preconceived beliefs. However, scientists are affected by their personal biases. As stated by the geographer Jeffrey Lee in his book *The Scientific Endeavor*:

It is often assumed that science is *objective*, in that evidence from the real world determines if a theory is correct, and the prejudices of the scientist do not affect the results presented. However, scientists are people, and they have their biases like everyone else, which adds a *subjective* element to science[...]. [M]any scientists who trust a theory for many years are unlikely to discard the theory even if there is strong evidence against it.¹

Scientists are human too, and like all humans, they have the potential to be prejudiced by their preconceived beliefs. However, the prejudicial nature of some scientists is particularly disturbing since the biases influencing science, unlike those in professional sports or courts of law, often go undetected or are totally ignored. As a result, little consideration is given to the possibility that the support for scientific theories, such as evolution or an ancient earth, may be due to what scientists *want* to believe, and not to what the scientific facts are *compelling* us to believe. As we shall see later in this book (chapter 4), it is quite possible that the theory of evolution lacks solid scientific support, but due to a preconceived belief which prejudices the scientist to accept evolution and disregard creationism, it remains the only academically acceptable theory of origins.

In the popular media, the debate on origins is described as science in the form of evolution, versus religion in the form of creation science. However, the attitude favouring scientific theories over doctrines of Christianity is not restricted to the origins debate. Christians who pursue academic study have often found themselves obligated to view other Bible stories, such as Adam and Eve, Noah's flood, the crossing of the Red Sea, and the virgin birth and resurrection of Jesus as allegories or metaphors

1. J. A. Lee, *The Scientific Endeavor: A Primer on Scientific Principles* (San Francisco, CA: Benjamin/Cummings, 2000), 20-21.

used to help early humans cope with the world around them. Because Science is believed to provide objective truth that is based on experimentation and observation, scientific knowledge tends to supercede biblical knowledge whenever the two disagree, as they do with any of the miraculous events described by Scripture.

What goes unnoticed in these debates is the fact that the disagreements are not between Science, on the one hand, and Christianity, on the other. It may not be scientifically possible to prove the facts of biblical revelation, but neither is it scientifically possible to disprove them. In a similar fashion, the theory of evolution may have arisen from the scientific study of the natural world, but the scientific method has yet to establish the theory of evolution as a fact (as is discussed further in Chapter 4). On a superficial level evolution may appear as a fact because no other theory is allowed to be discussed. Biblical revelation is dismissed even before the facts are considered. Interestingly, there is really no logical reason to exclude biblical revelation, except for the belief that all phenomena in our physical world of time and space are rooted in natural processes – the supernatural does not exist. This belief is a central doctrine of a religious belief known as Naturalism.

Naturalism states that all scientific facts can be explained by natural processes, and explanations that depend on the miraculous acts of a supernatural force must be avoided. Not all proponents of evolution are firm believers in Naturalism, for some do believe in a divine Creator who initiated the process. As with biblical revelation, there are different degrees to which people will support Naturalism. But a person's religious belief tends to correlate with the acceptance of certain scientific explanations. This predictability has given rise to its own bias such that Creationists are often associated with fundamental 'born-again' Christians, and staunch Evolutionists are often thought of as anti-religious atheists or agnostics.

The importance of beliefs in influencing the interpretation of scientific data is depicted diagrammatically in figure 2.1. This figure denotes that scientific methods (i.e., measuring, weighing, experimenting, observing, etc.) are the means by which the facts are collected. Left on their own, these facts are neutral, objective, and relatively free of distortion. But these facts are meaningless until they can be placed under a rubric that describes what is really true about our physical universe. In other words, these facts, or segments of scientific information, need to be used to construct theories to explain why they exist. It is during the process of theory-building that Science loses its objectivity. The cause for the loss of objectivity is shown in the diagram as a lens through which the mind of the scientist sees the facts. The mind may be able to construct a theory to logically explain the facts, but how the facts are seen is first determined by the characteristics of this lens. As noted by many scholars, this lens is our worldview.

If the lens of our worldview is aimed towards Naturalism (the left arrow in figure 2.1), our logical thinking excludes the spiritual nature of humankind and the existence of a spiritual realm. The invisible things of God from the creation of the world (Romans 1:20) are considered to be invisible because they do not exist. This distortion of the lens serves to place scientific theories in conflict with doctrines of Christianity, encouraging the scientist to avoid any explanation that may give credence to the Bible.

If the lens is aimed towards what we consider to be valid biblical revelation (the right arrow in figure 2.1), our logic fails to appreciate all that science can tell us about certain biblical truths. There are beliefs that some Bible literalists dogmatically adhere to that could be modified by the scientific facts without reducing in any way the inerrancy of Scripture.

When the lens takes into account the truth revealed by science and the truth revealed by biblical revelation (the centre arrow in figure 2.1), the mind will be able to construct a view of

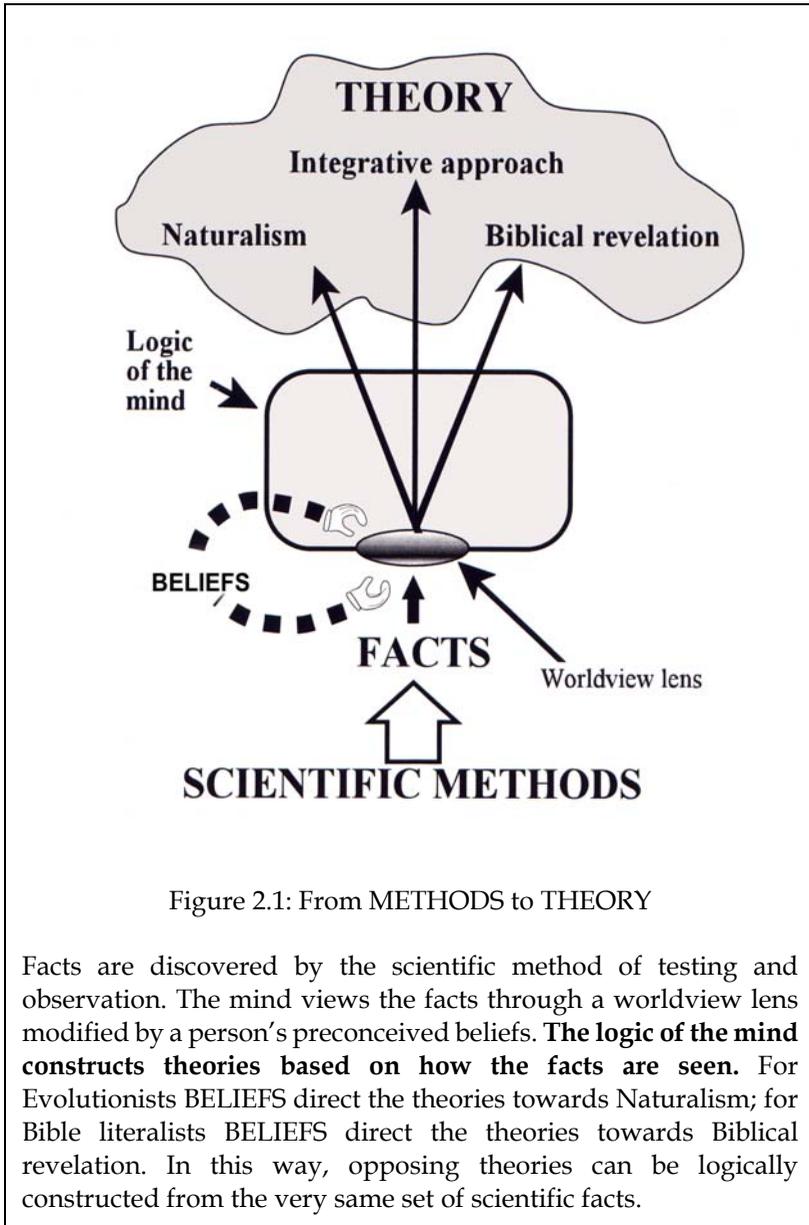


Figure 2.1: From METHODS to THEORY

Facts are discovered by the scientific method of testing and observation. The mind views the facts through a worldview lens modified by a person's preconceived beliefs. **The logic of the mind constructs theories based on how the facts are seen.** For Evolutionists BELIEFS direct the theories towards Naturalism; for Bible literalists BELIEFS direct the theories towards Biblical revelation. In this way, opposing theories can be logically constructed from the very same set of scientific facts.

the world which harmonizes the established facts of science with biblical revelation.

Because our preconceived beliefs determine which way the lens is aimed, these beliefs are the fundamental component that determines which theories we believe to be true. In this way our religious beliefs, not the scientific facts, lead to the conflict between Science and Christianity. To alleviate this conflict between two opposing views, the first step is to determine the religious beliefs of each of the proponents in the debate. The next step is to ensure that the scientific facts and theories being used in the debate are freed from interpretations based on these preconceived beliefs.

The role of beliefs in preventing scientists from arriving at the absolute "truth" by using scientific facts and human reasoning alone may be denied by many people in our modern technological world, but it has been known for centuries in philosophy. We must come to the realization that our opinions and attitudes are shaped within us long before we have any grasp of what the facts are. As facts are gained, they are assimilated by our consciousness according to beliefs that were instilled, either actively or passively, into our very being long before we could logically weigh the importance of one fact over another. In our journey from infancy into adulthood, we are encouraged to accept some beliefs and reject others, and we eventually form a preconceived belief that modifies the worldview through which we consider not only the origins debate, but any theory used to explain facts, whether those facts are scientific, historical or revealed by Scripture.

Although we are all influenced by our beliefs, it is important to know that these beliefs do not force us to be prejudicial. By knowing how our own beliefs affect our decisions, we can compensate for their effects, and by doing so, we can become better equipped to judge what is really true about the universe we were born into. This principle applies as much to a widow of World War II, and an Islamic Arab graduate student, as it does to

the scientist bent on explaining all phenomena based on natural causes. It also applies to almost every area of life where decisions are made, and not just the interaction between Science and Christianity. This point needs to be kept in mind whenever Science is used as the foundation upon which to build your theology.

As Arthur C. Custance laments, "Nothing quite equals the ignorance of the average scientist about theology, except perhaps the ignorance of most theologians about matters of science."² I have been fortunate enough as an academic to collaborate with both scientists and theologians, and I tend to agree with Dr. Custance. This reciprocal ignorance has caused these scientists (including myself) and theologians to make decisions which are guided more by their preconceived beliefs than their understanding of the facts.

This ignorance is particularly detrimental at the interface of science and faith, and is clearly identifiable in the debate on origins. The Evolutionist claims that evolution is a fact of science that is as obvious as the fact that organisms reproduce. The Creationist believes that the biological mechanisms associated with reproduction prevent one species from evolving into another. In engaging in this rhetoric, neither proponent fully understands the foundation of their differences. It is not in the scientific facts, but in their preconceived beliefs which have prejudiced their view of the facts. And this prejudice goes unnoticed like the lenses of any good set of corrective prescription glasses. If the lenses properly correct for the focus of the light rays, these lenses become invisible to (i.e., unnoticed by) the wearer.

My scientific training has been in one of the less familiar areas of science, and it was in this area that I began to truly appreciate how beliefs affect research. My research on the nerves

2. E.M. White, *The Biography of Arthur C. Custance: A Christian in the World of Science*, ed. R. Gary Chiang (Hamilton, ON: Doorway Publications, 2007), 118.

Arthur C. Custance
(1910 - 1985)

An accomplished government scientist with experience in a number of different academic disciplines, Custance noted that the average scientist knows as little about theology as the average theologian knows about science. Through his many published works and public presentations, he encouraged Christians to take seriously both the established facts of science, and the truth revealed in Scripture. (Photo taken in 1970)



and muscles of lobsters and insects is relatively unknown since it involves very specialized systems that are not of general interest to the average person. But it was in this arena that I learned the importance of beliefs in determining how the results are interpreted. Having learnt this truth and its implications for scientific discovery, I am able to see more clearly the role that religious beliefs play in emotionally charged debates.

This training has also afforded me the intellectual tools to analyse the nature of the evolution/creation debate. In essence, this debate continues because there is no clearly defined set of scientific facts that can falsify creationism. This statement may come as a surprise to many Evolutionists who firmly believe that their favourite theory is beyond reproach, but there is a very good reason why they may have come to this conclusion. The theory of evolution is taught first as a worldview, then the facts of science are interpreted according to this worldview. In other words, the mind must be trained to accept evolution, not only as a valid explanation of origins, but as the **ONLY** valid explanation of origins. Once this belief has been instilled into the heart and mind

of the individual, it is adhered to religiously. The same criticism can be directed towards creationism. Neither theory is a natural outcome of an understanding of the scientific facts. The facts are seen to support evolution or creationism once the mind has been trained to accept either worldview.

We take for granted the religious nature of creationism since children are taught this theory in their homes or churches. Because of its association with religious training, creationism has been banned from the public school classroom. It is a religion. But what about evolution? If it is a religious belief, then it must also be passed down from generation to generation. How this is accomplished is the topic of the following chapter.



Chapter 3

PASSING ON THE FAITH: *INSTILLING A RELIGIOUS BELIEF IN EVOLUTION*

In 1859, Darwin published his theory on the origin of species by means of natural selection. At that time, the creation of individual “kinds” of organisms, as described in Genesis 1, was considered by many people to be a scientifically proven fact. That biologists were able to group organisms into distinct categories could only be explained if organisms were created as unique groups of interbreeding populations (a species or kind), with each particular species appearing today as it did when it was first created. Coupled with beliefs in the truth and authenticity of the Holy Scriptures and the evidence of intelligent design in nature, the overriding opinion of the scientific world in 1859 was quite different to what it is today. The geologists in the 1800's may have started to question the age of the earth as more objective scientific facts of physical geology were being discovered, but they did not abandon their religious convictions. Instead of denying the authenticity of Scripture, they developed new theories (e.g. the Gap Theory and the Day/ Age Theory) to harmonize the “works” of God in nature with the “Word” of God in Scripture. In light of the belief that the natural world showed proof of a supernatural

creator, there was little doubt that such a Being existed, and that the God of the Bible created the properties of matter, properties that were being uncovered by scientific investigation. Before Darwin, it appeared to be impossible to study nature without seeing the works of the Creator in the creation.

Since the time of Victorian England, the opinion of the scientific community has changed considerably. If the theories of creation and evolution were placed on either side of a pendulum today, we would see this pendulum located very close to, if not directly on, the side of evolution. Many modern Evolutionists believe that this overwhelming acceptance of evolution resulted from the increase in scientific knowledge, and in more than one case Evolutionists have linked the belief in evolution to science literacy and the belief in creationism to science illiteracy. Evolutionists assume that an adequate understanding of the many varieties of organisms found on earth (biology) and in the fossil record (palaeontology) will discourage any belief in special creation. In much the same way that an increased understanding of planetary movements showed that the sun is the centre of our solar system (heliocentric solar system) rather than the earth (geocentric solar system), Evolutionists believe that modern scientific knowledge should silence creationism. In the mind of today's Evolutionist, there is no more doubt about the theory of evolution being true than there is about the planets revolving around the sun.

Despite the fact that evolution has permeated all areas of academic study, and has replaced creationism as the prevailing theory of choice among scientists, it is still very debatable whether or not its acceptance was due to the discovery of irrefutable scientific evidence. Had such evidence been found, creationism would have gone the way of the geocentric solar system. Yet creationism still maintains a grip on well-educated people. This grip is so strong that anti-creationists must resort to using courts

of law to prevent the teaching of Creation Science in the classroom.

Evolutionists, whether they are scientists or theologians, are often puzzled why large segments of our population still believe in creationism in light of all the scientific evidence used to support evolution. The answer to this phenomenon is actually quite simple. As it was in the days of Darwin, the evidence used to support evolution can also be used to support creationism. Unlike the belief in a geocentric solar system that crumbled at the scientific discovery of new knowledge, many newly discovered scientific facts actually support creationism. Our attitude toward evolution is largely determined at an early age from what we are taught, not from the logical deduction of the available scientific evidence. Long before we had the mental capacity to understand what science is, we had already developed a disposition which determines if we will place our faith either in the God who created this world or in the world which created this God.

3.1 An early experience with the origins debate

To fully appreciate the fact that we, while still children, are predisposed by our environment to accept either a supernatural or a natural explanation of life, ask a child what their concept of God is, or recall (if possible) when you first encountered the origins debate. My first encounter occurred with a young atheistic Evolutionist when I was in grade school, long before I could fully appreciate the significance of the study of science. This early experience left a lasting impression on me, and serves to emphasize the fact that the origins debate can be fought quite vehemently even with a limited understanding of the science involved in the study of origins.

I was raised in a fundamental Christian environment and was never taught to accept the concept of evolution, even within the public school system I attended. When I first encountered an

Evolutionist, my feeling was one of amazement. I had no reason to doubt the accuracy of Scripture, and even if Scripture was fallible I still had no reason to doubt the existence of God. I had made a personal commitment to God, and although this commitment could not be measured by scientific means, for me the commitment was real. As a young man of 12, I was simply astonished to discover that a fellow student and a new friend of mine was an atheist. While adults are better able to articulate their convictions, his reason for accepting atheism was his trust in science which, he believed, heavily supported the theory of evolution. For him, science not only demonstrated that God was not needed, science eliminated the supernatural from his reality. Without giving much thought to the different philosophical approaches to the question of evolution or creationism, this friend and I engaged in many heated debates armed with little more than anecdotes used to support one view over the other. For us the question was of paramount importance, despite our inability to actually say why.

It has taken many years of experience, but I now understand why my friend and I differed so completely in our acceptance of evolution and the existence of God. As I previously noted, I was raised in a fundamental Christian environment. My mother was diligent in teaching us to pray and to read the Bible on a regular basis. We lived in a very stable, predictable rural community where the local newspaper often covered tea parties, birthdays, and visits from friends and family who lived in the city. My friend, on the other hand, was a recent immigrant from Hungary, and was raised in a country which experienced political and social upheaval. He and his family escaped his homeland under cloak and dagger to find freedom in the West. His parents did not attend church regularly, nor did they study Scripture with him. When exposed to evolution, he had no reason to doubt its validity. He could even see the struggle for "survival of the fittest" in the political unrest he had witnessed in his native country. I

Teaching Biology in a Christian Setting

The religious beliefs which determine the acceptance of one theory over another are instilled into us at an early age. Photographed here is a group of Christian grade school students participating in the science education program at Redeemer University College. In Christian schools, the students are taught biology from a perspective that includes God, and being taught in this fashion, these students are unlikely to become atheists.



was different. I was prejudiced against evolution because I was taught first that God created humans and the animal kinds and, second, that the earth was only a few thousand years old. I gave thanks each day to this invisible God who kept us safe, warm and fed. For my friend, this God was not only invisible, he was nonexistent.

Much of the frustration that Creationists give to Evolutionists stems from the nature of the Creationist's mind. Creationists who have been raised as Bible-believing Christian fundamentalists still adhere to the creation description even after being exposed to a

considerable amount of science education. This education in itself cannot persuade them to change their minds since they believe that the scientific evidence can be used to support the creation of the universe by the God of Genesis as much, if not more than, the theory of evolution. As it was in the days of Darwin, the scientific evidence for evolution is far from being irrefutable. Astronomical data could convince the world that the earth circled the sun, but similar objective evidence for evolution has yet to be found. So how one sees the scientific evidence is still largely dependent on how one chooses to see the evidence. And how one chooses to see the evidence is often decided quite early in life, as happened to me. Had I been the Hungarian refugee fleeing for my life during my impressionable years, maybe I too would have seen life in the light of evolution.

3.2 The ancient earth

Unlike many of the Evolutionists today, the scientists in the 1800's who articulated the theories of the ancient earth and evolution knew that the scientific facts would not convince people of the validity of their theories. They knew they had to deal first of all with a person's faith or preconceived belief in creationism before they could convince that person to accept, or even consider, different theories of origins. The facts on their own were simply not convincing enough to convert a Creationist to evolution. But once the religious belief in the creation account was shaken, it was possible to replace this belief with the idea that natural processes, such as evolution and natural selection, gave rise to the world around us.

To prepare the mind to accept evolution as a scientifically proven fact, one of the most important beliefs that had to be cultivated was the belief in an ancient earth. Evolution is a theory used to explain how living organisms develop through time, but few people actually appreciate the fact that this theory is

predicated on the belief that the earth is several millions of years old. Many biology texts describing the theory of evolution will inevitably make reference to the age of the earth since the processes of evolution occur so slowly that great amounts of time are needed for evolution to be scientifically valid. One introductory biology text notes, "It was the geologists, more than biologists, who paved the way for modern evolutionary theory."¹ Another states, "To understand the long-term patterns of evolutionary change[...]we must think in time frames spanning many millions of years and imagine events and conditions very different from those we now observe."² One more reports, "Darwin accepted the supposition that the earth must be very old, and he began to think that there would be enough time for descent with modification to occur. Therefore, living forms must be descended from extinct forms known only from the fossil record."³

That the earth has changed over time was not disputed by Creationists in Darwin's day, but this change was thought to have occurred over a period of months to years, not over millions of years. For example, the great French scientist, Georges Cuvier (1767-1832), proposed that the disappearance and appearance of fossils in the different strata of rock resulted from a series of catastrophes.⁴ Each catastrophe devastated most of the animal and plant life, but isolated geographical regions were spared. The surviving species then replenished the earth to fill the vacancies

1. H. Curtis and N.S. Barnes, *Biology*, 5th ed. (New York: Worth, 1994), 2.

2. W.K. Purves et al., *Life: The Science of Biology*, 5th ed. (Salt Lake City, UT: W.H. Freeman, 1998), 432.

3. S.S. Mader, *Biology*, 5th ed. (Dubuque, IA: Wm. C. Brown, 1996), 298.

4. Georges Cuvier (1769-1832) was a French scientist who founded vertebrate paleontology as a scientific discipline and created the comparative method of organismal biology. Cuvier did not believe in evolution, and argued that any change in an organism's anatomy would have rendered it unable to survive. It was Cuvier who established the fact of the extinction of past life-forms. He completed an immense amount of research in vertebrate and invertebrate zoology and paleontology, and also wrote and lectured on the history of science.

caused by extinction with the latest extinction being associated with Noah's flood. To interpret this same data in support of evolution, you would have to exclude the possibility of catastrophes and accept the theory of uniformitarianism. Uniformitarianism states that the earth "had been moulded not by sudden, violent events but by slow and gradual processes – wind, weather, and the flow of water – the same processes than can be seen at work in the world today."⁵

James Hutton (1726-1797) was one of the first to propose that extreme geological changes can be accounted for by slow, natural processes, given enough time. Catastrophes were not necessary. It was a generation later when Hutton's theory of uniformitarianism was used by Charles Lyell to support the belief in an ancient earth, and Lyell's writings appear to have convinced Darwin to believe in uniformitarianism. Since Lyell also convinced the scientific community to question the biblical account of creation, and to seriously consider that the earth was ancient, Lyell is usually credited with being the individual who gave Darwin the intellectual and academic freedom to promote the theory of evolution.

3.2.1 Charles Lyell's presupposition

In his *Principles of Geology*, Lyell reasoned that the present geology of the earth was created by small forces working over millions of years. The articulation of his rationale took several volumes, and despite all this written material, it is hard to find any new geological information to compel the reader to accept Lyell's conclusions. A casual reading of Lyell's work reveals that his rationale was based on a debating style that persuades through rhetoric rather than building upon newly discovered scientific evidence. He realized that to sell his theory to geologists

5. Curtis and Barnes *Biology*, 5.

of his day, he would need to persuade them to set aside a previous belief. As he stated in 1830:

Now the reader may easily satisfy himself, that, however undeviating the course of nature may have been from the earliest epochs, it was impossible for the first cultivators of geology to come to such a conclusion, *so long as they were under a delusion as to the age of the world, and the date of the first creation of animate beings.*⁶ (italics added)

Lyell severely criticised geologists who believed in Noah's flood and described their reasoning as an exercise in self-deceit:

[...]we find many able naturalists adducing the fossil remains of marine animals, as proofs of an event related in Scripture. The evidence is deemed conclusive by the multitude for a century or more; for it favours opinions which they entertained before, and they are gratified by supposing them confirmed by fresh and unexpected proofs.⁷

Lyell's argument proceeding from his premise – that the earth was ancient and that the geological record was created by exceedingly slow processes, not catastrophes – was pitted against a religious ideology, not a scientific foe. For Lyell knew that you could not logically deduce that the world was millions of years old from a thorough understanding of the facts. Wisely, Lyell challenged his audience to replace a belief in one religion with a belief in another. He knew he had to remove the credibility of the writings of Moses before he could compel geologists to see his

6. C. Lyell, *Principles of Geology*, vol. 1, 1st ed., (1830; reprinted Chicago: University of Chicago Press, 1990), 76.

7. Lyell, vol. 1, 67.

point of view with regard to the age of the earth. In this endeavour, Lyell was very successful. A literal interpretation of Genesis was abandoned, and uniformitarianism and the concept of an ancient earth replaced belief in a young earth.

For more than 100 years, geologists have worked within the constraints of uniformitarianism and the concept of an ancient earth, but geology, as a science, is still unable to confirm that the world is more than a few thousand years old. The official position of professional geologists is that the world is ancient, but the evidence upon which this belief is based is ambiguous. Geologists often point to radiometric dating methods as providing objective scientific evidence that proves an old earth, but these same geologists admit that this method assumes, but cannot verify, either the original condition of the elements in the rocks, or the decay rates of radioisotopes in differing environments. As one old-earth geologist⁸ lamented to me, you cannot use geologic evidence to verify that the earth is old. Every fact he knows about geology can be reinterpreted in light of a young earth. And that is what frustrates him about young-earth Creationists: "They have an answer for everything."

I have also conversed with another geologist⁹ who makes a passionate plea for Christians to accept the concept of an ancient earth. He believes that their adherence to a young earth hinders intelligent people from taking the gospel message seriously. In

8. R. Geddes describes himself as an old-earth geologist who believes in creation. He was a Presbyterian minister in Hamilton, Ontario, Canada, but prior to entering the ministry, he received an M.Sc in Geology from the University of Western Ontario, and worked as a professional geologist, first for an oil company, and then for the government of Ontario. He has given a number of presentations to Christian audiences assuring them that an old-earth geologist can also be a committed Christian.

9. C. Gordon Winder is a professor emeritus of the Department of Geology, University of Western Ontario. Since retiring, Winder has devoted considerable time to addressing the conflict between Christianity and evolution. He firmly believes that the proponents of creationism hinder educated people from accepting the truths of the Bible. To alleviate the conflict between Christianity and science, he attempts to persuade Christians that the Scriptures fully support evolution.

one argument he uses to compel young-earth Christians to change their minds, he starts by displaying a map of the geological survey of Canada. He then points to the inscription on the map which states that the map was produced and endorsed by the government of Canada. It is an official government map depicting the earth to be millions of years old. After emphasising that the government has authoritatively stated that the earth is ancient, he then reads a passage of Scripture which is supposed to convince young-earth Christians to give up their belief in a young earth: "Let every person be in subjection to the governing authorities." (Romans 13:1) Fortunately most people recognize the weakness (and humour) of this argument. The map of the geological survey of Canada, and the passage from the New Testament are both taken out of context and cannot be compared in this fashion.

Although this argument is far too tenuous to convince Bible literalists to accept that the earth is ancient, many geologists use a similar appeal to authority to support their belief in an ancient earth. They argue that the earth is ancient, not because the rocks tell us so, but because biology has shown that the process of evolution takes millions of years. But unbeknownst to many who are not biologists, the irrefutable evidence from science for evolution (dealt within the next chapter) is not found in biology. Many biologists who believe in evolution are fully aware that biology provides very little direct proof for evolution. These biologists, in turn, point to geology for the proof of evolution and an ancient earth. In these types of arguments one branch of science relies on the authority of another branch of science, yet when we take both sciences into account, there is no irrefutable evidence to support the concepts of an ancient earth and evolution. In this case, two sets of subjective evidence do not make one objective fact.

It can be seen from these examples that what was true for Lyell many years ago is true for society today. Only after the belief in a young earth is shaken will an individual start to believe

that the physical properties of the rocks support an ancient earth. Despite how vehemently an old-earth geologist may deny this, his belief in an ancient earth is grounded on a premise, not the presence of overwhelming scientific proof. It may seem to the old-earth Evolutionist or the young-earth Creationist that the scientific evidence can only support their own point of view, but in reality the evidence remains subjective for it can be interpreted either way.

The Grand Canyon illustrates this point quite nicely. This magnificent canyon, considered one of the seven natural wonders of the world, is often used as an example by old-earth and young-earth geologists alike. For the old-earth geologist, this canyon could have taken millions of years to form if the effects of small forces measured today are extrapolated into the past, while for the young-earth geologist it could have been created in a matter of a few months to a few years by the action of very large forces working over a much shorter period of time. On the one hand, the old-earth geologist has faith that the environment was constant over millions of years, while on the other, the young-earth geologist has faith that the environment changed considerably over short periods of time.

Lyell was able to convince the academic community of his day to accept that the earth is ancient by using evidence that could be interpreted according to the premise of the individual. He did so by challenging the premise, not by presenting any newly discovered facts. By doing so, he prepared the way for the collective minds of the scientific world to accept another theory based on a subjective interpretation of the facts revealed by science. That theory, of course, was evolution.

3.2.2 Darwin's reliance on Lyell

Today, it does not take a courageous person to propose theories that support evolution. However, Darwin faced a very

different audience, and it was probably the publication and public acceptance of Lyell's argument against the belief in a young earth that gave Darwin the courage to also consider an explanation for the origin of life on earth that differed from the biblical account of creation. Once society could accept that Genesis was an allegory or myth, it was easier to suggest that humans were not created directly from the dust of the earth by an act of God, but had evolved over millions of years from a single cell into the complex organisms we now are.

Lyell's work may have given Darwin the courage to consider a theory of origins that ran counter to popular belief, but an ancient earth also allowed Darwin to propose natural selection as the mechanism for evolution. It was Darwin's understanding that any noticeable change in the structure of an individual of a species would render that individual less fit than its siblings. His studies of the natural world obviously impressed upon him that organisms were ideally suited to the environment in which he studied them. Darwin appreciated how the design of the creature was necessary for that creature to function in its particular niche. Therefore he logically concluded that for evolution to have happened, only imperceptibly small changes could have occurred in any individual. These small changes were beneficial, and accumulated with time. An ancient earth provided the time needed for new species to evolve from a preexisting species so that a giraffe could have evolved from a gazelle, for example.

It is important to realize that Darwin's theory of evolution is built upon two very significant presuppositions. The first is that the earth is millions of years old; the second is that natural selection gave rise to new species—a process referred to as speciation. Of the two, the presupposition of an ancient earth is more fundamental since speciation by natural selection requires vast periods of time.

Darwin knew that an ancient earth was an absolute necessity for natural selection to have worked. It is this fact alone which

makes the question of the age of the earth so vital to the entire argument. If you prove the world less than millions of years old, you eliminate evolution as an explanation for the origin of species. Even Darwin confessed:

The belief that the species were immutable productions [i.e. created to reproduce consistently after their own kind] was almost unavoidable as long as the history of the world was thought to be of short duration;[...].¹⁰

Darwin stated here that, (1) given the evidence of his day AND (2) a belief in a young earth, then any intelligent person could only conclude that organisms must have been created more or less as they now appear. According to his own reasoning then, Darwin, being of sound mind, had to change his premise about the history of the world before he could see evolution in the facts he collected.

How Darwin was finally driven to accept evolution probably has as much to do with his own beliefs or premises as it does with the evidence he was able to accumulate during his study of the natural world. In other words, he was preconditioned to interpret the facts he uncovered in terms of an ancient earth, an interpretation that could only be true if the Genesis account of creation was historically inaccurate. Similarly, once the scientific community could believe that God did not create the world within a few thousand years, then it was far easier to deny that the Christian God created the world as written in Scripture. With

10. C. R. Darwin, *The Origin of Species*, 6th ed. (1872; rpt. New York: Mentor Books, 1958), 443. Charles Darwin's book, *The Origin of Species*, is considered to have introduced evolution by way of natural selection to the scientific world. The first edition was published on 24 November 1859 under the title: *On the Origin of Species by Means of Natural Selection: or the Preservation of Favoured Races in the Struggle for Life* (London: John Murray). This edition quickly sold out, and eventually five subsequent editions followed; these appeared in 1860, 1861, 1866, 1869 and 1872. Some Evolutionists consider the first and second editions to be the best because Darwin, in order to answer criticisms of his theory, retreated from his initial views in the later editions.

God rationally removed from the natural world, scientists accepted Darwin's explanation of origins even though it was untestable and based on a hypothesis with little supporting evidence.

3.3 Fostering the evolutionary worldview

It does not require much knowledge of modern biology to know that the scientific support of evolution—the origin of species by natural selection—is less today than it was in 1859 when *The Origin of Species* was first published. Rather than supporting evolution, practically all the major discoveries of science *since* Darwin's time have necessitated a reinterpretation of his original thesis. This fact has forced many qualified scientists of evolutionary persuasion to readily admit that the modern concept of evolution differs significantly from the theory Darwin first proposed.

Although the articulation of the theory of evolution has undergone several revisions, what has *not* changed since Darwin's time is the need to condition the mind to accept evolution before the facts can be explained by evolution. Simply knowing the facts will not automatically lead to understanding these facts from an evolutionary perspective. Darwin was obviously aware of this when he wrote:

Although I am fully convinced of the truth of the views given in this volume[...], I by no means expect to convince experienced naturalists whose minds are stocked with a multitude of facts all viewed, during a long course of years, from a point of view directly opposite to mine.¹¹

11. Darwin, *Origin of Species*, 443.

In the drive to discover more and more facts, and to apply these facts to evolution, many Evolutionists have come to the realization that a straightforward interpretation of these facts renders Darwinian evolution less and less apparent. To foster the evolutionary worldview, each new generation needs to be mentally prepared to accept evolution as the only explanation of the facts since the facts themselves do not oblige us to do so. Scientific knowledge alone will not convince a Creationist, or even the undecided person, of the truth of evolution. Other means of persuasion must be employed by Evolutionists to ensure that evolution maintains its favoured position in the world of science.

From my own experience, I have encountered two techniques distinct from science education used by Evolutionists to portray evolution as the only scientifically and academically acceptable theory of origins. One technique is to appeal to authority. It is difficult to doubt the 'fact' of evolution when we are told that it is overwhelmingly endorsed by all professional scientists. Evolution becomes an intellectual obligation, and questioning the validity of this theory is a form of academic suicide. The other technique is to give the theory of evolution the monopoly in the classroom by banning all other origin theories, such as creationism. By having evolution presented as the only academically acceptable theory of origins, students are indoctrinated into the evolutionary worldview long before they have had a chance to consider other theories challenging this concept.

3.3.1 Appealing to authority

A cursory survey of the authority figures in the evolution/creation debate will establish one particularly problematic fact for Creationists. All the major persons of scientific fame or with any media exposure are supporters of evolution. In the face of any challenges to evolution, such individuals will reassure the general public that evolution is a

scientifically verifiable fact. Their support raises a major barrier to the acceptance of creationism. How can an individual question the reality of evolution when it is supported by so many well-respected authority figures in science?

One such well-respected scientist among Christian academics is Richard Wright, professor emeritus of biology at Gordon College in Wenham, Massachusetts. In the Through the Eyes of Faith Series, sponsored by the Council for Christian Colleges and Universities, Wright authored the book, *Biology Through the Eyes of Faith*. This book has become required or recommended reading in first year biology courses in many of these Christian colleges, not because of its scientific information, but because it helps to prepare the student to see the glory of God in the study of biology. With respect to the theory of evolution, he challenges doubters to examine the evidence themselves and to be prepared to see that this evidence is overwhelming. He writes in the revised and updated edition that:

Evolution as an explanation of origins is both fact and theory[...]. It has weaknesses: uncertainties are always involved in extrapolation to the past[...], [but] proponents constantly overstate their case, often confusing a scientific explanation with a worldview. But the fact is, there is no scientifically useful alternative to evolution[...]. No one should accept evolutionary reasoning without examining the evidence, but be advised: the evidence is strong, and it is convincing.¹²

Another well-respected Christian academic is Howard Van Till, professor emeritus of physics and astronomy at Calvin College, Grand Rapids, MI. Van Till has devoted much of his time

12. R. T. Wright, *Biology through the Eyes of Faith*, rev. ed. (San Francisco, CA: Harper San Francisco, 2003), 143.

trying to defuse the conflict between science and the Bible. His years of experience and success in the academic world compel us to take his opinions very seriously for he speaks with authority, from authority. In his book, *The Fourth Day*, he implores the reader to accept the presuppositions on which modern science is based. He writes:

[...]the first step in taking the material world seriously in the twentieth century is to respect the credibility of the presuppositions on which the scientific study of that world is founded.¹³

The major presuppositions, of course, are that the universe in which we exist is billions of years old, and that God used evolution to create all life, including humans.

Based on the recommendations of such well qualified experts, many of us, who are not as sufficiently versed in the subject, accept the presuppositions mentioned by Van Till as credible without fully knowing what these presuppositions are. Nor do we realize that these presuppositions are not objective facts, and that they cannot be verified by the scientific method.

With respect to evolution, the presuppositions we are asked to accept as facts of science are many. They include the following:

- 1) The earth is millions of years old, not just a few thousand years old.
- 2) The process of natural selection over millions of years can gradually change one animal, such as a gazelle, into another, such as a giraffe. As such, species (or kind, as noted in Genesis 1) of organisms were not created individually but arose from a common ancestor.

13. H. J. Van Till, *The Fourth Day: What the Bible and the Heavens are Telling Us about the Creation* (Grand Rapids, MI: Eerdmans), 104.

- 3) Once the fossil record is complete enough, we will be able to see a countless number of fossils linking older, less-evolved species to many other younger, more evolved species. The major gaps between species that now exist in the fossil record do not represent the creation of individual species, but arise as an artifact of incomplete knowledge.
- 4) The strata or layers of rock in the geological record represent vast periods of time, not sediment deposits that could have been created within a few months.

Because the impression is given that these scientists, the authorities on this subject, do not question the validity of these presuppositions, we are led to believe that each of these presuppositions is an *objective* fact of science rather than an *interpretation* of a fact. If it is pointed out that these presuppositions are explanations of facts subject to the religious beliefs of the interpreter, Evolutionists often respond by saying that these presuppositions are so well supported that they might as well be considered facts.

To add weight to the authoritative voice of scientists, the concept of an ancient earth and evolution are commonly treated as absolute truths in university-level introductory biology textbooks. That the earth is millions of years old is not contested, and that these epochs of time allowed natural selection to give rise to new species is considered to be as obvious as the fact that earth is round. Note the following quotes:

To reject this view of Earth's history, [i.e. evolution] a person must reject not only evolutionary biology, but also modern geology, astronomy, chemistry, and physics.¹⁴

14. W.K. Purves et al, *Life: the Science of Biology*. 6th ed. (Sunderland, MA: Sinauer, Gordonsville, VA: W. H. Freeman, 2001), 14.

Darwin's theory of evolution has proved to be one of the great unifying concepts of biology. Biologists in almost every subdiscipline try to understand the features and functions of organisms and their constituent cells and parts by considering them in light of the long, continuing process of evolution.¹⁵

That evolution has occurred is not, however, a matter of controversy among biologists. There is virtually complete agreement that Earth has had a long history – some 4.5 billion years is the current estimate – and that, during the course of that history, the complex living things present today, including ourselves, arose from simpler forms.¹⁶

Evolutionary change has been a central feature of life since it arose about 4 billion years ago. The evolutionary connections among all organisms explain the unity and diversity of life.¹⁷

The concept of evolution actually has two faces – one fact, one theory. If we ask how all the organisms on Earth have reached their present forms, the answer is that they have evolved. This answer is based on such an enormous, coherent body of evidence that we must take it as fact.¹⁸

At one time, many biology textbooks never mentioned creation, creationism, or scientific creationism, but now several of

15. Solomon, E.P., et al. *Biology*, 4th ed. (Fort Worth: Saunders College Pub., 1996), 8.

16. Curtis and Barnes, *Biology*, 12.

17. N.A. Campbell et al., *Biology* 5th ed. (Menlo Park, CA: Benjamin Cummings, 1999), 9.

18. B.S. Guttman, *Biology* (Boston, MA: WCB/McGraw-Hill, 1999), 8.

them vehemently warn us against Creation Science. This change in approach may reflect the need to counter the tremendous gains that creationism has made in the minds of the general population. Note how the following quotes from some introductory university level biology textbooks illustrate this counteroffensive quite nicely:

The confusion is not in the beliefs of the scientific Creationists, which are religious beliefs that many people hold, but rather in their labelling of these beliefs as “scientific.” There is no scientific evidence to support the hypothesis that the earth is much younger, and none that indicates that every species of organism was created separately. These conclusions can be reached only on the basis of arbitrary faith; they are untestable, and, as such, they lie outside the realm of science.¹⁹

Creationism[...] is contrary to both natural causality and uniformity in time. The overwhelming success of science in explaining natural events through natural causes has led almost all scientists to reject creationism.²⁰

Creation Science is not science[...]. Creation Science begins with the unsubstantiated assertion that Earth is only about 4000 [sic] years old and that all species of organisms were created in approximately their present forms. This assertion is not presented as a hypothesis from which

19. Raven, P.H. and G.B. Johnson, *Biology*, 3rd ed. (St. Louis, MO: Mosby-Year Book, 1992), 401.

20. T. Audesirk and G. Audesirk, *Biology: Life on Earth*, 4th ed. (Upper Saddle River, NJ: Prentice Hall, 1996), 9.

testable predictions are derived. Advocates of Creation Science do not believe that tests are needed, because they assume the assertion to be true, nor do they suggest what evidence would refute it.²¹

Religious fundamentalists who do not believe in biological evolution because it contradicts the biblical story of creation have tried to support their beliefs with pseudoscientific arguments[...]. It is important to see that these beliefs are *unscientific*[...]. The unscientific imitates science but does it badly, with too strong a will to believe and too little objective testing and skepticism.²²

By referring specifically to Creation Science, the authors of these textbooks are indirectly admitting that this alternate theory of origins poses so great a threat to Evolution that Creation Science needs to be confronted directly. Creation Science must be excluded from the science of biology because it is “untestable,” is rejected by “almost all scientists,” “is not science” and “imitates science[...]*badly*.” But more recently, another anti-evolution concept, the concept of intelligent design, has gained notoriety. Intelligent design questions the belief that life could have evolved by chance.

The concept of intelligent design challenges evolution on the academic level, and some Evolutionists believe it to be as great a threat to science as Creation Science. In addressing the concept of intelligent design, the authors of one introductory biology textbook make the argument that if an intelligent designer existed, he would never have created an organism as grotesque as a bottom-dwelling flatfish.

21. Purves et al., *Life: The Science of Biology*, 5th ed., (1998) 13.

22. Guttman, *Biology*, 9.

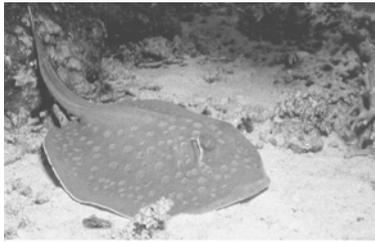
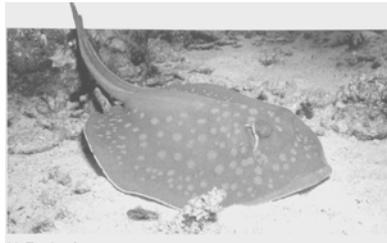
A striking example that illustrates how natural selection operates by modifying existing states is provided by the evolution of fishes that spend most of their time resting on the sea bottom. One lineage, the bottom-dwelling skates and rays, is beautifully symmetrical. These fishes are descended from sharks, which were already somewhat flattened and, therefore, able to lie on their bellies.

Plaice, sole, and flounders, on the other hand, are descendants of deep-bodied ancestors. Unlike sharks, these fishes cannot lie on their bellies; they must flop over on their sides. During development, the eyes of plaice and sole are grotesquely twisted around to bring both eyes to one side of the body. No clever designer who was free of constraints would have designed plaice and sole as they are. But small shifts in the position of one eye probably helped ancestral flatfishes see better, resulting in the form found today.²³

Saying that an intelligent designer would not have created something grotesque assumes first, that symmetry has the virtue of being beautiful, and second, that an intelligent designer has the same tastes in morphology as we do. It fails to consider that the creature's eyes may be placed appropriately for its anatomy and its environment.

These textbooks were written by experts in the field. Surely evolution must be a science and creationism a pseudoscience if we take seriously the opinions of these authorities. But although someone who has made a career of science, and in particular biology, is probably more qualified than anyone else to interpret scientific data, there is a danger in assuming that the authors of

23. Purves, W.K., et al., *Life: The Science of Biology*, 6th ed. (2001) 410.

(a) *Taeniatira lymma*(a) *Taeniatira lymma*(b) *Bothus lunatus*(b) *Bothus lunatus*

Evolutionists confront Intelligent Design

Some evolutionists believe that the concept of intelligent design poses a greater threat to science than creationism. Using examples of two types of fish (pictures on left), one biology textbook noted that no clever designer, free of constraints, would have created something as grotesque as the flatfish (bottom left). I drew the attention of this passage to the sales representative, noting that the authors' logic was flawed. An intelligent designer could, in fact, have a different taste in beauty than we do. The representative agreed that this passage was not appropriate, not because he believed in intelligent design, but because he believed something made by evolution should not be considered ugly. The representative said he would communicate this objection to the authors. In the next edition the example of rays and bottom dwellers (pictures on right) still appeared (with a different picture of a bottom dweller; W. K. Purves et al., *Life: The Science of Biology*, 7th ed. , [Sunderland, MA: Sinauer, Gordonsville, VA: W. H. Freeman, 2004], 477). But all reference to the concept of Intelligent Design was removed, and flatfish were not called grotesque.

these types of textbooks have dealt fairly with this subject. The danger is the fact that the origins debate is NOT a debate between different *sciences*, but a debate between different *philosophies*. It is not a debate about the accuracy of the objective scientific data, but a debate on the interpretation of that data. Despite being well trained in science, with few exceptions, scientists are not well trained as philosophers, and in many respects, ignore the basic question regarding the truth of evolution by simply accepting evolution as true. By appealing to authority, the validity of deeply-held presuppositions or religious beliefs associated with the theory of evolution is glossed over. Mountains of scientific data, which can only provide circumstantial or subjective evidence to support evolution, are then used to say that “we must take it [evolution] as a fact.”²⁴

3.3.2 Banning Creationism from the science classroom

Believing that the scientific evidence for evolution can also be interpreted in the light of creationism, some school boards and States in the US have passed laws to give creationism equal time in the science classroom along with evolution. It may seem quite logical that if creationism is antithetical to science, and evolution is supported by the scientific evidence, then having both taught in the science classroom ought to encourage students to reject the antiquated notion of a young earth and creationism, and to accept the concepts of an ancient earth and evolution. Evolutionists should welcome such an opportunity to deal with creationism on their own turf. But rather than taking up the challenge and defeating creationism in the minds of the nation’s youth, Evolutionists have attacked the laws themselves, hoping to prevent any mention of creationism in the classroom. To bar scientific creationism from the science classroom, some educators

24. Guttman, *Biology*, 9.

assure the public that evolution is beyond doubt, while others have warned us of the dangers of not considering evolution a fact.

Evolution is without doubt

To keep creationism away from students, educators have assured us that all scientists believe in evolution, and only disagree with respect to the specifics. Further, evolution is equated with all other sciences, so that an attack on evolution is the same as questioning the entire scientific fraternity including astronomy, physics, and chemistry. This comparison gives the impression that the facts uncovered by science fully support the theory of evolution. Questioning the reality of evolution would be akin to questioning the existence of gravity or the shape of the earth.

Another way to establish the credibility of evolution is simply to refer to it as an absolute truth. Wayne Cartley of the National Association of Biology Teachers writes that:

Because evolution itself is real, it makes no more sense to say, "I do (or do not) believe in evolution," than it does to say, "I do (or do not) believe in the air around us or believe in the chair I'm sitting in or believe in the hair (or lack thereof) on your head."²⁵

With such an assurance of the reality of evolution, it is very difficult for anyone wishing to appear academically responsible to reject evolution as the scientific explanation of the origin of species, and of life itself. Creation Science cannot be taught in the science classroom since evolution is the only theory supported by science. As noted above, evolution becomes an ideological obligation.

25. W. W. Cartley, "In defense of fundamentalism," *The American Biology Teacher* 58, no. 4 (1996): 196-197.

Use of fear

Having affirmed that evolution is a fact, and hence, creationism is a myth, another tactic is to instill fear—a fear of what could happen if creationism were taught in the classroom. Some Evolutionists state that teaching creationism in the classroom opens the door to every outrageous proposal. To prevent our children from being exposed to such tripe, these Evolutionists even go as far as to say that the concept of open mindedness, one of the hallmarks of a democratic educational system, should be downplayed in this particular instance. To some Evolutionists, it is even unthinkable to teach evolution as a theory rather than a scientific fact. Cartley in the above-mentioned editorial also writes:

To deny or eliminate the teaching of evolution as fact destroys the essential content of the discipline and threatens the principles of academic freedom upon which our educational system – and indeed our larger society – is based.²⁶

In this passage, Cartley is arguing that even if evolution were to have the monopoly in the science classroom, it is not good enough to teach evolution as a theory; it must be taught as a scientifically proved fact. And if evolution is not taught as a fact, then he fears that educators will destroy the foundation upon which biology is based, and will even threaten the very freedoms that are rightfully ours in a democratic society. For him, treating evolution as a theory, rather than a fact, would undermine the American way of life. How he arrived at this grim conclusion can only be surmised, but if any portion of his reasoning is true, creationism must be stopped at all costs to preserve our freedom and way of life.

26. Cartley, 196.

Cartley then proceeds to defend evolution, not on its own merits, but on its importance to society as a whole. Speaking against a law that would allow Creation Science to be taught in the classroom, he states that "The greatest challenge to education posed by this bill is not to the teaching of biology. It is to the academic freedom of our schools."²⁷ And he furthers this argument by suggesting that to refer to evolution as a theory, not a fact, is even a threat to religion.

[T]he very testing of religious beliefs such as creationism in a scientific setting destroys the basis of the religion: faith. Just as evolution is fundamental to biology, faith is the very foundation of every religion[...]. Placing a religious belief under scientific analysis, which demands physical evidence, erodes the faith that is fundamental to that belief. Even Jesus recognized this principle. When the disciple Thomas demanded to place his hands in Jesus' wounds before he would believe Jesus had risen, Jesus did not praise Thomas for his wise use of the scientific method.²⁷

Cartley is not alone in his fear of creationism. Many Evolutionists believe that the teaching of creationism would weaken the theory of evolution in the minds of the nation's youth, and that this weakening would result in the demise of modern science, as well as a weakening of our devotion to religion. Creationism must be feared on two levels: First, it could cause us to question evolution, and the questioning of evolution would lead to the deconstruction of all of modern science. Second, the belief in creationism would destroy the foundation of faith upon which religion is based. Evolutionists are warning us that

27. Cartley, 197.

creationism is not just attacking the theory of evolution, it is attacking our way of life, and the very religion that Creationists are trying to support. The teaching of creationism must be stopped at all costs, even if it means giving up freedom in education!

3.4 What do Evolutionists fear?

In an effort to keep creationism out of the classroom and to ensure that only evolution is taught, and taught as a fact, Evolutionists must extend their rationale beyond the examination of the facts themselves. Unlike the concept of the geocentric solar system, which has been dispelled by irrefutable scientific evidence, creationism continues to have a large number of adherents even among legitimate scientists. A favourite argument used to support evolution identifies evolution as a scientific theory, and creationism as a religion. Since religion cannot be taught in the public school system, then evolution is the only theory of origins that is permitted. This argument may exclude creationism from the science classroom, but it has little to no effect in negating creationism as an explanation of the scientific facts. Banning it from the classroom for religious reasons does not reduce its ability to provide a coherent and plausible interpretation of the objective facts of science.

It is obvious from the way these educators have defended evolution that something is not quite right. Why would a theory, thought to be so well supported by science that some people consider it to be a fact, need to be protected from competing explanations? Is it possible that evolution will not stand up against creationism in the science classroom? Do we have to keep creationism out of the minds of our students, and to teach them that evolution is a fact in order to ensure that they will see evolution as a scientifically proved fact?

Educators know that curriculum has the power to shape the values and opinions of future generations. This effort by Evolutionists to keep creationism out of the minds of students can only be warranted if evolution cannot be readily supported by the evidence from science. Such an attack on creationism suggests that the scientific evidence for evolution is so weak that evolution must have the monopoly in the science classroom to ensure that it is passed on to the next generation.

The examples of attacks on creationism provided here are a few of the many that have been waged in the educational world. But if the debate over the teaching of creationism and evolution in schools reaches the judicial system, it tends to run a predictable course. In the end, the judgements usually favour evolution, but not because evolution has been shown to be a fact; it is because creationism has been shown to be a religion. As Federal Judge Overton ruled in 1982, “[...]the evidence is overwhelming that both the purpose and effect of Act 590 [to allow creationism to be taught] is the advancement of religion in the public schools.”²⁸ This decision was affirmed by the United States Supreme Court in 1987, and as one textbook hopefully noted, “effectively ending a dispute that had begun 128 years before.”²⁹

Unfortunately for Evolutionists, the apparent victories in the judicial system have not weakened creationism among the masses. Opinion polls continue to show that a very large proportion of adults in our society are Creationists despite the tremendous falloff in the number of people who regularly attend religious functions. It will be interesting to see how future court battles will be waged in light of the fact that many Evolutionists now admit that the theory of evolution does rely on unprovable presuppositions similar to that of any religion. If one is an

28. W. R. Overton, “Creationism in Schools: The Decision in *McLean v. Arkansas Board of Education*,” *Science* 215 (1982): 934-943.

29. A. J. Tobin and J. Dusheck, *Asking about life* (Fort Worth: Saunders College Pub., 1998), 357.

Evolutionist, it might be wise to reconsider how evolution is portrayed. Continuing to foster a belief in evolution by appealing to authority, or by teaching evolution as the only theory of origins may not be sufficient to stem the steady growth in the belief in creationism.

3.5 Evaluating objections to the teaching of creationism

Before ending this chapter, I would be remiss not to comment on the objections that Cartley of the National Association of Biology Teachers has against the teaching of Creation Science in the science classroom. First of all, it should be noted that the success Evolutionists have had in stopping the teaching of creationism has actually been limited. Despite one well-publicized victory for Evolutionists in the Overton and subsequent Supreme Court rulings, creationism continues to make great strides in public education which was, at one time, only open to evolution.

Legislation to question the validity of evolution as a scientific theory for origins has either been considered or passed in a number of states in the US As I write, the Creationists' influence in politics can be seen in such states as Kansas, Michigan, Montana, Alabama, Pennsylvania, Louisiana, and Idaho. For example, on August 14, 1999, the Kansas Board of Education accepted new guidelines which according to the Washington Times were the most "anti-evolutionary science standards in the country."³⁰ These guidelines have since been revised to reinstate evolution as a scientific theory,³¹ but the Kansas Board of Education continues to receive a significant number of complaints from creationist parents. And the reinstatement of evolution is not a full endorsement of this theory since students are expected to

30. L. Witham, "Evolution takes a hit in Kansas schools," *The Washington Times*, August 12, 1999.

31. On Feb. 14, 2001, the Kansas State Board of Education voted 7-3 to reinstate the teaching of biological evolution and the origin of the earth into the state's science education standards.

understand “biological evolution, the significance of fossils, the geologic time scale, and theories” [not just evolution] “regarding the origins of the Earth.”³² In another example of the advance of Creationism into politics, Daniel Eismann, an Idaho statesman, was elected into office over an incumbent who refused to comment on the origins debate. Whereas the incumbent remained silent on this matter, Eismann unashamedly sought support from the Christian right by stating his views on creationism and denying outright the scientific basis of evolution.³³

As with the Overton ruling, Evolutionists have been able to reverse many of the gains that Creationists have made into education, but many of these reversals have not fully reestablished the scientific integrity of the theory of evolution. For example, Tangipahoa Parish (county) in Louisiana had to reverse a resolution which added a disclaimer to the teaching of evolution. This disclaimer noted that evolution was a scientific theory, and the teaching of evolution “should be presented to inform the students of the scientific concept and [is] not intended to influence or dissuade the Biblical version of creation or any other concept.”³⁴ Although Evolutionists were able to have this disclaimer removed, three Supreme Court judges³⁵ lamented that

32. Kansas Science Education Standards for grade 8 and grade 12 as of Feb. 2001.

33. People for the American Way, Right Wing Watch Online E-Mail Newsletter (September 25, 2000) *Right Wing Attacks on Judicial Independence in the States in 2000*, <http://www.rightwingwatch.org/sites/default/files/rww-sept-25-00-news.html>.

34. A resolution passed in 1994 by the school board in the Tangipahoa Parish (county), Louisiana, required that whenever evolution was to be presented, the following disclaimer must be read: “It is hereby recognized by the Tangipahoa Parish Board of Education, that the lesson to be presented, regarding the origin of life and matter, is known as the Scientific Theory of Evolution and should be presented to inform the students of the scientific concept and not intended to influence or dissuade the Biblical version of Creation or any other concept. It is further recognized by the Board of Education that it is the basic right and privilege of each student to form his/her opinion or maintain beliefs taught by parents on this very important matter of the origin of life and matter. Students are urged to exercise critical thinking and gather all information possible and closely examine each alternative toward forming an opinion.”

35. Justice Antonio Scalia, Chief Justice William Rehnquist, Justice Clarence Thomas. August 25, 2000.

“We stand by in silence while a deeply divided Fifth Circuit bars a school district from even suggesting to students that other theories besides evolution—including, but not limited to, the Biblical theory of creation—are worthy of their consideration.” In reversing the gains of Creationists in this case, Evolutionists may have tainted the objectivity of evolution by demanding that it be accepted without question. On the one hand, Evolutionists are asking Creationists to accept evolution based on the objective facts of science, but on the other hand, they do not want students to consider these objective facts in the light of any other theory of origins.

A second point to be made against Cartley’s support of evolution is his inappropriate appeal to authority. He claims that “A scientific theory is a well-documented, well-supported, and well-accepted explanation based on a large body of experimental and experiential evidence.”³⁶ This statement is an example of how some educators, distant from science, think of science. I am a scientist; I know scientific theorizing very well, having published some of my own theories on insect egg production. There are as many scientific theories as there are scientists, and only a few of these theories are well supported by the scientific facts. Indeed, many scientific theories with little empirical evidence to support them are widely accepted. They make a good story, and not enough evidence is available to refute them. To say there are certain scientific theories that are well-established is one thing; to say all scientific theories are well-established is another. Then to designate evolution as a well-established scientific theory, like the periodic table in chemistry, or the cell theory in biology, is an extrapolation of the facts far beyond reason.

A third criticism of Cartley’s defence of evolution concerns his concept of what is real. When Cartley states that “Because evolution itself is real, it makes no more sense to say, “I do (or do

36. Cartley, “In Defense of Fundamentalism,” 196.

not) believe in evolution," than it does to say, "I do (or do not) believe in the air around us or believe in the chair I'm sitting in or believe in the hair (or lack thereof) on your head,"³⁷ he has made a fundamental error in reasoning. My five senses intuitively tell me that I breathe air, or that I can sit on a chair, or that I am losing my hair. These objects are real. I can see, touch and feel each of them. However, the scientific evidence does not tell me the necessity of evolution. If you take away my air, I die; if you take away my chair, I fall or sit on the ground; if you take away my hair, I may need to wear a hat. But if you take away evolution, the facts do not change. We still exist, and our planet still contains a great diversity of living organisms. Evolution is a theory that *explains* the facts. It is not real in the same way that facts are real. It cannot be equated to the air we breathe, or the chair we sit on, or the hat we use to keep our head warm.

Finally, when Cartley states that "the very testing of religious beliefs such as creationism in a scientific setting destroys the basis of the religion: faith"³⁸ he demonstrates his particular understanding of Christianity. Jesus may have shown some disappointment when Thomas did not believe as the other disciples had, but if Jesus did not see the value of scientific proof, why did he provide so much of it to support his claim to be God-on-earth, the Messiah? Why not go by faith alone, which according to Cartley, would strengthen the religion? But no leader of any other major or minor religion can claim to have healed the lame, given sight to the blind, or raised the dead. Jesus was reported to have done all this and more.

Christianity, unlike other world religions, depends on proof, strong scientific proof, rather than intangible feelings. Each miracle Jesus performed was proof of his deity. Cartley is probably fair in his evaluation of Thomas, but unfortunately Cartley appears to underestimate the value of tangible evidence

37. Cartley, 197.

38. Cartley, 197.

to support a vibrant Christian faith. James 2:20 tells us that, “faith without works is dead.” Christians have faith, but unless that faith has empirical evidence, it is nothing. That is what it means to be a Christian. In the same way, a scientific theory without evidence is no better than a fairy tale. Fairy tales make good stories, but they are not something on which anyone should base their faith.

3.6 Is there a Santa Claus?

I would not be surprised if this chapter were difficult for those who believe strongly in the theory of evolution or an ancient earth. Nowhere have I provided any scientific proof that evolution and an ancient earth are not facts of science, nor do I support scientific creationism. Instead, I have evaluated the manner by which Evolutionists, from Darwin to today, use techniques of persuasion outside of the scientific evidence to convince their audience that evolution is a scientifically verifiable fact. These techniques are not novel, and they are not confined to Evolutionists. Creationists have developed these techniques even better than the Evolutionists, and they often end their presentations with what could be considered the greatest fear factor imaginable – to be lost in hell for eternity. It is no secret that many Creation Science organizations are officially known as “ministries.” Their ministry is to preach the gospel to the lost. These creation scientists believe that evolution is the major stumbling block that unbelievers need to overcome in order to receive Jesus Christ as Saviour. It is little wonder that Creation Science is considered a religion when the full intention of Creationists is made known to a court of law.

Whether or not the persuasion techniques used by Evolutionists or Creationists have been successful in making converts, it is important to understand that these mind games are only possible because the scientific evidence *per se* is ambiguous.

As in the days of Darwin, the scientific evidence can be used to support either evolution or creation. Both Creationists and Evolutionists can take the same objective evidence and interpret it in favour of their respective theories. These interpretations are based on presuppositions or premises fostered by religious beliefs. There is therefore a very good possibility that students taught both theories of origins in a neutral setting will decide to dismiss evolution in favour of creation. To ensure that evolution maintains its favoured status in society, Evolutionists must continue to rely on conditioning the minds of each new generation of students to accept evolution.

By instilling the evolutionary view of the world into a child before that child is able to understand the scientific facts, it may be thought that evolution will gain credibility in the minds of our youth. But this form of indoctrination has a fatal flaw. As we will see in the next chapter, the facts constantly uncovered by modern science continue to necessitate a reinterpretation of the theory of evolution. Moreover, as the basic tenets of evolution are being challenged by this new knowledge, the interpretation of the scientific facts by Creationists steadily and stubbornly gains support. Many outspoken Creationists now have difficulty finding Evolutionists with whom to debate, since the evidence, when presented without being distorted by presuppositions, will decisively favour the existence of an intelligent designer and refute any mechanism of origins that depends on chance.

Elevating evolution to the level of a scientific fact by making it an ideological obligation, without dealing with the new scientific evidence, or without addressing personal bias, becomes an increasingly ineffective means of persuasion. The sooner Evolutionists are willing to refute creationism in a knowledgeable and constructive fashion in the science classroom, the sooner our children will learn to distinguish between fact and fantasy.

Even though it may have seemed wise to reassure Virginia that Santa Claus was really alive and well in the spirit of

Christmas,³⁹ we assume Virginia eventually learned the truth. Similarly, our children ought to be told the truth that evolution from molecule to man is a scientific theory, and as a theory, it is not a scientific fact. Should Virginia decide to accept either evolution or creation as her view of the world, it would be prudent on behalf of her teachers and/or parents that she be taught all the facts, not just those used to support one point of view.



39. Eight-year old Virginia O'Hanlon of 115 West Ninety-fifth Street, New York wrote to *The New York Sun* asking if there really was a Santa Claus. Editor Francis P. Church replied to her letter on Sept. 21, 1897, stating "Yes, Virginia, there is a Santa Claus. He exists as certainly as love and generosity and devotion exist, and you know that they abound and give to your life its highest beauty and joy."

Chapter 4

THE SCIENTIFIC MERIT OF EVOLUTION

It is the overwhelming consensus held by those who strongly believe in evolution that this theory is a fact of science that is so firmly established that there is absolutely no room for doubt. They may agree with the observation made in the previous chapter that each new generation of students has this worldview instilled into them, as it may have happened to them, but this manipulation is condoned as a necessary evil because it passes on a truth, a reality that cannot be denied. When a news reporter made the suggestion that the Federal Science Minister for Canada was an anti-Evolutionist, because the minister would not say if he believed in evolution, the outcry from pro-Evolutionists was swift and poignant. Brian Alters, founder and director of the Evolution Education Research Centre at McGill University exclaimed that:

Evolution is a scientific fact, and the foundation of modern biology, genetics and palaeontology.¹

1. Anne McLroy, "Science minister won't confirm belief in evolution," *The Globe and Mail*, 17 March, 2009.

In support of evolution, Jim Turk, executive director of the Canadian Association of University Teachers, said:

The traditions of science and the reliance on testable and provable knowledge has served us well for several hundred years and have been the basis for most of our advancement. It is inconceivable that a government would have a minister of science that rejects the basis of scientific discovery and traditions.²

Under this public pressure, the Canadian Federal Science Minister, Gary Goodyear, had to reassure the scientific community that:

We're evolving all the time. Of course I believe in evolution. Our decisions on the science and tech file are not based on what one reporter wants to have people believe, which is that religion forms a part of our policy.³

As evidenced from this particular incident, and from examples listed below, those who strongly believe in evolution view it as a fact free of any religious sentiment or dogma. But what is this belief based on?

In essence, there are three main tenets that hold together this undying support for evolution:

- 1) evolution is true;
- 2) this truth is supported by science; and
- 3) being science, it is immune to any personal biases arising from religious beliefs.

These tenets are viewed as facts, but in reality they are strongly held presuppositions that pose as facts. As long as they maintain

2. McIlroy, "Science minister."

3. Article in *The Hamilton Spectator*, 21 March, 2009.

this status in the mind of an individual, it is impossible for that individual to objectively evaluate the theory of evolution.

When evolution, or even creationism, is considered an established fact, the evidence is either interpreted to support that ‘fact’ or else the evidence is ignored. This ignorance is an intellectual handicap, and I believe it is one of the primary reasons the origins debate continues unabated in the mass media.

The present chapter has been written to overcome this handicap by challenging one of the main tenets of evolution – that evolution is supported by science. If you already have an appreciation for the scientific evidence that does not support evolution, knowing the contents of this chapter is not necessary to understand what follows in the book. But if you strongly adhere to the theory of evolution, and believe it serves as the foundation of modern science, you will do well to become aware of the scientific objections to this theory.

Listing these objections, which are many, is not meant to challenge a faith in evolution, nor to gain converts to creationism. Instead, it is hoped that this knowledge will help the reader to overcome ignorance and break through the intellectual handicap that sees the theory of evolution as being beyond reproach. As noted in the previous chapter, there are many Evolutionists who now admit that this theory has flaws. The present chapter goes beyond the admission of the flaws to describe what some of these flaws may be.

4.1 Evolution seen as fact

In today’s world, with its advances in science and technology, the scientific evidence for evolution is believed to be so strong that no amount of evidence to the contrary could ever question cast doubt on it. As one prominent scientist noted:

In 1859 Darwin published his theory of common descent through natural selection. I don't think there has ever been a set of theories so heavily attacked or that has had so many alternative theories to face. Look at it now. It stands there, not a dent in it.⁴

Most people accept the opinion of experts, so it comes as no surprise that the acceptance of evolution extends beyond scientific circles to the community at large. In his television series on the Arts and Entertainment Network, former news anchorman Walter Cronkite (once considered the most trusted voice in America) started his program on the evolution of man by stating:

Now there are many, many people who believe in God's creation and this program respects their passionately held beliefs, but the plain unvarnished truth is that evolution is not a theory. It's a scientifically sound fact. Ape and man are part of one story, a story with many twists and turns which leads into an uncertain future.⁵

Evolution also permeates Christianity to the extent that many Christian scientists, theologians and educators believe that the Scriptures can be reinterpreted to accommodate the theory of evolution. For Christians, the debate between evolution and creation is not whether or not the Creator exists, but whether or not this Creator used evolution in order to create. In this case, Scripture can be reinterpreted in a number of ways to maintain faith in the Bible while at the same time, accepting the rational

4. Ernst Mayr, as quoted by J. Rennie, "Darwin's current bulldog," *Scientific American*, 271 (August 1994): 24-25.

5. *Ape Man: The Story of Human Evolution*, host Walter Cronkite, VHS, (New York: A&E, 1994).

scientific arguments for an old earth and evolution. For many Christian academics *any* interpretation of the creation account in Genesis is permissible, provided that it makes room for a very old earth and evolution. However, to take the six days of creation to mean 24-hour days is, in some people's opinion, akin to turning your back on the truth that God has revealed in His creation. Some Christians even argue that if the world is young, and God made it look as if it were old, then God would be a liar. Since God cannot lie, then the world must be very old.

Yet despite the unwavering endorsement of evolution by science and the media in today's society, there continues to be a large number of people who question whether the random events of natural processes could have given rise to the evolution of living organisms. Young-earth Creationists cannot accept the concept of an ancient earth, a concept which is needed to allow for evolution. Other doubters may accept some of the evidence for evolution, but question the basic premise that chance and time alone could have given rise to intricate biological processes needed for life. For the latter, the appearance of design in nature denotes an intelligent designer who, among other things, may have directed the process of evolution. Creationists may be ignored by the scientific community, but the concept of intelligent design attacks evolution at the academic level, and to some Evolutionists it has become a considerable threat to the theory of evolution.

To help combat an apparent resurgence of irrational thinking fostered by the Creationists and proponents of intelligent design, and to prevent civilization from slipping back into the Dark Ages, the established scientific community has organized its own defence of evolution and has begun the attack on any rival theory of origins. Their arguments usually begin with the assurance that evolution is indeed a verifiable, objective, scientific fact. One book begins its attack on creationism by stating:

Evolution is a *fact* which is so well confirmed that there is no more doubt about its reality than there is about the earth being round[...].⁶

Indeed, many Evolutionists believe that people attempting to disprove evolutionary theory lack the ability to reason rationally. This attitude is exemplified in the following words of the biologist, David Suzuki, well known for his science programs on Canadian television:

Evolution is an informative and enlightening lens under which we can scrutinize the natural world, including human history. Denying or ignoring this theory hobbles us intellectually to the point that it becomes virtually impossible to understand nature.⁷

With this religiously held belief that accepts evolution as a fact of nature, it is little wonder that an Evolutionist is amazed to meet anyone who questions the validity of this theory. But rather than being astonished that a fellow human being could be so stupid as to question this fact of science, the Evolutionist should consider the following question: If evolution is truly a well-established scientific fact, as testified by the sources quoted above, then why do so many people still believe in creationism?

It could be assumed that people who dismiss evolution have all been deceived, or are not capable of logical thought, or are so heavily influenced by religion that they cannot see the world any other way. But could so many people be deceived for so long, even generation after generation? If evolution is a "*fact* which is

6. W. A. Young, *Fallacies of Creationism* (Calgary, AB: Detselig Enterprises, 1985), 145.

7. D. Suzuki, "Learning evolution key to understanding ourselves." In the January 19, 2000, Science Matters Syndicated Newspaper Column, which appeared in *The Ancaster News*, 23 February, 2000.

so well confirmed that there is no more doubt about its reality than there is about the earth being round," then why has creationism not gone the way of the flat earth theory?

In light of the existence of so many people who question evolution, it is imperative that the objective facts of science that support, or refute, evolution be explained clearly. The remainder of this chapter does just that. There is a vast array of scientific facts to be digested, and the novice may find it difficult to fully understand the processes involved, so it is important to take in this information one step at a time. The first step is to clearly define what we mean by evolution.

4.2 Evolution defined

In 1859, Darwin defined evolution as descent with modifications. Old species gave rise to new species as the forces of nature selected for small differences between individuals. Today the term evolution has been extended beyond this original definition and can be applied to a number of different processes. One biology text first describes evolution as "any gradual change."⁸ This definition of evolution is self-evident, and obviously is not the definition of evolution that has caused such a rift between science and the Book of Genesis. This same textbook then provides a more specific definition of evolution: Any change in the frequency of genotypes in a population from one generation to the next. To fully appreciate the meaning of this more specific definition of evolution, it is important to know what is meant by differences in the frequency of genotypes.

The genotype is the genetic makeup of an individual, the type of genes that are present within each of the cells in that person. By definition, a gene is an inheritable trait and in our present understanding of cell biology, we equate the gene or the

8. The definition of evolution as found in the glossary of W. K. Purves, *Life: The Science of Biology*. 6th ed. (2001).

inheritable trait to a certain length of a DNA (deoxyribonucleic acid) molecule located in the nucleus of each cell. All living organisms have a genotype, or a set of DNA molecules specific to them, and all the cells of the same organism have the same genotype. Because of this, each cell is capable of being any other cell type in that organism. Yet cells differ from each other because they read, or express, only some of the information in the genotype, or their set of DNA molecules. Thus their outward appearance, or phenotype, varies. A liver cell and a heart cell of the same body have exactly the same genotype, but they each have a different phenotypes or physical appearance because they express or read different genes of the genotype.

An analogy which is frequently used to explain how the DNA in the nucleus determines the characteristics of a cell is that of a library. Consider that the nucleus of the cell houses a vast collection of "how-to" books. The genotype of the cell is all the information contained within this library written in the form of DNA. If a cell needs to be part of the liver, it will obtain information from the library which tells it "how to" be a liver cell. Although the library contains all the information to make a new individual, only that information which is needed to make a liver cell will be read. All other information in the library or genotype remains dormant. The trick to cloning is to encourage a cell of an organism to start to read the appropriate information in its genotype which would allow it to multiply and produce an entirely new individual.

The concept of a genotype can be applied to different individuals in the same population of organisms in the same way it is applied to different cells in the same body. Each organism in a population of interbreeding individuals belongs to the same species. All organisms in the same species have similar morphological characteristics identifying them as members of that species. The similarity in appearance reflects the fact that all the organisms of the same species contain very similar genotypes.

Through the mechanism of sexual reproduction, members of the same species are able to share genes with each other, so they tend to have very similar genotypes. Sharing genes and having similar genotypes tends to maintain the population as a relatively homogeneous set of individuals.

Unlike individual cells, no two organisms of a species have exactly the same genotype (or exactly the same genes) because of the mixing of genes during sexual reproduction. The exception to this rule, of course, occurs in the case of identical twins. Identical twins are derived from a single fertilization; hence, they have the same genotype. But for all other individuals in the population, the genotypes differ slightly because, at conception, each individual receives, by chance, half their genes from a father, and the other half from a mother. By receiving their genotype from different sources overall the offspring appear to have inherited characteristics from both parents. In addition, since the genotypes of siblings come from the same parents, these genotypes will be more similar to each other than the genotypes of distant cousins. This similarity in genotype is reflected in the similarity of physical appearance. Offspring of the same parents tend to resemble each other far more than individuals who are related through their grandparents or great-grandparents.

Not all individuals in a population of humans look alike because the genotype, the type of genes in their cells, varies between individuals. In any single population, we tend to see similarities between individuals, and when these similarities can be recognized in whole groups of people, these groups are often referred to as races. The difference we see between the races of humans reflects the difference in the frequency of particular genotypes or genes in these races. For example, some races have a higher frequency of genotypes for blond hair and fair skin whereas others have a higher frequency of genotypes for black hair and dark skin. In other words, starting with an original population of similar looking individuals (that is to say, a single

race), the many races we see today can be readily explained. Over time, small interbreeding groups became geographically isolated from the original breeding population, and could no longer share the genes of the whole population. By sexually reproducing within itself, the smaller population started to display its own unique set of genes that it carried with it when it separated from the larger population. In other words, each population now had a frequency of genotypes unique to itself. This process is a statistical phenomenon, and it functions at the level of small interbreeding populations of individuals. In scientific terms, it is known as genetic drift.

Genetic drift has been documented for a number of species in nature, and the biological mechanism giving rise to genetic drift is the same by which breeds of animals can be produced through artificial selection. The definition of evolution as a change in the frequency of genotypes in a population over several generations is fully supported by reproducible scientific evidence, and would not be contested by any Creationist. In fact, genetic drift is a verifiable biological process that can be used to explain a very interesting portion of Scripture.

Genesis 10 reports that the sons of Noah gave rise to distinct groups of people "after their tongues, in their country, and in their nations." The Bible makes no mention of different nations or races of man *before* the flood. The appearance of different races of man *after* Noah's flood is a textbook example of genetic drift in which a small interbreeding population, separated from the larger population (in this case, by a global flood which killed off the larger population), gave rise to differences in the frequency of genotypes. Each of Noah's sons and their wives carried with them only a small portion of the entire genotype that was originally available to the pre flood population from which they came. After the flood, they also became isolated from each other. These smaller interbreeding groups carried their own characteristic frequency of genotypes, determined simply by chance. Over a few

generations, each of these isolated groups started to develop characteristics peculiar to themselves, such as hair colour and skin colour. A change in the frequency of genotypes over time would best explain the development of the different races of mankind from a single race. Obviously this definition of evolution has not caused the rift between Science and Scripture.

Then why is evolution such a contentious issue? It is because the most universally accepted definition of evolution is the descent of modern species of organisms from preexisting species of organisms as a result of natural selection. That is to say, the theory of evolution states that man was not created by God directly from the dust of the earth on day six of the creation week, but evolved by chance over millions of years through an exceedingly slow process. In this process, each subsequent generation of organisms was altered ever so slightly until modern man appeared.

Species giving rise to another species through natural selection working on chance events is a form of evolution sometimes referred to as *Big E evolution*, or macroevolution. Presumably, changes in the frequency of genotypes in a population become so great over periods of centuries, millennia, or longer that the species barrier is crossed and new species are formed. Big E evolution or macroevolution is contrasted with little "e" evolution or microevolution. Microevolution describes variations observed over a small number of generations between individuals belonging to the same species, such as can be seen with genetic drift. When evidence for evolution is presented, it is very important to determine if this evidence applies to microevolution, variation within the same species, or to macroevolution, variation that causes the formation of new species.⁹

9. University biology textbooks define microevolution to mean genetic variation within a species or adaptation, e.g. "Small-scale evolutionary change due to changes in allele or genotype frequencies that occur within a population over successive generations." (E.P. Solomon et al., *Biology*, 6th ed. [Pacific Grove, CA: Brooks/Cole Thomson Learning, 2002],

Based on the assumption that species evolved from preexisting species, the evolutionary history has been worked out for many different species. Textbooks provide diagrams that link all organisms on earth with an original single-cell organism. Arranging the different species of organisms present in nature today from simplest to most complex (actually smallest to largest and/or most intelligent), and assuming macroevolution, it is possible to postulate where along the evolutionary history the common ancestors divided to get what we see now. Thus, the objective scientific evidence consists of the variety of organisms present in today's world, or present in the fossil record. The scientific theory of macroevolution explains this evidence by postulating that the less complex animals gave rise to the more complex animals through natural selection over millions to billions of years (see figure 4.1).

However, the same objective evidence can be explained equally well by assuming that each kind of animal was created at time zero to reproduce after its own kind. The considerable variation we see in the appearance of individuals in a species merely reflects the organisms' ability to adapt, within limits, to environmental variables (see figure 4.2).

G-28). And again: "Refers to the evolutionary process itself. Evolution within a species." (P.H. Raven et al, *Biology*, 7th ed. [Boston, MA: McGraw Hill Higher Education, 2005], G-9). Some authors refer to microevolution as small scale changes which produce new species. This definition for microevolution takes on a significantly different meaning since it refers to the production of new species, rather than to genetic variation observed within the same species. This different definition is problematic since, in essence, it does not differ from macroevolution, the production of new species over time. According to the accepted mechanism for evolution, natural selection works on imperceptibly small differences between individuals, thus macroevolution is the proper term to use when describing small differences that lead to the formation of new species. The term microevolution should not mean the same as macroevolution, therefore I am using the term microevolution to mean genetic variation or adaptation in a species, and not small changes that produce a new species.

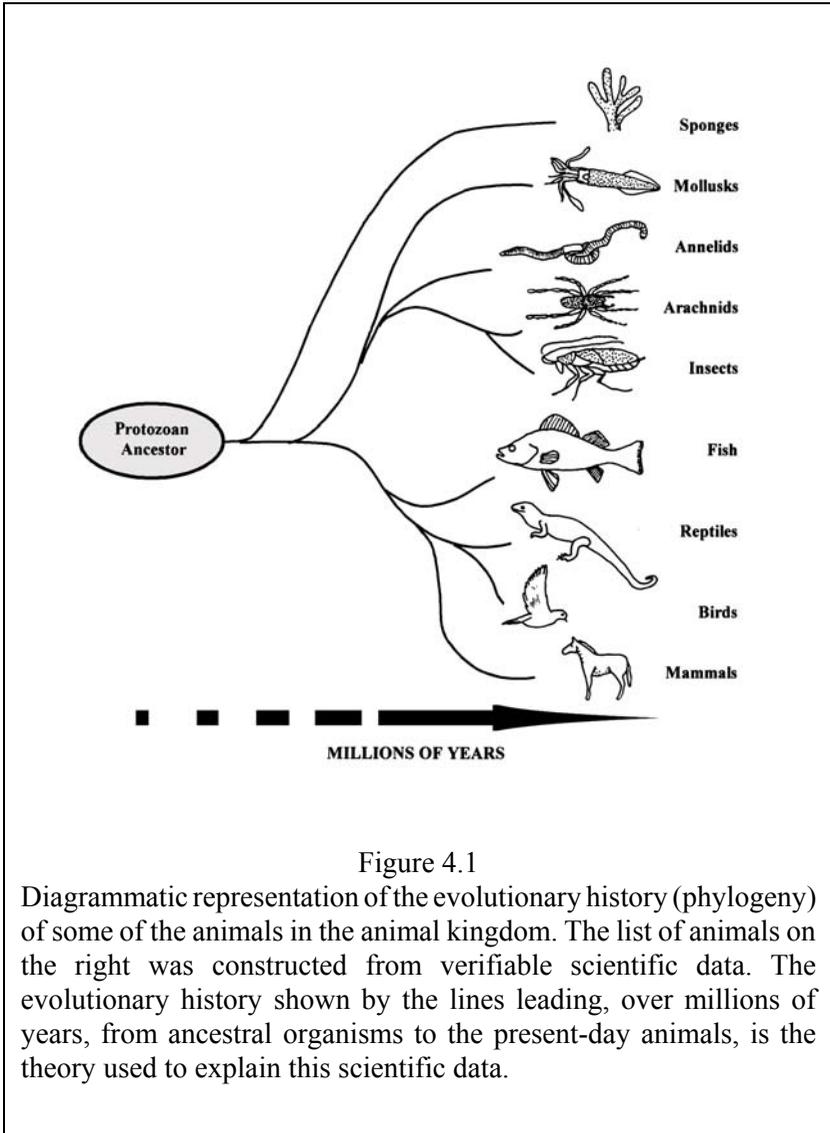


Figure 4.1

Diagrammatic representation of the evolutionary history (phylogeny) of some of the animals in the animal kingdom. The list of animals on the right was constructed from verifiable scientific data. The evolutionary history shown by the lines leading, over millions of years, from ancestral organisms to the present-day animals, is the theory used to explain this scientific data.

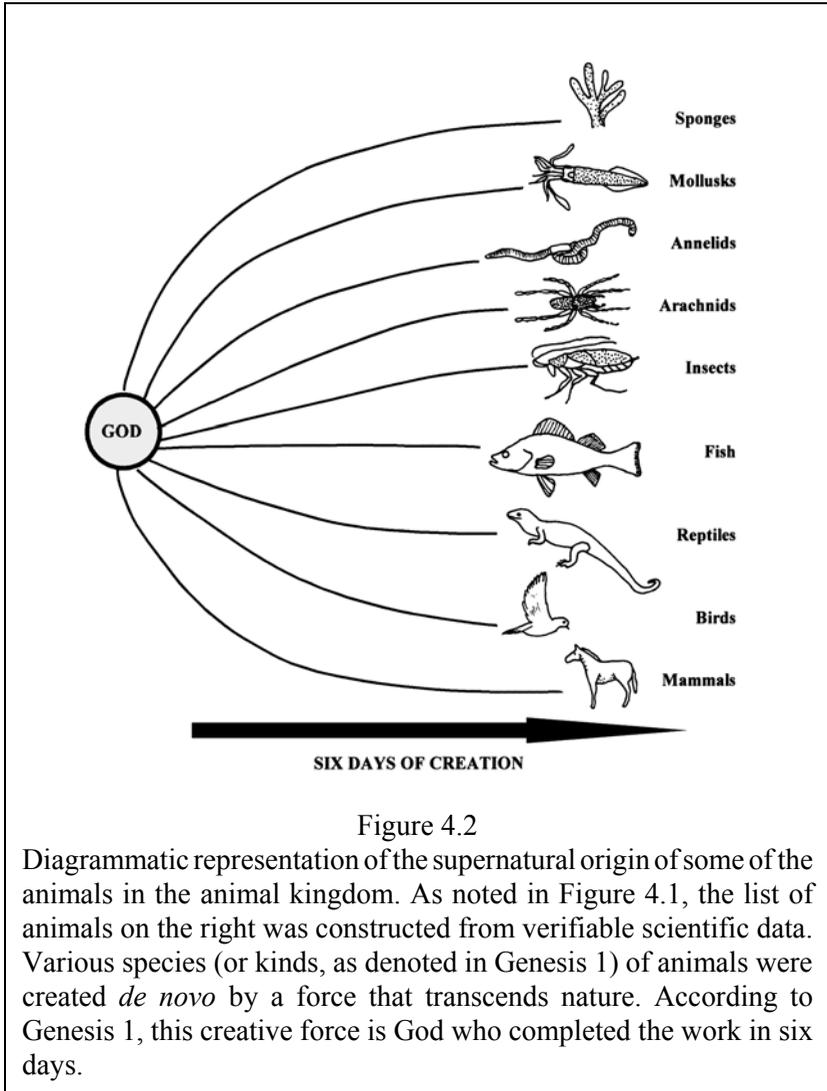


Figure 4.2

Diagrammatic representation of the supernatural origin of some of the animals in the animal kingdom. As noted in Figure 4.1, the list of animals on the right was constructed from verifiable scientific data. Various species (or kinds, as denoted in Genesis 1) of animals were created *de novo* by a force that transcends nature. According to Genesis 1, this creative force is God who completed the work in six days.

When debating origins it is very important to know what is the exact meaning of the term *evolution* since, as we have seen above, evolution can be used to describe distinctly different processes. It can simply mean *any* change; or it can refer to genetic variations *within* a species; or it can mean macroevolution, the origin of *new* species from preexisting species by the process of natural selection. Since macroevolution is the only definition of evolution which is in keeping with Darwin's original concept, it is this definition that is at the heart of the origins debate since it contradicts a literal translation of Scripture. It is macroevolution that needs to be evaluated in the light of modern scientific knowledge.

4.3 The scientific evidence for (macro)evolution

For any scientific theory, two types of evidence exist. Evidence can be subjective, or it can be objective. Subjective evidence is subject to the interpretation of the experimenter. For example, in a murder trial, the fact that the accused cannot prove that he was not at the scene of the crime is subjective evidence that he is guilty. This evidence suggests that he *could* have committed the crime, but it does not prove that he *did* commit the crime since it does not directly associate him with the crime scene.

In contrast to subjective scientific evidence, objective evidence is testable and repeatable, and less liable to the interpretation of the experimenter. In a murder trial, objective evidence linking an accused person to the crime would be the presence of his fingerprints on the murder weapon, or the presence of his DNA at the crime scene. In both cases, the evidence links the accused to the crime scene, and in both cases, the evidence is testable and repeatable. His fingerprints can be compared to a picture of the fingerprints taken from the crime scene, and the makeup of his DNA can be compared to the DNA taken from the crime scene.

It is important to note, however, that the certainty levels of the objective evidence can vary depending on the method used. To date, no two humans have been found to share the same fingerprints; therefore the presence of the fingerprints on the murder weapon that matches the fingerprints of the accused can be used to convict him. On the other hand, there is enough experimental error in comparing the DNA from two sources (a technique known as DNA fingerprinting) that a sample of DNA from the accused could match a sample of DNA from another person one time in 500,000. For a city of five million people, there could be as many as 100 people whose DNA will match using the DNA fingerprinting technique. Thus, matching the DNA of the accused with DNA samples taken from the crime scene does not automatically link him to the crime. There is a one in 500,000 chance that the DNA at the crime scene was not his. On the other hand, in cases where the DNA at the crime scene does not match the DNA of the accused, this evidence has been used to exonerate previously convicted individuals.

When deciding on the validity of a scientific theory that will have an impact on your worldview, it is best to consider only the objective evidence. Subjective evidence is subject to the premises that you already have. In one way, subjective evidence for macroevolution could consist of observations that the genetic makeup of individuals of a species does vary. This variation is then extrapolated to suggest that two separate populations of the same organism could eventually become genetically distinct from each other to the point of being separate species. In another way, subjective evidence could be derived from the observation that the DNA from two different species is closely similar. For instance, when the DNA of chimpanzees and humans is compared, not only do they “appear to have essentially the same set of 30,000 genes, but these genes are arranged in nearly the same way along the chromosomes of the two species.”¹⁰ This similarity is used to

10. B. Alberts et al., *Molecular Biology of the Cell*, 4th ed. (New York, NY: Garland Science,

argue that these species arose from a common ancestor in the not-too-distant evolutionary past. In both cases, the evidence is subjective, because how you interpret the variation *within* a species or the similarities *between* a species depends on what you want to believe. These scientific facts can also be used as evidence in support of the belief that each species was created independent of any other species.

Objective scientific evidence for macroevolution would need to consist of actual observations, repeated several times, of new species arising from preexisting species. According to all proponents of evolution, from Darwin to the present, the *only objective scientific evidence that macroevolution gave rise to new species is found in the fossil record*. Since evolution works on imperceptibly small differences over very long periods of time, direct observation by any single individual or civilization would be impossible. Assuming that the fossil record contains representative examples of once-living specimens arranged chronologically in the sedimentary rocks, then the fossil record is analogous to a photo album with snapshots of organisms through time. By comparing "pictures" of organisms in one stratum of rock with those in another, the fossil record can provide objective evidence for evolution by showing the gradual change in one species as it was transformed through time to give rise to two or more new species.

How much objective scientific evidence for macroevolution does the fossil record hold?

Darwin acknowledged that the fossil record held both the strongest and the weakest evidence for his theory of macroevolution. According to his reasoning, any substantial change in the design of an organism would weaken that organism. Therefore, macroevolution had to proceed with small, almost imperceptible differences between generations over very prolonged periods of time. He argued that the fossil record, when

complete, would show countless examples of links between simple and more complex animals. According to Darwin, there should be a gradation from one species into another. And once enough of the fossil record was known, the gaps between various fossilized species would disappear. If the fossil record failed to fill in these gaps, then macroevolution for Darwin would have no objective scientific evidence to support it. This form of macroevolution is referred to as *Darwinian gradualism*.

Those Creationists who are knowledgeable about the fossil record have always insisted that the fossil record is so full of gaps between even rather closely related species that the fossil record actually supports creationism and refutes macroevolution. However, Evolutionists who believe in gradualism have always used the fossil record as their only objective scientific evidence for macroevolution.

In the early 1970's an interesting paradigm shift occurred in the study of fossils. Many evolutionary scientists came to the realization that the fossil record does not support Darwinian gradualism. In any particular stratum or layer of sedimentary rock, there might be many different varieties of the same species, but no evidence of macroevolution of one species into another. The links are still missing. In the next stratum, there appears an entirely new set of organisms more complex than those in the previous strata, and here as well, there is no evidence of macroevolution. Presupposing that macroevolution is a fact, these scientists postulated that during long periods when the fossil record was being laid down, macroevolution was not occurring. The environmental pressure needed for natural selection to work on the imperceptibly small differences between individuals of the same species was not present. This assumes that although the earth may have had a variety of climates over the eons, any one of these climatic types was relatively stable over long periods of time. Millions of years of the same climate or environment would

be needed to form the fossils of organisms which were alive during that time.

In this version of the theory of evolution, each sedimentary rock stratum would represent a long period of equilibrium to explain the stability of species observed in that rock stratum. The gaps found between these sedimentary rock layers would coincide with relatively short periods of unstable environmental conditions. These changing environments would create the driving force by which natural selection would work to select those individuals with physical characteristics better suited for the new environments. During these periods, which could range anywhere from 10,000 to 200,000 years, macroevolution would have occurred so fast that the intermediate forms would not have been fossilized, thus explaining their absence from the fossil record. In the next stratum, the newly evolved species would suddenly appear as if they were created, not evolved. This type of macroevolution is referred to as *punctuated equilibrium* since periods of equilibrium or stasis are punctuated by periods of rapid change. It explains the gaps between the strata and the lack of transitional forms between species.¹¹ (For a diagrammatic comparison of Darwinian gradualism and punctuated equilibrium, refer to figure 4.3)

If anything, these contradicting interpretations of the fossil record from two very knowledgeable groups of Evolutionists, clearly indicate that the fossil evidence is ambiguous. It could be used to support two conflicting points of view. If you are an Evolutionist who believes in Darwinian gradualism, you believe that the fossil record shows examples of gradual changes in organisms from the simple to the complex. If you are an Evolutionist who believes in punctuated equilibrium, you believe that the fossil record shows few, if any, gradual changes in animals from the simple to the complex.

11. Curtis and Barnes, *Biology*, 1028-1029 .

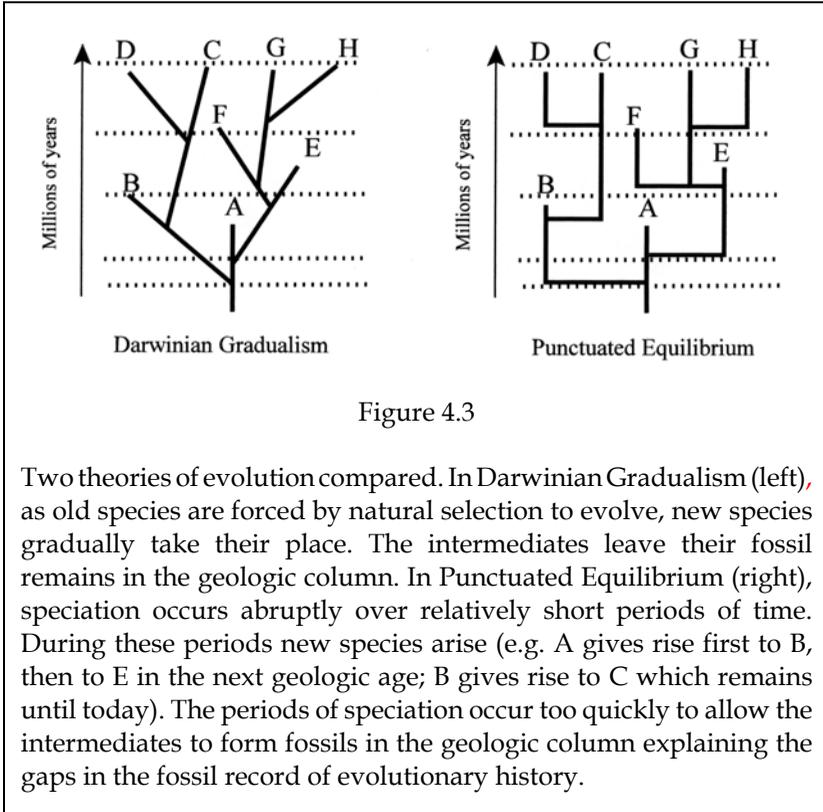


Figure 4.3

Two theories of evolution compared. In Darwinian Gradualism (left), as old species are forced by natural selection to evolve, new species gradually take their place. The intermediates leave their fossil remains in the geologic column. In Punctuated Equilibrium (right), speciation occurs abruptly over relatively short periods of time. During these periods new species arise (e.g. A gives rise first to B, then to E in the next geologic age; B gives rise to C which remains until today). The periods of speciation occur too quickly to allow the intermediates to form fossils in the geologic column explaining the gaps in the fossil record of evolutionary history.

The only objective scientific evidence for macroevolution is in the fossil record, but as seen in this debate between Darwinian gradualism and punctuated equilibrium, many Evolutionists now agree with what the Creationists have been stating for decades. The fossil record provides no objective scientific evidence for evolution; the evidence it provides is at best circumstantial, and at worst, contradictory. Indeed, the objective scientific evidence for macroevolution is, as it was in Darwin's day, virtually absent. Although Darwin's *Origin of Species* contains hundreds of pages

describing small variations between organisms of increasing size and complexity, Darwin clearly admits that the only empirical evidence for his theory would be found in the fossil record. However, because the fossil record was only partially known to him in 1859, Darwin could argue that this evidence would eventually be found once this record was more fully known. Darwin provided no other objective scientific evidence for macroevolution.

This very important description of the objective scientific evidence for macroevolution must sadly come to an end. There is no more scientific evidence to discuss. In short, the objective scientific evidence for macroevolution is still missing. The fossil record in which Darwin placed considerable hope has not lived up to his expectations. Further, the more knowledge gained of the fossil record, the less it can be used to support macroevolution. This rather sparse evidence for macroevolution is in striking contrast to the overwhelming acceptance of macroevolution by both the established scientific and academic communities.

4.4 The scientific evidence against (macro)evolution

In contrast to the lack of objective scientific evidence to support macroevolution, there is an abundance of evidence that refutes macroevolution. This evidence clearly supports the belief in the stability of a species and the inability of new species to develop out of older ones. That is to say, there is biological evidence which contradicts macroevolution. New species are not seen to arise from older species by the process of natural selection, for although the gene frequencies of populations of a species can vary with changing environments, the present scientific evidence defines a limit to this variation. When conditions change to the point where the environment can no longer support any of the various forms or phenotypes of a species,¹² the species becomes

12. Due to their ability to interbreed and produce viable offspring, some groups presently

extinct long before it can develop the new genes it needs to continue on the evolutionary pathway.

Considering that evolution is supposed to be an irrefutable fact, and that one substantial piece of evidence against evolution ought therefore to be a serious concern, it is disconcerting to discover that there are several facts of biology that run totally counter to the theory that a new species arises from an older species. In my years of teaching a large number of biology courses in a liberal arts and science university, I have encountered several reproducible biological experiments that oppose the concept of macroevolution. These studies have been gleaned, not from books tainted by Creationist propaganda, but from biology textbooks written by authors who believe evolution is an irrefutable scientific fact. Some of this objective scientific evidence against macroevolution is described below under the following headings of Genetics, Living Fossils, Mitochondrial DNA, C-value Paradox, Natural Selection (i.e., Survival of the Fittest), and Ancient DNA.

4.4.1 Genetics

Genetics is the science which explores the process by which offspring inherit traits from their parents. The "gene" is the term describing a factor passed on, or transmitted, by the parent to the offspring. Prior to our present understanding of heredity, many, such as Darwin, believed that traits or genes from both parents were somehow combined in the offspring so that differing traits, such as tallness or shortness, were blended in the children to produce medium sized individuals. Darwin also believed that traits acquired during the lifetime of a parent, such as a muscular build due to exercise, could be passed on to the offspring. Today, these ideas have been replaced with the concept that the gene is a distinct inherited unit passed on from parent to offspring in the

classified as separate species have been shown to be phenotypes or breeds of the same species. This ambiguity is addressed in the discussion of Darwin's finches in section 4.5.

form of DNA. Although the variation among offspring obtained by chance mixing of genes from two parents has been used to support macroevolution, it may come as a surprise to many that the science of genetics actually refutes the very concept that old species give rise to new species. This is clearly evident in the original Mendelian genetics, and is also seen in our current understanding of mutations and genetic drift.

Mendelian genetics

Gregor Mendel, the founder of Mendelian genetics, was an Augustinian monk who had a fascination with nature, and in particular, with the way in which traits were passed from one generation to the next. He is best known for his work with peas in which he reported that peas differing in just one trait, such as colour, or size, could be cross-pollinated to produce offspring which displayed a trait characteristic of only one of its parents, not a blend of traits from both parents. For example, a dwarf plant and a tall plant produced either dwarf or tall offspring, not medium-sized offspring. Mendel observed that:

The progeny [i.e., offspring] of hybrids [i.e., who had parents who were from different strains of peas] carries one or the other of the parental characteristics, or the hybrid form of the two; I have never observed gradual transitions between the parental characters or a progressive approach toward one of them.¹³

In other words, when Mendel crossed peas having different physical characteristics, he never saw a trait that was the result of the mixing of two different traits. Instead, one trait could

13. As quoted from a letter written by Gregor Mendel (1867) to Carl von Nageli, a celebrated botanist and authority on evolution. This letter was reprinted in *Great Experiments in Biology*, M.L. Gabriel and S. Fogel, eds. (Englewood Cliffs, NJ: Prentice-Hall, 1955), 228-233.

disappear in one generation to reappear in another generation. The traits acted as individual units so that the offspring could be tall or short, but not medium, or they could be white or red, but not pink. This observation has been articulated in scientific language as the "Particulate Theory," which states that hereditary material behaves in a particulate rather than a fluid way. More specifically, this theory proposes that discrete hereditary units (particles or genes) are transmitted from one generation to the next without being altered when mixed with units from another individual to form offspring. Traits exist as packets of information that compete with each other but do not mix.

Contrary to many historical accounts, Mendel's discovery was known to the scientific community during his lifetime. His scientific research (conducted between 1856 and 1863 and first published in 1866) was well publicized, appearing in respected scientific journals and being presented at academic meetings. It was known to many of the prominent scientists of his day, including Darwin. Yet his research was ignored, and essentially forgotten by his generation. Assuming that scientists are not totally objective, and are affected by bias fostered by their religious beliefs, it is possible that Mendel's research was ignored because it did not support evolution during a time in history when evolutionary theory had yet to be fully established in the minds of the general populace. Rather than supporting evolution, Mendel's experiments actually provided the scientific explanation for the variation within a species, and clearly indicated that this variation was in fact limited in degree.

Formulated more recently is the Law of Limitation of Variation in Progeny. This law, which can be explained by Mendelian genetics, states:

The fertile progeny of any sexually or asexually reproducing group of organisms inherits those

characteristics which distinguish it as belonging to that group.

That is to say, variations in offspring do exist, as explained by Mendel, but regardless of how much they differ from their parents, offspring are always generation after generation the same species as their parents. In our recorded history, this law has yet to be broken. For macroevolution to have occurred, this law of biology would have been broken millions of times during our assumed evolutionary history.

In contrast to what was observed by Mendel, Darwin argued that variation was not limited, and "changed conditions" in the environment, along with "increased use or disuse of parts" could result in variations that could be "infinitely complex."¹⁴ To incorporate Mendel's findings into the scientific thought of his day, scientists would have had to admit that variations within a species were predictable, and that there were serious limitations to these variations, unlike the "infinitely complex" variations that Darwin believed were necessary for macroevolution. Accepting Mendel's work at the time when *The Origins of Species* was just beginning to take hold of the scientific community would have meant a total rejection of Darwin's theory.

By 1900, Mendel's findings were rediscovered by scientists working independently of each other: Hugo de Vries in Holland, Carl Correns in Germany, and Erich Tschermak in Austria. Mendel's work could not be ignored any longer, but by this time evolution had become well accepted. Without fear of rejection, Darwin's theory could be reworked to fit into the new facts of genetics. As it has turned out, the variation predicted by Mendelian genetics is now used extensively as support for evolution by extrapolating the observed variations within the species (microevolution) to the point where these variations become great enough to create new species (macroevolution).

14. Darwin, *Origin of Species*, 57.

In reality, however, Mendelian genetics demonstrates that the variation between members of the same species is predictable and "particulate," and that heredity does not conform to the properties that Darwin deemed vital for natural selection to work. Although Mendelian genetics might be used as support for evolution, it is still as damning to macroevolution as it was when Mendel first discovered it. As the Evolutionist, Ernst Mayr, has confessed, "Unfortunately, the genetics of microevolutionary processes has been unable to provide a full explanation of macroevolution."¹⁵ And now that science has documented the characteristics of the DNA for thousands of genes, W. Ford Doolittle has observed that, "Many[...] genes[...] seem to come from nowhere."¹⁶ In other words, many of the more recently evolved organisms appear to have genes which did not arise by natural selection from ancestral organisms. Instead, these genes appear as if they were created. There is no evidence of earlier stages in the evolutionary history which gave rise to these genes.

Mutations

Mutations refer to alterations, changes or variations from the norm of a whole part or a characteristic of an organism. Although variations are recognized between individuals of any population of organisms, the term *mutation* is not used to describe expected variations. Rather, it describes unexpected changes in the physical makeup of an organism, and generally refers to changes which are deleterious to the organism, rather than beneficial.

In the terms of modern genetics, mutations are random unexpected changes in the genotype of individuals. Since the discovery of the three-dimensional structure of DNA,¹⁷ a mutation

15. E. Mayr, *Toward a New Philosophy of Biology*, (Cambridge, MA: Harvard University Press, 1988), 405.

16. W. F. Doolittle "Uprooting the tree of life," *Scientific American* 282, no. 2 (February 2000): 90-95.

17. J. D. Watson and F.H.C. Crick "A structure for deoxyribose nucleic acid," *Nature*, 171 (April 1953): 737-738.

can be explained at the level of the molecule. Mutations are caused by changes in the building blocks that make up the DNA in the nucleus. These random changes are assumed to give rise to the imperceptibly small differences between individuals of a species upon which the mechanism of natural selection could operate. For macroevolution to have occurred, it is assumed that some mutations are beneficial and that, by the process of natural selection, an accumulation of beneficial mutations leads to the development of a new species which is a better fit for the environment. This reasoning appears quite logical and rationally sound, until its foundational assumption is examined in greater detail. The assumption is that some of the chance mutations are beneficial. If so, then given enough time, the beneficial mutations would accumulate until a new, more complex species is formed. This is the assumption; now let us examine the problem.

Mutations work in the opposite direction to species improvement. All mutations that have had any effect on the phenotype or outward appearance of an organism have been either detrimental or neutral; they have *never* been shown to be beneficial. In modern biology, beneficial mutation is a contradiction in terms. Rather than increasing in fitness as mutations accumulate, organisms actually become less fit. Mutations will never create a species more complex than a predecessor since each mutation actually removes usable genetic information and renders the organism less fit for survival. A mutation represents damage, not improvement. Moreover, natural selection actually works to remove these mutated forms from the population. In practice, natural selection does not accumulate mutations, but gets rid of them.

The observed reproducible scientific fact that mutations are neutral or detrimental further reinforces the scientific observation that there is a distinct limit to variation in the appearance of offspring. Rather than changing gradually over millions of years, each species behaves as if it were designed to ensure that it will

continue to produce like offspring generation after generation. Modern science has clearly shown that organisms are not capable of producing infinite variations, variations that Darwin saw as indispensable for natural selection to give rise to new species. Mutation is a mechanism that could give rise to microevolution – variation within a species – but by their very nature, mutations as we know them today, could not have given rise to macroevolution, the development of new, more complex species.

Genetic Drift

One university biology textbook describes genetic drift as: "Changes in gene frequencies from generation to generation in a small population as a result of random processes."¹⁸ If you recall, this is essentially the same definition as one of the definitions used for evolution. This same textbook defines evolution as "any genetic and resulting phenotypic change in organisms from generation to generation." In essence, the definitions of genetic drift and evolution are practically identical. The words used to define these terms may differ, but the meaning of the words is the same. Given this similarity, one would expect that examples of genetic drift would fully support, not contradict, the theory of evolution. Yet in every example of genetic drift ever documented, the organisms clearly followed the Law of Limitation of Variation in Progeny. Genetic drift may have occurred to give rise to different races or breeds of the same species, but the assumption that this process could lead to the development of a new, more complex species has never been observed even once in nature.

When viewed through the eyes of an Evolutionist, examples of genetic drift, such as the peppered moth in England or Darwin's finches in the Galápagos Islands, or the development of resistance to antibiotics in pathological microbes, provide objective proofs of macroevolution in action. Yet the reason all

18. The definition of genetic drift as found in the glossary of W.K. Purves et al., *Life: the Science of Biology*, 6th ed. (2001).

these examples, and many like them, fail to support macroevolution is the fact that they are all better explained by the existence within the original populations of all the variations that were selected by the particular environments. That is to say, these examples actually depict microevolution, small changes within a species over a few generations, not macroevolution, significant changes over thousands to millions of years leading to the production of a new species. If the gene for antibody resistance was not already in the population before the drug treatment, then the entire population of pathogenic microbes would have been killed off before any evolution could have occurred. The appearance of drug-resistant strains cannot be explained by the evolution of new genes. These genes must have been present in the original populations, and were subsequently discovered as the drugs killed off the drug-susceptible varieties.

4.4.2 Living Fossils

The word "fossil" is derived from the Latin word "fossilis" meaning "dug up." At one time, this term was applied to anything that was recovered from the ground, and in today's world *fossil* generally refers to a solidified or petrified object that was once a plant or animal. But fossil can also be used to refer to any geological evidence of the presence of life, such as footprints frozen in stone or worm holes preserved in wood. Fossils are normally encased in sediment or sedimentary rock, but can also be found suspended in substances like asphalt and resin or frozen in ice. In other words, not all fossils consist of inorganic minerals which have replaced the original organic matter. In some cases, such as the frozen fossils, organic matter is still present allowing scientists to study such things as the DNA of dinosaurs. A living fossil is an organism alive today which has representatives in the fossil record.

During Darwin's day, most fossils found in the sedimentary rocks had no living counterparts, suggesting that the fossil record provided evidence of a world that once was, but no longer existed. The fossil record gave the impression that many species had become extinct suddenly. In Victorian England, some scientists interpreted this extinction as proof of a global flood. Conversely, Darwin argued that extinctions provided proof of natural selection working over millions of years, rather than proof of a single catastrophe that affected the whole world. As Darwin argued:

The theory of natural selection is grounded on the belief that each new variety and ultimately each new species, is produced and maintained by having some advantage over those with which it comes into competition; and the consequent extinction of the less-favoured forms almost inevitably follows.¹⁹

Darwin conceded that it may have been possible for some species to have escaped extinction while remaining unchanged over millions of years but, generally, these survivors would not have given rise to newer forms. The forces at work to create new forms would ultimately lead to the extinction of older forms. Whenever a new modified form has evolved from an older species:

[...]the improved and modified descendants of a species will generally cause the extermination of the parent-species[...]if many new forms have been developed from any one species, the nearest allies of that species, *i.e.* the species of the same genus, will be the most liable to extermination.²⁰

19. Darwin, *Origin of Species*, 318-319.

20. Darwin, *Origin of Species*, 319.

Darwin therefore reasoned that the logical extension of his theory of natural selection was reinforced by the fact that most of the animal forms in the fossil record became extinct as they gave rise to new and improved species.

The observation that extinction occurred corroborated Darwin's theory of natural selection, for extinction provided the evidence that the environment changed enough to require organisms to evolve or else to become extinct. Unfortunately for Darwin, as the scientific knowledge of the dead world of fossils and the living world of biology has increased, there are now many examples of living animals whose forms are also depicted in the fossil record. Organisms once thought to be extinct because they gave rise to more complex organisms have been found alive and well in nature. If species are so subject to change, as is required for macroevolution, why have so many of them remained unchanged over millions of years, and why do some organisms, that have supposedly given rise to other organisms, still exist?

Assuming that the earth is billions of years old, the existence of living fossils is objective scientific proof that organisms stay the same over millions of years. This conservation of form is in keeping with what modern biology tells us about the organisms of today. Whether species were designed or appeared by chance, their machinery or biological processes function to maintain the integrity of the species from generation to generation. The presence of living fossils does, in fact, run counter to Darwin's prediction based on his theory of evolution.

Evolutionists seem to pass over the fact that Darwin believed that the *absence* of living fossils was proof for evolution, and credit him for predicting the *presence* of living fossils. As noted on a television program describing that ancient fish, the coelacanth,²¹ Darwin did suggest that certain animals may have been sheltered

21. "Ancient Creature of the Deep," *NOVA*, PBS, 21 January, 2003. See also: <http://www.pbs.org/wgbh/nova/fish>.

from selection pressure in isolated regions allowing them to continue unchanged for millions of years. However, this program neglected to point out that Darwin used this argument to explain why a species would *not* have given rise to new species. If the organism did not become extinct, then there must have been no selection pressure to drive the process of natural selection. For Darwin, any living fossil would be an unlikely ancestor of species existing today. Yet living fossils discovered today, such as the coelacanth, are still considered to be ancestors of modern organisms, even though Darwin believed that living fossils show the absence of natural selection, and would likely represent the end of a branch on the evolutionary tree.

4.4.3 Mitochondrial DNA

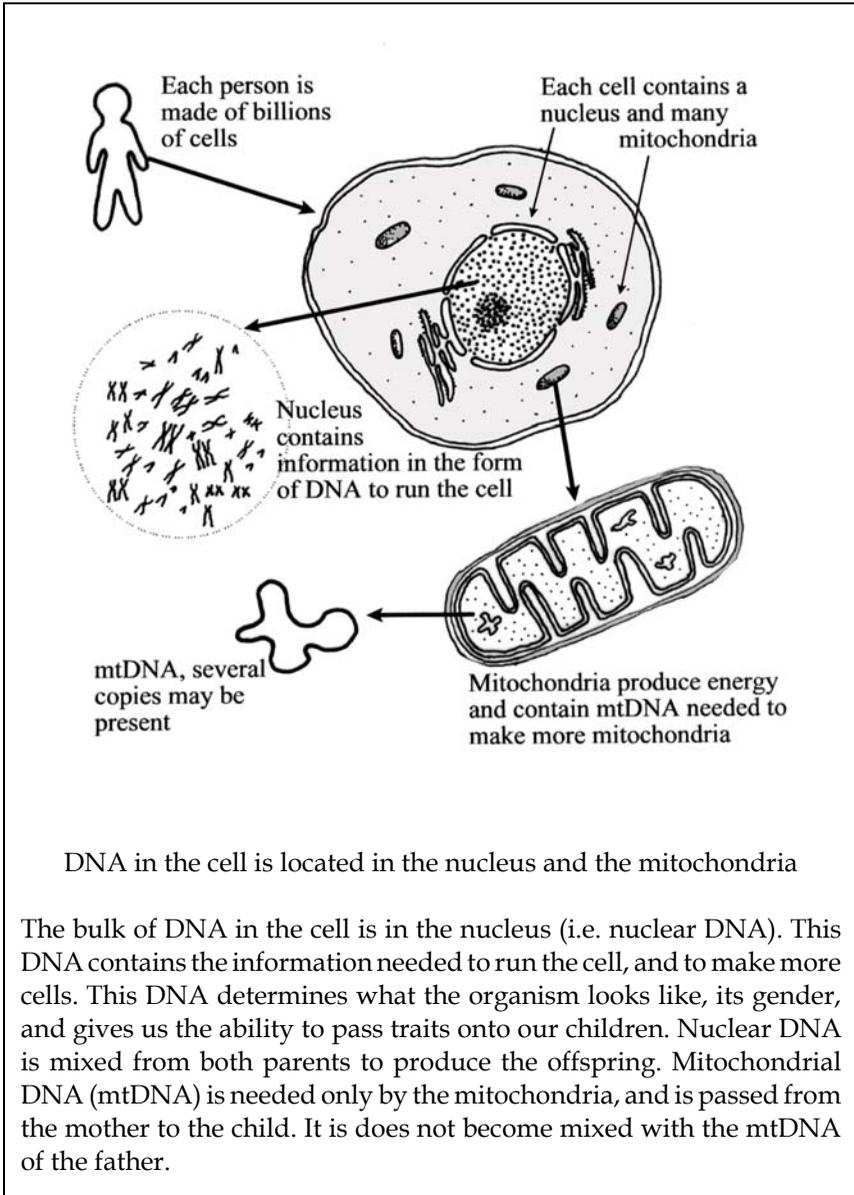
Living organisms are composed of basic structural units called cells. Each cell in each organism, with the exception of a prokaryote (e.g., bacteria), contain identifiable structures needed to carry out a particular function necessary for the life of that cell. For instance, the nucleus within the cell is the structure that contains DNA. This DNA provides the information for running the cell, thus the nucleus could be considered the cell's "brain." In addition to a single large nucleus, each cell contains many smaller mitochondria. These mitochondria provide the energy to run the cell and, as such, are often referred to as the cell's engine rooms or powerhouses.

Interestingly, not all the DNA needed to run the cell is located in the nucleus. The mitochondria also contain a small amount of DNA referred to as mitochondrial DNA (mtDNA). The mtDNA, coupled with the DNA in the nucleus, provides the necessary information to allow the mitochondria to produce proteins, and to reproduce asexually. This asexual reproduction is similar to that seen in bacteria, in which a single parent duplicates its DNA and then separates into two new daughter

cells. In mitochondria, this form of reproduction results in the production of daughter mitochondria in which the DNA is an exact copy of DNA that was once in the parent mitochondrion. It should be emphasized, however, that the mitochondria are not totally independent organisms like bacteria, since they require information from the DNA in the nucleus to be functional. Nonetheless, the only differences in the DNA among a population of mitochondria would be the result of rare mutations that may occur as the DNA of the parent mitochondrion is being replicated for the two daughter mitochondria. There is no mixing of DNA between mitochondria, and the DNA of the parent mitochondrion is faithfully passed on to the new daughter mitochondria.

In human reproduction, it was once assumed that only the nucleus of the sperm entered the egg. The sperm mitochondria, which are localized in the tail, remain outside the egg as the DNA of the nucleus is being delivered. Thus an embryo receives mitochondria only from its mother, as the mitochondria from the fertilizing sperm are lost. Since the mitochondria come exclusively from the mother, the mtDNA in the embryo would be identical to that found in the mother, except for very rare mutations.

Since mtDNA is considerably smaller than the DNA in the nucleus (less than 0.05% the size of nuclear DNA), it is possible to analyse mtDNA and to compare this DNA between human populations. Assuming that the differences in the mtDNA result from rare mutations, and that these mutations accumulate at a steady rate, then comparing mtDNA from different groups of humans will allow us to determine how closely related these groups are. If their mtDNA are identical, they share a common female ancestor who existed a short time ago. If their mtDNA differ somewhat, then their common ancestor would have existed far into the distant past. The greater the number of differences between two sets of mtDNA, the greater the number of generations and the greater the period of time that would have been required to produce the mutations creating these differences.



Using this reasoning, Cann, Stoneking and Wilson (1987)²² analysed the mtDNA from the females of five distinct groups of humans: Africans, Asians, Caucasians, aboriginal Australians, and aboriginal New Guineans. They first discovered that the mtDNA in each of these groups was more similar between females within the group than between individuals from different groups. This result confirms what seems to be intuitively correct: Each race of humans represents a population of interbreeding individuals who are generally isolated from other such populations. Interracial unions do occur, but since individuals of the same race tend to marry within the race, their mtDNA, as well as their nuclear DNA, can be identified as belonging to that race.

Cann and her coworkers also discovered that the Africans could be divided into two distinct groups based on their mtDNA. One of these groups was different from all the rest, whereas the other group of Africans had a form of mtDNA that could be found in one or more of the other races of humans. Assuming that Africans are much older than any other racial group, these researchers explained their results as follows: After the original humans had evolved in Africa, the population divided into two distinct lines. One line remained in Africa, and the rest migrated to other regions of the globe. These migrating African groups then gave rise to the distinct races of humans, as supported by the presence of their mtDNA among individuals of these other groups.

The notion that all of the races of humans evolved from a single line that arose in Africa further suggests that one woman living in Africa prior to the development of the African groups of mtDNA gave rise to all the other nations of the world. Using the rate of mutation as a means to estimate when this female lived, the researchers got a value of around 200,000 years ago. Since this

22. Cann, R.L. et al "Mitochondrial DNA and Human Evolution," *Nature* 325 (1 January 1987): 32.

woman would have been the mother of all living, Evolutionists nicknamed her “Mitochondrial Eve.” The presence of Mitochondrial Eve is problematic for macroevolution which requires thousands to millions of mating pairs on which natural selection could work. On the other hand, the discovery of a single woman who is the mother of us all fully supports the Genesis record of creation. Although the time when Mitochondrial Eve appeared (200,000 years ago) may not support the historical accuracy of Genesis, scientists also admit that this length of time is probably too short for natural selection to have occurred.

4.4.4 C-value Paradox

All animals have two main types of cells in their bodies. One type, the somatic cell, comprises almost all of the tissues of the body, and the other is the germ cell. The somatic cell contains a full set of chromosomes, having one set from each parent. The germ cell undergoes a process after which it is left with a half set of chromosomes containing pieces from both parents. These germ cells are the gametes: the sperm in the male, and the egg in the female. During sexual reproduction, the half set of chromosomes from the egg and the half set of chromosomes from the sperm fuse to produce a single cell which now contains a full set of chromosomes. This single cell is the zygote which undergoes a process to make more cells and eventually give rise to a new individual.

The C-value represents the amount of DNA in the egg or sperm of a sexually reproducing organism, and this value has been calculated for a large number of organisms.

According to macroevolution, mutations give rise to new genes or pieces of DNA. As the environment selects for the beneficial mutations (i.e., natural selection), these pieces of DNA accumulate over time until enough DNA is present to regulate more complex structures and behaviours. That is to say, evolution

by natural selection increases the C-value, and this increased C-value leads to increasing complexity. The older and less complex species ought to have less DNA or a smaller C-value, whereas the newer and more complex species ought to have a larger C-value. This pattern of increasing complexity can be found in yeast, fruit flies, chickens and humans and seems to indicate a correlation between DNA content and complexity of the organism. However, there are significant discrepancies. For instance, many amphibians have as much as 25 times more DNA than humans. Also plants, such as tulips, have 10 times as much DNA per cell as humans. Obviously, the amount of DNA does not always correlate with the complexity of the organism. If evolution is based on accumulation of information in the genes, why do less complex organisms have more DNA than humans?

These results do not support the existence of a Creator, but they do bring into question an accepted mechanism for macroevolution, whereby the more complex species evolved as natural selection caused genetic information, in the form of DNA, to accumulate. Evolutionists recognize this contradiction, and have termed it the C-value paradox.²³

4.4.5 Survival of the Fittest (Natural Selection)

Darwin may not have been the first person to come up with the theory of evolution, but he is generally given credit for providing the mechanism by which evolution could work. This mechanism is natural selection, or survival of the fittest. In survival of the fittest, the fittest out-compete other individuals in a population of a species so that the most fit eliminates the less fit. Changes in the environment, such as climate or levels of predation, would remove the less fit individuals from the

23. For a textbook description of the C-value paradox, see H. Lodish et al, *Molecular Cell Biology*, 3rd ed. (New York, NY: Scientific American Books, 1995), 312.

population and encourage those individuals having advantageous modifications, however slight, to pass on their traits to the new generations. Once a species has given rise to two or more new species, it would, in all probability, become extinct, being eliminated by the daughter species to which it gave rise. In Darwin's opinion, species in nature are constantly competing with each other, and this constant competition is the driving force for the mechanism of natural selection.

Unfortunately for the theory of evolution, studies of the social interaction of animals have shown that the natural world is not in a state of constant turmoil where one species tries to out-compete another species. If anything, given their natural state, organisms live in harmony with each other. Whereas Darwin believed that the predator-prey relationship is one mechanism which would eventually force evolution to occur, many of the ecological studies of today show that although prey and predator numbers do oscillate, the predator does not eliminate the prey.

For example, the lynx may feed on the snowshoe hare, and the lynx population may oscillate with the hare population, but the hare population has yet to be eliminated, nor is there any hint that predation by the lynx will lead to the extermination of the hare. Oscillations occur such that increases in the number of hares precede increases in the number of lynxes, but as the number of hares decreases, so does the number of lynxes, without the elimination of the hare. These are changing numbers, but over the years they remain in a predictable relationship, a type of equilibrium. If macroevolution were occurring, there should be a gradual reduction in the type of hare killed by the lynx, but a gradual increase in a variety of hare better able to elude the lynx. There should be a slight, ever present imbalance, which would cause one species, such as the hare, to gradually evolve to the point where it eludes the lynx. Instead, there is this dynamic equilibrium that serves to maintain the hare as a hare, and the lynx as a lynx.

Many ecologists recognize the dynamic equilibrium between the predator and its prey, and rather than believing that the predator regulates the prey population, ecological theories tend to turn the tables around by theorizing that the size of the predator population is regulated by the availability of prey. In other words, in nature, the mechanism needed for natural selection to occur is not readily apparent. Instead of a constant struggle wherein the prey tries to survive in the presence of a predator, these results can be explained by another hypothesis. It is possible that other factors determine the abundance of prey (e.g., food availability) which, in turn, determines the abundance of predators. This is a scenario quite opposite to that suggested by Darwin's understanding of ecological relationships between organisms. Rather than survival of the fittest, nature seems to behave as if the important factor is the survival of the meekest. It is the prey population that determines the size of the predator population, not vice versa.

To further compound the problems faced by natural selection, there are even some species which actually benefit other species, rather than competing with them. Arthur Cushman notes that:

Darwin stated categorically that if one single instance of real and complete interdependence between two species could be demonstrated, he would be willing to abandon his theory, for such interdependence could not be (he felt) accounted for upon evolutionary principles. But, as we know, when many such instances began to be reported to him, he did not abandon his evolutionary ideas. Such interdependences are so numerous and are now so familiar to naturalists — between birds and reptiles, between birds and mammals, between fishes of different species, between insects and

plants (pollination by bees)—that it would be tiresome to record them.²⁴

For macroevolution to have occurred, there would need to be a constant struggle between organisms occupying the same regions, with the eventual extinction of some organisms to give way to new improved varieties. It is in this way that Darwin understood evolution to work. Without the constant struggle, evolution could not explain the origin of species. But our increased knowledge in such matters paints a very different picture of nature compared to the one Darwin believed in. Rather than nature consisting of different teams of organisms all competing against each other for the same goal—to survive—she is better described as a well-oiled machine with her different parts all contributing to the smooth operation of that machine.

The belief that nature fails to show us that natural selection occurs is also a conclusion of some Evolutionists. One such Evolutionist, Costas B. Krimbas of the University of Athens, Greece, described how evolutionary theory can be applied to different disciplines.²⁵ He suggested that language may have developed in the following way. As man evolved, he had to begin to hunt more intelligently; the less intelligent died off. In order for him to capture certain prey, he had to rehearse the moves over in his mind leading to long chains of thought. As man began to hunt in groups, this thought had to be communicated and language evolved. Nature would then select for those individuals better able to communicate. He noted that this scenario was an interesting theory, but as with all other theories involving evolution and natural selection, he was sufficiently bothered by

24. A. C. Custance. *Evolution or Creation?* (Grand Rapids, MI: Zondervan, 1976), 197.

25. C.B. Krimbas, "Extending Darwinism to its limits," lecture presented at McMaster University, Hamilton, Ontario, Canada, 23 June 1995. Dr. Krimbas, recipient of the 1995 Hooker Distinguished Lectures Award, is an evolutionary biologist by training and has a broad interest in the history and philosophy of science. He is a professor in the Department of History and the Philosophy of Science, University of Athens, Athens, Greece.

the lack of evidence to ask how do we support these theories. His answer – we choose to negate or ignore the negative evidence, and we choose to forget that *there is currently no experimental proof that natural selection actually takes place*. Such is the confession by a world-renowned Evolutionist!

4.4.6 Ancient DNA

Woodward and his associates²⁶ reported in 1994 that they had sequenced the DNA for a common molecule (an enzyme that regulates chemical reactions in the body) that was isolated from a dinosaur bone. This bone was believed to be 80 million years old. Remember that the DNA works like a library and provides the necessary information for the cell to make the molecules needed for it to fulfil its role in an organism. Although the actual enzyme may not be present in the dinosaur bone, the information to build such an enzyme was found in its DNA.

According to evolutionary theory, the dinosaurs evolved into the birds of today. It is for this reason that popular science fiction stories are keen to describe dinosaurs behaving like birds of prey. Since the birds evolved from the dinosaurs by way of natural selection, then of all the animals in the animal kingdom, the birds would be the closest evolutionary relatives to the dinosaurs. Therefore “dino DNA” was expected to show the greatest similarities to the DNA of birds. However, Woodward discovered something quite different. Surprisingly, the dino DNA was found to be quite distinct from the DNA of birds, but very similar to the DNA of humans, as if the dinosaurs were part of our evolutionary history. This result contradicts the macroevolutionary history that has been so carefully and painstakingly worked out by evolutionary biologists, and which, in many respects, has become one of the dogmas of evolution: The dinosaur line did not die off; it evolved into the birds of today.

26. S.R. Woodward, N.J. Weyand, and M. Bunnell, “DNA Sequence from Cretaceous Period Bone Fragments,” *Science* 266, no. 5188 (18 November 1994): 1229-1232.

In order to explain the results obtained by Woodward, his fellow evolutionary scientists have suggested one the following four possibilities:²⁷

- 1) Even in light of the dogma that reptiles evolved into birds, some scientists admit that the evolutionary history of birds is not well known and, for all we know, humans and dinosaurs might be more closely related than birds and dinosaurs.
- 2) Maybe the DNA of ancient mammals somehow got on the dinosaur bone.
- 3) Woodward and his associates were incompetent, and the sample they worked on was contaminated by human DNA from one or more of the researchers.
- 4) The results were doubted entirely since ancient DNA may be just an artifact. DNA even under the best conditions cannot remain viable for millions of years.

Assuming the dino DNA to be authentic, and not an artifact, Woodward's evidence not only refutes the generally accepted evolutionary history, as derived from the fossil record and portrayed in popular movies such as Jurassic Park, it brings into question the belief that dinosaurs lived millions of years ago. It questions the very first presupposition needed to believe in evolution – that the earth is millions to billions of years old.

DNA is a relatively stable molecule, but like all other organic molecules, it degrades quickly if not kept in the appropriate

27. For comments pertaining to Woodward's work on dinosaur DNA, and his rebuttal, refer to "Technical Comments," *Science* 268 (1995): 1191-1194. Four different letters criticized this work. The authors of these letters were i) S.B. Hedges and M.H. Schweitzer; ii) S. Henikoff; iii) M.W. Allard, D. Young and Y. Huyen; and iv) H. Zischler, M. Hoss, A. von Haeseler, A.C. van der Kyl, J. Goudsmit, and S. Paabo.

environment. Many of us are aware that dead organic matter can be preserved if it is prepared and stored properly, as is done with frozen foods, but even with the most advanced techniques, such material eventually loses its “freshness” in a matter of months. These scientists may have been able to examine the DNA from dinosaur bones, but the fact that they had intact DNA to examine in the first place questions one of the foundations upon which the theory of evolution is based. Possibly the world is not as old as many suppose.

On the other hand, it is possible that the DNA found on the dinosaur bone *may have been* real human DNA. But this DNA may not have come from the researchers. It may have already been on the bone. If so, this DNA “evidence” points to the possibility that humans and dinosaurs existed at the same time. Viewed from a Creationist perspective, this scientific evidence is as damning to macroevolution as finding human footprints in the same rock strata as dinosaur footprints.²⁸

4.5 Dealing with anomalies

The objective scientific evidence which demonstrates the stability of species, and the unlikelihood that mutants could give rise to improved variations on a general plan, are many. I have provided just a few, and this scientific data was collected and described by Evolutionists, not Creationists. Since Evolutionists consider evolution to be an irrefutable fact of science upon which all of biology is based, many of these objective facts I have

28. The presence of human footprints among strata containing dinosaur footprints has been used by Creationists to show that humans and dinosaurs, separated by millions of years in evolutionary history, actually existed at the same time. A short comment on this evidence can be found in H. M. Morris and G. E. Parker, *What is Creation Science?* (Green Forest, AR: Master Books, 1996), 160-163. Unfortunately for the Creationists, some of the human footprints in the Paluxy River, Texas, were eroded in time to show that many of the human prints may have been dinosaur prints in the first place. Further erosion has affirmed the human appearance of these tracks (Don Patton, personal communication), but many Creationists now avoid using the Paluxy River tracks as evidence against evolution.

described are simply considered anomalies that will someday make sense in the light of evolution, or else they are ignored when they cannot be dealt with.

For example, one way to deal with Mitochondrial Eve, the woman who gave rise to all of mankind, is to question the assumptions on which this anomaly is based. One assumption is that all the mtDNA in an individual originates from asexual reproduction, and there is no mixing of DNA between mitochondria. Another assumption is that our mitochondria are inherited only from our mothers. The third assumption is that mutation rates have been constant over our evolutionary history. The first two assumptions, that mtDNA between mitochondria do not mix, and that all our mitochondria are inherited from the mother, narrow the origin of the human race to one woman. The third assumption – that of a constant rate of mutation – places Mitochondrial Eve only 200,000 years ago, far too short a time for the evolution of all of humankind.

Some scientists question the first two assumptions by pointing out that mitochondria might undergo a form of sexual reproduction, thereby mixing mtDNA from two sources into one mitochondrion, and that, in rare cases, some of the mitochondria of an individual may be derived from the sperm of the father. If mitochondria can exchange DNA, and/or the father can donate some of his mitochondria to his children, then it can be argued that the mtDNA present today was not all derived from a single mother. This mtDNA may have descended from more than one woman. This explanation, however, does not address the fact that mitochondria, regardless of which parent they come from, have very similar DNA, and this similarity still supports the theory that modern mtDNA is the product of one mating pair (i.e., Adam and Eve). Although the assumptions concerning the details of mitochondrial genetics may be questionable, the fact still remains that the differences in mtDNA between races of humans can still be explained by all races originating from a single set of parents.

The third assumption, that the rate of mutation has changed over the years, has been criticized in a somewhat peculiar fashion. Rather than arguing that the mutation rates are much slower so that Mitochondrial Eve could have lived millions of years ago, and not 200,000 years ago, the critiques provide reasons to believe that mutation rates are actually much faster. Having faster mutation rates places Mitochondrial Eve only 6,000 years ago. The critics then argue that 6,000 years is far too short a time to be taken as a serious conclusion, and therefore the dating process must be fundamentally flawed. Evolutionists may have convinced themselves that 6000 years is far too short a period to be taken seriously, but this value of 6000 years fits quite nicely into the Creationist explanation of our world.

Another way to deal with Mitochondrial Eve without having to explain this anomaly is to ignore that these results had ever been discovered. The biology textbook which introduced the research on mtDNA²⁹ to me briefly mentioned that the conclusion derived from this research (i.e., all mankind descended from one woman) was a curiosity. In no way did it consider that this woman could have represented the actual Eve. Instead, the results meant that all the women present at the time of Mitochondrial Eve had been prevented from passing on their mitochondria to the next generation. Only one woman, Mitochondrial Eve, was able to do this. If you were to try to imagine a whole host of pre-humans struggling to survive in their ever-changing environment, and of all these pre-humans from all over the world only one female, located in Africa, had female offspring which subsequently populated the entire earth, then one begins to see the absurdity of this scenario. A more recent edition of this biology text³⁰ avoids this anomaly by not referring to mtDNA at all, even though this research is still being actively pursued in

29. G. Audesirk and T. Audesirk, *Biology: Life on Earth*, 3rd ed. (Toronto, ON: Maxwell Macmillan Canada, 1993), 417.

30. T. Audesirk and G. Audesirk, *Biology: Life on Earth*, 5th ed. (Toronto, ON: Prentice Hall Canada, 1999).

biology. So this anomaly, wherein the objective scientific facts do not support macroevolution, is dealt with by not being dealt with. It is simply ignored.

On the other hand, an anomaly regarding Darwin's finches on the Galápagos Islands may be more problematic for Evolutionists. These finches have been used too extensively as an example of objective scientific evidence in support of speciation to simply be forgotten. The account of speciation among the finches in the Galápagos Islands is presented in every biology textbook as a scientific fact, and we are led to believe that this fact was a major part of the scientific evidence that prompted Darwin to postulate his theory of evolution. Yet a twenty-year study, begun in the 1970's and conducted by the husband and wife team of Peter and Rosemary Grant from Princeton University, found that these finches actually behave as phenotypes or individuals belonging to the same species, not separate species. What is particularly interesting about this anomaly is that its discovery was not new. It has been dealt with at least twice since these finches were first used to support Darwin's theory.

Darwin initially believed that many of the finches he was collecting in the Galápagos were varieties of the same species of finch so he placed some of the finches he collected from different islands into the same bag, and often failed to note the island from which the specimens came.³¹ After he returned to England, he donated his specimens to the Zoological Society of London, and it was the work of John Gould in the Zoological Society that convinced Darwin that these finches could be divided into separate species based on very slight differences in their beak size. These differences could, in turn, be correlated with specific islands.

31. For a full historical account, see chapter 2 of J. Weiner's book, *The Beak of the Finch: A Story of Evolution in Our Time* (New York, NY: Alfred A. Knopf, 1995).

Nearly a hundred years elapsed before these finches were actually studied in their natural habitat. Lowe³² observed that the finches of the Galápagos behaved like varieties of a single species, just as Darwin had first believed they were. Lowe described these birds, not as separate species at all, but as hybrid swarms. In other words, they may show some slight variations between the populations, but they were able to interbreed and produce viable offspring. Lowe's observations on these populations in the wild substantiated Darwin's first impression that these birds were varieties or breeds of a single species. And this created the anomaly. These finches, separated into different species based on small differences in morphology, behaved biologically as if they still belonged to the same species.

The anomaly was dealt with shortly thereafter by Lack.³³ Rather than observing the finches in the wild, where breeding pairs could be confused, Lack set up aviaries for these birds on the Galápagos Islands to see if the different morphologically distinct species of finch could mate. According to the functional definition of species, members of the same species breed and produce fertile young. Lack was unable to get these birds to breed, so he concluded that these birds were separate species. Lack's findings seemed to correct for the anomaly.

Lack's experiment and its conclusion were well-received by the scientific community, but the experiment lacked a crucial control: Many "wild" animals in captivity do not mate. Had his birds bred and produced infertile offspring, then he could have safely concluded that the birds had undergone sufficient speciation over time to now be considered different species. For instance, the female horse and the male donkey can mate to produce the mule, but the mule is always an infertile male. Therefore, the genes of horses and donkeys do not mix since their

32. P.R. Lowe, "The Finches of the Galápagos in Relation to Darwin's Conception of Species," *Ibis* 13 (1936): 310-321.

33. D. Lack, "Evolution of the Galápagos Finches," *Nature* 146 (1940): 324-327.

hybrids cannot reproduce, and this reproducible scientific fact identifies them as separate species. That Lack could not get his birds to copulate and reproduce might have been due to their confinement, and/or their isolation from the breeding grounds. They could still have been the same species. Lack's experiment did not have the required control, but its conclusion that these morphologically different groups of finch were separate species was readily accepted by the scientific community as true.

In the more recent work done by Peter and Rosemary Grant, Lack's conclusion that these species of finch were reproductively isolated from each other has not been confirmed. Instead, the Grants found that these species of finch were able to mate and produce fertile offspring as originally described by Lowe. By monitoring mating pairs and their offspring in the wild, the Grants observed a significant number of "hybrid" crosses, and these hybrid crosses, unlike the mule, were able to produce fertile offspring.³⁴ In other words, these species of finch, identified by their beak size, were not reproductively isolated from each other, but shared the same gene pool, as would be expected for breeds of the same species.

The fact that these birds behave as a single species was further substantiated by examination of their DNA. The DNA studies indicate that the gene pools of the various species of finch were not separate, but mixed regularly. "Genes are continually flowing back and forth between them, by the crossing of species and the backcrossing of hybrids. The islands are a melting pot."³⁵ In light of this overwhelming evidence that the morphologically distinct species of finch are not isolated interbreeding populations (i.e., separate species), but varieties of the same species, how do Evolutionists now deal with this anomaly?

34. This portion of the Grants' research is summarized in Weiner, *Beak of the Finch*, 120-123.

35. Weiner, 222.

As we have seen with mtDNA, one way to deal with this anomaly is to ignore that it exists. As one Evolutionist wrote, "the clear sexual isolation and the maintenance of the separate identities in nature warrants calling each of them a separate species."³⁶ In other words, by ignoring the fact that these birds look almost alike (subjective scientific evidence for a single species), and the fact that they pass genes back and forth on a regular basis, and are not sexually isolated from one another (objective scientific evidence for a single species), one concludes that these "breeds" of birds are separate species. This conclusion is based on wishful thinking, and ignores the existence of objective scientific evidence which clearly contradicts it. But if this option is stated with authority, the scientific evidence against this conclusion is underestimated.

Another way to address this anomaly is to accept the research that these finches can mate and produce fertile offspring, but still, by definition, call these different varieties or phenotypes of the same species different species. If you maintain the species designation, and if you observe that during periods of climate change one species of finch can have offspring which look like another species of finch, then you have documented proof of speciation due to natural selection. Rather than having to deal with the anomaly that these "species" interbreed, their ability to interbreed can be interpreted as "evolution made visible."³⁷ The anomaly becomes proof of evolution, and Darwin's finches maintain their privileged position in the ranks of the evolutionary literature. Nevertheless, from a purely functional point of view (and the term *species* is a functional term, not a philosophical term), these varieties **ARE NOT SEPARATE SPECIES!** At best, they are variations in phenotypes within the same population of birds. To call them separate species is the same as calling different

36. Weiner, 195.

37. J. Weiner, "Evolution made visible," *Science* 267 (1995):30-33.

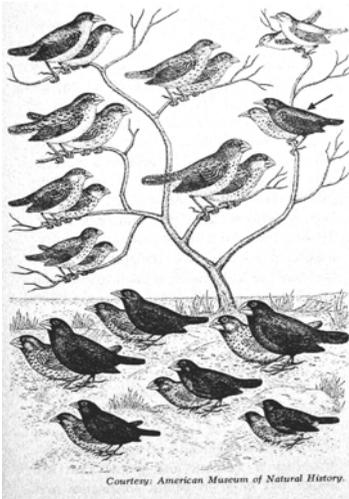
racess or ethnic groups of humans separate species, or the different breeds of dogs separate species, and so on.

Darwin's finches offer the first and most convincing biological evidence for evolution of an older species into newer species. If it is assumed that these birds are separate species, then they have evolved from a single species that first inhabited these islands. As each island became inhabited by members of the founding population, each of the various groups, now geographically isolated from other islands, became a new species in accordance with the type of food on their respective island. The only problem with this explanation is the fact that these birds do not behave as separate species – hence the anomaly.

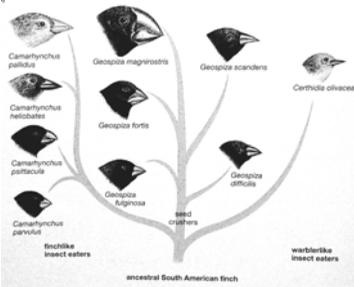
But from a microevolutionary point of view, is there an anomaly? Let us, for a moment, accept the objective scientific fact that the finches do *not* represent separate species. Let us also accept the objective fact that their genes mix as freely as the genes do between different races of humans. Indeed, there is evidence that these finches routinely visit other islands. If we were to accept these facts as true, can these facts, gathered from years of objective scientific research, be interpreted in the light of what we understand about genetics and behaviour? The answer is a resounding Yes!

Darwin's finches behave exactly as would be expected for any small group of individuals isolated from the larger population. Selection is occurring, but this selection has made it possible for a single species to inhabit various environments. The variation induced in the original finch, or warbler (there is one bird that looks like a warbler and acts like a warbler, but is now placed on the finch evolutionary tree) reflects what happens in artificial selection. By breeding the offspring of the same parents together, the "hidden" phenotypes manifest themselves. In the case of these finches, natural selection has occurred, but this mechanism has not given rise to any new species. It has actually served to maintain the species in a steady state. As the Grants

Darwin's Finches



Courtesy: American Museum of Natural History.



These birds are a group of finches found on the Galápagos Islands, a set of volcanic islands located 600 miles west of Ecuador. Based on eating preferences and appearance, these birds can be divided into: (1) *Camarhynchus* (finchlike insect eaters), (2) *Geospiza* (seed eaters), (3) *Certhidia* (warblerlike insect eaters). The top figure is from a 1966 highschool text (D.I. Galbraith and D.G. Wilson, *Biological Science: Principles and Patterns of Life* [Toronto: Holt, Rinehart and Winston], 709), and the bottom figure is from a 1997 university text (Audesirk and Audesirk, *Life on Earth*, 4th ed., 296).

Biology textbooks have used these birds as an example of macroevolution. An individual group of birds is supposed to make up its own distinct species. The appearance of

different species shows that a single species of bird populated the islands, and over millions of years, evolved into as many as 14 species.

The most recent evidence tells us that many of these groups representing different species are not biologically distinct species. They can interbreed with each other producing viable young. Functionally, many of these groups are genetic variations within the same species, and macroevolution has not occurred. Evolutionists inadvertently miss this anomaly, and continue to use these groups of birds as a scientifically verifiable example of macroevolution.

confess, "In spite of all this selection pressure, the cactus finches have not changed in the last ten years."³⁸ Given this conclusion based on the objective scientific evidence, one wonders how evolution by natural selection could ever have served to create a human being from an amoeba. The empirical evidence for macroevolution is yet to be found.

4.6 Darwin on evidence against natural selection

When the sixth edition of Darwin's *Origin of Species* appeared, evolution was well on its way to being accepted by both the scientific community and society at large. By this time, Darwin had received many criticisms of his theory, but he had also received considerable support from the public and high-ranking scientists in the academy.

In Chapter 6 of the sixth edition he dealt with some of the criticisms. Two of the more serious criticisms concerned, first, the absence or rarity of transitional forms in nature, and second, the appearance of organs of extreme perfection. Darwin was able to argue confidently that, given the available scientific evidence, these two criticisms of his theory could be easily refuted. His reasoning, however, was based on the lack, not the wealth, of scientific knowledge. Our scientific knowledge has grown enormously over the last 150 years, and this knowledge has not supported Darwin's predictions which were based on the validity of natural selection. The criticisms voiced during Darwin's day are even more valid today than they were when they were first raised. It is interesting to note how Darwin dealt with these two criticisms since this information provides an insight into what he thought were the objective scientific facts that supported the scientific merit of evolution.

38. J. Weiner, *Beak of the Finch*, 192.

4.6.1 On the Absence or Rarity of Transitional Varieties

Natural selection works on very small differences between individuals of the same population and, in the face of changing environments or other selection pressures, the new variants will gradually displace the parent species. This process of natural selection is supposed to work very gradually over millions of years so that the lineage between an older extinct species and a newly evolved species should contain countless examples of intermediate forms. However, Darwin knew that in the natural world these transitional varieties were either altogether absent or else very rare. As he queried:

[...]why, if species have descended from other species by fine gradations, do we not everywhere see innumerable transitional forms? Why is not all nature in confusion, instead of the species being, as we see them, well defined?³⁹

If natural selection works on the fine differences between individuals of the same species to cause the formation of new species, why do we not have, in nature, a huge number of intermediate forms linking one species to the other? Why are species, instead, distinct recognizable groups as if they appeared originally as separate species reproducing after their own kind?

One way in which Darwin addressed this anomaly was to argue, from logic, that the very absence of intermediates would be expected if the process of natural selection actually occurred. As he stated:

39. Darwin, *Origin of Species*, 158.

[...]if my theory be true, numberless intermediate varieties, linking closely together all the species of the same group, must assuredly have existed[...].⁴⁰

However, these intermediates were missing so he provided his own explanation of what had happened to them:

[...]the very process of natural selection constantly tends, as has been so often remarked, to exterminate the parent-forms and the intermediate links.⁴¹

In this argument, natural selection both created the intermediates, and got rid of the intermediates, so that the lack of intermediates proved that natural selection occurred. Thus the criticism against natural selection (i.e. that there are no intermediates) became support for natural selection (i.e. that the process of natural selection eliminates intermediates). This reasoning might be an exercise in logic, but it offers no experimental proof. Darwin recognized this shortfall and suggested that, "Consequently evidence of their former existence" (i.e. the links) "could be found only amongst fossil remains[...]."⁴² Therefore, finding gradations between species in the fossil record would be the empirical evidence that could prove his theory right. As described in section 4.2, the fossil record shows gaps between even very closely related species, thus refuting Darwin's claim and reflecting exactly what is seen in the living world.

Having established in his mind that natural selection eliminated the intermediates it had created, Darwin then provided a mechanism whereby the intermediates could have disappeared. In a location that presently contained two closely

40. Darwin, *Origin of Species*, 163.

41. Darwin, *Origin of Species*, 163.

42. Darwin, *Origin of Species*, 163.

related species but no intermediates, he suggested that land masses were originally connected, then moved apart over millions of years, then came back together again:

[...]areas now continuous must often have existed within the recent period as isolated portions, in which many forms[...] may have separately been rendered sufficiently distinct to rank as representative species.⁴³

Darwin suggested that populations of the original species became geographically isolated from each other when the land masses separated, and over millions of years evolved into separate species, while natural selection simultaneously removed the intermediate forms. Then the land masses changed to allow these species to mix once more, but because natural selection had occurred while the land masses were separated, these species, arising from the same parent species, were now totally distinct. Again, the problem with this explanation is its lack of any empirical evidence. If natural selection works in this fashion (a conjecture) and if the land has changed so enormously over millions of years (another conjecture), then evolution occurred, not because we see it, but because we don't see it. Evolution occurred in the gaps *between* species, the very fact Darwin was trying to account for. In this Darwinian logic, two hypotheses supported only by subjective evidence become stronger when they rely on each other. In reality, two weak hypotheses make the overall theory weaker still.

Darwin also tried to explain the existence of distinct species in nature in light of the actual distribution he observed in nature. He reasoned that the intermediate varieties "will[...] exist in the intermediate zones in lesser numbers than the varieties which

43. Darwin, *Origin of Species*, 162.

they tend to connect."⁴⁴ That is to say, in a border area between two distinct phenotypes of a species, there exist rarer forms that appear to be intermediates between the two more common forms. Since these intermediate forms are rarer, they are more likely to become extinct simply by chance, thus leaving two distinct species with no intermediate links. Darwin reasoned:

The intermediate variety, consequently, will exist in lesser numbers from inhabiting a narrow and lesser area; and practically, as far as I can make out, this rule holds good with varieties in a state of nature. I have met with striking instances of the rule[...] generally, when varieties intermediate between two other forms occur, they are much rarer numerically than the forms which they connect. Now, if we may trust these facts and inferences, and conclude that varieties linking two other varieties together generally have existed in lesser numbers than the forms which they connect, then we can understand why intermediate varieties should not endure for very long periods: --why, as a general rule, they should be exterminated and disappear, sooner than the forms which they originally linked together.

For any form existing in lesser numbers would, as already remarked, run a greater chance of being exterminated than one existing in large numbers; and in this particular case the intermediate form would be eminently liable to the inroads of closely-allied forms existing on both sides of it.⁴⁵

44. Darwin, *Origin of Species*, 163.

45. Darwin, *Origin of Species*, 161.

The problem with this reasoning is the fact that Darwin had based it on his concept of inheritance wherein traits or genes could be washed out of a population as these genes were being passed from parent to offspring. We now know that traits are passed on as units, and rare traits are always present, not just in the intermediate zones among the hybrids, but within the population in general. Eventually a rare gene could be lost from a population when that population is isolated from the larger breeding group, but it can once again be inserted into the population by breeding with members from the larger group. Thus, the genes for the rare intermediate forms, that are supposed to exist only in the intermediate zones between two diverging populations, are actually part of the gene pool for the larger populations.

In the case of the founder effect in genetic drift, when a smaller population breaks off from the larger one to start a new population in a new location, the recessive traits appear. These traits give the impression that they belong to rare intermediates, and are confined to the intermediate zone. In reality, they are simply masked in the larger population, and are uncovered in the smaller interbreeding population. Darwin concluded that species do not merge one into another because rarer phenotypes, which he interpreted as the transitional forms, became extinct due to their small numbers. Our present knowledge can now explain these rarer phenotypes, and why these organisms are always present in low frequency. They are not transitional forms, but reappear whenever the conditions allow. Unfortunately, Darwin's logic was based on knowledge of the scientific evidence that has now been shown to be outdated.

4.6.2 Organs of Extreme Perfection and Complication

The belief that nature was the product of a creator was supported for many years by the concept of a designer whose

design could be studied using the methods of science. As William Paley noted in the 1700's, finding a stone on a desert path would not cause any concern, but finding a watch in the desert denotes the existence of a watch maker. The design in the watch conveys, without a doubt, that the watch was made by design, not chance. This example can be applied to nature, and the design we see so evident in nature was used by Darwin's opponents to argue that natural selection working on blind chance could not have given rise to complex organic machines. Today, this argument for a designer from the design in nature is commonly referred to as the concept of intelligent design.

Darwin began his rebuttal of intelligent design by first of all acknowledging how ludicrous it might seem to believe that chance events could give rise to complex structures.

To suppose that the eye with all its inimitable contrivances for adjusting the focus to different distances, for admitting different amounts of light, and for the correction of spherical and chromatic aberration, could have been formed by natural selection, seems, I freely confess, absurd in the highest degree.⁴⁶

How did Darwin defend his theory from this attack?

First, he reminded the reader that accepted facts, such as the earth circling the sun, were once considered as outlandish as his belief that complex organs could arise by natural selection. This reference to a historical fact stated nothing about the merit of his scientific evidence, but it did have an impact on the reader. To reject his theory of natural selection could be considered as foolish as rejecting the theory that the earth goes around the sun. Then appealing to reason, Darwin suggested that if one could show, today, a gradation of eye structure from simple to complex, then

46. Darwin, *Origin of Species*, 168.

it would not be too difficult to believe that the evolution of the eye began with "some of the lowest organisms, in which nerves cannot be detected" until, through gradations, the eye was formed.

According to Darwin's reasoning, if he could provide from nature examples of several light detection organs from the most simple to the most complex, then the skeptic ought to be able to believe that the evolution of the human eye followed such a course. As he, himself, argued in the 6th edition of *The Origin of Species*:

If we must compare the eye to an optical instrument, we ought in imagination to take a thick layer of transparent tissue, with spaces filled with fluid, and with a nerve sensitive to light beneath, and then suppose every part of this layer to be continually changing slowly in density, so as to separate into layers of different densities and thicknesses, placed at different distances from each other, and with the surfaces of each layer slowly changing in form. Further we must suppose that there is a power, represented by natural selection or the survival of the fittest, always intently watching each slight alteration in the transparent layers; and carefully preserving each which, under varied circumstances, in any way or in any degree, tends to produce a distincter image. We must suppose each new state preserved until a better one is produced, and then the old ones to be all destroyed. In living bodies, variation will cause the slight alterations, generation will multiply them almost infinitely, and natural selection will pick out with unerring skill each improvement. Let this process go on for millions of years; and during

each year on millions of individuals of many kinds; and may we not believe that a living optical instrument might thus be formed as superior to one of glass, as the works of the Creator are to those of man?⁴⁷

To counter the opponents of intelligent design, Darwin provided an argument that depended on reason. Although the argument may have been logically sound, the scientific facts he provided could only be viewed as proof of evolution if, in the first place, evolution was assumed to be true. He provided no objective scientific evidence to support his case. And to weaken his argument further, the scientific knowledge gained since his time has destroyed the very foundation upon which this argument was based. Darwin began the description of the evolutionary progression of the eye with what he thought was the simplest form of vision: "[...] aggregates of pigment-cells, apparently serving as organs of vision, without any nerves, and resting merely on sarcode tissue."⁴⁸

Modern science has shown this organization to be far from simple. Unknown to Darwin was the molecular basis of vision whereby molecules transduce light energy into electrical signals. Rather than being simple, the system Darwin described has proven to be as complex, on the molecular level, as that of the human eye itself. In his defence of natural selection in light of intelligent design, Darwin erred by equating small with simple. As Michael Behe notes in his book *Darwin's Black Box*,⁴⁹ the physiological basis of vision relies on a design at the molecular level in which all parts must be present before the structure has any selective value. This concept is referred to as "irreducible complexity." To simplify the structure any further would render

47. Darwin, *Origin of Species*, 171.

48. Darwin, *Origin of Species*, 169.

49. M.J. Behe, *Darwin's Black Box: The Biochemical Challenge to Evolution* (New York, NY: Simon & Schuster, 1996).



THE EYES

Probably one of the single greatest challenges to the theory of evolution is the appearance of marvellously designed biological machines, such as the eye. We can compare the anatomy of the human eye to the visual systems of other organisms, but this comparison, although interesting, fails to explain how simple structures could evolve into extremely complex arrangements of cells and tissues. Nor does the morphological description, to which Darwin referred, take into account the differences that occur at the molecular level, where processes are just as complex as those that occur in the organ as a whole.

it useless, making it invisible to the mechanism of natural selection. The eye, or any other light detector organ, is only one of many highly complex organs which demonstrate the property of irreducible complexity. Each of these types of structure, in turn, represents objective scientific evidence that runs counter to the theory of evolution.

4.7 Thoughts for the future

When it comes down to the bare facts, the biological evidence against macroevolution is rather astounding considering the overwhelming acceptance of evolution as a fact of science. In light

of this evidence, it would be difficult to maintain the belief that the truth of evolution is fully supported by the scientific facts. This theory may be a way of explaining the scientific facts, but the facts do not necessitate a belief in evolution. When viewed without any religious bias, many of these facts, like Mendelian genetics, even contradict evolution.

It should also be noted that this chapter provides a sample of some of the contradictions that occur in modern biology. Other sciences have similar tales to tell. And unknown to many outside of science, it has now become “fashionable” for Evolutionists to admit that evolution is based on unprovable assumptions. But a committed Evolutionist will remain an Evolutionist because evolution is the only theory of origins that does not depend on the supernatural. Evolutionists consider evolution the unifying principle of biology, not because it is a rational scientific theory, but because it is the *only* natural theory. It is the strongly held presupposition that God did not, and does not, operate in this world that will cause an Evolutionist to overlook any evidence contradicting a naturalistic explanation of origins. The Evolutionist needs to overcome this ignorance and to accept the reality that evolution is not a fact of science.

Many Creationists will read the examples provided above, and will attempt to use them to arm themselves in their attack on evolution. Such Creationists should take note that Evolutionists will read these same examples without considering them a threat. After all, scientific knowledge increases each day, and what might now seem to be a paradox or an anomaly will eventually become explainable in naturalistic terms thanks to newly gained knowledge.

On the other hand, Evolutionists should not rely too heavily on future findings. History tells us that evolution had its greatest scientific support when knowledge was relatively meagre. As more knowledge has been gained, over and over again, this knowledge has demonstrated that each species behaves as if it

were designed distinct from other species, and that within each species there are controls to ensure that the original created line maintains itself from generation to generation. One could argue that as new fossils are discovered the gaps between the species appear to fill in, but it is difficult to argue that the scientific facts discovered about living organisms support evolution when real live animals continue to produce after their own kind.

Whether or not one chooses to believe that God created each kind separately, or that evolution through natural selection gave rise to the diversity of organisms in this world, the species existing today behave as if they will continue to be what they are for millions of years to come. This observation is an established fact of modern biology. The Law of Limitation of Variation in Progeny has never been contravened.

Many Evolutionists fully recognize this scientific fact, and suggest that long ago the physical conditions of the world were significantly different from those of today. A different type of environment may have allowed for chance events to give rise to the evolution of species. Other Evolutionists believe that conditions have not changed significantly, and that the earth never possessed an environment in which life could evolve. To explain how life appeared, these Evolutionists have postulated that the earth was seeded with life from some extraterrestrial source, a theory referred to as *panspermia*.

Slowly but steadily, our increase in scientific knowledge is encouraging naturalistic scientists to consider forces outside this world to explain the existence of biological life. Such is the contradictory nature of human reasoning. Some people may deny the existence of an extraterrestrial supernatural creating force, but the same people are willing to postulate an extraterrestrial origin to life.



Chapter 5

DARWIN'S COMMITMENT
TO
EVOLUTION

The author at Madam Tussauds in London standing by a wax figure of Darwin. Darwin suffered from an undiagnosed illness for most of his life, and his beard was grown, in part, to hide some of the effects of his ill health. This illness left him fatigued and depressed. Some scholars believe that he contracted a tropical disease (Chagas disease) during his expedition on the



Beagle. This chapter ponders how and why Darwin became an agnostic evolutionist although he was raised in a society where the Church played a large part in family life, education, and politics.

If you believe that the scientific facts do not oblige you to accept the theory of evolution, as I have argued in the preceding chapter, the following question then comes to mind: What

religious belief fostered the prejudice that predisposed Darwin, who was educated by God-fearing scientists, to become a committed Evolutionist and eventually an agnostic?

There are probably as many answers to this question as there are historians and philosophers of science, and undoubtedly, how this question is answered depends on your own religious beliefs that have influenced your choice of origins theory. If you are a young-earth Creationist, you believe that an intelligent designer created *ex nihilo* (out of nothing) the universe and the diversity of life on this planet. For you, the study of the natural world reveals the product of design, not the end result of natural events occurring randomly over millions or billions of years. To the Creationist, the scientific facts alone would not have led Darwin into accepting evolution as a theory of origins. Something in Darwin's life history other than the scientific facts must have freed him from any belief in Genesis, and motivated him to interpret the facts to fit the ideology of evolution. This ideology, at the same time, allowed him to logically reject the concept of a creator who could be personally involved with His creation.

In contrast to the Creationist view that Darwin first believed in evolution and then made the facts fit his theory, it is possible that, at the time, the wealth of facts supporting evolution was just too massive for him to have interpreted the data in any other way. A Creationist may believe that the scientific evidence for evolution is still missing, but the Evolutionist has been led to believe that the concept of evolution is logically derived from, and fully supported by, the scientific facts.

In the eyes of an Evolutionist, Darwin was a gifted naturalist and an intelligent man. He would readily have deduced the theory of evolution from the facts he collected. His delay in publishing his theory might be construed by Creationists to reflect his lack of confidence in the theory of evolution, but this delay could also have been caused by his reluctance to upset the strongly-held religious beliefs of his day. Due to his sensitivity to

the beliefs of his family and friends, he kept the theory of evolution private. Some Evolutionists believe that this silence created within him an inner conflict so great that it may have affected his health. As one very prominent advocate of evolution, Sir Julian Huxley, wrote:

[...]there seems no doubt that his (Darwin's) ill health was in part what psychiatrists now call an escape mechanism, fostered by the devotion of his wife, who became the ideal sick-nurse as Darwin became the ideal patient. His reluctance to commit himself publicly and in print to belief in the mutability of species and in evolution by natural causes sprang ultimately from some unacknowledged inner conflict which was partly rooted in his relations with his father[...] what can be more symptomatic of a guilt complex than Darwin's confession, in a letter to Hooker early in 1844, that to assert that species are not immutable is 'like confessing a murder'! If he felt like this, it is little wonder that he kept on putting off the public statement of his views.¹

To an Evolutionist, Darwin's study of nature clearly showed that this world was not the product of the special acts of creation described in Genesis 1. Instead, our world arose gradually over millions of years by the natural process of evolution. Since Darwin was sensitive to the fact that science in Victorian England was actually being used to support Scripture and not to reject it, he broke the news of evolution to the world very reluctantly.

These contrasting views of Darwin describe him, on the one hand, as a political opportunist, and on the other, as a brilliant scientist. As a political opportunist, he used his station and

1. J. Huxley, The emergence of Darwinism in *The Evolution of Life*, vol.1 of *Evolution after Darwin: the University of Chicago Centennial*, ed., S. Tax (Chicago: University of Chicago Press, 1960), 3-4.

influence to con the world into accepting naturalistic evolution as the only scientifically acceptable explanation of origins, thereby advancing his anti-Christian philosophy. As a brilliant scientist, he was able to convince the world to separate science from religion, making it possible for the great advances that science has made since his time. In the first view, Darwin would be one of the charlatans and self-seeking individuals the world has ever known. In the latter view, Darwin would be one of the greatest scientists in history. He was able to see the truth in the scientific facts, and in doing so, freed science from the grasps of religion and superstition.

These two theories, explaining how Darwin's commitment to evolution may have come about, are diametrically opposed; yet either one is perfectly reasonable depending on your own perspective. Darwin could have been a great and noble scientist, or he could have been an infamous con man. Or maybe the truth lies somewhere in between?

5.1 Darwin the Great Scientist

If you are an old-earth Evolutionist, you may argue that the facts of evolution presented themselves so clearly to Darwin that, from a purely logical point of view, he could do nothing but to accept this theory. In his book *Darwinism Defended*, Evolutionist Michael Ruse writes:

[...]around the end of the *Beagle* voyage, the tensions in the uniformitarian position became too much for Darwin, and he became a (secret) Evolutionist. Probably the facts that tipped the scales right over were the tortoises and finches of the Galápagos Archipelago[...]that the *Beagle* had visited[...]. Within the finches and the tortoises one finds many very similar but distinctly different forms from island to island. How else

could one explain these similarities and differences, except as the product of evolution? Darwin certainly could find no other answer.²

From the perspective of this Evolutionist, Darwin originally believed in Scripture and special creation, and was persuaded to abandon this belief in light of the strong evidence for evolution in nature. In a video presentation called *Darwin's Revolution in Thought*,³ another well-known Evolutionist, Stephen Jay Gould, argued that Darwin was a very intelligent individual who could not do otherwise than accept the facts as found in nature.

Ruse and Gould are speaking from the perspective of old-earth Evolutionists who believe that the evidence for evolution in nature is so overwhelming that it forced Darwin to abandon the faith of his youth and to give up his belief in special creation and the validity of Scripture. The choice of origins theory is considered an either/or situation. If the scientific facts point you to evolution, then you must abandon your beliefs in creation, and eventually, your belief in God.

According to Ruse, this change in Darwin began during the voyage of the *Beagle*. As Darwin thought more and more about the nature of the lands he visited and the specimens he collected, he started to see evolution at work. He may have left England as a nominal Creationist, but he returned a converted Evolutionist. Darwin became an agnostic because of his clear understanding of the facts. His intelligence first inspired him to reject his faith in

2. M. Ruse, *Darwinism Defended: A Guide to the Evolution Controversies* (Reading, MA: Addison Wesley, Advanced Book Program, 1982), 24.

3. S.J. Gould, "Darwin's revolution in thought: an illustrated lecture by Stephen Jay Gould," Into the Classroom Video, 1995. Stephen Jay Gould was an outspoken and often controversial paleontologist who along with Niles Eldredge, developed the evolutionary theory called "punctuated equilibrium." Gould was the Alexander Agassiz Professor of Zoology, and spent his professional career at Harvard. He wrote on many topics but was especially well known for his overwhelming endorsement of evolution. He appeared on the cover of *Newsweek* in 1982, and colleagues called him "the bulldog of evolutionary biology" for his outspoken advocacy of his views. He died on May 20, 2002, of lung cancer.

Genesis, as the world could not have been created in just six days a few thousand years ago. Then it enabled him to discover the naturalistic explanation of origins. The acceptance of evolution led to the "loss of his faith." Darwin's ability to reject or sacrifice his faith in light of the truth revealed by science demonstrated how great this scientist truly was.

Many Evolutionists believe that Darwin was faced with this either/or situation. In light of the overwhelming scientific evidence for an ancient earth and evolution, he had to logically reject his faith in Christianity. For some of these Evolutionists, this explanation for Darwin's commitment to evolution seems perfectly natural since they, too, have had a similar experience. However, the validity of this explanation is weakened by the fact that many Christians actually believe in evolution. Some Creation Science organizations may give the impression that to be a Christian one has to subscribe to six-day recent creationism, but my experience in the academic world tells me that many Christian academics have no difficulty accepting the scientific evidence of an old earth and evolution. For these Christians, who usually describe themselves as Theistic Evolutionists, there is no either/or situation. Thus, Christianity and the theory of evolution are not mutually exclusive.

For Theistic Evolutionists the tension between evolution and Christianity is purely artificial, and was originally concocted by atheistic Evolutionists, not the church, in order to draw attention to the theory of evolution. There may be some truth to this perspective since neither the Catholic nor the Anglican church of his day officially opposed Darwin's theory, whereas several of his supporters accused proponents of special creation of allowing their religious bias to undermine how they interpreted the scientific facts.

While the church was confident that evolution, if anything, showed how powerful God really was, Evolutionists, such as T.H. Huxley, argued that the "doctrine of special creation owes its

existence very largely to the supposed necessity of making science accord with the Hebrew cosmogony[...]."⁴ For Huxley, special creation only existed as a theory because of the need to believe the Bible. Rejecting special creation necessitated rejecting Scripture. Huxley's attitude was clearly driven by his beliefs that encouraged him to deny God, since for many Christians of his day evolution was perfectly acceptable as an explanation of origins. Evolution and Christianity could be compatible beliefs.

If evolution and Christianity are compatible beliefs, then Darwin's journey to agnosticism may not have resulted from his direct observation of nature. Darwin could have been both a Christian and an Evolutionist, as many Theistic Evolutionists are today. Yet he was not. As his theory became more acceptable to society in general, he became more and more open about his negative views of Christianity. Darwin may have made an intellectual journey from Christianity to agnosticism by a logical deduction of the scientific facts, as suggested by Ruse and Gould, but Theistic Evolutionists would seriously question this explanation since, for them, a commitment to evolution does not necessitate a rejection of religion.

On the other hand, it could be argued that even though Theistic Evolutionists are able to reconcile evolution with Christianity, Darwin may not have been able to do so. In this respect, Darwin's journey to agnosticism is mirrored in at least one modern-day example. Charles Templeton was a famous Canadian evangelist who, at his prime, outshone in popularity the great American evangelist Billy Graham. According to his own testimony⁵, Templeton abandoned Christianity due to doubts about the question of origins and the accuracy of Genesis. Since he came to believe that all life was the result of timeless evolutionary

4. T. H. Huxley, "The origin of species," *Westminster Review* 17 (1860), reprinted in [Review of] *The Origin of Species Darwin*, P. Appleman, ed. (New York, NY: W.W. Norton, 1970), 437.

5. C. Templeton, *Farewell to God: My Reasons for Rejecting the Christian Faith* (Toronto, ON: McClelland and Stewart, 1996).

Charles Templeton (1915-2001)

Once rivaling Billy Graham in popularity as an evangelist, Templeton grew disillusioned with evangelism and Christianity. He abandoned Christianity, in part, because he doubted the accuracy of Genesis. A well-known media personality in Canadian newspapers, radio and television, he died of Alzheimer's Disease.



forces occurring over millions of years, he could no longer believe in a supreme being with divine attributes.

Despite God-directed evolution being a favourite theory among many Christians today, there are Christians who recognize the tension between these two views of origins, and if they were to see evolution in the scientific facts, they would be forced to reject Christianity. Charles Templeton was one such person; Darwin could have been one of the first. The Evolutionist view that Darwin rejected his faith in light of the overwhelming evidence for evolution is still quite plausible considering the real life experiences of other people.

5.2 Darwin the Con Man

Some of Darwin's own writings suggest that he initially believed in the creation account of Genesis and in Noah's flood, but was convinced by logic and scientific evidence that the

Scriptures were not historically accurate. In his autobiography, he described how he did not "in the least doubt the strict and literal truth of every word in the bible" when he entered Cambridge to study for the clergy, but years later realized that, "It never struck me how illogical it was to say that I believed in what I could not understand and what is in fact unintelligible."⁶ This confession suggests that Darwin had once held Scripture in high esteem, and that only when he became convinced that the earth was ancient did he start to have his doubts.

Rather than being a con man having a hidden agenda, Darwin seems to have approached the subject of origins somewhat naïvely. He started to question the Genesis account of creation only after becoming aware of the scientific facts, and in particular, those facts associated with geology. Many young-earth Creationists concur with this notion, and have identified Darwin's willingness to entertain the belief that the earth was very old as the "thin edge of the wedge" leading him away from Genesis and toward naturalistic evolution. This scenario has some historical support.

It is an accepted fact that on his five-year voyage around the world on the *Beagle*, Darwin took with him Charles Lyell's textbook on geology. In this book, Lyell promoted the theory of uniformity which states that the geology of the earth was formed by the natural processes we see at work today. In this belief, generally referred to as uniformitarianism, geological strata or sedimentary layers came about by the action of the slow and steady processes of erosion and sedimentation extending over millions of years. After his voyage on the *Beagle*, Darwin became known as a proponent of uniformitarianism. This timing supports the idea that the science of geology, as taught by Lyell, encouraged Darwin to question the creation narrative in Genesis.

6. C. Darwin, *The Autobiography of Charles Darwin, 1809-1882* ed. N. Barlow (London: Collins, 1958), cited in I.T. Taylor, *In the Minds of Men: Darwin and the New World Order* (Toronto, ON: TFE, 1991), 122.

This account of Darwin's conversion, which portrays him as a deep thinker moved by the overwhelming evidence in nature, runs counter to the belief that he used evolution to promote his agnosticism. But it needs to be noted that any of Darwin's references to a belief in Scripture were made by him *after* he had disclosed his belief in evolution, not before. Darwin has given us little or no proof that he was actually persuaded to change his view of the world by the facts seen in this world. Instead, his references to a so-called previous belief in Christianity may be a cunning manoeuvre to persuade his audience that they, too, ought to change their allegiance. His agnosticism could have been well developed long before he had any knowledge of the scientific facts. His push to have evolution accepted as a valid scientific theory could have been driven by his presuppositions, not by the objective scientific facts.

The idea that Darwin was driven by an undisclosed agenda is also supported by the fact that the science of geology does not provide objective evidence for an ancient earth. As we will see in chapter 7 of this book, irrefutable scientific evidence for an old earth cannot be found in geology. In light of this fact of geology, it is quite likely that Darwin was predisposed to reject the Genesis account of creation even before he realized that geology could be used to support the belief in an ancient earth. You might be able to argue that Darwin became an Evolutionist and an agnostic because the facts could only be explained by evolution, but these facts are ambiguous at best. Because of their ambiguity, these facts alone could not have been enough to convince Darwin to reject Christianity if he had truly believed in it. He had to be predisposed to question Scripture in the first place. Thus, he probably already had anti-creationist sentiments even before reading Lyell's book on geology. As Lyell's theory gained acceptance among the general populace, it became easier for Darwin to be more open about his beliefs. Since the theory of uniformitarianism disagreed with Genesis, the popularity of

uniformitarianism made it possible for him to publicly admit that he also disagreed with the creation account in Genesis.

In this scenario, which labels Darwin as a con man, Lyell's uniformitarianism undermined the validity of Genesis in the eyes of society, and set the stage for Darwin to advance evolution as an alternative explanation for the diversity of organisms in this world. Darwin did not become an Evolutionist because he deduced evolution from the scientific facts. The events that eventually gave rise to *The Origin of Species* did not change Darwin's worldview; instead they opened the door for him to share his naturalistic philosophy, a religious belief in Naturalism, with the academy. These events may have occurred as follows:

- 1) A young Darwin was introduced to the concept of evolution even before he had any first-hand knowledge of the natural world, thus preparing his mind for the acceptance of a theory of origins contrary to the Genesis account.
- 2) After uniformitarianism became more popular as an explanation of geologic phenomena, Darwin could publicly question the historical accuracy of Genesis, as well as the prevailing belief of his time that all species were immutable and were created by special creation.
- 3) Having the courage to publicly declare special creation a myth, he could now consider other theories of origins. The concept of evolution, planted in his mind years before, could now be openly discussed, and taken seriously by the scientific community.
- 4) Assuming organisms evolved, it was then a matter of identifying the mechanism by which this took place. Borrowing from his knowledge of artificial selection, and possibly stealing ideas from other scientists,⁷ Darwin proposed natural selection, or survival of the fittest as a

7. Taylor, *In the minds of men*, 125.

means to explain evolution. In natural selection, nature selected those individuals best fit for the environment.

In this series of events, Darwin was never committed to the inerrancy of Scripture, and once it became both academically possible and socially acceptable to reject the Genesis account of origins, Darwin introduced the theory of evolution through natural selection as the only valid explanation of origins.

Darwin's own writings suggest that he was probably never an atheist, but he greatly limited God to a very small role in the creation story, such as the origin of the first life, and he certainly dismissed anything that was supernatural from his everyday life. From a Creationist perspective, Darwin's view of the world was not an outcome of a logical deduction of the available evidence, as he may have conned the world into believing. The predisposition to accept the theory of evolution had to have developed first, probably years before Darwin boarded the *Beagle*, following which the scientific facts, as he collected them, were arranged to support this theory.

5.3 The Third Possibility

The young-earth Creationist sees Darwin as never having had a living faith in God, and when society became receptive, he made public a naturalistic explanation for origins into which the scientific facts could be placed. The old-earth Evolutionist sees Darwin as an intelligent and thoughtful Christian who reluctantly rejected the Genesis account of creation and the historical accuracy of the Scriptures when the scientific facts pointed overwhelmingly toward evolution by natural selection. Both points of view explain the same result, but the explanations are based on contrasting views of the theory of evolution.

If one believes that Darwin was always inclined to reject Christianity, then one could still argue that even for this great

man of science the acceptance of evolution was based on his religious beliefs and not on the scientific facts. On the other hand, if you believe that the facts first led Darwin to evolution, after which he lost his faith, you could argue that the scientific evidence for evolution was so convincing that, given the inflexibility of Victorian Christianity's theology of creation, Darwin had no other choice but to abandon his faith in the Bible.

These scenarios represent two extreme positions. To some Creationists, Darwin was an unbeliever who conned society into accepting his own anti-Christian philosophy of agnosticism. To some Evolutionists, Darwin was an intelligent and sensitive individual who became an Evolutionist because the facts of science forced him reluctantly into that position. Although either one of these two extremes can explain Darwin's actions, I envision a third possibility. In this third possibility, I describe Darwin as a passive Creationist who transformed a nominal belief in special creation into an unswerving belief in naturalistic evolution, one step at a time. His rejection of creationism was encouraged by a combination of factors, and not due to any particular incident in his life.

The myriad of factors that may have induced Darwin to reject creationism could have included: (i) the personal satisfaction he gained from his study of biology; (ii) his rise to celebrity status following the widespread interest in the specimens he had collected from around the world; (iii) his changing attitude toward Scripture; (iv) his association with Unitarianism, a belief that challenged the fundamental doctrines of Christianity; and (v) the tragic death of his daughter, Annie, a death which left him questioning the very existence of God.

Darwin's own writings even suggest that his transition from Christian to agnostic was not abrupt, but followed a long and gradual process. In this process the erosion of some aspect of his faith was closely followed by some scientific evidence that seemed to support his theory, or vice versa. In a sense, he changed from

a nominal Christian Creationist to a confirmed agnostic Evolutionist as he was buffeted by different circumstances in his life. Had these circumstances occurred at different times, or in a different order, Darwin might not have become an Evolutionist. In this third scenario, I label Darwin the evolving Evolutionist. His commitment to evolution was not immediately evident as he collected his scientific facts, but it grew gradually as he worked with, and reinterpreted, his findings.

5.3.1 Darwin, the Evolving Evolutionist

None of the accounts of Darwin's character would suggest, even remotely, that he was a person who would shout "Eureka!" at the discovery of a new scientific truth. Instead, Darwin appears to have been a reserved individual who, in his later years, was particularly reluctant to engage in any conflicts concerning differences of opinion. Others spoke more loudly for him than he did for himself.

That Darwin was not an extrovert is reflected in his own self-appraisal. By his own admission, he was not a quick thinker, but required time to digest and come to some understanding of any scientific theory. Some historians of science concur with Darwin, and have described him as dull-witted. Ideas came slowly to him, even if these ideas were well worked out and mulled over, he needed to be encouraged before he would take a definitive stand on any particular point of view. These are neither the characteristics of a con man attempting to fulfill his own agenda, nor a great scientist who believes he has made a major scientific discovery. Were Darwin's character close to either one of these extremes, he ought to have shown at least a flicker of enthusiasm in the declaration of his theory.

The Evolving *Origin of Species*

Darwin's gradual transformation from a tentative believer of evolution to an ardent supporter is reflected in the manner by which *The Origin of Species* was born, and how it changed from its first edition to its sixth and last edition. Although Darwin had been working on his idea of natural selection for years, he was prompted to publish his theory only by the threat of another person, Alfred Russel Wallace, publishing the same theory before he did. Had it not been for loyal friends in high places, who ensured that Darwin was given credit for his ideas, we would, in all likelihood, be studying the Wallace theory of evolution, not Darwinian evolution. One wonders if such prompting would have been needed by someone compelled by scientific evidence that his theory was correct.

Further, in the first edition of *The Origin of Species*, it was only tentatively suggested that the theory of evolution could explain all of life. In no way was it Darwin's intention to endorse rational atheism, supporting the opinion that he may have had serious doubts about evolution. Only after evolution was accepted by the established scientific community did Darwin begin to consider that evolution, via natural selection, might have given rise to all life. The reader need only compare the first edition of *The Origin of Species* to the sixth to see that arguments for evolution which were considered tentative in the first edition were given far more weight in the sixth.

At the publication of the first edition, Darwin was an Evolutionist, but not openly agnostic; at the publication of the sixth edition, Darwin showed more confidence that his theory could explain the origin of all the species of organisms in the world. Unlike Columbus who believed so strongly that the earth was round that he bravely faced ridicule, or Galileo who believed so strongly that the earth orbited the sun that he accepted imprisonment, or Louis Pasteur who believed so strongly that microbes caused disease that he endured attacks on his abilities as

a scientist, Darwin became an ardent supporter of his own theory, and started rejecting Genesis, *only after he felt bolstered by the scientific community*. Darwin behaved neither like a con artist, nor like a great scientist, but appeared to change his posture toward evolution gradually as he received encouragement from his supporters.

John Gould

John Gould is a name seldom encountered in the study of origins, but one historian suggests that the theory of evolution became apparent to Darwin because of the work of this particular man. In his book, *The Beak of the Finch*, Jonathan Weiner⁸ describes what he considers to be the turning point for Darwin's journey from special creation to naturalistic evolution. Unlike some other historians, Weiner does not believe that Darwin's acceptance of an old earth, outlined in Charles Lyell's *Principles of Geology* (1830-1833), was the pivotal point. Lyell may have advanced the theory of uniformitarianism, but Lyell himself believed that the evolution of species, as suggested by Lamarck, was unthinkable. As Lyell wrote:

It is idle to dispute about the abstract possibility of the conversion of one species into another when there are known causes, so much more active in their nature, which must always intervene and prevent the actual accomplishment of such conversions[...]. There are fixed limits beyond which the descendants from common parents can never deviate from a certain type.⁹

Even though Lyell argued for an ancient earth, he recognized the "Law of Limitation of Variation in Progeny," and he believed that the scientific evidence was so overpowering that it was

8. Weiner, *Beak of the Finch*, 28.

9. C. Lyell, as cited in Weiner, *Beak of the Finch*, 26.

unthinkable for one species to give rise to another. A belief in Lyell's estimation of the age of the earth may have made Darwin reject Genesis, but it does not necessarily follow that it caused Darwin to accept evolution. Weiner believes that the pivotal point guiding Darwin toward evolution was not his acceptance of uniformitarianism, but his encounter with the work of John Gould.

John Gould (1804-1881) was an ornithologist at the Zoological Society of London. When Darwin returned from his five-year voyage around the world, he donated his samples to the Zoological Society. Gould was in charge of identifying the bird specimens that Darwin brought back from this voyage.

As Darwin collected different specimens, he grouped similar appearing organisms together in a fashion that would suggest he was a firm believer in the fixity of species, or the stability of species. When he examined the birds and tortoises from the different Galápagos Islands, he was surprised to see characteristics within birds or tortoises that were unique to the island they were from. However, Darwin did not come up with this relationship by deducing it from his own observations; he was told this by the local sailors. Being a skeptic, Darwin began to examine his specimens more closely and actually found this to be true. Variations of animals, which appeared to be within the same species, seemed to be localized to particular islands.

At first, Darwin did not see this phenomenon as evidence for the evolution of new species. Instead, he viewed these variations as varieties within the same species. Darwin paid little attention to these different varieties, or where they came from, assuming that the varieties represented individuals of the same species. The general appearance of these birds was so similar that Darwin packaged some of them in the same bag without indicating which island they came from, assuming they were simply varieties of the same species found on the different islands.

After his examination of Darwin's collection of finches, Gould announced to the Zoological Society that Darwin had discovered a new group of finches that could be divided into several different species based on some very slight variations in morphology. Unfortunately, Gould lacked Darwin's field experience. Though he was able to separate these birds into different groups based on small variations in structure, in much the same way a population of humans can be grouped according to skin colour, he arbitrarily assumed that each group of finches represented a different *species* of finch. It is this fundamental error – considering morphology separate from physiology – that has caused so much confusion in evolutionary science.

In their natural setting, Darwin did not consider these finches to be separate species, and if we believe Darwin was a responsible naturalist, then his observations must have told him that these birds behaved as a single species. On the other hand, without the advantage of knowing their physiology or their behaviour in the wild, Gould erroneously classified them as distinct species. Gould's classification was based only on his ability to separate them into different groups according to very small differences in morphology. His conclusions may also have been fuelled by the climate of his day in which the public was crazed for the discovery of new things. The discovery of a new species was met with excitement; the discovery of *several* new species was considered a feat of monumental proportions.

The news of the existence of new species of finches was reported in the *London Daily Herald*, and Darwin was on his way to becoming a celebrity. It was only after the recommendation of Gould, who studied the static morphology, and the fame which followed the public announcement of the discovery of new species, that Darwin began to think of these groups of birds as different species. It is possible that with the passage of time, Darwin's memory of these birds behaving as a single species in the wild was overshadowed by the public's desire for these birds

John Gould (1804 - 1881)

Gould began his career as a taxidermist, and quickly adopted the newly invented printing technique of lithography to preserve the appearance of his specimens. His art work was exceptional, and today, if he is remembered, it is for his many bird books which include close to 3000 illustrations. Few people realize the impact that his work may have had on Darwin's acceptance of the theory of evolution.



to be separate species. For decades, these same finches have been considered a textbook example of Darwinian evolution without any of these birds ever being studied in their natural setting.

Today, Darwin's finches have been examined in the wild, and as described in section 4.4 of this book, the results clearly show that many of these morphologically distinct species are actually phenotypes or breeds of the very same species. They are able to mate and produce viable offspring, and their offspring display in their appearance the variations seen between the so-called "different species." It is apparent that the tentative classification scheme devised by Gould, and joyfully supported by the public led Darwin to believe in evolution. The scientific facts alone did not lead Darwin to this conclusion. It was in Gould's best interest to make the different groups of phenotypes into separate species of finch. Once they had been accepted as such, Darwin could explain their origin by way of evolution from a common ancestor.

This account of the finches from the Galápagos Islands suggests that Darwin was drawn to evolution because of the belief that each variety of finch represented a separate species. For Darwin, it was irrational to believe that each species was designed

as a separate creation. It was more logical to conclude that these birds, being separate species, arose from a founding population which diversified according to the conditions on their respective islands. If this could happen for one group of closely related species, then it could also happen for all of biological life. If it could happen on an isolated set of islands which were far younger than the mainland, then it must have happened for all of biological life over the millions of years the earth has been inhabited.

Considering Darwin's hobby in pigeon breeding, it is somewhat surprising that he was so willing to accept Gould's classification scheme. From pigeon breeding, Darwin knew that considerable variations in morphological types could occur within the same species. Although he did not have the advantage of understanding genetics at the level of the DNA, he did understand the main principles in producing desired traits in birds, as his pigeon studies showed, and he also knew that whatever breed of pigeon he produced, the birds were still pigeons. Darwin had first hand knowledge that, even within one species, individuals could show enormous variations, so he *ought* to have understood that great variations could also occur among individuals of a species in the wild. Possibly at one time he did, and in response to this belief, he showed no concern in placing different varieties of finch into the same bag.

Given that Darwin first identified the different finches as varieties or hybrids of the same species, something significant happened when Gould classified these specimens for him. Possibly the fame and prestige Darwin obtained by discovering so many new species tempted him to disregard his initial evaluation of these birds. After all, finding variations of the same species would not have ignited the same public interest. Darwin did not start off as a believer in evolution, but his fame was built upon the belief that he had discovered a great number of new species, and this number of species was inflated by classifying

hybrids of the same species as distinct species. Darwin was encouraged to believe that these very similar-appearing flocks of birds could not breed with each other, and if so, then they must be separate species which arose from a common ancestor. Since it was assumed that the environments were unique on the islands to which each species was endemic, then nature, working on very small differences between individuals of a population, advantaged those individuals deemed most fit. Thus, natural selection gave rise to the different species of finch on the Galápagos Islands.

By offering “natural selection” or “survival of the fittest” as an explanation of the origin of species, Darwin opened the door for rational atheism. It was no longer necessary to see the hand of a creator in the design in creation. Natural processes alone could have given rise to the same result.

Evolution resonated with many of the successful people of Darwin's day who saw their own rise to power as simply the survival of the fittest as they out-competed and out-manoeuvred their competition. Having been bolstered by science, these individuals, driven by the need to succeed at all costs, could ignore Christian charity and excuse their Machiavellian actions as a natural outcome of evolution. Other up-and-coming scientists saw evolution as a way to gain public opinion and government resources which, in the mid 1800's, were primarily the prerogatives of the clergy.¹⁰ Establishing a new theory of origins based on scientific discovery rather than Scriptural revelation would heighten the importance of doing science, as well as the importance of those scientists doing the science.

Before leaving this assessment of Darwin's journey toward evolution and agnosticism, we will touch on one facet of Darwin's life that seems to be overlooked by many historians of science.

10. J.A. Secord, *Victorian Sensation: The Extraordinary Publication, Reception and Secret Authorship of Vestiges of the Natural History of Creation* (Chicago: University of Chicago Press, 2000), 511-514.

Darwin was not a person who devoted his whole life to science, as the textbooks tend to imply. Above all else, Darwin was a very dedicated family man whose main interest was the welfare of his wife and children. He may have spent five years away from England travelling on the *Beagle* collecting samples and making observations, but within about two years after returning to England, he was married; he never went on another journey of discovery. Furthermore, for a man from an upper class, wealthy family, he had a somewhat unusual home. It was kept more as a playground for his children than a formal place to entertain adults. He greatly adored his children, and continually interacted with them, especially his oldest daughter, Annie. Darwin wrote that she was the "joy of the household, and the solace of our old age."¹¹

Tragically, Annie became ill, and after a period of a few months in which her health gradually deteriorated, she died on April 23, 1851 at only 10 years old. Her death had a profound effect on Darwin, and years later, he still found it difficult to deal with his grief.

This aspect of Darwin's personal life has been kept separate from his scientific work. Science involves the discovery of truth by the logical deduction of the observed facts, so there seems to be little need to comment on a personal loss that would not have influenced the interpretation of the scientific data. Instead of his domestic life, historians of science have concentrated on the personalities with whom Darwin interacted as he carried out his scientific studies. These personalities included such people as Fitzroy, Sedgwick, Lyell, Hooker and Huxley. Yet a careful look at the death of Annie and its effect on Darwin suggests that this personal loss may have contributed significantly to Darwin's agnosticism.

11. For a thorough account of Darwin's personal life see, R. Keynes, *Annie's Box: Charles Darwin, His Daughter and Human Evolution* (London, UK: Fourth Estate, 2002), 198.

Annie Darwin (1841 - 1851)

Darwin loved his children, and dearest to him was Annie, his second oldest child.



Annie became ill and was taken to Malvern for treatment. Darwin went with her, and wrote daily to his wife Emma about her progress. When Annie died, Darwin went home to comfort his wife, and neither attended Annie's funeral. Pictured right is Annie's simple grave marker at Malvern Priory.



Darwin's grief over Annie was immeasurable. Her death made him not only sad, but angry. He was angry at a God who did not appear to be interested in the welfare of innocent children, such as Annie, and a God who allowed evil, such as sickness, to exist in this world. He came to believe that the benevolent God described in the Bible could not exist. If he did exist, then Darwin could not logically explain the existence of evil and suffering. It became easier for Darwin to deny the existence of the Christian God, and to explain evil in the world as a natural outcome of the struggle to survive.

It is quite possible that, along with other factors in Darwin's life, Annie's death led him to reject the reality of God and to accept the faith of Naturalism. The acceptance of Naturalism would, in turn, have made it easy for him to proceed down the path toward the total acceptance of naturalistic evolution.

That Annie's death greatly affected Darwin's attitude towards God is substantiated by the fact that her death coincides

with a change in his behaviour. Prior to her death, Darwin accompanied his family to worship, and participated in the services. After her death, "He did not attend church services with the family; he walked with them to the church door, but left them to enter on their own and stood talking with the village constable or walked along the lanes around the parish."¹² For his own funeral, Darwin even made explicit arrangements to be interred in a cemetery close to his home.

It is one of the great ironies in history that when Darwin died, he was laid to rest, against his wishes, within the walls of Westminster Abbey. His body now lies there in the floor between the nave and the choir. In life, Darwin rejected the church; now in death, he is forced to attend every service.

5.4 The Phenomenon of Darwin

This evaluation of Darwin's commitment to evolution suggests that Darwin was neither an influential figure with a secret agenda, nor a highly gifted scientist who deduced evolution from the empirical evidence he had collected. Over the years, his commitment to evolution grew. When he reached the point where he could no longer view the origin of species in any other way, except by random processes guided by natural selection, he gave up any belief in special creation, and doubted the existence of the Christian God. In this journey from Christianity to agnosticism, Darwin was not one who was moved by the facts he saw, but neither was he arbitrarily fitting the facts into his preconceived beliefs. His belief in evolution was fostered by encouragement from his fellow scientists and the personal events that occurred in his life. It did not develop in a vacuum .

To quote Shakespeare: "Some are born great, some achieve greatness, and others have greatness thrust upon them."¹³ Darwin

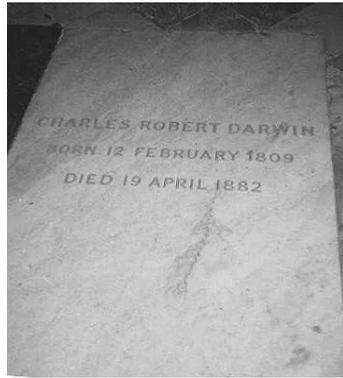
12. Secord, *Victorian Sensation*, 222.

13. W. Shakespeare, *Twelfth Night*, ii, 5.

experienced all three. He was born into a family highly respected for its contributions to the academy; he performed the monumental task of collecting, over a five-year period, biological specimens from around the world; and finally, he was exalted by his peers and laid to rest, against his wishes, in Westminster Abbey among the great scientists in history. Whether Darwin was a con man, a great scientist, or something in between, he was no ordinary man – he became, and continues to be, a phenomenon.



The marble stone under which Charles Darwin's body lies in Westminster Abbey. When I visited the Abbey in 2003, Darwin was not mentioned either in the tour pamphlets, nor by the tour guides. Possibly Darwin is not revered as much as some people would like to believe. The stone is easily passed over as it is located in a passage way between the nave and the choir. It is ironic that after having shunned the Church in life, in death Darwin now attends every service.



Darwin's Study at Down House, Kent.

While visiting Down House in 2005, I was able to capture an image of myself in the mirror over the fireplace (left photograph). This is the familiar view of Darwin's study showing his library and a work table portraying his dedication to science. Another view (right photograph) shows a part of Darwin that is less publicised. On the floor beside his chair is a place for the family dog, and behind the chair against the wall is a curtain that could be drawn to cover a small alcove beside the fireplace. With his poor health, this alcove provided privacy for bodily functions. We often consider Darwin only as the scientist (left photograph), not appreciating that circumstances in his personal life (right photograph) also influenced his thinking, and his beliefs.

Chapter 6

**SCIENCE MEETS RELIGION:
*THE SHROUD OF TURIN***

Turin Cathedral



A picture of crowds visiting the cathedral during the 1978 exposition of the Shroud. At this time, scientists using advanced techniques were allowed to physically examine the Shroud. They hoped to discover how the image could have been imprinted on this cloth used to attract pilgrims since the 1300's. (photo by B. Schwartz)

What do science and scientists have to do with the Shroud of Turin, an old piece of cloth which (according to folklore at least) is the very linen that wrapped the body of Jesus as it lay in the tomb more than 2000 years ago? According to the Roman Catholic Church, the current owner of this cloth, the answer is “Nothing.”

Science has had its chance; now it is time for scientists to leave the cloth alone.

Why has the Church placed a moratorium on scientific study of this cloth? Could it be that the Church is afraid that modern technology will prove the Shroud a fake, and hence, seriously harm the faith of millions who believe in it? That is unlikely. Instead, the Church has come to the very same conclusion about scientists that this book is attempting to illustrate—that the prejudices of a scientist determine how that scientist interprets the scientific facts, more so than any overwhelming scientific evidence that points to one theory being more valid than another. Authorities in the Church realize that scientists who have based their faith in Naturalism will never admit to the possibility that the Shroud could have wrapped the body of Christ. To admit to this possibility is also to support the conclusion that this cloth was touched by a God who became a real human being for a very short period of time in earth's history. That would be a supernatural explanation, and supernatural explanations are ruled out *a priori* by those scientists who believe that all of nature must be explained in purely materialistic terms.

The story of the Shroud is interesting in its own right, and is discussed in a large number of well-documented scientific articles and books. I discuss the Shroud here only because it provides a unique opportunity to observe the extent to which some scientists will ignore irrefutable scientific evidence to ensure, in their own minds, that Scripture is not historically accurate, and that all physical phenomena can be explained by natural, not supernatural, causes. In this way, the religious beliefs that affect the scientific study of the Shroud are similar in nature to those observed in the scientific study of origins. But unlike origins, the Shroud *can* be measured and tested, and tests repeated over and over again. Compared to the origins controversy, the debate surrounding the Shroud is far more focussed. The authenticity of the Shroud does not deal with a vast theory with admitted gaps,

but with a specific object which can be examined directly by state-of-the-art scientific equipment. Following a thorough experimental investigation, modern science ought to be able to pronounce some sort of verdict on the Shroud.

The reader needs to be mindful of the fact that in the following description, the question of the actual authenticity of the Shroud is not important and will not be dealt with here. Instead, the following chapter will concentrate on describing difficulties scientists have been having with two particular questions regarding the Shroud. These questions pertain to (i) how the image on the Shroud was formed, and (ii) how old the linen cloth is. As we shall see, the answers given by scientists to these two questions depend more on the religious beliefs of the scientists than on the scientific data itself. A deeply-held faith in Naturalism fosters prejudices that severely bias the interpretation of the available scientific data. As noted previously, the opinions of experts in a particular field are necessary for the lay person to form his own opinion. However, in evaluating the opinion of experts, the lay person also needs to be aware of the prejudices of these experts. It would be unwise to rely on expert opinions if all these experts worked from the same set of religious beliefs.

6.1 What is the Shroud?

The Shroud of Turin is a linen cloth stored in a cathedral in Turin, the major city in the Piedmont region of northwest Italy. It is in the shape of a large tablecloth, approximately 14 ft long and 3.5 ft wide, and down the middle of the cloth, there is a faint, straw-coloured image of the front and back of a naked man (figure 6.1).

Since this cloth exists today, it can be, and has been, subjected to numerous scientific investigations. But after decades of study, science has yet to determine how this image got on the cloth. Tradition states that the faint image represents Christ as his

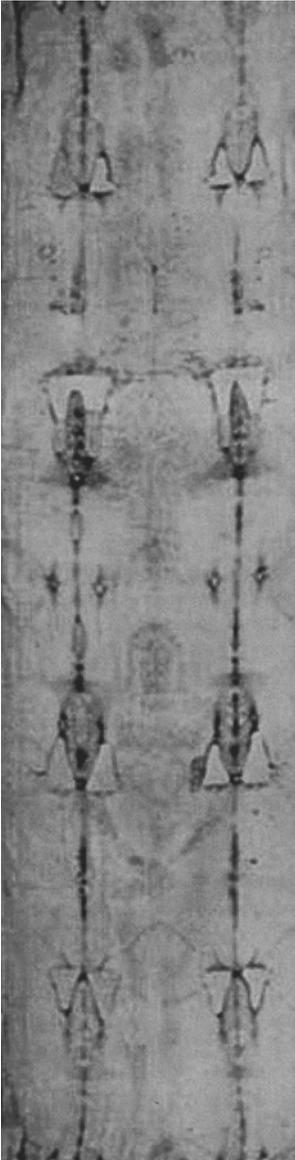


Figure 6.1: Image of the Shroud as it appears in real life. Series of symmetrical scorch marks were caused when the folded cloth was exposed to extreme heat during the 1532 fire. (Computer rendition by Andrea Ketelaars.)

lifeless body lay in the tomb following his crucifixion, but alas, there is also no scientific means to test if the image is Christ's. On the other hand, science has been able to determine first, that this image is not the product of an artist, and second, that this image is, so far as modern science can tell, a flawless representation of a man who was crucified and buried as Christ was.

Historical documents on the Shroud start in AD 1357, and because this places the Shroud in the Middle Ages during the golden age of religious relics, many skeptics believe that the image on the Shroud was painted in order to be used as a relic to obtain funds for a struggling church. Other experts believe the Shroud to be authentic, and Wilson¹ has provided a reasonable scenario which places the Shroud first in the hands of Jesus' disciples, then in Turkey where it was used to impart healing, and eventually in the possession of the Crusaders prior to the collapse of Constantinople at the hands of the Turks. According to Wilson, the Shroud was cared for by the Knights Templars for several centuries. The Knights Templars was a secret sect composed of knights who were crusaders or the descendants of crusaders. The appearance of the cloth in Medieval Europe corresponds roughly to the time the Templars were undergoing severe persecution for political reasons, possibly explaining why it surfaces at this point in history.

In 1506, the town of Lirey in southeast France was designated as the Shroud's permanent home, but in 1532, fire destroyed the chapel in which it was kept. At this time, the Shroud was protected by a wooden casket overlaid with silver. This casket became so hot that burn marks and holes were scorched along the edges where the cloth was folded. Nuns sewed a backing onto the cloth for support, and patched the holes caused by the fire. The damage to the Shroud was quite significant, and the patches and burn marks appear in a regular pattern down both sides of the cloth. Fortunately the bulk of the image is positioned down the

1. I. Wilson, *The Blood and the Shroud*, (London, UK: Weidenfeld and Nicolson, 1998).

centre of the cloth, and it remained undamaged. Today, the patches and burn marks are the most distinguishing features of the Shroud.

After being moved around to a number of cities because of various wars, the Shroud came to Turin. Its home until April 1997 was the Royal Chapel in the Turin Cathedral. On April 11, 1997, the chapel in which the Shroud was housed was severely damaged by fire, but the Shroud escaped any further harm. As a result of this incident, believed to have been caused by arson, the Shroud is now housed in an impregnable case under layers upon layers of protective coverings in the main part of the Turin Cathedral. It is seldom brought out for display, but remains fully protected while a replica hangs above its place of repose for the public to see.

After the Reformation, Protestant Christians not only distanced themselves from the politics and theology of the Roman Catholic Church, they also disregarded all relics and religious icons which had become objects of worship. This tradition has extended into the present, and many Protestants in North America, if they are familiar with the Shroud, consider it a religious relic not worthy of any serious consideration. However, the importance of a burial cloth should not be underestimated since such a burial cloth is mentioned several times in the Gospels.²

For any Christian who believes the Gospels are historically accurate, it would be safe to conclude that not only did a burial cloth exist, it must have had some importance, for each of the four Gospels describes the body of Jesus being wrapped in this linen.

2. Biblical references to the burial cloth of Christ can be found in Mt 27:59 (And when Joseph had taken the body, he wrapped it in a clean *linen cloth*.); Mk 15:46 (And he [Joseph] bought fine linen, and took him down, and wrapped him in the *linen*[...]); Lk 23:53 (And he [Joseph] took it down, and wrapped it in *linen*[...]); Lk 24:12 (Then rose Peter, and ran unto the sepulchre; and stooping down, he beheld the *linen clothes* laid by themselves[...]); Jn 19:40 ([...]they took the body of Jesus, and wound it in *linen clothes*[...]); Jn 20: 5 (And he [Peter] stooping down, and looking in, saw the *linen clothes*[...]).

It is the assumption of many today that the Shroud of Turin is the actual burial cloth or linen that wrapped the body of Christ. Whether the Shroud could be, in fact, that very linen is the question that science has been trying to answer.

6.2 Science and the Shroud

Many scientists have been drawn into the study of the Shroud because of the mystery that surrounds it. If it is a medieval forgery, then modern science should be able to expose this fake without too much difficulty.

The first intensive scientific study of the Shroud was conducted in 1978 by a group of about 40 scientists collectively referred to as the Shroud of Turin Research Project (STURP). These scientists transported more than two million dollars worth of state-of-the-art technology to Turin, and were able to examine the Shroud over a period of several days. Since this cloth was being brought out from storage for only a short period of time, the scientists worked in shifts and used every minute of every day to collect data. When STURP finally reached its conclusion, it could find nothing to discredit the claim that the Shroud was indeed the burial cloth of Christ. In fact, several new pieces of information were uncovered to further support this claim. As the official statement from STURP reads:

We can conclude for now that the Shroud image is that of a real human form of a scourged, crucified man. It is not the product of an artist. The blood stains are composed of hemoglobin and also give a positive test for serum albumin. The image is an ongoing study and until further chemical studies are made[...] the problem remains unsolved.³

3. STURP's findings have appeared in 21 peer-reviewed academic journals and several popular books. Consult the web at <http://www.shroud.com> for complete listings.

Then ten years later, in 1988, radiocarbon dating of the cloth was done by three independent research laboratories. In the February 1989 issue of *Nature* (one of the most prestigious scientific journals in the world), it was announced by these scientists that the cloth was a fraud. The cloth was far too young to have existed at the time of Christ. Of all the data ever collected on the Shroud, scientists finally found one piece of evidence that questioned the possibility that the Shroud had once wrapped the body of Christ. With this evidence, they concluded “conclusively” that the image must have been created during the Middle Ages by some man-made process.⁴ They failed to mention that their “conclusive” conclusion was based only on circumstantial evidence.

It is the weight that is given to this single piece of evidence from radiocarbon dating which clearly demonstrates how scientists, wanting to reach a predetermined conclusion, will let their own prejudices arising from their religious beliefs dictate how they interpret the data. To declare conclusively that this article is a fake based only on radiocarbon dating, you need to manipulate the scientific facts, accepting some and ignoring others. And declaring the Shroud a fake raises some very difficult questions that cannot be answered by state-of-the-art technology. Because of the significance placed on the single piece of evidence that questions the Shroud’s authenticity, other questions regarding how and why it was made are simply tossed aside.

Following the 1988 radiocarbon dating, the interest in the Shroud greatly diminished, reflecting the fact that many scientists were studying the Shroud only to discredit it, not to document and more fully understand its physical qualities. Many of these scientists chose to pursue other areas of study after the radiocarbon dating. This course of action may have been

4. P.E. Damon et al., “Radiocarbon dating of the Shroud of Turin,” *Nature* 337, no. 6208 (16 February 1989): 611-615.

premature. Since 1988, radiocarbon dating of other relics from the past has proven to be totally unreliable under certain circumstances, and such circumstances are applicable in the case of the Shroud.

In light of the new concerns regarding the accuracy of radiocarbon dating, there is now a renewed interest in the Shroud. It would seem that despite the religious belief to accept only naturalistic explanations, which caused the scientific community to label the Shroud a fake in the first place, the image still glares out at us, prompting us to ponder what is it and how it got there.

6.3 What is the image on the Shroud?

If you have never seen the image on the Shroud, but have listened to the considerable hype that is associated with it, you might expect to see a clearly defined picture of a man on a relatively well-preserved piece of cloth. However, as depicted in figure 6.1, what you see is a yellowish-brown cloth, with the most noticeable marks being a set of stains and patches that run down each side of the cloth. Most of these marks were caused by its exposure to heat and water during the 1532 fire. Then, as your eyes adjust to the slighter differences in contrast, you will begin to detect faint shadows in the centre of the cloth between the damaged areas. Eventually, you may be able to pick out the ghost-like face on the Shroud, and having found that, you might be able to ascertain that the front and back images of the body are placed down the centre of the cloth with the front and back of the head in the middle. You need to take great care not to get too close to the Shroud because the closer you get, the fainter the image becomes.

The difficulty with picking out the figure on the cloth results from its poor contrast compared to the high contrast of the damaged areas. The eye is drawn instinctively to the darker stains and patches, and must adjust before the image in the middle

begins to stand out. This fact is made readily apparent by reconstructing the Shroud without the stains and patches. Andrea Ketelaars, a student in the Technical and Scientific Illustration Program at Sheridan College (Oakville, Ontario) who did a co-op placement in my laboratory, used computer technology to recreate an image of the Shroud as it may have looked prior to the 1532 fire (see figure 6.2). Without the additional marks, the ghostly image of the front and back of a man is made more visible. Such may have been the appearance of the Shroud as it was originally presented to pilgrims in medieval Europe.

Knowing what the image on the Shroud looks like does not tell us what the image is made of. In 1389, a number of years after its first showing in medieval Europe, Pierre d'Arcis, Bishop of the Roman Catholic Church in Troyes, declared the Shroud a forgery painted by a clever painter. On the other hand, the image is so unlike any painting that this accusation did not stop others from believing in its authenticity. If it were a painting, then evidence of that fact should have been readily apparent. This was not the case, so the question of whether or not the image was a painting remained unanswered for several centuries. Then in 1898, an amateur photographer, Secondo Pia, made a discovery that catapulted the Shroud from the world of mysticism and superstition associated with the Middle Ages into the more objective world of modern science.

Secondo Pia was born in 1855 to a well-to-do family in the Piedmont region of Italy. He was fascinated by the arts, as well as the sciences. In 1870, he decided to explore the new technology of photography in order to take pictures of the art works around him. He began making his own glass plates at home and by 1878, he was producing excellent pictures. He was a lawyer by trade, but in his free time he became an expert in photography. Eventually, Pia entered politics and in 1898 he was asked to take some pictures of sacred art in the Piedmont region. This art was to be displayed at Turin during a festive occasion. At this time, Pia

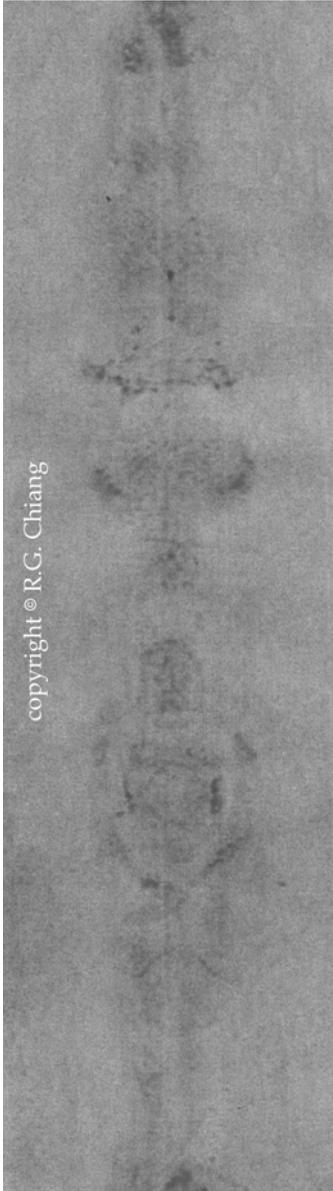


Figure 6.2: Computer technology was used to remove the burn marks caused by the 1532 fire to show what the cloth would have looked like prior to this damage. (Computer rendition by Andrea Ketelaars.)

also decided to include in this collection a photograph of the Shroud of Turin since it was the region's most significant religious treasure. Despite several objections, Pia was finally granted permission to test this new technology on the Shroud. He had to play with lighting and scaffolding in order to get in the right position and to have enough light to capture the image on film. It took two attempts.

If you are familiar with photography prior to our digital age, then you will know that Pia, after taking the picture, went to his dark room to develop the film. Developing the film produces a negative image. The negative image appears on the film that was actually in the camera, and was caused by the light that entered the camera. When you pick up your pictures from the "photoshop," the negatives are the strips of plastic that accompany your pictures. In a negative, you see a reverse image of the real world with respect to light and shadow, and in a black and white negative, people appear more like ghosts than real objects. The print, which you recognize as representing real life, is processed by passing light through the negative. In a sense, the final print is a negative image of the negative image. If you take a picture of a negative, you get a positive or real life appearance of an object.

When Pia developed his negative, he expected to see an image on the negative that was somewhat incomprehensible—more ghost-like in appearance than real life. The light areas observed by the eye would appear as dark, and the dark as light. In addition, since the actual image on the Shroud was ghostly to begin with, then its image on the negative should be even less apprehensible. However, what Pia saw in his developing pan, and the sensation he felt when he first observed it, was so overwhelming that they would stay with him for the rest of his life. Even when describing the event several years later, he would become quite emotional.

So what exactly did Pia see?

The negative image of the Shroud appeared as a well-defined picture of a man which, for all intents and purposes, was the actual positive print (refer to figure 6.3). No longer was there any confusion between light and dark areas. Instead, Pia observed a picture that was so lifelike that it could not have been a painting, but a photograph. The image on the Shroud was actually a negative, which means that the cloth functioned just like the film in a camera by capturing an image when it was exposed to some form of energy. A medieval artist painting the Shroud would have needed knowledge of photography about 500 years before the first camera was invented, and would have needed the ability to paint a negative image without having the means by which to see what that image would look like after it was photographed. For Pia, and many others, this was evidence enough that the image was not a painting. Somehow the image was imprinted on the Shroud, possibly by some type of physical force associated with the resurrection, a supernatural event. It was not made by human hands.

6.4 Science stumbles over the Shroud

This first photograph of the Shroud marks the beginning of its modern scientific study. Heller⁵ has estimated that since Pia's time, and prior to the radiocarbon dating studies, between 100,000 and 150,000 scientific man-hours have been spent on the Shroud with the best analytical tools available. Yet despite being the most studied object on earth, the evidence cannot tell us if the Shroud is a fake, nor can it tell us how the image was imprinted on the cloth. Essentially, we are obliged to accept one of two hypotheses as guided by our own personal beliefs: (i) The Shroud is a fake, produced in the 1300's, either as a joke, or to help raise funds for a struggling church community; or (ii) the Shroud is the actual photographic imprint of a man crucified as Christ was.

5. J. H. Heller, *Report on the Shroud of Turin*, (Boston, MA: Houghton Mifflin, 1983), 219.

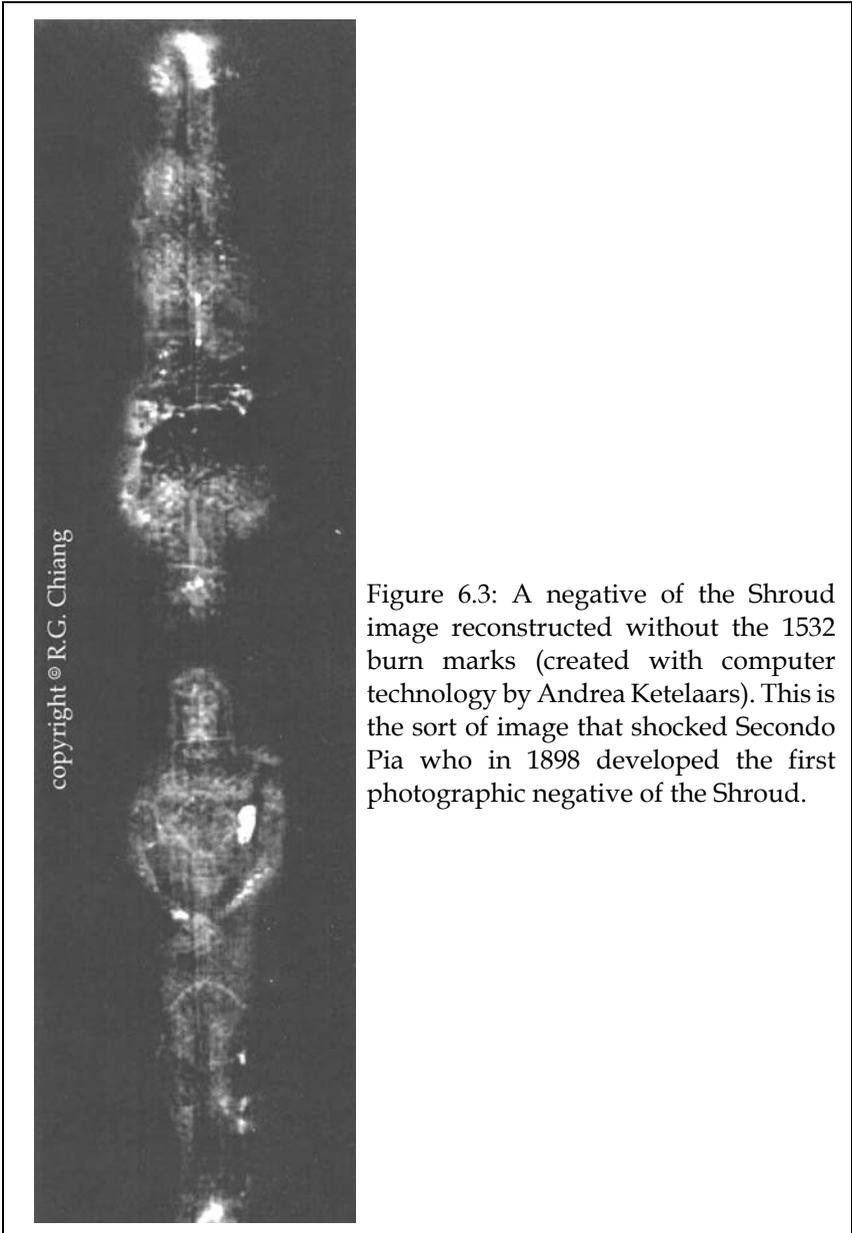


Figure 6.3: A negative of the Shroud image reconstructed without the 1532 burn marks (created with computer technology by Andrea Ketelaars). This is the sort of image that shocked Secondo Pia who in 1898 developed the first photographic negative of the Shroud.

The debate in the scientific world does not centre around the image being Christ's, for there are no scientific tests to determine if it is Christ's. If the man on the cloth looked like Jesus, this would serve as proof that it is Jesus, but we do not have any pictures of him. Instead, the debate in the scientific world questions whether this image can be Christ, a hypothesis that can be rejected in one of two ways. First, if this image can be explained as a piece of artwork painted by human hands, then it was not created by a supernatural event associated with the resurrection. Second, if the cloth on which this image has been placed is not at least 2000 years old, then the cloth is too young to have been around at the time of Christ. As previously noted, the opinion that the image was a painting has been expressed ever since the Shroud first appeared in recorded history. The opinion that it is too young to have wrapped the body of Christ has been around since the radiocarbon dating experiments. How do these opinions hold up in the face of all the other scientific data?

6.4.1 The Shroud as a Painting

Some scientists insist that the image on the Shroud is a painting, and accuse those who think otherwise of being misled by their own presuppositions. One such skeptic was Walter McCrone, founder of the McCrone Research Institute. McCrone was originally asked to be part of the STURP team which studied the Shroud in 1978, but he was not allowed to study the Shroud firsthand. Since the Shroud was to be exposed for a very short period of time, the privilege of touching the Shroud was permitted only to those scientists whose techniques required them to do so. McCrone's technique of polarized light microscopy was to be applied to fibres removed from the Shroud by other scientists working on the relic. According to one account, when McCrone was informed that he would not have direct access to the Shroud, he became difficult to work with. After receiving and

keeping 32 sticky tape samples taken from the Shroud, he resigned from STURP stating the cause of his withdrawal to be “strong divergences of opinion.”

These strong disagreements were clearly evident in McCrone’s interpretation of the results. His conclusions ran totally opposite to the official statement of the STURP team, and in his writings, McCrone was very critical of all the other scientists of that team. One wonders if McCrone’s opinion of STURP’s findings could have been triggered by STURP’s unwillingness to allow McCrone to view the Shroud directly. It would be hoped that any responsible scientist would provide a fair judgement of the facts he uncovered rather than being influenced by his feelings of resentment directed toward other scientists. But the history of science has many situations where emotions, not reason, have led to contradictory conclusions.

On the basis of the minute samples he was given to study, McCrone published two papers⁶ identifying the Shroud to be a painting executed about AD 1355. He came to this conclusion because he discovered iron oxide in the fibres from the Shroud. This chemical compound is commonly used as a paint pigment, and for this reason, he concluded that the Shroud was a painting. As noted above, this opinion goes against the opinion of all the other scientists who studied the Shroud back in 1978. In a more recent article in *American Laboratory*,⁷ McCrone attacks these other scientists as “promoting bad science” and he goes so far as to say that they were using their “incompetence to support a falsehood.”

McCrone cannot accept the idea that this image was not made by human hands, and he adamantly defends the belief that it is the artwork of a painter during the Middle Ages. Moreover, in his 1998 paper in *American Laboratory*, McCrone promotes the use of polarized light microscopy, and calls into question the far

6. W. C. McCrone and C. Skirius “Light-Microscopical Study of the Turin ‘Shroud’, [parts] I and II,” *The Microscope*, 29, no. 3-4 (1980): 119-128.

7. McCrone, W.C. “Choosing proper chemical problem-solving instrumentation,” 34.

more advanced chemical and visual methods used by other members of the STURP team. As he states:

If these techniques [used by STURP] do such a bad job on highly visible problems like the[...] Turin Shroud, [...] how many important industrial and medical problems are also mis-solved every day because the polarized light microscope was not used.⁷

Interestingly, McCrone's scientific company makes its money with the use of polarized light microscopy. One is forced to wonder whether McCrone's opinion of the Shroud, which may have been tainted by his personal feelings toward the STURP team, was also influenced by monetary considerations.

Despite McCrone's insistence that the "Shroud" is a beautiful painting created to help a struggling church community, this conclusion overlooks a number of questions regarding the ability of artists in medieval Europe. The actual image on the Shroud was made by burn marks at the surface of the uppermost fibres making up the cloth. These burn marks could have been created by the very delicate application of an acidic solution with a very fine brush so that only the uppermost surface of individual strands of the cloth would be coated. The burn does not extend into the fibres below the surface.

Assuming a medieval painter did create this image by a technology yet to be developed by modern science, then this "gifted" artist would also have had to complete a number of impossible tasks, some of which are listed below:

- 1) He painted the bloodstains before painting the image. At the microscopic level, the burn marks that create the image cover the blood stains.
- 2) He used genuine human blood having excessive amounts of bilirubin. Modern forensics has demonstrated that severe

- scourging will cause the red blood cells to rupture releasing large amounts of bilirubin. The artist not only knew this information, he also painted the Shroud knowing that one day the technology would be developed to reveal this detail.
- 3) The artist painted Jesus as a nude. Medieval paintings never depict a nude Christ, and even today, the image of a totally naked Christ would be almost impossible to come by. On the other hand, a nude Christ conforms to genuine Roman crucifixions.
 - 4) The artist placed the nail marks on the wrists, not in the hands. This placement goes against medieval convention, but represents the actual place where the nails must be inserted in order for a body to hang on the cross without ripping away.
 - 5) He painted an anatomically and photographically perfect human image in a photographic negative centuries before the science of photography was developed.

Moreover, since this “painting” agrees with all findings from modern biochemistry, medicine, forensic pathology and anatomy, botany, photography and 3-D computer analysis, the artist had to know enough of the effects of crucifixion on the body to avoid detection by all the efforts of modern science. It might actually be easier to believe that the artist was capable of time travel, thus gaining information about the future, than to believe that such a person living in medieval times possessed this information.

In addition to all these reasons for disregarding the belief that the image was painted by a medieval painter, the image is such that it tells us the linen was draped, not wrapped, around the body. In the Middle Ages, the only type of wrapping depicted in pictures was the mummy style. It was unknown during medieval Europe that Jews at the time of Christ did not wind the cloth around the bodies of their dead. It was not until the 20th century that archeologists discovered this form of wrapping. Did the artist

know that eventually people would discover this? If so, the artist himself must have been divine. If the Shroud of Turin is a forgery of the 14th century, as McCrone claims, and not a genuine artifact of the 1st century, the purported medieval forger must have been able to do all the impossible tasks noted above.

6.4.2 The Shroud: a primitive photograph

At one time, the evidence provided by McCrone that the Shroud was a painting was widely used to discredit this relic. However, many skeptics now accept the fact first documented by Secondo Pia—that the image on the Shroud is a photographic negative, not a painting. And if the Shroud is considered to be a photographic negative, the next challenge is to devise a theory that explains in naturalistic terms how a photographic negative of a crucified man could have been imprinted on a piece of linen during the Middle Ages.

One of the more intriguing and imaginative theories to explain the photographic negative on the Shroud was described in a book by Picknett and Prince.⁸ These authors accept the fact that the image on the Shroud is a photographic negative. If it is a photographic negative, then who in medieval Europe would have had the scientific knowledge, ingenuity, and desire to produce this Shroud as a hoax? The answer to their question: Leonardo da Vinci. Assuming that da Vinci was dissatisfied with the Church in one way or another, he produced the Shroud to play an elaborate joke on the Church.

According to Picknett and Prince, da Vinci constructed a light-tight room with a small hole in one of the walls of this room. He then obtained the body of a recently crucified man to ensure that the image of this body would be truly representative of the crucified Christ. His next step was to hang this body in the

8. L. Picknett, and C. Prince, *Turin Shroud in whose image? The truth behind the centuries-long conspiracy of silence* New York, NY: HarperCollins, (1994).

sunlight outside of the light-tight room and directly in front of the aforementioned hole. Constructed in this fashion, this room served as a very large pinhole camera in which the image of the crucified man was projected into the room through the hole. This image was captured on a cloth soaked in a chemical that burned the cloth when it was exposed to light. The exposure time would have been relatively long since the material on the cloth was not very sensitive to light. Therefore, to ensure a sharply focussed image, the body needed to be turned continuously to account for the movement of the sun. Once one side of the cloth was done (let us say the front of the body), the cloth was flipped over, and the body turned to obtain the other side of the image.

The authors provide some scientific evidence of their own to show that such a picture could be produced with this technology, but compared to the image on the Shroud, their examples are far from the quality that was produced hundreds of years earlier. To add credence to their theory, they also compare a self-portrait of da Vinci with the face on the Shroud, and they see a remarkable similarity. They conclude that, for the ultimate joke on the Church, da Vinci removed the head of the crucified man and placed an image of his own face there.

This theory has received little attention from those who believe in the Shroud's authenticity since it is absurd to the highest degree. Conversely, it has been seriously considered by Shroud skeptics who simply cannot accept a supernatural origin for the image on the Shroud. For want of any better theory, this one has gained credibility among the skeptics.

Unfortunately for the Shroud skeptics, there are many difficulties with the Picknett and Prince interpretation, one of which is a problem of chronology. Da Vinci was born in 1452; the Shroud appeared in recorded history almost a hundred years earlier, in 1357. For their theory to be correct, not only did da Vinci understand photography centuries before it was discovered, he also had to replace the original Shroud with a replica of his

own devising, and this switch had to occur without being detected by those who were intimately acquainted with this relic.

One wonders, first of all, what motive would have driven da Vinci to undertake such a deception, and second, why a scientist as gifted as he was would not have developed photography to its full potential. It is simply unimaginable that anyone like da Vinci would have remained silent about a work of art he himself had created and that even today scientists are unable to duplicate. Nevertheless, as with the theory of evolution, this naturalistic theory of the Shroud has been given serious consideration because it does not require the existence of a supernatural force. By endorsing a totally naturalistic explanation, it is no longer necessary for skeptics to worry that a supernatural force could have created the image on the Shroud.

Although the Picknett and Prince theory is very, very weak, it does represent a significant change in the attitude of the skeptics, who no longer insist that the image on the Shroud is a painting. This turnabout may have been encouraged by the fact that the radiocarbon dating has shown “conclusively” that the Shroud was too young to have been around to wrap the body of Christ. Possibly because of the assurance of the radiocarbon dating, the opponents of the Shroud have been more willing to concede that the facts are indeed overwhelmingly in favour of the image *not* being a painting. Unfortunately for the skeptics, who had their day when the radiocarbon results were first reported, radiocarbon dating is not thought to be as conclusive as it once was. It is quite possible that antique relics like the Shroud which have been exposed to everything from extreme heat and smoke to the touch of human hands, have too many variables associated with them for us to accurately determine their age using radiocarbon dating.

6.4.3 The not-so conclusive radiocarbon dating

The easiest way to understand radiocarbon dating is to consider the sand in an hourglass. When you see all the sand in the bottom compartment of an hourglass, and no sand in the upper compartment, you know that the hourglass was last turned over at least one hour previously. If, however, you find half the sand in the bottom, and half in the top, and the sand is still flowing, then you can deduce that the glass was inverted 30 minutes previously. This conclusion is intuitively correct, but if you did not actually observe the hourglass during the last half hour, your conclusion also depends on two assumptions that are not necessarily true. First, you are assuming that when the hourglass was originally inverted at time zero all the sand was in the top compartment. That is to say, the hour glass was fully "charged." Second, you need to assume that no other sand was added to either of the two compartments, so that all the sand in the lower compartment came from the upper once the flow began. Assuming it takes one hour for all the sand to empty from the top chamber, then stopping the sand at any time and measuring how much is present in the top chamber, or how much has accumulated in the lower chamber, will provide you enough information to determine how long the sand has been flowing. It will tell you time zero, the time when the hourglass was originally inverted to start the sand flowing.

Radiocarbon dating works on the same principle as an hourglass with the radioactive isotope of carbon (carbon 14) serving as the sands of time in the upper compartment. Living organisms incorporate radioactive carbon into their bodies until a steady state is reached so that any living organism has a fixed amount of carbon 14 in it, an amount which is correlated with the amount of carbon 14 in today's atmosphere. Assuming that the amount of carbon 14 in the atmosphere has not changed over the

eons, the amount of carbon 14 in any living organism at the time of its death can be estimated.

Upon death, no more carbon 14 is being incorporated into the animal, and the amount of carbon 14 in the object begins to diminish like the sand in the upper chamber of an hourglass. Unlike the hourglass, where sand is collected in the lower chamber, the carbon 14 decays into another element, nitrogen, which is lost from the object. In an hourglass, it takes 30 minutes for half the sand to move from the top to the bottom of the instrument. For a dead organism, it takes approximately 5700 years for half its complement of carbon 14 at the time of death to disappear. To estimate the age of a once-living object, radiocarbon dating laboratories use very sophisticated machines to measure extremely small amounts of carbon 14 in these objects. The amount that is found in the object now is compared to the amount that was *supposed to be in* the object at the time of its death. Assuming (i) that there was a steady loss of carbon 14 and (ii) that no new carbon 14 was added since the object died, then the time when the object died can be calculated.

Although radiocarbon laboratories will give you an estimate of the age of a once-living specimen, *the only empirical fact they provide* is the amount of carbon 14 present in the sample. The assumptions that an organism contained a certain amount of carbon 14 at death, and that no other carbon 14 from an outside source were added to it after its death, are used alongside the rate of decay of carbon 14 to provide an estimate of the age of the material. Since carbon 14 disappears at a constant rate after death, then the more carbon 14 found in the sample, the younger the sample must be. Conversely, the less carbon 14 found in the sample, the older the sample must be. If no carbon 14 is found in the sample, then the sample is estimated to be millions of years old.

Since the Shroud is made of materials that were once living plants, radiocarbon dating can be applied to the Shroud. Before

1988, the Shroud had already undergone several forensic tests carried out by many experts in the field, and each finding supported the belief that this cloth was approximately 2000 years old, and that it originated from Israel. For example, the weaving is distinctive to the time of Christ and microscopic pollen grains found embedded in the cloth are from plants endemic to regions around the Dead Sea. Supposedly, radiocarbon dating would be able to tell us whether or not the cloth were old enough to have been in existence at the time of Christ. If it were significantly younger than expected, this would support the theory that it was not the death shroud of Christ. And if, by chance, this cloth were as young as the Middle Ages, this would confirm the theory that the image was produced by someone using a natural process to help support a fledgling church community.

In the winter of 1989, Damon *et al.* announced to the world the results of the radiocarbon dating. Their article in *Nature* stated, "The results provide conclusive evidence that the linen of the Shroud of Turin is medieval."⁹

It is interesting that a reputable science journal like *Nature* would permit any author to claim that his results were conclusive unless one takes into account the strongly held religious opposition that the scientific community has to any theory that is not purely naturalistic. To claim conclusively that the Shroud is medieval demonstrates the effect of this prejudice and deflects attention from the difficult questions regarding the Shroud's origin. The evidence the article presented was not conclusive; it was, at best, supportive. The only definitive conclusion that can be made from this data is that the Shroud has enough carbon 14 in it to suggest that it is relatively young, provided that the assumption concerning the amount of carbon 14 in it to begin with is true, and that carbon 14 was not added after the cloth was made.

9. P.E. Damon et al., "Radiocarbon dating of the Shroud of Turin," 611-615.

To conclude that the Shroud is medieval is an extrapolation of the facts; this statement should, in proper science, never be deemed "conclusive." Conclusive proof should be reserved for data that are reproducible and free from assumptions based on personal bias. The amount of carbon 14 in the cloth, and the rate of decay of carbon 14, are testable variables that can be measured over and over again, but the amount of carbon 14 present in the cloth when it was originally made, and the exclusion of extraneous sources of carbon 14 after death, are unprovable postulates that must be accepted by faith.

Although the popular press never reported any rebuttal of the conclusions of the *Nature* paper, the journal itself did entertain at least one suggestion of a different possibility in the same issue.¹⁰ Phillips argued that the interpretation of the radiocarbon dating may have been flawed since an extra source of carbon 14 could have appeared on the cloth as a result of a singular event that occurred at the time of Christ's resurrection. This argument, of course, assumes that the cloth is authentic, and goes one step further by believing in a resurrection event which produced a burst of energy to form the photographic image on the cloth. But if such an event occurred, Phillips argued that it could have been associated with the production of extra neutrons which would have bombarded all the atoms in the cloth, not just the carbon. These extra neutrons would have created new carbon 14, making the cloth appear much younger than it really is.

In order to test this hypothesis, Phillips proposed that the cloth should be measured for the presence of other radioactive isotopes. If an unusual abundance of other radioactive isotopes were discovered, then the cloth could easily be 2000 years old while appearing only 500 to 700 years old according to radioactive carbon technique. In his reply to this rebuttal, Hedges¹¹, the

10. T.J. Phillips, "Shroud irradiated with neutrons?" *Nature* 337, no. 6208 (16 February 1989): 594.

11. R.E.M. Hedges, "Hedges replies," *Nature* 337, no. 6208 (16 February 1989): 594

eleventh author on the 21-authored radiocarbon paper in *Nature*, stated that such an alteration in the carbon in the cloth may have occurred, and could be measured. Unfortunately, he declined to consider such experimentation because, "If a supernatural explanation is to be proposed, it seems pointless to make any scientific measurement of the shroud at all."

In essence, Hedges agreed with Phillip's suggestion that a resurrection event could have increased the amount of radioactive isotopes on the cloth, but argued against carrying out the definitive experiments because of his preconceived belief that the resurrection event not only *could* not, but *did* not, occur. Since the neutron flux proposed by Phillips would have been produced by a supernatural event, Hedges felt no need to test this hypothesis since divine forces do not exist. Hedges' religious beliefs did not allow him to consider that a neutron flux might have been created by something other than a divine force, such as a natural phenomenon associated with the physical particulars of the burial site, the interment, or some form of cosmic event. Hedges' stubborn reliance on radiocarbon dating to discredit the Shroud has prevented him from seizing an opportunity which might have led him to discover some new property in nuclear physics. In fact, his religious belief led to a missed opportunity.

Since the publication of the initial radiocarbon testing, there have been a number of theories proposed to explain why an object which should be 2000 years old could have enough carbon 14 in it to appear only 600 to 700 years old. These theories have become of greater interest, not because of the Shroud itself, but because of the radiocarbon dating of other archaeological relics. Apparently some relics taken from sites known to be thousands of years old have had enough carbon 14 on them to be dated to only hundreds of years old.

Of all the theories used to explain the excess carbon 14 in ancient relics, I find that the most compelling one suggests that living microorganisms, such as bacteria, were present on these

relics during their history. As these microorganisms grew and multiplied, they would have incorporated new carbon 14 into themselves, and into their organic wastes. This process would have resulted in the formation, on the specimen, of a bioplastic coating made up of a transparent layer of microbiological contaminants long after the specimen had died.¹² In this way, bacteria on the Shroud could have added the excess carbon 14 that caused the Shroud to appear younger than it truly is. That the Shroud could have had bacteria on it is unquestionable since it has always been touched, stroked or held by human hands, and considering its passage through time, it is unlikely that many of these hands were aseptic. Furthermore, the Shroud has never been known to have been washed. Given these conditions, it would seem highly likely that bacteria were living on this relic. To confirm the theory of the presence of extraneous living material on the cloth, the Shroud would need to be reexamined for the presence of this bioplastic coating.

Unfortunately, the debate over the age of the Shroud has caused some serious concerns regarding the manner in which the Shroud should be revered. At present all the existing strands of the cloth were ordered returned, and there are no plans to allow the Shroud to undergo any further scientific testing. Possibly the Roman Catholic Church has grown tired of the exploitation of this relic by the scientific community and is saying to scientists that one can only accept the authenticity of the Shroud by faith, for if it is authentic, science will not be able to confirm it to be the image of Christ. Unless it is proven a hoax, science will never reach a satisfactory conclusion based on the facts. As one philosopher of science argues, maybe "science cannot cope with the Shroud of Turin."¹³

12. Wilson, *The Blood and the Shroud*, 224

13. T. J. Trenn "Why science cannot cope with the Shroud of Turin," 18 March 1992. An unpublished text for the lecture presented April 6, 1992 at the Pascal Centre, Redeemer University College, Ancaster, ON, Canada.

6.5 The future for science and the Shroud

After the radiocarbon dating, work on the Shroud diminished. Many scientists did not consider it a worthwhile object of study once it was declared a fake. Indeed, most scientists started examining the Shroud in the first place to try to discover the natural means by which the image was placed on the cloth, and it this way, to show that it is was not the image of Christ. Since the radiocarbon dating seemed to provide this proof, the impetus to study it was removed. Herein lies an example of how a religious belief has directed attention away from a very interesting scientific question, for abandoning the Shroud as a probable forgery does not explain how the image was created in the first place. Should the method by which the negative image was placed so carefully on the very surface of the fibres of the cloth be discovered, then a quantum leap in our understanding of the natural world may occur. But due to a misguided feeling, this opportunity is overlooked.

The religious beliefs associated with the scientific study of the Shroud illustrate that these beliefs cannot be put aside in the interpretation of scientific data. Despite the overwhelming evidence that the cloth displays the photographic image of someone who was crucified in the manner that is described for Jesus, some people have given infinitely more weight to the questionable evidence that the Shroud is not 2000 years old. In the apparent name of science, the Shroud is declared a hoax. One biology textbook¹⁴ describes the controversy as follows: To be authentic, the Shroud needs to be at least 2000 years old; and if the Shroud is not at least 2000 years old, then it must be a painting which “was painted as a religious art object or as a fraud.” The text ignores the most important question of all. If it were a painting, by what unknown technology did the artist create this masterpiece?

14. Audesirk and Audesirk, *Biology: Life on Earth*, 3rd ed. (1993): 339.

Although we do not know at present what created the image on the Shroud, deeming it unworthy of study simply because it may not, or cannot, be the image of Christ verges on scientific arrogance. Our religious beliefs should never cause us to stop questioning and probing for the truth. After all, is that not what science is for? We must be able to overcome any prejudices, or at least recognize how our religious beliefs give rise to them, so that we are able to respond intelligently to events that are totally contrary to what we might be expecting to see. As Louis Pasteur stated, "Chance favours only the mind that is prepared."¹⁵ And to be prepared, that mind needs to be open to new and wonderful ideas so that it can take up the challenge of deciphering what is really true about our natural world.



15. M.P. Grant, *Louis Pasteur: fighting hero of science*, (Toronto: McGraw-Hill, 1959), 191.

Chapter 7

RELIGIOUS BELIEFS AND GEOLOGIC TIME

If I were asked as a geologist what is the single greatest contribution of the science of geology to modern civilized thought, the answer would be the realization of the immense length of time. So vast is the span of time recorded in the history of the earth that it is generally distinguished from the more modest kinds of time by being called geologic time.¹

So wrote the American geologist Adolph Knopf in 1949. In this statement, Knopf not only defines what is meant by geologic time, he also judges its importance as geology's single greatest contribution to modern science or "civilized thought." Today Knopf's perspective of an ancient earth continues to reflect what is considered the foundation of modern geology. That the earth is extremely ancient is accepted without question. To suggest

1. A. Knopf, "The geologic records of time," vol. 3 of *Time and its mysteries* (New York, NY: New York University Press, 1949), cited in L.D. Leet and S. Judson *Physical Geology* (Englewood Cliffs, NJ: Prentice-Hall, 1965), 3.

otherwise is to be ostracized or excommunicated from the fraternity. The concept of geologic time has become an intellectual obligation.

Despite the overwhelming acceptance by geologists that the earth is ancient, most of the scientists who laid down the foundations of modern science in the 1700's and 1800's believed that the physical characteristics of the earth were created to sustain biological life, and that for the bulk of earth's history, man has always been present. Their religious belief encouraged them to accept the Genesis account of creation as being more or less accurate, and from this worldview they interpreted the facts of geology to fit into the concept of a young earth. Today, this belief of the fathers of modern science has been almost entirely lost. The concept of geologic time is so overwhelmingly endorsed by the scientific and academic communities that questioning the age of the ancient earth is akin to believing in a flat earth.

The acceptance of geologic time did not come about suddenly. The first person to seriously consider that the geological evidence pointed to an ancient earth was James Hutton (1726-1797), a Scottish physician-turned-gentleman-farmer. The reason he believed in the concept of geologic time was not that the rocks themselves forced him to that conclusion. Instead, he developed a theory to explain the physical appearance of the land. According to this theory, small forces that reshape the land today, such as glaciers, wind, and water, were considered to be the only forces available to alter the appearance of the earth. In other words, Hutton believed that the same processes operating in the present also operated in the past; there is a uniformity of processes past and present. This principle is known as the doctrine of uniformitarianism. Hutton did not believe in the existence of catastrophes—massive forces of nature that could alter the landscape in short periods of time. By eliminating catastrophes as a means to explain the appearance of the land, Hutton postulated that the earth must be millions of years old in order for the feeble

forces at work today to have had any effect on the earth's geology. As modern geologists admit, "Time makes possible what seems impossible."²

Hutton's doctrine of uniformitarianism was expounded upon a generation later by Charles Lyell (1797-1875) who laid down the basis of modern geology in a three-volume set called *Principles of Geology*. In this massive work, Lyell argued that the appearance of rocks, terrain and fossils was fashioned by small forces working over vast periods of time. He provided little, if any, new geologic data to support this belief, but took the known data and explained it according to his belief in uniformitarianism, which necessitated a corresponding belief in geologic time. The concept of geologic time, which is derived directly from the doctrine of uniformitarianism, challenged the chronology of creation and questioned the biblical account of our origins as recorded in Genesis. However, it did more than this. Darwin was very familiar with Lyell's work, and applied Lyell's concepts, based on the doctrine of uniformitarianism, to the geology and the organisms he observed. For Darwin, the concept of geologic time provided the duration of time needed for evolution to give rise to the diversity of organisms we see in the world today. Lyell's *Principles of Geology* gave Darwin the intellectual freedom to propose his theory of natural selection. Without geologic time, natural selection could not be used as a mechanism to explain the origin of species.

The concept of geologic time was proposed independent of, and prior to the origin of species by natural selection, but in today's world these theories are so intertwined that in many cases the acceptance of one implies the acceptance of the other. Therefore, when identifying the religious beliefs needed to believe in geologic time, it is essential to recognize the influence that the theory of evolution has had on geology. The scientific evidence for geologic time must be evaluated independent of the theory of

2. Leet and Judson, 3.

evolution in order to properly consider its validity. This task is not easy since we are indoctrinated from childhood to believe that geologists can actually see our evolutionary history as they search through the various layers of rock. We take for granted that exceedingly slow physical processes working over millions of years formed these layers or strata in which we find the fossils depicting our evolutionary history. We are taught by the established scientific community that the earth, and the universe in which it exists, are billions of years old, and that rock strata on the earth were formed over the eons by the gradual processes still at work today. Taught in this fashion, it is little wonder that we cannot help but view the strata in the rocks as time markers in much the same way we see the numbers on a clock face as hours, and not as the individual numerical digits they actually are.

As we noted in chapter 3, Charles Lyell proposed the theory of an ancient earth to a society which generally believed in creation and a young earth. He recognized that the readers of his day would have difficulty accepting the theory of an ancient earth as long as they adhered to the religious belief that the earth was created by God according to Genesis 1 only a few thousand years ago. Eventually, over a period of many decades, the collective minds of the academic community did overcome their religious opposition to Lyell's theory, and today, it is considered by many to be an established scientific fact. But to objectively evaluate the evidence supporting geologic time, we now need to overcome the bias that prevents us from considering catastrophes in the shaping of the earth's geology.

If you believe that all physical phenomena are products of natural processes, then the concepts of evolution and an ancient earth appear to be logically sound. Moreover, the credibility of each is enhanced when one theory is used to support the other. Unfortunately, there is a danger in using these theories to support each other. As we saw in chapter 4, paleontologists cannot find objective evidence for evolution in the geologic record, and the

biological evidence for evolution is too weak to support an ancient earth. This being the case, the use of one theory to support the other becomes an exercise in circular reasoning. To break out of this circular reasoning, what I ask the reader to do in this chapter is to separate the time needed for evolution from the concept of geologic time, and to look at the physical characteristics of the earth without seeing these characteristics as a gigantic clock extending back millions of years. It is very possible that the layers or strata of sedimentary rock do represent different geologic time periods, but we must examine the rationale that obliges us to interpret the strata as such before assuming that the strata do so. In other words, the concept of geologic time interprets rock strata in terms of millions of years, so the soundness of this interpretation must be viewed without automatically assigning time to the strata. Such an evaluation is possible, provided that we are not restricted by a strong commitment to uniformitarianism.

When I was a child, my family ran a market garden. Most of the terrain on the farm was marsh land consisting of rich black soil, but on one place near the middle of the property sat a sandhill. On this island of sand in a sea of black earth was a large metal trough about 10 feet long, 3 feet wide and 1.5 feet deep, once used as a watering trough for horses. It was in this converted horse trough that the leaf lettuce picked from the fields was washed before being packed into crates for the Toronto market. While in use, water constantly trickled over the trough and ran down the hill to the ditch below, and my sisters and I could play in this runoff for what seemed like hours making dams out of the sand and stones. Little villages sprang up, and large castles made of sticks and mud lined the waterway leading from the trough to the ditch. Then the washing was over, and my dad pulled the plug on the trough. It always amazed me to see the torrent of water, released from the cleaning trough, wash clean the side of the hill erasing all evidence of the former imaginary river formed by a trickle of water, and the mud cities and towns that lined its

banks. A little trickle of water over a long period of time allowed us to construct entire villages; a lot of water over a short time completely obliterated what we created during our hours of fun.

Today, many of us have been lulled, or even coerced, into forgetting that large forces over short periods of time can create enormous changes in our physical environment. The 1980 eruption of Mount St. Helen's in Washington State served as a reminder that great changes can occur when a tremendous force meets a seemingly immovable object. Within a matter of days to weeks, the geology around Mount St. Helen's completely changed, and had this eruption not been observed and recorded for posterity, it would not be possible to tell whether these changes had been created by a large force over a short time, or small forces over a very long time.

Unless we can appreciate the fact that large forces can accomplish large changes over a short time, as did a massive amount of water leaving the cleaning trough, we become forgetful of this fact. Instead, we see only the small forces presently at work, forces that would need long stretches of time to have any effect on the geology of the earth. Similarly, when we forget that the earth could have been affected by great forces over a short period of time to create what we now see, we continue to assign long ages to rock strata, not realizing that this applied time is an interpretation of the fact, and is *not the fact itself*. You do not have to set aside your belief in an ancient earth to evaluate the physical evidence, but you *do* need to recognize this religious belief when it starts to limit the breadth of your scientific interpretations. Only by separating the concept of geologic time from the physical appearance of the rock strata will it be possible to identify the preconceived belief that encourages us to believe in geologic time.

7.1 Facts of Geology: Physical and Historical

The first step in evaluating the concept of geologic time is to become familiar with the facts of geology. One irrefutable fact of geology is that the earth has not always been as we see it today. Fossil remains of marine animals appear near the tops of mountains; fossils of tropical plants have been found throughout the planet, and not just in the tropics. Trilobites no longer scurry along the ocean floor, and dinosaurs have ceased to roam the earth. Both old-earth geologists and young-earth Creationists will agree that the geology of the earth has changed, but how you believe this change took place depends entirely on your perspective.

During Darwin's time, as in our own, many young-earth geologists believed that the catastrophic event associated with Noah's flood was responsible for the geology of the earth. Old-earth geologists, on the other hand, avoided any notion of catastrophes, and explained the appearance of the earth according to the concept of uniformitarianism. The fossils of marine animals found on mountains came about by an intermittent rising and settling of the earth's surface, an exceedingly slow process that could be physically possible provided that the earth is millions to billions of years old. And if the earth is ancient, then fossils of tropical plants created in the tropics could have been carried from the tropics by another exceedingly slow process that caused land masses to move.

The scientifically verifiable facts of geology upon which everyone agrees, such as the appearance of marine fossils on mountains, are considered facts of physical geology. The various interpretations of these facts as the end result of a massive catastrophe over a short time *or* the result of small forces working over millions of years, are themselves considered "facts" of historical geology. Although considered "facts" they are distinctly different from the physical facts, as their acceptance depends on

personal bias. That the earth must be ancient is a fact of *historical geology* necessitated by the belief in uniformitarianism to explain the scientifically verifiable facts of *physical geology*.

By separating the knowledge of geology into the facts of physical and historical geology, geologists have inadvertently blurred the distinction between an objective fact and a subjective fact. While *physical geology* describes the reproducible, objective facts, such as the rate of sedimentation in bodies of water, or the formation of corals on coral reefs, or the destructive powers of volcanoes and earthquakes, the facts in *historical geology* are subject to the doctrine of uniformitarianism. This doctrine extrapolates the rates of gradual processes observed today and applies these rates to already-formed features of the landscape. For example, the rate of sedimentation measured at the bottom of a lake over a period of months to years can be divided into the full depth of sedimentary rock (assumed to have been formed by the process of sedimentation) to provide an age of the rock exceeding millions of years. The rate of sedimentation occurring today, and the depth of the sedimentary rock, are verifiable, objective facts of physical geology. However, the age estimate using these two objective facts of physical geology is a circumstantial or subjective fact of historical geology. Its validity is subject to the assumption that only the small, gentle forces measured today created these layers of sedimentary rocks.

The following section examines some of the physical and historical facts of geology that are used to support the concept of geologic time. Since geologists assume that the doctrine of uniformitarianism is scientifically sound, they make little or no distinction between the objective facts of physical geology, and subjective facts of historical geology. The historical facts are treated on a par with the physical facts giving the impression that the concept of geologic time has been scientifically verified. In many cases, the assumptions associated with the subjective facts of historical geology are so fundamental to the entire line of

reasoning that their deficiencies are forgotten when the final conclusions are reached. The tendency for old-earth geologists to treat facts of historical geology on the same level as the facts of physical geology may explain why their conclusions differ so widely from the conclusions of those who believe in a young earth.

7.2 Time Facts: Relative and Absolute

Geologists separate the vastness of geologic time into two components: relative time and absolute time. In relative time, different rock layers are placed chronologically before or after each other, disregarding the absolute number of years that may have occurred between the times they were formed. On the other hand, absolute time measures whether a geologic event took place a few thousand years ago, a million years ago, or at some date even further back in earth's history. Let us first look at the facts of relative time.

7.2.1 Facts of relative time

The Law of Superposition

At any locality where the layers of sedimentary rock have not been overturned, the topmost layer is always the youngest, and the lowermost layer is always the oldest. Placing the deeper layer earlier in history than each of the subsequent shallower layers is referred to as the Law of Superposition, which simply states what appears to be intuitively correct. If physical matter followed the law of gravity, and if only the slow and gentle forces of sedimentation and erosion were responsible for the formation of rock strata, then the lowest layer must have been formed first before the next layer could have formed on top of it. Although this law appears ridiculously obvious, it does so only if you believe that the earth is millions of years old. As one geologist warns:

You may think it obvious that layers of rock lie on top of one another in the order in which they were deposited. But recognizing this simple fact was a profound scientific achievement and has made possible the reconstruction of the geologic history of any part of the earth. When the universe was believed to have been created in an instant in its present form, no such step-by-step development could be visualized.³

If the Law of Superposition appears “obvious” to you, then you are not aware of its full significance. What is not readily apparent from the articulation of this law is the underlying assumption that the time needed to form any layer requires thousands to millions of years. It is assumed, without any scientifically irrefutable evidence, that a given layer of sedimentary rock represents an extremely long period of time, the time it would have taken for a deposit to have accumulated according to the rate at which sedimentation occurs today. As the above quotation notes, “When the universe was believed to have been created in an instant,” the Law of Superposition could not be “visualized.” The reason why this law is a “profound scientific achievement” is that it rules out the possibility that larger forces, working over shorter periods of time, could have created these strata. If you accept the Law of Superposition as a scientifically verifiable fact, then you are logically obligated to reject the literal translation of the Genesis account of creation.

By ruling out the action of massive forces to form rock strata, the Law of Superposition does more than describe the physical appearance of the rocks. Rocks occur in layers; this is an observable and verifiable fact of physical geology. That these layers were created by being superimposed one on top of another

3. R.M. Pearl, *1001 questions answered about earth science* (New York, NY: Dodd, Mead, 1969), 5.

over very long periods of time, as the Law of Superposition articulates, is an explanation of this fact. *Explanations* of facts are not laws of science, but *theories* of science.⁴ By providing an explanation for the appearance of the layers, the Law of Superposition is no longer merely a scientific law, but becomes, in effect, a scientific theory. A theory of science provides an explanation for an observable fact, and is subject to change as our knowledge increases. Incorrectly referring to the Law of Superposition as a law and not a theory gives the impression that the mere existence of strata in the rocks is irrefutable scientific proof for the concept of geologic time.

The subtle difference between describing the rock strata as a *fact* of physical geology, and using the Law of Superposition to explain this fact, is visually illustrated in Figure 7.1. If a localized area consists of various strata or layers of rock, the geologist can determine if these rock layers extend over the entire region by simply making observations at different points. A ravine or canyon might expose the strata at one point, a shoreline at another, or a deep mine at another (see Figure 7.1 A). By seeing how one layer relates to another layer in each of these different locations, it is possible to predict what material you will pass through if you were to drill in any location in the region. The

4. The distinction between a fact and a theory must be clearly understood in any debate based on scientific evidence. By definition, a fact is anything that is actually true, or has actually happened. A theory is an *explanation* of what has happened. If a fact is the actual event, and a theory is the explanation of the event, then a theory, no matter how much it may be supported by the facts, remains a theory. Theories can never become facts because they explain, but do not describe, the facts. Facts and theories are two different entities, like apples and oranges. No matter how yellow an apple may be, it can never be an orange. Unfortunately, some scientists believe that if a theory is proven to be true by one or more interconnected evidences, it becomes a fact. This notion is incorrect according to a basic understanding of the English language. To address this concern, some scientists have proposed a redefinition of fact to mean something considered to be true by the overwhelming majority of scientists. Since evolution is the theory of choice of most scientists, then by majority rule it becomes a fact. However, this changes the basic meaning of the word "fact."

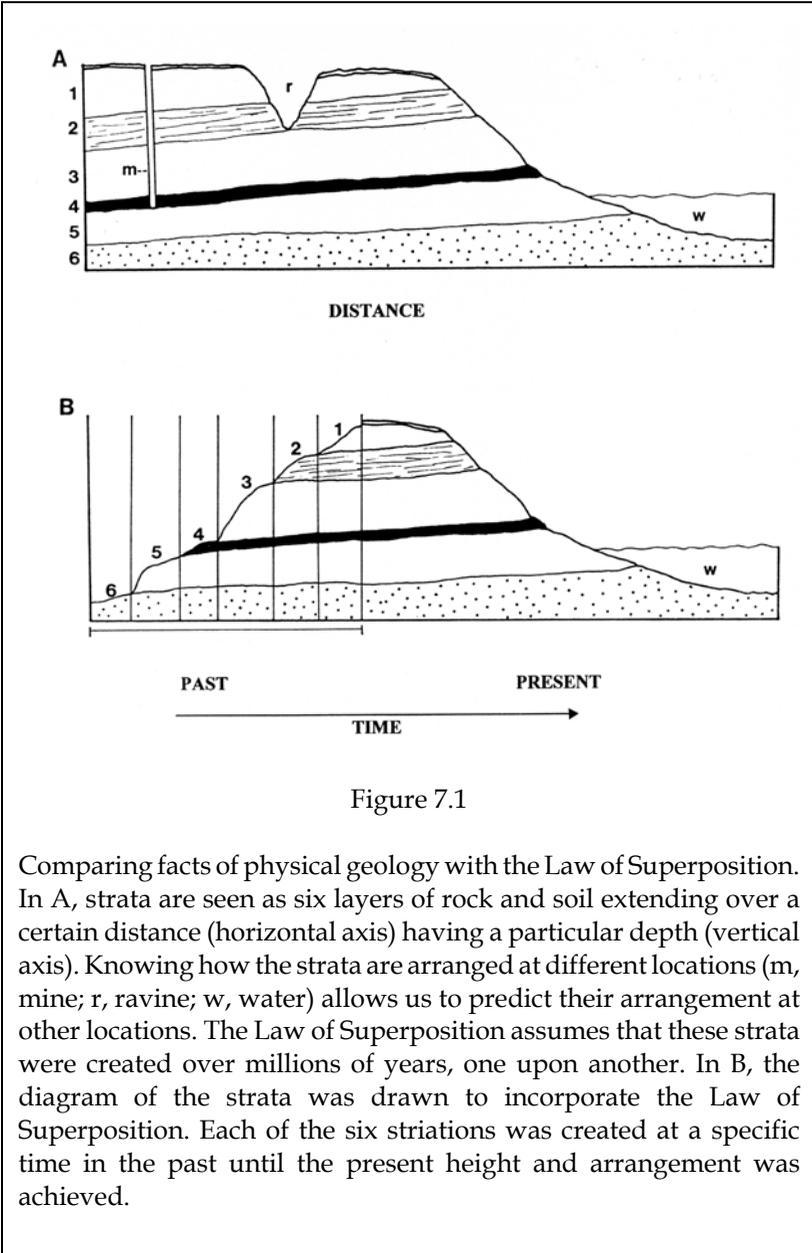


Figure 7.1

Comparing facts of physical geology with the Law of Superposition. In A, strata are seen as six layers of rock and soil extending over a certain distance (horizontal axis) having a particular depth (vertical axis). Knowing how the strata are arranged at different locations (m, mine; r, ravine; w, water) allows us to predict their arrangement at other locations. The Law of Superposition assumes that these strata were created over millions of years, one upon another. In B, the diagram of the strata was drawn to incorporate the Law of Superposition. Each of the six striations was created at a specific time in the past until the present height and arrangement was achieved.

physical fact is that these striated formations exist, and the fact that they exist can be quite useful to the geologist.

However, figure 7.1B demonstrates how these strata should appear when the Law of Superposition is applied to them. Rather than simply showing the strata on top of each other, the Law of Superposition incorporates a time component placed on the horizontal axis (along the bottom) of the figure. At time zero (striation 6), there is only one striation; the second striation has yet to form on the first. Then, in keeping with the Law of Superposition, a striation would be added during each geologic period in the past until the present conditions are reached. Figure 7.1A differs from Figure 7.1B because the latter figure properly displays this time component which assumes that each stratum was created during a different period (assumption one), during the earth's ancient history (assumption two). The presence of striated formations allows geologists to predict where to find particular mineral deposits in a particular region, but the fact of striated formations does not prove the validity of extremely long time spans that are needed for the Law of Superposition.

Logic may indicate that the Law of Superposition has been mislabeled as a law of science. However, this logic is difficult for the geologic community to accept. Modern old-earth geologists believe, without a doubt, that if a series of sedimentary rocks has not been overturned, the topmost layer is always the youngest, by millions of years, and the lowermost layer is always the oldest, by millions of years. The Law of Superposition is so appealing that one geology text noted, "On first glance, this [Law of Superposition] is an almost absurdly simple principle."⁵ If you agree with this statement, you are an old-earth geologist who firmly believes that the presence of layers of sedimentary rock proves that the earth is ancient. Nevertheless, this interpretation of the rock strata rests upon one major, unverifiable assumption. It excludes the possibility, *a priori*, that the layers were all formed

5. Leet and Judson, 116.

at, or about, the same time. How does the Law of Superposition, which is a theory based on an untestable assumption, appear to be so unquestionably correct?

The Law of Superposition is deemed absurdly simple because of the following logic. First, a reasonable explanation for the formation of the rock strata is proposed: rock strata were formed by sedimentation and erosion. (However, any other mechanism for rock formation is ruled out.) Second, we suppose that the mechanisms of sedimentation and erosion can be measured and shown to be exceedingly slow processes. Third, it is assumed that sedimentation and erosion only form one striation during one geologic time period, since these processes are, in fact, very slow. Given these criteria, it then becomes an absurdly simple principle that the appearance of rock strata can only mean that each subsequent striation was formed on top of the one below it. And since it takes millions of years to form a striation, then the earth must be millions of years old. In all this reasoning, the initial decision to exclude large forces working over short periods of time has been entirely forgotten by the time the end of the argument is reached. This logic is even less convincing in light of more recent studies of sedimentation in the laboratory.⁶ Given the appropriate conditions, a mixture of large and small granules will spontaneously form layers or striations as it settles. It does not require millions of years to create a series of striations when they can all form from a single event.

6. Using a simple glass chamber to allow a mixture of granules to settle towards one end, Makse, Havlin, King and Stanley showed that spontaneous stratification takes place (see their article "Spontaneous Stratification in Granular Mixtures," *Nature* 386 [27 March, 1997]: 379-382). There is a formation of alternating layers consisting of small and large grains. These authors suggest that this process could give rise to striations during avalanches but they avoid any comments that could support the concept of a young earth. Young-earth Creationists point out that this work was predated by G. Berthault (for example see Berthault, "Experiments on lamination of sediments," *Creation Ex Nihilo Technical Journal* 3 (1988): 25-29), and that it supports the concept of Flood geology (see A. Snelling, "Sedimentation experiments: *Nature* finally catches up!" *Creation Ex Nihilo Technical Journal* 11, no. 2 (1997): 125-126).

If you are an unshakeable old-earth geologist, you have succumbed, willingly or unwillingly, to this form of reasoning. Even though it may be true that the earth is millions to billions of years old, the old-earth geologist needs to grasp the point that this interpretation of the age of the earth is a circumstantial fact, that is, a fact of historical geology, and not a fact of physical geology. It is an interpretation, not an actual observation. There is still a possibility, however remote in the eyes of the old-earth geologist, that the earth could be only a few thousand years old based on our present scientific knowledge of the facts of physical geology.

The Index Fossil and Geologic Column:

After accepting both the doctrine of uniformitarianism and the Law of Superposition as well-established scientific facts, it is possible to reenforce the soundness of these theories by including into the mix the concept of the index fossil. An index fossil is a fossil that is found only in a specific level or zone within the rock strata, so whenever that fossil is encountered in a rock stratum, it tells you what stratum you are looking at. The level that is demarcated by an index fossil is referred to as biostratigraphic unit.

The boundaries of a biostratigraphic unit are defined by the range of a given fossil, or in the case of an assemblage zone, on the total fossil content.⁷ (Note the circular reasoning: the index fossil is restricted to a biostratigraphic unit, but the biostratigraphic unit is defined by the range of the index fossil.) The best index fossils are made by organisms that inhabited a large part of the earth during a relatively brief period of time.⁸ Hence, these fossils are widely distributed horizontally in a rock stratum, but are restricted in vertical range (i.e., they do not extent through several strata). An index fossil should be both abundant and easy to identify.

7. R. Moody, *Fossils* (New York, NY: Macmillan, 1986), 15.

8. Pearl, *1001 questions answered about earth science*, 24.

The concept of the index fossil stems from the belief that sedimentary rocks containing the same fossil assemblages were formed at the same time, whereas rock strata having different index fossils were created at different times. Index fossils are used so frequently that it has become an axiom in geology to say that fossils are a key to correlating rocks, and that rocks having the same assemblage of fossils are of the same age. But if index fossils allow you to correlate strata from all over the world, then during the formation of index fossils unique to particular strata, very distant parts of the globe must have experienced the same type of environment and possessed the same assemblage of organisms for millions of years. Furthermore, this organism (the index fossil) must have become extinct at the same time over all locations on the globe where it once existed. Old-earth geologists have used this reasoning to describe worldwide climates which prevailed during the formation of index fossils. Thus, the Carboniferous period (lasting 65 million years) experienced widespread moisture and warmth, creating a mild, wet climate typical of jungle conditions; the Permian period (lasting 50 million years) was essentially dry, and experienced the broadest distribution of a glacial climate; the Triassic period (lasting 50 million years) was generally semiarid; the Cretaceous period (lasting 72 million years) was mild and moist; the Tertiary period (lasting 62 million years) had a relatively uniform climate during its first half, but underwent declining temperatures during the second half, culminating in the Great Ice Age of the Pleistocene.⁹

To create an index fossil, the climate of the earth had to be relatively uniform throughout the earth for great periods of time during the past three to four billion years since the evolution of the first life. Yet we know that a uniform climate does not exist on the earth today. Rather, the earth can best be described as a planet of extremes in both its climate and its variety of organisms. Many different regions of the globe have different environments and

9. Pearl, 143-149.

different flora and fauna, and even for similar climatic zones on different continents, the planet contains different assemblages of organisms. To believe that index fossils are a key to identifying which strata were created at the same time, or which strata were created at different times, it is necessary to assume that the climate and distribution of organisms throughout much of the ancient earth were relatively uniform for very, very long periods of time. But the climate of the earth is *not* relatively uniform today, and it is a conjecture to suggest that it was uniform in the distant past. Although the present is supposed to be the key to the past, as the doctrine of uniformitarianism articulates, the climatic and ecological conditions we know to exist in our world today could not have given rise to index fossils.

The presence of similar-looking index fossils in strata in different locations over the earth is a fact of *physical* geology. Using this fact of physical geology, two strata having the same assemblage of fossils are thought to have been formed during the same geologic time period. It then logically follows that two strata with different assemblages of fossils were formed during different geologic time periods. Yet this interpretation of the appearance of the rock strata is a fact of *historical* geology that depends on an interpretation of the physical facts. If two strata from two different locations have different index fossils, they may have been formed at different times, or *they may have been formed at the same time*. There is no irrefutable fact of physical geology which can tell us which one of these TWO facts of historical geology is more likely to be true. The fact that dinosaurs can be found in strata from the Mesozoic Era, and trilobites in strata from the Paleozoic Era, is no objective proof that these organisms lived millions of years apart in earth's history. There is an equally compelling reason to explain these facts of physical geology in another way. The physical fact that dinosaurs and trilobites are found in different strata located in different regions of the globe can also be explained, not by

differences in *time*, but by differences in the *environment* in which these strata were formed.

It is very possible that strata from different locations of the globe may contain fossil assemblages that reflect a difference in *climate*, not a difference in *time*. Ignoring this possibility, old-earth geologists assume that rock strata having the same index fossils were created at the same time, whereas rock strata with different index fossils were created at different times. The rock strata from different locations of the earth are then categorized with respect to their index fossils so that strata having similar index fossils are assigned the same age. Then the strata are arranged in an ascending order from those having the simplest fossils to those having the most complex. The index fossils determine which strata are of similar age; the other fossils in the strata determine if the strata are older (less complex fossils), or younger (more complex fossils). Geologists have constructed the geologic column on the basis of this rationale. The geologic column places rock strata with the simplest fossils at the bottom of the column, and the strata with the most complex fossils on the top. The strata between these two extremes are arranged according to the increasing complexity of their fossils since this arrangement is in keeping with the theory of evolution.

As we go from the bottom to the top of the geologic column, we see that the Precambrian rocks contain a scant fossil record with some primitive marine plants and invertebrates; the Paleozoic Era contains the first vertebrates and amphibians, and the first signs of reptiles; the Mesozoic Era contains dinosaurs and birds; and in the Cenozoic Era, mammals appear in abundance. Within these Eras, the strata can be further subdivided into Periods, and these Periods are arranged from oldest (on the bottom) to youngest (on the top) according to the evolutionary progress of their fossils.¹⁰

10. C. Dunbar, *Historical geology*, 2nd ed. (New York, NY: John Wiley and Sons, 1966), 15.

Old-earth geologists have constructed the geologic column assuming first that the divisions in the column represent strata that were made at different times, and second, that strata made at the same time can be identified by the presence of the same index fossils. Although the geologic column is presented in diagrams as a fact of geology, it is not a fact of *physical* geology. Moreover, geologists have found physical facts in some rock strata that appear to contradict the idea that the fossils can be used in this fashion to arrange the rocks according to age. For instance, it is possible to find fossils of organisms thought to have become extinct eons previously embedded in the same strata alongside fossils of more advanced organisms. This fact of physical geology suggests that these two organisms, distant to each other on the proposed evolutionary scale, were living on the earth at the same time. Rather than entertain this possibility that could cast serious doubt on the evolutionary interpretation of the geologic column, the "older" fossils are labelled "misplaced" or "derived" fossils. Derived fossils are fossils "that have been eroded from one bed, and then transported and deposited in a younger (more recently formed) bed. They are therefore older than the sediment in which they are enclosed when discovered."¹¹ If the concept of the geologic column is true, then this explanation is perfectly valid. On the other hand, those who believe in the concept of geologic time need to recognize the assumptions upon which this belief is based.

The concept of the geologic column is foundational to the modern study of geology. It is as fundamental to the modern geologist's way of thinking as the theory of evolution is to the modern biologist. However, it should be noted that the complete geologic column does not exist anywhere on the planet. There has been the odd claim that the complete geologic column has been discovered in one or two places on earth, but these claims appear questionable for the following reason. In order to construct the

11. Moody, *Fossils* 15.

complete record on a regional or worldwide scale, it was necessary to piece together in a single table the separate data from different places. However,

If the layered (stratified) rocks that are known of different ages could be brought together from all over the world to make a composite record for travelers to see, such a national monument would be more than 500,000 feet, or 95 miles, thick. This is several times the thickness of the crust of the earth!¹²

Because of the physical constraints of this planet, and the existence of misplaced fossils, the geologic column will have to remain a subjective fact of historical geology, not an objective fact of physical geology that old-earth geologists wish it to be.

As in the case of the Law of Superposition, the geologic column is a theory to explain the facts of *physical* geology. The same facts could also be explained by attributing the creation of strata and fossils to large forces occurring over a short period of time. In this case, the fossils in the strata would be from animals living at the same time. The different index fossils in different strata created at the same time could be explained by differences in location and climate, not necessarily by a difference in time.

The geologic column gives the impression that throughout the earth the rock strata with less evolved organisms are located lower in the rocks, whereas the strata with more highly evolved organisms are located towards the top. But the geologic column is constructed by amalgamating all the strata from all over the earth. The actual location of the strata has been ignored, and only the assemblage of fossils has been used to construct the geologic column. On the other hand, the geographical location or the climatic conditions in which the strata are found may be the

12. Pearl, 13.

reason why fossils appear the same or different. It is not necessary to explain the geologic column by depending on geologic time.

Interestingly, old-earth geologists do admit that different fossil assemblages may reflect different environments that existed simultaneously but at different locations. For example, the term *faunal province* refers to a region characterized by an assemblage of fossils which is the same throughout that region. Based on the type of fossils found in different areas of the globe, a number of faunal provinces have been identified. Each province contains fossils created in one geographical area during a particular time in the geological timescale.¹³ The ability to identify faunal provinces suggests that different regions of the earth experienced different environmental or climatic conditions at the same time, and that the fossils found in these regions differed according to ecology, not evolutionary history.

The geologic column brings together strata from all over the world and arranges these strata from bottom to top according to the complexity of the fossils. No consideration is given to the possibility that different strata from different locations may have been created at the same time. This treatment of the objective facts of physical geology is highly subjective, and is guided by a preconceived belief in an ancient earth and evolution. It is equally possible that this data does not reflect evolution, but instead, results from a difference in the geographical, ecological or climatic conditions of the location in which the fossils were formed.

The premises used to construct the geologic column may still be valid, and if so, this description of relative time clearly shows the earth to be far older than a few thousand years. However, the old-earth geologist needs to recognize that this theory requires the acceptance of some unprovable assumptions. The young-earth Creationist can use exactly the same data to provide a more reasonable explanation of the facts. What needs to be emphasized here is that both views are beliefs which do not logically arise

13. Moody, 14.

from the facts of physical geology. It requires a certain amount of faith to accept one view over the other. As one young-earth Creationist¹⁴ confessed to me, both young-earth and old-earth geologists accept the same geological facts to be true. Since where they differ is in the interpretation of the facts, it becomes fruitless to use facts to make one's point. Interestingly, Lyell recognized this very same situation more than a hundred years ago when he argued in favour of uniformitarianism and the concept of geologic time.

7.2.2 Facts of absolute time

The principal technique used to measure absolute time is radiometric dating based on radioactive decay. A substance that is radioactive has more energy in it than it can hold, and as such, it releases this energy into the environment. A useful analogy is that of a hot coal from a fire. The coal cannot hold the heat and over time it cools by transferring this heat to its surroundings. How hot the coal is as you touch it tells you how long ago it had started to cool. A very hot coal suggests that it left the fire only recently; a warm coal has obviously been out of the fire longer to allow it to "decay" to a cooler temperature. As with coals from a fire, time can be estimated by changes in temperature. For radioactive substances, time is calculated by measuring the amount of the radioactive material that still remains in the substance.

Radioactive minerals "cool" or decay at a constant rate; thus, measuring the amount of parent and/or daughter element(s) in

14. John Mackay is the Australian Director of Creation Research. For many years he was a science teacher in both state and private secondary education systems in Queensland, Australia. He also lectured in Geology at the Tertiary level for Technical Education and was instrumental in establishing Creation Research in Australia. His geology degree was obtained at the University of Queensland. Mackay addresses audiences worldwide, and his organization has produced teaching videos and curricula that question the theory of evolution.

a sample will provide a means to determine absolute age. As one writer notes:

Radioactive dating is the *only* method which provides an accurate *absolute* age in years for the earth[...]. After the discovery of radioactivity, absolute ages could be determined and *then* the rocks and their fossils were dated in absolute years. Radioactivity made it possible not only to calibrate the relative geologic age scale already established, but also allowed it to be improved and refined independently of fossils.¹⁵

Radiometric dating is considered the best evidence for an ancient earth, but there are also other ways to determine age. Before describing how religious belief determines one's attitude to radiometric dating, I will describe two other indicators used to estimate absolute time, keeping in mind that the earth was considered ancient long before radiometric dating methods became available. These indicators are the growth of coral reefs and layers of chalk in the Mediterranean Sea. They do not give us absolute dates, but they do provide an absolute minimal length of time which is much longer than the 6,000 years indicated by Scripture.

Coral reefs:

Coral reefs are created by the growth and building activity of coral animals and other lime-secreting organisms. These reefs are quite extensive, with some reefs in the South Pacific reaching depths of as much as 4,600 feet. If one assumes that these reefs began at their base, and were added to by the slow growth of coral animals and other organisms which live with them, then dividing the depth of these reefs by an experimentally-measured

15. W. A. Young, *Fallacies of Creationism*, 239.

rate of growth ought to give a good approximation of how long it took for these reefs to form. Using the measured rate of growth of 1 foot per 28.5 years for a coral reef off the coast of Florida, and dividing this estimate into the 4,600 feet for the large reef in the South Pacific, we obtain more than 130,000 years. For such a reef to have formed, it would take a lot longer than the estimated 4000 years since Noah's flood. Thus, this reef stands there as a testimony to the absurdity of considering the earth younger than a mere few thousand years.¹⁶

The above reasoning is logically sound, but before accepting as fact the conclusion that the earth is far older than 4000 years, the major assumptions in this argument need to be identified. Two variables used in this calculation are the depth of the coral reef and the rate of growth. Assuming that the depth of the reef ought to be scientifically verifiable by direct measurement, let us consider the estimate of the growth rate.

The growth rates have been estimated for a large number of coral reefs, and more than one type of indicator has been used to determine these rates. One way to calculate the rate of growth is to measure the physical characteristics of the reef. In these cases, core samples have been taken from the reef, and the age of the reef has been estimated based on the minerals, fossils, and striations (e.g., unconformities and erosion patterns) found in the reef.¹⁷ Unfortunately, these estimates, like those associated with the geologic column, are subjective, since they rely on the assumption that the earth is ancient. The same facts of physical geology can be used to substantiate a young earth. All one needs to do is to assume that the geology of the reef was fashioned by substantial changes in the environment over short periods of time, not by a history of slow formation.

16. D. Wonderly, *God's Time-Records in Ancient Sediments: Evidences of Long Time Spans in Earth's History* (Flint, MI: Crystal Press, 1977), 23-34.

17. W.H. Adey, "Coral Reef Morphogenesis: A Multidimensional Model," *Science* 202, no. 4370 (24 November, 1978): 831-837.

Instead of relying on the physical appearance of the reef to estimate its rate of growth, a more direct measurement is to calculate the growth rate of the organisms that make up the reef. In the first example noted above, the growth rate of 1 foot per 28.5 years for a coral reef near Florida was based on the measured growth of *Montastrea annularis*.¹⁸ By dividing this value into the height of the largest coral reef in the South Pacific, you obtain an estimate of 130,000 years for the formation of this reef. Unfortunately for the proponents of an ancient earth, the 4600 foot coral reef is found in the Pacific, whereas the growth rates of *Montastrea annularis* were obtained from the Florida-Bahama area. As Wonderly notes, some of the reefs in the Pacific have "a latitude, water temperature, and other conditions which are more favorable for coral growth than is found in the Florida-Bahama and Hawaiian areas."¹⁹ The growth rate measured for some coral-forming organisms in the Pacific (near Samoa) has been calculated to be as great as 0.055 feet per year (approximately 1 foot every 18 years). Dividing this rate into 4600 feet gives an age estimate of about 84,000 years. This age is significantly shorter than 130,000, as calculated using the slower growth rates of the Florida reefs, but it is still far longer than the 4,000 years since Noah's flood derived from the literal translation of Genesis. Possibly the growth rates vary with season or year, and this could skew the results.

Another more damning possibility is that the growth rates recorded today at the heights of these reefs are not truly representative of the growth rates in the past when the reefs were being established. Available evidence suggests that growth is not steady, and most of the numerous coral reef-flats in the Pacific which have been studied during the past 75 years are wearing down at about the same rate as they are being built up.²⁰ This

18. J.E. Hoffmeister, and H.G. Multer, "Growth Rate Estimates of a Pleistocene Coral reef of Florida," *Geological Society of America Bulletin* 75, no. 4 (April 1964): 353-358.

19. Wonderly, *God's time-records*, 31.

20. A.A. Roth, "Coral reef growth," *Origins* 6, no. 2 (1979): 88-95.

evidence clearly suggests that what is being measured at the top of these reefs today is not the growth rate of reefs as they build up from nothing to the 4600 feet, but if anything, it represents the rates needed to maintain the reef at 4600 feet. This possibility is supported by the evidence showing that mature reefs stay about the same height as if old growth is being removed to make room for new growth. However, conditions differ lower down the water column where the action of waves and the harmful effects of ultraviolet light do not limit the rate of growth. Measurement in one such area, recorded as long ago as 1932, reported a growth rate of approximately 16.5 inches per year.²¹ Using this value for the growth rate, an estimate to form a coral reef 4600 feet deep is approximately 3,345 years (4600 feet divided by 1.375 feet per year). This value is well within the 4,000 years since the time Noah's flood is supposed to have occurred.

Another assumption regarding the growth rates of coral reefs is that the height of the reef is dependent only on the growth rate of a single coral, or layer of coral, at the uppermost regions of the reef. Yet it is possible that the height of the reef may not be caused by the growth of the local population alone. There may have been colonization such that the corals from the surrounding region gathered at this one place. These coral reefs are actually located on the top of sunken volcanoes which are ideally situated to attract any juvenile coral or other animals floating by. If your calculations depend only on the growth rate of a single coral, then you have greatly underestimated the rate of growth of the entire population, and have incorrectly lengthened the time needed to create the reef.

The earth may be ancient, but the use of the growth rates of coral reefs does not, as some old-earth geologists had hoped, provide enough evidence to persuade young-earth believers to

21. J.T. Vestelle, "The Growth Rate at Various Depths of Coral Reefs in the Dutch East Indian Archipelago," *Treubia* 14 (1932): 117-126.

change their minds. The choice is still a matter of a prejudice fostered by a religious belief.

Chalk layers in the Mediterranean Sea

When a solution of salt evaporates it leaves behind its once dissolved material, referred to as evaporitic minerals. Evaporitic minerals give rise to salt lines like those that appear on your dry pant legs after they have been soaked by water from slush-covered sidewalks. This water is not “clean” and when it evaporates from your pant legs, it leaves its impurities on your dry clothing.

Wonderly, an old-earth geologist and a Christian, describes how the Mediterranean Sea shows signs of having been completely dry at one time. The evidence for this loss of water is the layers of chalk, an evaporitic mineral, on the present ocean floor. He argues that these mineral deposits could have only come about by the evaporation of the sea water. The Mediterranean Sea must have been a great evaporative basin which was receiving and storing the thick layers of salts all across its floor. He reasons that:

[...]the presence of thick and sea-wide layers of these evaporitic minerals deep in the Mediterranean floor leaves absolutely no doubt that there were at least a few hundred thousand years of evaporative deposition, after which greater quantities of water became available to return this sea to a salinity level similar to that of the oceans.²²

To reach this conclusion, Wonderly extrapolates the present rate of evaporation from the Mediterranean Sea and compares this rate with the rate of accumulation of evaporites from an assumed

22. Wonderly, *God's time-records*, 171.

concentration within the water. Combining this information with the observation that the evaporitic mineral layers are also covered by normal oceanic sediments, then the time needed for these evaporites to accumulate would be enormous. Wonderly's primary assumption, considering that the physical nature of the Mediterranean Sea has not changed over millions of years, is that this body of water is too large to dry up within human history. Therefore, the earth must be old.

This interpretation of the evidence is not a fact of physical geology that Wonderly wishes it to be. Instead, it is a fact of historical geology that depends on the assumption that the present state of the Mediterranean Sea has not changed over millions of years. If the Mediterranean Sea needs to disappear in order to create the evaporitic deposits within human history, then this fact of physical geology (i.e., the presence of evaporitic deposits) convinces a young-earth Creationist that the Mediterranean Sea must have completely evaporated a short time ago. Indeed, there is evidence from physical geology that large seas do dry up, and probably quite quickly.

In the middle of the Sahara Desert in Egypt there is a place referred to as the Valley of Whales. At this location, there are deposits of large marine animals suggesting that this desert place was, at one time, a gigantic sea. This sea must have dried up relatively fast to leave trapped within it these large sea creatures. Furthermore, some portions of Scripture even suggest that large seas can disappear in a human life time by stating that God has the ability to dry up oceans (Isaiah 44:27; 50:2, Nahum 1:4). To comment on God's ability to dry up a sea would be meaningless unless these writers knew that great seas *do* dry up. The reference to God drying up the seas could be compared to the reference to God lifting us up on wings of eagles. Only by witnessing the flight of eagles could you appreciate such a comparison. Even one old-earth geologist—who is also a Christian—admits that:

If a historical narrative mentions trees or snakes, as in Genesis 3, it is evidently the intention of the writer that we should understand a real, physical, actual tree or snake.²³

If the evaporation hypothesis is the only scientific explanation for the creation of chalk layers in a young earth, possibly the Mediterranean Sea did dry up during the history of mankind, making its application to the nature of God meaningful. So rather than the layers of evaporitic minerals at the bottom of the Mediterranean Sea being evidence of an old earth, from the perspective of the young-earth Creationist these layers become evidence for the great power of God and for the literal interpretation of Scripture. How you interpret the meaning of these facts of physical geology depends entirely on your religious belief.

Radioactive dating:

In his book, *Christianity and the Age of the Earth*,²⁴ Davis Young provides a Christian geologist's interpretation of the scientific dating which supports the concept of geologic time. He laments the fact that he must call the Creationist stance contrary to his own since, in terms of his faith, he is a Creationist. He believes that God did create. However, he expresses the belief that the "young-Earth view is unscientific and not necessarily biblical," and that "continued promotion of such ideas will in the long-run damage the credibility of Christianity and thus hinder our evangelistic and apologetic efforts."²⁵

With his bias clearly stated – that the world is ancient, and that Christians must accept this fact or hinder the work of the Holy Spirit – Young provides a number of examples to support

23. D.A. Young, *Creation and the Flood: An Alternative to Flood Geology and Theistic Evolution* (Grand Rapids, MI: Baker Book House, 1977), 41.

24. D.A. Young, *Christianity and the Age of the Earth* (Grand Rapids, MI: Zondervan, 1982).

25. D. A. Young, *Christianity and the Age of the Earth*, 10.

the theory of an ancient earth. After describing many of these examples in detail, he comes to a conclusion that may surprise other old-earth geologists: The absolute age of the earth cannot be deduced by the physical characteristics of the rocks. "Estimates can be made, but these are based on assumptions."²⁶ He then presents radiometric dating as "one of the most productive areas in all of geological research" since it is now possible "for geologists to determine the absolute ages of many kinds of rocks and of certain geological events."²⁷

Young describes a number of radiometric dating techniques, such as the potassium-argon method, the rubidium-strontium method, and the uranium-thorium-lead method. The radioactive carbon 14 dating method is not described since, as seen in the discussion of the Shroud of Turin, this method applies to once-living material, not to rocks. However, the assumptions outlined in the description of radioactive carbon 14 dating are essentially the same for these other methods of dating rocks.

The most significant assumption in radiometric dating is that we can know the amount of radioactive material in the specimen at time zero. If this assumption is not valid, and the analogy of an hourglass is used, then a value which gives more daughter atoms (i.e., sand in the bottom of the hour glass) and fewer parent atoms (i.e., sand in the upper part of the hour glass) than was actually present at time zero, would date rocks much older than they truly are. If the amount of parent and daughter atoms were measured today, and if we found very little parent and a lot of daughter atoms, then we would deduce that time was needed for the parent atoms to give rise to the daughter atoms. However, if there were a lot of daughter atoms present at time zero, then the rock would actually be very young, but would appear old. Therefore, how much of the parent and daughter substance is present at time zero is the most fundamental assumption of radiometric dating, but

26. D. A. Young, *Christianity and the Age of the Earth*, 93.

27. D. A. Young, *Christianity and the Age of the Earth*, 93.

this assumption cannot be validated empirically. Given the inability to substantiate this assumption (that is to say, the amount of parent and/or daughter elements at time zero), no amount of radiometric data could ever be used as a direct measurement for the age of the earth. The evidence could only be considered circumstantial at best, despite the tremendous amounts of resources that have been invested into this technology.

Young provides a good description in laymen's terms of the different radiometric dating methods, but before doing so, he admits that knowing accurately the physical makeup of the rock at time zero is an assumption. He mentions, almost as an afterthought, that to properly apply radiometric methods to minerals and rocks it is also necessary to know how much of the daughter element (i.e., sand in the bottom compartment of an hourglass) may have been present in the mineral at the time of its formation. But in taking a closer look at just one example of these radiometric dating techniques (the potassium-argon method), we see how Young's own beliefs have caused him to overlook the importance of this assumption in light of his desire to convince young-earth Christians to give up their stance. He writes:

Thus the geologist needs to know how much of a daughter element was already incorporated into the mineral when it was formed. The reader may well wonder how it is possible to know this, but the problem is not really so serious as it may seem. It is usually possible to make an estimate. For example, a mineral that is datable by the potassium-argon method usually can be considered to contain little if any argon at the time of formation since argon is an inert gas element and is not at all easily bound chemically to the structures of minerals. Exceptions have been

found, but usually argon is not present in a mineral when it forms. The argon generally develops in the mineral by radioactive decay of potassium.²⁸

Young's argument sounds logically thought out, and thus seems convincing, but remember that radiometric dating is purported to be the epitome of all dating techniques. We should expect to see nothing less than absolute certainty that the interpretation of the results is perfectly valid. Young, however, does not provide us this absolute certainty. Instead, we see a number of carefully worded qualifications of the results as well as the possibility that the whole reasoning process has empirical evidence arguing against it.

First, the problem of knowing the physical makeup of the rock when it was formed is downplayed as "not really so serious as it may seem." Then we are told it is possible to make an estimate, which is a euphemistic way of saying we are just taking a guess. Next we are told that argon should not be in the rock since it is an inert gas, yet we have never manufactured rocks to test this hypothesis. Even today, there are many processes in which very unreactive substances can be forced together given the appropriate conditions of heat and pressure. Whether this gas could have been mixed into the rock when the rock was formed cannot be measured empirically, but interestingly, Young does admit that "exceptions have been found." Yet having admitted that exceptions exist, he believes they should not be a concern. Finally we are asked to believe that all the argon (the daughter element) present in the rock as measured today was formed by the radioactive decay of potassium (the parent element). There seems to be a lot of assumptions here for a method that is supposed to provide ironclad proof for the concept of geologic time.

28. D. A. Young, *Christianity and the Age of the Earth*, 98.

In all these radiometric dating techniques, the same fundamental assumption is made. It is assumed that we know the makeup of the rock at time zero. If, in fact, there were no radioactive elements to begin with, but just the daughter element formed *de novo*, then all radioactive dating would be thrown off by the same error. Thus, rather than interpreting the consistency of the radiometric dating techniques as validating the theory of an ancient earth, this same consistency could be used to substantiate the claim that the reasoning behind radiometric dating is fundamentally flawed. This flaw would result in a consistent error. As such, radiometric dating cannot be used as absolute proof, for it only suggests, but does not confirm, that the earth is millions of years old. In other words, despite Young's claim that radiometric dating provides conclusive proof of an old earth, this conclusion is at best circumstantial; no empirical evidence is provided. As Lyell clearly recognized more than one hundred years ago, one has to first change one's premises based on one's religious beliefs before one can see how the scientific evidence could be interpreted to prove an old earth.

Young's arguments against a young earth may be well-articulated but they are not new, and they are encouraged by the same religious beliefs that have always been present since the days of Lyell. These religious beliefs do not affect the description of the physical facts, or physical geology; they are beliefs that affect the explanation of these facts, that is to say, historical geology. And being a Christian, Young's concern is also fuelled by his belief that "creationism and Flood geology have put a serious roadblock in the way of unbelieving scientists," and that "Some people who might otherwise be open to the gospel could be completely turned off by Flood geology."²⁹ So Young interprets the physical evidence of geology as irrefutable proof that the world is old, and argues, out of his own religious convictions, that unless young-earth Creationists accept this overwhelming

29. D. A. Young, *Christianity and the Age of the Earth*, 152.

evidence for an ancient earth, they are hindering others from hearing the Gospel message.

What Young fails to realize is that he himself is using the circumstantial evidence of historical geology in exactly the same way Creationists do. He is very critical of this type of reasoning when it is used to support a young earth, but the religious beliefs and irrational thinking that Young imputes to the Creationists can be equally applied to himself.

Ironically, despite Young's warnings to the young-earth Creationists that their philosophy stands as a stumbling block to unbelievers, these same Creationists are continually being encouraged to maintain their fundamental beliefs. This encouragement comes from the testimonies of many converts who have been greatly influenced by the creation ministries. Young's fear that the Creationist stance impedes the Christian witness may be warranted in some situations, but he has not provided any evidence, anecdotal or otherwise, to show that this is so. Maybe this fear is more 'urban legend' than fact.

7.3 Homeostasis and geology

Besides the facts of physical geology mentioned thus far, there are many other facts that have been used to discredit the young earth theory.³⁰ Some of these facts include continental drift, and changes in the magnetic field of the earth. Whatever the indicator may be, the same line of reasoning is followed. First, using the available technology of today, you obtain the rate associated with the formation of a fact of physical geology. Then, you divide this rate into the magnitude of that fact to determine how long it took for that fact to have been formed. In all cases, these indicators depend on activity rates measured *today*, and

30. For example, see the afore-mentioned books by D.A.Young (footnotes 23, 24) and D. Wonderly (footnote 22)

assume that these rates can be extrapolated into the distance past in order to come up with a particular length of time.

Using the present as a key to the past, and having repeatable measurements of geologic processes, the old-earth geologist believes he has infallible proof of an ancient earth. If the old-earth geologist is a Christian, he may even attribute his failure to convince young-earth Creationists to accept these proofs to their religious commitments which make them reject evolution, a process that requires millions of years. On the other hand, the old-earth geologist has made a fundamental assumption of which even he may not be fully aware.

As a biologist, I study the physiological processes of organisms. I have grown to appreciate changes occurring in the life history of any organism, and to recognize that organisms generally have a tendency to maintain a constant internal environment or "internal milieu" as coined by the famous French physiologist, Claude Bernard. The maintenance of a steady-state or a constant internal environment is known as the process of homeostasis. I have also studied growth rates of individuals and populations, and I have researched the rate of egg production in insects. With all this type of biological information assimilated into my thought processes, I tend to view activity rates recorded at any single time to be indicative of three possible states: First, at the initial stages of a process; second, at a period of equilibrium or homeostasis; third, at the final stages of a process. This reasoning makes intuitive sense to the biologist who studies changing rates over periods of minutes, hours, days, weeks and months.

The geologist, however, does not have this type of training. He is taught instead that the structures present in the world were created by processes working through history at the same rates as they do today. There is no appreciation for the possibility that any of these rates may represent the beginning, the middle or even the end of a particular process that gave rise to the fact of physical geology. Erosion, or sedimentation, or continental drifts seem to

provide evidence for an old earth because the rates at which they operate today are very, very slow. On the other hand, these very slow rates may, in fact, be expected if the mechanisms giving rise to these physical phenomena have reached a point of equilibrium or homeostasis, or are being measured in their final stages. If so, then it is little wonder that the rates are as slow as they are.

When an old-earth geologist believes he has made his case, he must be cognizant of this “religious belief” held by the young-earth geologist, and structure his argument to account for it. For instance, when present-day erosion rates are used to estimate the time it took for the Colorado River to form the Grand Canyon, millions of years are required. But if today’s rates actually represent a state in equilibrium or homeostasis, applying them to the present-day Grand Canyon would be inappropriate. It would be the same mistake as taking the growth rate (in weight) of a 40-year-old man measured over a few days, and dividing this into his present stature to estimate how long it took him to reach that weight. A 40-year-old man can increase in mass, but on average, will probably increase very little (e.g., 0.25 lbs per year). Divide 0.25 into 200 lbs and the resulting value would be an estimate of the time when that man was first conceived — 800 years ago.

Unlike an old-earth geologist who has been trained very differently to a biologist, I would view the rates of processes as variable. There are no exceptions in biology; organisms are conceived, they grow, reproduce and then die. Rates change. It is because an old-earth geologist is limited by the doctrine of uniformitarianism that the sheer vastness of the sedimentary rocks tells of the enormous amount of time needed to make these rocks. And it is because a young-earth geologist is *not* limited by the doctrine of uniformitarianism that the sheer vastness of the sedimentary rocks tells of the enormous catastrophic events that created these rocks. Similarly, oil wells extending down through rock layers miles thick may tell the old-earth geologist that millions of years were needed to form these deposits, whereas this

same data tells the young-earth geologist of the magnitude of the flood. *The same geological data viewed from two different perspectives is able to give support to two diametrically opposed views of the world.*

To make any progress in the debate over the concept of geologic time, both the old-earth and young-earth geologists need to understand the religious beliefs inherent in the hearts of their opponents, as well as those that they themselves unwittingly hold on to. Scientific facts regarding the physical geology of the planet, and the physiological processes of organisms, will continue to be uncovered using sound scientific methods. The debate over the age of the earth has not, and will not, alter the validity of these facts, but it will determine how these facts are explained.

With this thought in mind, it is hoped that this chapter has impressed upon the reader that the concept of geologic time is a means to explain the physical facts of geology, and does not, in itself, constitute irrefutable scientific proof of an ancient earth. Likewise, the ability to explain the appearance of the earth based on catastrophic events is not irrefutable scientific proof for the historical accuracy of the Bible. A certain set of facts may lead an individual to accept one theory over the other, but the acceptance of one theory over another is ultimately dependent upon underlying religious beliefs which foster a predisposition to encourage or discourage a particular view of the world.



Chapter 8

EVOLUTION: *RELIGIOUS DOCTRINE AND SCIENTIFIC THEORY*

The disagreements between Evolutionists and Creationists have gone on for more than a hundred years, and during this time, evolution has won at least four celebrated cases. First, the debate between Thomas Huxley and Samuel Wilberforce at Oxford University in 1860, the year following the publication of Darwin's *Origin of Species*, has been described as a great victory for evolution and an embarrassment for Christian fundamentalism. Second, the Scopes Monkey Trial in Tennessee in 1925 served to establish evolution as a legitimate origins theory to be taught in the science classroom. Third, in 1982, Judge William R. Overton was convinced by the arguments from Evolutionists that Creation Science is not a science, whereas the theory of evolution, being a scientific theory, should be the only origins theory taught in the science classroom. More recently, in 2005, the concept of Intelligent Design was deemed by Judge J.E. Jones to be Creation Science in disguise, and this anti-evolution concept was also banned from the public school classrooms in the area of Dover, Pennsylvania.

All these confrontations are considered great victories, not only for evolution, but also for academic freedom, yet all came

about because evolution was being questioned by a large portion of society. These victories by Evolutionists were not victories that overcame any stronghold belonging to the Creationists; instead, they were defensive postures that were taken to ward off serious attacks on the theory of evolution. Under the attack from scientists of his day, Thomas Huxley was hoping to establish the theory of evolution in a society which believed that the laws of nature attested to the existence of a creator God, and in turn, gave authority to the clergy. John Scopes was challenging a law which made the teaching of evolution a crime. Incidentally, Scopes lost his case, but was acquitted on a technicality. Judge Overton's decision in 1982 forced a government to rescind a law which, had it been implemented, would have given Creation Science equal time with evolution in the classroom. In Dover, Pennsylvania, the judge sided with Evolutionists who disapproved of the school board's decision to include Intelligent Design as an alternative explanation of the origin of life.

Despite these apparent setbacks, creationism continues to triumph, and laws limiting the teaching of evolution still abound in the United States. In the State of Kansas, the Board of Education decided to remove evolution and the Big Bang Theory from the state's science curriculum, which prompted Evolutionist Stephen Jay Gould to lament that curriculum without evolution can "only spiral inward toward restriction and ignorance."¹ Although the outcome of a few celebrated cases has favoured evolution, it is very clear that creationism has had the upper hand among "average" people. Still today, Evolutionists must continue to fight against the steady growth of the acceptance of creationism in order to ensure that the theory of evolution remains the fundamental unifying theory in the sciences. Even after decades of being the only theory of origins considered to be scientifically sound, a 1993 Angus Reid poll showed that 53% of Canadians

1. S.J. Gould, "Dorothy, it's really Oz: A ProCreationist Decision in Kansas is More than a Blow against Darwin," *Time* 154, no.8 (23 August, 1999): 59.

surveyed did not believe the statement, "Human beings as we know them today developed from earlier species of animals."²

In the United States, much of the work in discouraging the growing acceptance of creationism has been carried out by the National Academy of Sciences (NAS), an American organization which describes itself as a "society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare." It received its charter by an Act of Congress in 1863, and its mandate is to advise the federal government on scientific and technical matters. The NAS is a highly influential governing body which incorporates the National Academy of Engineering (NAE), the Institute of Medicine (IOM), and the National Research Council (NRC). Since education is a government matter, the NAS has been called upon to provide guidance with respect to the origins debate.

The NAS equates *evolution with science*, and *creationism with religion*, and has produced a number of policy statements refuting the notion that creationism could be considered a science. In response to the laws requiring equal time for the teaching of Creation Science in public education, they have stated that:

The claim that equity demands balanced treatment of evolutionary theory and special creation in science classrooms reflects a misunderstanding of what science is and how it is conducted. Scientific investigators seek to understand natural phenomena by observation and experimentation.³

2. 1993 Angus Reid poll as cited in "Evolution doubters," *University Affairs* 41, no. 7 (August/September 2000): 9.

3. Steering Committee on Science and Creationism and National Academy of Sciences, *Science and Creationism: A View from the National Academy of Sciences*, 2nd ed. (Washington, D.C.: National Academy Press, 1999), 25.

Arguing that science is a process in which natural phenomena are observed and experimented on, the NAS is adamant that the explanations of these phenomena must also be based in the natural world, and that any scientific interpretations of facts or explanations that account for them must be testable “by observation and experimentation.” Since science deals only with the natural world, and evolution is a theory that considers only natural processes, then evolution is science. The NAS has argued that “Creationism, Intelligent Design, and other claims of supernatural intervention in the origin of life or of species are not science because they are not testable by the methods of science.”⁴

The argument that evolution is science and creationism is religion has been accepted by court judges in the United States. These judges consider Creation Science to be a religion, and did not allow it to be taught in the science classrooms of state-run schools. Yet considering the unproven philosophical assumptions implicit in evolution as described in this book, one wonders if this is a fair comparison of these two competing theories of origins. Furthermore, one may even wonder if the question of origins is a scientific question at all in light of the NAS statement that a scientific theory must be testable “by observation and experimentation.” Today, the question of origins is beyond our technology, so neither evolution nor creationism can be tested in the scientific manner prescribed by the NAS. If the question of origins is a metaphysical question beyond the reach of scientific investigation, then evolution and creationism stand on equal footing when it comes to explaining origins. Then how is it possible for Evolutionists to label Creation Science a religion without encouraging a similar attack on evolution?

To ensure that evolution is never compared to religion, Evolutionists have made special efforts to distance evolution from religion even though, like creationism, it is based on untestable presuppositions. This strategy is very important since the Overton

4. Steering Committee on Science and Creationism and National Academy of Sciences, 25.

ruling, which bans Creation Science because it is a religion, could conceivably have the same effect on evolution if evolution can also be classed as a religion.

As the first step to avoid having their theory compared with religion, or even with Creation Science, Evolutionists point out that Creation Science, or creationism, makes claims about observed data based on “authority, revelation, or religious belief,” and that creation publications “do not offer hypotheses subject to change in light of new data, new interpretations, or demonstration of error.” Then having accused creationism of being based on beliefs that cannot be altered in the light of new scientific information, they contrast creationism, not with evolution, but with “science, where any hypothesis or theory always remains subject to the possibility of rejection or modification in the light of new knowledge.”

By comparing creationism with science rather than with evolution, evolution is spared from evaluation in this dispute. The NAS can then argue that:

No body of beliefs that has its origin in doctrinal material rather than scientific observation, interpretation, and experimentation should be admissible as science in any science course. Incorporating the teaching of such doctrines into a science curriculum compromises the objectives of public education[...]. The growing role that science plays in modern life requires that science, and not religion, be taught in science classes.⁵

This comparison has the appearance of being appropriate and the conclusion justified, but something is inherently wrong with this reasoning. First, as pointed out in this book, the question of

5. Steering Committee on Science and Creationism and National Academy of Sciences, 25.

origins is not scientifically testable. It is your religious beliefs, more than the scientific evidence, that have shaped your opinion on origins. Either you believe that you arose by evolution as natural selection worked on chance events in nature, or that the order and complexity observed in yourself and the world you live in were designed and brought about by the actions of an intelligent designer. Scientific evidence can be used to support either theory – chance versus design – but there is no scientific study which can give us irrefutable proof that one theory is right and the other is wrong. Second, by comparing creationism with science rather than with evolution, you are not actually determining how well creationism explains the scientific evidence compared to its rival theory, evolution.

In their argument against creationism, the NAS first labels creationism religion, then compares this religion to science. No direct comparison is ever made with evolution. If creationism is to be compared to science, to properly balance the argument, the NAS should have compared evolution to science as well. Instead, evolution is left out of the equation, and its validity as a sound scientific theory is never questioned.

By constructing their argument against creationism in this fashion, the NAS has failed to address the main question asked by that many people who doubt evolution: Is evolution really a theory of science, or is it a religious doctrine of Naturalism, the belief that all of reality can be explained by natural causes? The NAS can identify the religious nature of Creation Science, but they assume that religion and evolution are as far apart as the east is from the west. Yet evolution has religious qualities, which are either unrecognised or are simply being ignored by the NAS. Unless they can address the doctrinal nature of the evolutionary explanation of the universe, then their defence of evolutionary theory and their attack on creationism (which has not been all that successful of late), will remain stagnant for years to come.

Even now, the theory of evolution is receiving more and more criticism, not just from fundamental Christians, but also from many different academics *within* the scientific community. It is important that the religiously held prejudices *for* evolution, and *against* creationism do not cause the NAS to ignore what has become obvious to many. The theory of evolution, when applied to the question of origins, can be easily described as the religious doctrine of evolutionism which explains the design we see in nature as an epiphenomenon of “chance.” The probability of creating life from non-life by chance is so infinitesimally small⁶ that it requires a considerable measure of faith to believe that the great complexity of life on this planet resulted from the chance interaction of molecules which coalesced from a “primordial dust cloud” about 4.6 billion years ago.⁷ With respect to origins, evolution is a doctrine of Naturalism, the religious belief in natural causes.

Today, the number of books which question the validity of evolution as a scientific theory is vast. Several authors have challenged evolution on scientific grounds, and have been very successful in getting the established scientific community to take seriously many of their concerns. I have also added, in a small way, to the wealth of this information by describing the scientific merit of evolution in Chapter 4. However, the present chapter goes beyond science to describe an aspect of evolution which is largely overlooked – its religious nature. This chapter first points out many attributes of the theory of evolution which parallel ones found in Christianity, then it describes one system of religious belief which arises from an unshakeable faith in evolution.

Rather than confining our evaluation of the theory of evolution to the realm of science, as the NAS insists we do, I have ventured outside this arbitrary boundary placed on evolutionary

6. F. Hoyle “The big bang in astronomy,” *New Scientist* 92, no. 1280 (19 November 1981): 521.

7. R. E. Dickerson “Chemical evolution and the origin of life,” in *Evolution: A Scientific American Book* (San Francisco, CA: W.H. Freeman, 1978), 30.

theory by Evolutionists themselves. Below, I evaluate the theory of evolution from a religious perspective. In other words, I take evolution into the realm of religion, the place where Evolutionists insist that Creation Science should stay.

8.1 The Religious Nature of Evolution

If you were to search the scientific literature to see if the word “religion” is associated with evolutionary theory, you would come up empty-handed. Religion does not exist in the vocabulary of the naturalistic Evolutionist, whose main concern is to explain the scientific facts in purely materialistic terms. When religion or dogma is mentioned, these words are applied to the Christian Creationist whose “Scientific Creationism” is considered to be a contradiction in terms.

Interestingly, some Evolutionists, such as Michael Ruse, have even argued that creationism should not be taught in the classroom, not for any scientific reasons, but for religious reasons. He believes that people in a pluralistic society have a right to hold any particular religious belief, and “one important way of preserving this right to freedom of religious belief is to insist that no particular belief be taught”.⁸

Ruse accuses the Creationists of having an agenda to bring a particular flavour of Christianity into the classroom, rather than providing an alternate scientific explanation of origins. He also argues that by definition Scientific Creationism excludes itself from the realm of science because Creationists believe that the world started miraculously, and miracles have no place in science. Therefore, creationism has no right to be considered seriously in any educational or academic setting as long as Creationists insist that their theory has scientific merit. Ruse concludes that Scientific Creationism is a religion whose boundaries should not extend

8. Ruse, *Darwinism defended*, 322.

beyond church, and he states in no uncertain terms that it should not, and must not, enter the public school classroom.

These are serious accusations, so it is important to understand how Ruse has constructed his argument. His primary premise is that evolution is science, whereas creationism is religion. Further, creationism is a particular type of religion, i.e., fundamentalist Christianity, which appears to be antithetical to evolutionary science. As a result of his strongly-held religious belief against fundamentalist Christianity, Ruse judges any explanation of origins to be fantasy if it supports a biblical narrative. As Ruse warns, we cannot talk about catastrophes as invoked by Creationists because it immediately brings to mind a major flood, which in turn, leads directly to the story of Noah.⁹ Although the geologic community has become more willing to accept the occurrence of catastrophes in light of the overwhelming evidence that such things have occurred, these explanations are shunned because they support a biblical narrative. Scientific Creationism is not attacked for its scientific merits, for by definition Ruse believes it has none. Instead, it is attacked because it is a religion, the teaching of which must be actively suppressed in the public schools.

Ruse's reason for preventing the teaching of Scientific Creationism hinges entirely on his accusation that it is a religion. Since he believes that science is not religion, and evolution is science, he has not considered the possibility that the theory of evolution may be as religious as creationism. Indeed, many Evolutionists, and even many Creationists, would agree with Ruse, either because they have had no first hand experience with science, or they do not understand the power of Christianity at the personal level. On the other hand, I have had years of experience working in both scientific and religious institutions, and am now employed in an academic institution which encourages me to integrate my personal faith and my field of academia which, in

9. Ruse, *Darwinism defended*, 322.

my case, is biology. With such experiences, it is possible for me to identify aspects of evolution which show religious characteristics that a staunch Evolutionist, lacking any religious experience, may find difficult to recognize.

To evaluate the religious component of evolution, let us first consider what constitutes a religion. According to Webster's Dictionary, religion is any system of faith and worship. To be religious, there ought to be a faith component and a worship component. Ruse claims that Scientific Creationism is based on faith (belief in the Bible) and has a formal system of worship (fundamentalist Christianity); hence it is a religion. How does this compare to the theory of evolution?

First, the theory of evolution has a definite "faith" component. As I have argued throughout this book, the interpretation of any set of scientific facts is subject to religious beliefs, but the theory of evolution, as a science, is incredibly devoid of any empirical proof. When Darwin proposed this theory, he offered as proof only speculation based on circumstantial evidence. Since his time, even his speculations have proved wrong. As in the days of Darwin, evolution needs to be firmly embedded into the thinking of the individual before the scientific facts can be seen to support it.

Despite the lack of empirical evidence, many scientists continue to believe that evolutionary theory is a fact, and that this theory should be referred to as the Law of Evolution. Without the irrefutable scientific evidence to support evolution, it is obvious that the unshakeable belief in evolution is based on faith, the substance of things hoped for, the evidence of things unseen (Hebrews 11:1). After years of denying this faith component, Ruse has admitted that evolutionary theory is based on "unproven philosophical assumptions."¹⁰ He equates the belief that Evolutionists have in evolutionary theory with the belief that

10. T. Woodward, "Ruse gives away the store, admits evolution is a philosophy," *The Real Issue* 13, no. 4 (November-December 1994).

fundamental Christians have in creationism. Thus, Ruse himself clearly recognizes that evolution, like creationism, is religious with respect to faith.

It is possible to place your faith in a philosophy or a cause without the philosophy or cause being a religion as such. A faith component is only one aspect of a religion. Religion also needs to provide the believer with a reason to live, and with an ethic that guides the believer in the way that he lives. For Christians, one reason to live is the hope of eternal life; Christians believe that humans were created specifically to love God, and will continue to exist beyond this earthly form. The way that Christians are to live is given by Christ's command for us to "love God with all your heart and all your mind" (Matt. 22:37), and to "love your neighbour as yourself" (Matt. 22:39). In this respect, Christianity is a religion. Could a faith in evolution be considered to have these same attributes?

If one were to take seriously the words of many naturalistic Evolutionists, evolution has no purpose whatsoever. We are here only by chance. We came from nothing, and we will return to nothing. These sentiments are not particularly comforting. Taking evolution to this extreme (which the true Evolutionist would insist on doing), makes evolution not a religion, but an anti-religion. It is not a religion because it gives its believer no purpose.

On the other hand, we humans, being the contradictions that we are, have been able to take the meaninglessness of evolution and its lack of purpose and transform them into a reason to exist. Evolution, like a religion, does provide a reason for the existence of the believer. As the Evolutionist Derek Hough notes, "You would have to be an extremely dull human being not to have questioned the reason for your existence. The study of evolution is really a scientific approach to solving this mystery of mysteries."¹¹

11. D. Hough, *Evolution: a Case of Stating the Obvious*, (Berkeley, Gloucestershire, U.K.: Berkeley, 1997), 23.

Another Evolutionist, Stephen Jay Gould, gave himself a reason to exist by arguing that all of evolution is a fluke and that he should not exist at all. "We are here because distant cellular ancestors evolved multiple copies of many genes, thereby allowing some to change while others retained needed functions."¹² Gould has turned the logical extension of evolution that there is no purpose in anything that exists, into the very reason he exists! The fact that he exists in spite of the tremendous odds against his existence is enough to give him a purpose in life. So although the theory of evolution is based on pure chance and coincidence, it still provides the believer with a reason for his existence – thereby fulfilling an important criterion for a religion.

Not only does evolution provide a reason for existence, it fulfills another characteristic of a religion by providing an ethic by which we are to exist. George Gaylord Simpson who believes that the "factual truth of evolution" is well established, discusses the meaning of evolution "in terms of the nature of man, his values and ethical standards, and his possible destiny."¹³ As Simpson writes, "Man almost inevitably acquires an ethic and this responds to a deep need in any normal member of the species[...]. It suffices here to recognize the fact that the need does exist and that it is itself a natural product of evolution."¹⁴ In this quote Simpson has distanced evolution from religion by referring to a person's ethics rather than those morals that arise from his religious beliefs. Yet in practice a person's ethics is determined by his need to commit to a personalized religion which Simpson in fact describes as "a deep need." So although the word *religion* is not found in evolutionary vocabulary, this theory functions as a religion by providing a basis for morals disguised in the term "ethics." That an Evolutionist will describe the development of ethics as a natural outcome of evolution is a clear indication that

12. S.J. Gould, "Creating the creators," *Discover* 17 (October 1996): 54.

13. G.G. Simpson, *The meaning of evolution* (New York, NY: Bantam, 1971), 7.

14. Simpson, 268.

evolution fulfills another important criterion for a religion: Evolution provides the believer with an ethic, a way to live.

Considering that evolution provides the believer with a purpose for living and a way to live, the theory of evolution fulfills most of the requirements of a legitimate religion. These criteria—faith, purpose and morality—are apparent in both Christianity and evolution, and both a Christian Creationist and a materialistic Evolutionist can be religious to the same degree. Possibly the only criterion for a religion that evolution does not appear to fulfill is a system of formal worship. As Ruse argues, Scientific Creationism is a particular type of fundamental Christianity, and bringing creationism into the classroom is tantamount to opening the door for religious doctrine of an identifiable faith. Evolution is not associated with any particular system of worship. Thus, it is clearly distinct from religion. This argument would be logically sound, if in fact, creationism could be identified with a particular brand of Christianity. But this is not the case.

Many believers from a variety of Christian denominations would take exception to the accusation that Scientific Creationism is the prerogative of fundamentalist Christian churches. And even some members of fundamental Christian churches would take exception to being labelled scientific Creationists. The Creationist viewpoint is not restricted to fundamentalist Christianity, nor is it found only in Christianity. Other religions such as Islam, Judaism, Jehovah's Witnesses, and Mormons fully support a creation account and reject the theory of evolution even though they deny Christ as being God-on-earth.

To identify the formal worship of Scientific Creationism with a particular brand of Christianity is to provide an unfair comparison between evolution and creationism. Instead, creationism, contrary to what Evolutionists may say, has no identifiable formal place of worship. There are no denominations referred to as The Creationists, and in Christian churches where

creationism is the theory of choice, Scientific Creationism is not the object of worship; the Creator is. To believe that evolution differs from Scientific Creationism because Scientific Creationism is a particular form of Christian fundamentalism is not valid since Scientific Creationism is not restricted to one system of worship.

Another factor which makes it meaningless to equate Scientific Creationism with religion, while equating evolution with science, is the existence of systems of worship which depend on the theory of evolution as foundational to their beliefs. This dependence on evolution is very similar to the way many Christian denominations depend on a literal translation of Genesis to support the Christian doctrine of creation, fall and redemption. Systems of worship based on belief in the theory of evolution have been developed, but they are not readily apparent to Evolutionists, or even Creationists, because our culture is based on Christianity. We tend to view worship as the traditional church service, not realizing that there are also many other forms of worship. Those scientists who believe that science and religion do not mix are particularly ignorant of different forms of worship since they have not allowed themselves to experience worship on the personal level. But once evolution-based religions are recognized, it becomes far easier to realize that evolution is as much a religion as creationism because it too forms the basis for worship.

To identify religious movements or organizations that are rooted in evolution, it is first necessary to realize that a logical extension of evolutionary theory is to believe that we represent minuscule particles in the grand evolutionary experiment, and that as a species, we now await the next quantum leap in this progression. This form of reasoning is not specific to any well-defined religious organization, in much the same way that Scientific Creationism is not found only in fundamentalist Christianity. Instead, it lies at the base of a number of diverse

schools of thought that can be classified under the broad heading of "New Age" religions.

There are many varieties of New Age religions, but the common thread between them is the belief that humankind itself will eventually usher in a New Age of enlightenment, or reach the next step on the evolutionary ladder. Believers in New Age religions are staunch supporters of evolution. They believe in the steady progression from the initial life forms in the primordial ocean, to the physical forms we now occupy, to heavenly beings into which we will eventually evolve. At the end of this process, we will become gods ourselves.

New Age religions are diverse and change frequently in their specifics, so I will describe one case which provides a general appreciation for the manner in which evolution serves as the foundation of a system of worship. This form of New Age religion is nicely presented in the popular, best-selling novel, *The Celestine Prophecy*.¹⁵ Although the following description is specific to this particular novel, the novel summarizes much of what New Age theology is all about.

8.2 Evolution worshipped: *The Celestine Prophecy*

The Celestine Prophecy describes the experiences of an individual who becomes acquainted with the contents of an ancient manuscript. This manuscript, found amongst the Mayan ruins in Peru, is believed to contain nine insights into the development of mankind. The novel traces the actions and feelings of an American as he searches for the various parts of this manuscript in the cities and rainforest of Peru. In some cases, the insights are related to him verbally by people he meets, and in other cases, he is able to read illicit copies of portions of the manuscript that have been banned by the Peruvian Church and government. Each of these insights is one step along the pathway

15. J. Redfield, *The Celestine Prophecy* (New York, NY: Warner Books, 1994).

leading to a new dimension for mankind. As the protagonist becomes aware of these insights, he undergoes a gradual inner transformation until he almost becomes transformed from a physical natural being into a celestial being of pure "spiritual consciousness." In many respects, several well-known Evolutionists have taken a similar journey, and have gone from believing simply in natural processes to accepting a supernatural reality based on their faith in evolution.

One of the more interesting reactions that readers have toward this novel is to believe that it is historically accurate. Many readers have actually identified so closely with the hero that the author, James Redfield, has written a second book to guide people through this "spiritual renaissance." In this second book,¹⁶ people are encouraged to continue to grow and develop in the "faith" in much the same way that Christians engage in Bible study and prayer. An important difference is that the Bible claims to be true, whereas a cursory examination of *The Celestine Prophecy* clearly reveals this book to be a novel, a fictitious adventure, and nowhere does the author attest to any of it remotely approaching truth. The characters do not exist, there is no ancient manuscript, and the Church is not involved in espionage to destroy all copies of it, nor is the Peruvian government attempting to keep anything undercover. Yet the religious component of *The Celestine Prophecy* is so captivating that many people believe that the nine insights described in this book can be used to explain what is happening in their lives today, as well as what will happen to them in the future. Many intelligent and rational minded people believe this book provides new insight into a reality that exists beyond the physical world.

I believe that the popularity of *The Celestine Prophecy* among both religious and nonreligious people, and the acceptance of its main thesis, result from its ability to awaken within us our latent spiritual nature. This spiritual nature has been denied by science,

16. J. Redfield, *Study Guide to the Celestine Prophecy*, (New York, NY: Bantam, 1994).

but it is a very important component in the everyday life of any individual. Although it cannot be measured technologically, its presence is as real as the air we breathe.

Christianity recognizes human spirituality, and the Apostle Paul describes this spiritual nature as different from the matter of our natural world. In 1 Corinthians 15:35-53, he carefully explains the difference between what is natural and what is spiritual, and he points out that the natural body will give rise to a spiritual body (not a ghost, but a real tangible body) and that this body will be ours for eternity. *The Celestine Prophecy* provides another explanation for the existence of man, and gives as its proof situations and feelings that a spiritually sensitive person can truly appreciate. Individuals seeking spiritual fulfillment do experience these scientifically-denied feelings. But rather than deny these feelings, *The Celestine Prophecy* provides a rational explanation for them based on the scientifically acceptable theory of evolution. *The Celestine Prophecy* gains acceptability, even though it is completely fictitious, because it addresses matters of the heart, and matters of the heart affect the way our minds work.

In *The Celestine Prophecy*, the transformation from an earthly or physical state to a spiritual, all-loving, energized state is described as the natural evolutionary progression of mankind. The nine insights in the ancient manuscript refer to development of the intellect until the entire person becomes so energized that he enters into the next dimension. According to the Biblical narrative, Adam and Eve became mortal because they chose to sin by disobeying God's command. This mortality has been passed on to all their descendants, but God, through the death of Jesus Christ, has provided a way for us to overcome the effects of sin. In New Age theology, transforming from the mortal body into a spiritual body is an inevitable outcome of evolution, which renders it no longer necessary for Jesus Christ to redeem the repenting sinner from sin.

The Apostle Paul acknowledged that a transformation from the natural to the spiritual is a real possibility. He claimed that some people will not die, but will be transformed in the twinkling of an eye (1 Cor. 15:51-52). In *The Celestine Prophecy*, this process is referred to as crossing over. Crossing over occurs because of the inherent evolutionary nature of the physical world, not because Jesus Christ made this possible through his death and resurrection. Jesus Christ is mentioned once or twice in the book, but the phenomenon of Christianity is given an evolutionary perspective. Jesus is described as the first man in our known history to put the principles outlined in *The Celestine Prophecy* into effect, which allowed him to be tuned into the energy within all matter.

He opened up to the energy until he was so light he could walk on water. He transcended death right here on Earth, and was the first cross over to expand the physical world into the spiritual. His life demonstrated how to do this, and if we connect with the same source we can head the same way[...] everyone will vibrate highly enough so that we can walk into heaven.¹⁷

According to *The Celestine Prophecy*, Jesus was able to develop this energy from within, and in doing so, he showed the rest of mankind how to evolve into the next stage of human evolution.

Many Christians believe that we humans are both physical and spiritual, and need to feed both our physical and spiritual bodies.¹⁸ However the North American scientific culture, which has rid us of our superstitions, has also removed from us the belief in the supernatural or spiritual. Mankind can feed itself

17. Redfield, *Celestine Prophecy*, 241.

18. N. Gumbel, *The Alpha Course Manual: A Practical Introduction to the Christian Faith* (Colorado Springs, CO: David C. Cook, 1995). This manual accompanies the Alpha Course, a video series developed by Holy Trinity Brompton Church in London, England.

physically, and to some extent spiritually through psychology or therapy, but the spiritual nature of man to which he is destined according to the Apostle Paul, has been reasoned away. Yet the need to be filled spiritually still exists. For this reason, many people have turned to the occult, such as Ouija boards and horoscopes, and others have turned to worshipping Nature (e.g. Mother Earth), all of which are related to New Age theology based on the theory of evolution.

The storyline of *The Celestine Prophecy* attempts to portray emotional religious experiences as the natural progression of the human species that leads humankind into a new stage in its evolutionary development. It is based on faith in evolution in much the same way as redemption through Jesus Christ is based on the belief in the historicity of Genesis. In *The Celestine Prophecy*, once all nine insights are obtained, the person can "vibrate" himself into a new existence, one of pure consciousness. *The Celestine Prophecy* equates pure consciousness to the rapture, a concept associated with the second coming of Christ when believers will be transported from this earth in the twinkling of an eye. It suggests that the Mayan civilization experienced this. The Mayans (who apparently produced this manuscript) disappeared because they collectively reached the ninth insight at the same time.

Whole groups of people, once they reach a certain level, will suddenly become invisible to those who are still vibrating at a lower level. It will appear to the people on this lower level that the others just disappeared.¹⁹

Since many of the circumstances that are explained by some of the nine insights can also be recognized in the everyday life of someone truly seeking spiritual growth, the storyline in this novel

19. Redfield, *Celestine Prophecy*, 241.

becomes believable, even for Christians. Such Christians, of course, would also have to believe that God used evolution to create.

8.2.1 The Nine Insights

Each of the Nine Insights is a step along the path leading humans from their physical animal nature to a supernatural godlike state. The author points out that these insights are not entirely new, since many were taken from ancient religious practices. *The Celestine Prophecy* is probably the first book to weave these ideas together in such a way that one idea or insight builds upon the other. Practically all the insights are dependent on a belief in evolution in much the same way as the biblical narrative is based on the creation story.

The First Insight "is the awareness of the mysterious occurrences that change one's life, the feeling that some other process is operating."²⁰ This is the initial step that encourages the reader to believe that some of the coincidences in life may have been planned by something or someone greater than ourselves. Most of us can point to times in our own lives when we felt we were meant to be somewhere, or were meant to speak to someone, or were meant to do something—events that appeared to be planned for a higher purpose. The older you are, the more you can recall these circumstances in your life, such as the first time you met your spouse, or when you landed a particular job, or when you happened to be in the right place at the right time to avoid a serious mishap. To believe that coincidences are planned is an important first step because it initiates your journey into faith. As one character of the book noted, "It doesn't quite fit with our modern day common sense, does it?" Although this insight runs counter to our understanding of the theory of evolution by suggesting that life has a purpose, it prepares the pilgrim to

20. Redfield, *Celestine Prophecy*, 19.

consider the existence of a greater power guiding the process of evolution.

"The Second Insight[...] puts our current awareness into a longer historical perspective."²¹ To really understand where we are today, the second insight advises the reader to go "back to the year 1000, and then move forward through the entire millennium experientially, as though you actually lived the whole period yourself in a single lifetime."²² The author then takes us on a journey from an understanding of reality based on church authority where the definitions of the universe were "based on speculation or scriptural faith" to a new understanding of reality based on the scientific method "which is nothing more than testing an idea about how the universe works, arriving afterward at some conclusions, and then offering the conclusions to others to see if they agree."²³ It "extends our consciousness of historical time[...]. It shows us how to observe culture not just from the perspective of our own lifetimes but from the perspective of a whole millennium."²⁴

The Second Insight encourages us to think beyond our own lifetimes and to connect with people of the past. Yet the author provides a very one-sided view of what happened in the past. He identifies the Church as anti-science and correlates the rise of modern scientific thought with the rejection of church authority, an authority based on "speculation or spiritual faith." The second insight is an effective way to encourage the nominal Creationist to give up his belief in the authority of Scripture, and to replace it with true science, which, in the following insights, turns out to support, and to be supported by, the theory of evolution.

"The Third Insight[...] describes a new understanding of the physical world. It says we humans will learn to perceive what was

21. Redfield, *Celestine Prophecy*, 21.

22. Redfield, *Celestine Prophecy*, 22.

23. Redfield, *Celestine Prophecy*, 25.

24. Redfield, *Celestine Prophecy*, 27.

formerly an invisible type of energy."²⁵ The author encourages us to try a little experiment which makes you sit up and take notice. He describes the hero learning to visualize this energy. He has him face a sunrise, place the tips of his two index fingers together and, while moving them in and out, look very closely at the space between them. To the hero's surprise, he detects this energy flowing between his finger tips. So why not try it yourself? Given enough time to allow your eyes to adjust to different planes of focus, you too can detect a distortion in the visual field between your finger tips. This phenomenon may be an optical illusion, but if your mind is conditioned to explain this illusion as an energy field, you will start to wonder if this insight is really genuine. With an optical illusion, a magician's trick, the author can get his reader to believe in the Third Insight – the presence of an energy force invisible to the novice.

The "Fourth Insight[...] is a matter of seeing the human world as a vast competition for energy and thus for power[...] [and] once humans understand their struggle[...] we would immediately begin to transcend this conflict. We would begin to break free from the competition over mere human energy because we would be able to receive our energy from another source."²⁶ Note the author's reliance on competition. Competition in the form of natural selection, or the survival of the fittest, is the backbone of evolution. Although this insight has us break free of competition, evolution remains the basis for this New Age theology because, after all, evolution got us to where we now are. The next step in this evolutionary progression is to go beyond our innate need to compete, and to obtain energy from another source. That other source is seen in the Fifth Insight.

The "Fourth Insight exposes the human tendency to steal energy from other humans by controlling them, taking over their minds[...]. This shortage of energy can be remedied, of course,

25. Redfield, *Celestine Prophecy*, 40.

26. Redfield, *Celestine Prophecy*, 89-90.

when we connect with the higher source. The universe can provide all we need if we can only open up to it. That is the revelation of the Fifth Insight.¹²⁷ Herein lies the source of energy – the molecules themselves that make up the universe.

By the Fifth Insight the pilgrim has been encouraged to accept the existence of a greater force (first insight), to consider his life in connection with generations of ancestors (second insight), to accept the idea that what is now invisible can be made visible (third insight), to pull away from the need to struggle (fourth insight), and to know that energy needed to evolve does not have to come from other people, but from the physical world itself (fifth insight). Up until the fifth insight, evolution has not been emphasized although it remains the foundation of this New Age theology. The next steps are clearly based on evolution, leaving no room to doubt that the theory of evolution is being used to support this system of religion.

The Sixth Insight states, "Clearing the past was a precise process of becoming aware of our individual ways of controlling learned in childhood. And once we could transcend this habit[...] we would find our higher selves, our *evolutionary* identities."²⁸ (emphasis added) It is now unmistakable that a full acceptance of evolution is needed for belief in this religion.

The Seventh Insight continues to support evolution. This insight "deals with the process of consciously *evolving* yourself, of staying alert to every coincidence, every answer the universe provides for you[...]. [I]t talks about the way objects jump out at us, the way certain thoughts come as guidance."²⁹ (emphasis added) Once you have obtained the Seventh Insight, you will be released from your "need to control everything" and will be placed "in the flow of *evolution*."³⁰ (emphasis added) As one character noted, "To grasp the Seventh Insight and truly enter the

27. Redfield, *Celestine Prophecy*, 119-120.

28. Redfield, *Celestine Prophecy*, 148.

29. Redfield, *Celestine Prophecy*, 156.

30. Redfield, *Celestine Prophecy*, 169.

movement of *evolution*[...], one must pull all the insights into one way of being."³¹(emphasis added)

The Eighth Insight "explains how we can aid others as they bring us the answers we seek. And further, it describes a whole new ethic governing the way humans should treat each other in order to facilitate everyone's *evolution*."³² (emphasis added) Not only does this insight reinforce the belief in evolution, but it takes us one step further by having us consider that we are at the end of a particular stage in our evolutionary history and at the beginning of the next stage. This insight also describes children "as end points in evolution that lead us forward[...]."³³

Finally, The Ninth Insight gets us to our final destination. In Christian terms, this insight would get us to "heaven." In the terms of New Age religion "The Ninth Insight[...] says that as we humans continue to increase our vibration, an amazing thing will begin to happen. Whole groups of people, once they reach a certain level, will suddenly become invisible to those who are still vibrating at a lower level[...]. When humans begin to raise their vibrations to a level where others cannot see them[...], it will signal that we are crossing the barrier between this life and the other world from which we came and to which we go after death."³⁴

What a glorious destiny, but a destiny that is only believable if one believes in evolution first. If belief in evolution were removed, this religion would crumble. Evolution is the foundation upon which the faith component in this New Age religion is based.

31. Redfield *Celestine Prophecy*, 174.

32. Redfield, *Celestine Prophecy*, 156.

33. Redfield, *Celestine Prophecy*, 184.

34. Redfield, *Celestine Prophecy*, 241.

8.3 Evolution, a religious doctrine

What I have attempted to do in this chapter is to encourage the reader to consider that the theory of evolution does serve a religious purpose as one of the major doctrines of Naturalism. It makes the belief in Naturalism possible, for it explains origins without the need for a supernatural force. It also forms the foundation upon which modern New Age theology is built. On the other hand, one could still question how evolution could be associated with a religion when its explanations are based only on natural causes. Would not the reliance on natural causes, rather than supernatural causes, remove any religious connotations from the theory of evolution? This question raises a legitimate concern. If evolution does away with God, and if religion requires a god to worship, then how could evolution be considered religious? I believe this question can be answered in the following way.

When I claim that natural causes created this world, I am obviously attributing to natural causes the ability to create. In other words, the created world had the ability to create itself. By describing our origins in this fashion, I have replaced a belief in a divine Creator, who fashioned this world out of nothing, with the belief that the material of this world organized itself into existence. A staunch belief in natural causes replaces the belief in a divine Creator, and since evolution is assigned the task of creating, then evolution is being elevated to the level of God. Attributing creative abilities to the properties of nature is the same as attributing creative powers to the objects that were created. In like manner, giving evolution the ability to create complex life forms is the same as making into a god "any graven image, or any likeness of any thing that is in heaven above, or that is in the earth beneath, or that is in the water under the earth"³⁵

By replacing the concept of a divine Creator with a belief that this world came about by the properties inherent in matter,

35. Exodus 4:4 (KJV).

evolution, the natural process, becomes equivalent to God. Like the golden calf made to be an object of worship, evolution has become a graven image made in the likeness of a material thing. And believing that evolution can give rise to new species of organisms, a process yet to be verified by any scientific study, requires as much faith as believing in any God-based religion. The important point here is not the *object* of the belief (Naturalism or a divine creator), but the *act* of believing. To believe in anything, regardless of how natural that thing might be, is an act of faith. Once you understand that the act of believing, not the object of the belief, is the benchmark of a religion, it is evident that believing strongly in naturalistic evolution does not purge evolution of any religious qualities. A firm belief in natural causes does not mean you lack faith; it means rather that you have faith. And if you believe strongly enough in the natural process of evolution, you can use this faith as the foundation of a *bone fide* religion, such as the New Age theology described in *The Celestine Prophecy*.

Those Evolutionists who point out the nonscientific, religious character of creationism are careful not to compare the theory of evolution with science, or with religion. Evolution may be a scientific theory, but if it were judged by the same criteria that has been applied to Creationism, it will fail to satisfy characteristics of good science. It has yet to be observed. It cannot be falsified. It does not serve as a good predictive tool. As our knowledge of the natural world has increased, this knowledge has necessitated more and more modifications to the theory of evolution. And when compared to a religion, the theory of evolution is as foundational to New Age theology as creationism is to Christianity. If the doctrine of evolution were removed from Naturalism that religion would crumble; if a belief in the Creator were removed from certain forms of Christianity, those forms of Christianity would also crumble. Moreover, when the belief in a divine creator is removed from science, science functions just fine,

as witnessed by the many discoveries made by atheistic or agnostic scientists. Interestingly enough, when the theory of evolution is removed from science, science does not collapse – despite the doomsday prediction of many Evolutionists. Given these similarities between creationism and evolution, it is easy to see that the theory of evolution is as much a religion as Creation Science.

The best place to witness the religious nature of evolution is in the words of Evolutionists themselves. For example, when lamenting the fact that a hundred years after the publication of *The Origin of Species* many people still questioned evolution, Harlow Shapley writes:

Would that the mind were more powerful, more penetrating, more free of delusions, free of silly hopes and prejudices.³⁶

In this wish, he is not actually asking that the mind be set free; instead, he is asking that it become confined within the boundaries of Naturalism. His statement may be asking that the mind be set free of prejudices, but he is also asking that it take on the prejudice whereby it can accept only naturalistic explanations for the origin of life and the universe.

Shapley has replaced faith in one religion by faith in another, without realizing that real science can be done without having to give up one's commitment to any religion. Demonstrating how strongly he holds onto his faith in evolution, he writes:

I ask only to insert my conviction that the origin of life is an inevitable step in the gas and liquid evolution on a star-fed planet's surface when the

36. H. Shapley, "On the evidences of inorganic evolution" in *The Evolution of Life*, vol.1 of *Evolution after Darwin: the University of Chicago Centennial*, ed., S. Tax (Chicago: University of Chicago Press, 1960), 27.

chemical, physical, and climatic conditions are right[...].³⁷

For many Evolutionists like Shapley, evolution *is* a religious doctrine, or to use his words, a “conviction.” Despite the wealth of scientific evidence that refutes evolution, he believes it to be inevitable given the makeup of the physical matter that appeared by chance on this planet millions to billions of years ago.

Evolution and creationism have far more in common than evolution and science. However, I would not be inclined to remove evolution from the science classroom because it may be a religious doctrine of Naturalism. Instead, I believe it should be taught as a legitimate scientific theory (which it is), and not an established scientific fact (which it is not). Then again, this is what the Evolutionist, Stephen Jay Gould, has said *must not* happen. If taught, evolution must be taught as a fact. Maybe Gould knew from experience that evolution must be *taught* as a fact before students will believe that it is one. After all, given the inability of Evolutionists to convince the majority of people today that evolution is scientifically sound, it may be unwise to think that students, without prompting, would be able to see evolution as a scientific fact from the facts alone.



37. Shapley, 29.

Chapter 9

CHRISTIAN VIEWS ON ORIGINS

Thus far, I have concentrated on exposing the religiously held beliefs underlying a naturalistic approach to science, an approach that has become an absolute truth and does not allow for the existence of the supernatural. Since the previous chapters have shown the weakness of this approach, it may leave the impression that the Christian approach is relatively free of prejudice. This is unfortunately not the case. Although Christians are free to take biblical knowledge seriously when constructing scientific theories, like all humans they are influenced by their personal religious beliefs. Any approach to science, including a Christian one, is influenced by these beliefs. We need to recognize what they are and to counter any prejudice that may arise from them.

It is obvious that religious beliefs can influence all areas of our life, but because our concept of origins involves an *interpretation* of scientific knowledge, how these beliefs influence science is best exemplified in the origins debate. It is for this reason that the previous chapters have concentrated on describing the religious beliefs needed to accept evolution as the only valid

explanation of origins. Interestingly, the origins debate, which is a major concern between Christians and non-Christians, is also an area of disagreement among Christians. Taking advantage of this disagreement, the following chapter describes the different theories of origins that Christians have developed, and in doing so, helps to expose the differing religious beliefs that influence the manner in which Christians approach Science and Christianity.

9.1 Origin theories of Christians

Differences in religious beliefs underlying theories of origins tend to polarize Christians towards one of two opposing views – old-earth evolution or young-earth creationism. In these two alternate views, an intellectual barrier exists between Science and Christianity. Old-earth Evolutionists reject the biblical concept of a six-day creation; young-earth Creationists accept only those scientific theories that support the biblical concept of a six-day creation. However, there are Christians who have taken both scientific knowledge and biblical revelation seriously, and this compromise has given rise to some interesting ideas. From my experience, the theories of origins to which Christians tend to adhere can be grouped into four major categories:

- 1) **Theistic Evolution**, which upholds both the theory of evolution and the concept of an ancient earth.
- 2) **The Day/Age Theory**, which believes that God created the world in steps, and that the days of Genesis describe different epochs of time during which this creation occurred. This theory denies macroevolution, but incorporates the concept of an ancient earth and the creation of living forms over millions of years.
- 3) **The Gap Theory**, which describes the six days of Genesis as a re-creation taking place 6,000 to 10,000 years ago, but which

allows for an indeterminate period of time (a gap) between Genesis 1:1 and 1:2.

- 4) **Young-earth Creationism**, which believes in a creation period of six 24-hour days that occurred about 6,000 years ago. This theory rejects both the theory of evolution and all the dating methods that show the earth to be ancient.

Many of my first-year biology students have been raised through a Christian school system and have never taken evolution or the origins debate seriously. In a university or college, they are now confronted with the theories of origins, and are faced with re-framing their previous understanding. Unfortunately, many of these students are not aware of the full range of options. For such students, I have developed a handout to help them decide which theory fits best into their own current worldview (refer to Appendix 1 at the end of this chapter). In this handout, the four theories of origins mentioned above are grouped into two main categories. One category supports evolution in one form or another, while the other category supports creationism. The categories are further divided into groups based on how much divine intervention was needed in the creation of the physical world.

When presented with this information, the vast majority (85 to 95 percent) of my first year students consider themselves Creationists (categories 4 and 5 in Appendix 1). Very few of them choose any form of God-directed evolution (categories 2 and 3 in Appendix 1). Of those who accept creationism, 60 to 70 percent reject the concept of an old earth, and accept Young-earth Creationism (category 5).

The above data was collected over a five-year period from 1996 to 2001, and is based on a population of students who have chosen to attend a Christian university. Despite polling a select group of Christians, this result still reflects the general trend in North America to reject evolution. For instance, a 2001 Gallup Poll

(Survey #GO 133064) found that 10% of Americans had no opinion on origins, and 33% believed in, or leaned towards the theory of evolution, whereas 57% believed in, or leaned towards the theory of creationism. In other words, among the 90% of those surveyed who did have an opinion on origins, over 60% rejected evolution.

Whichever theory of origins best fits your beliefs, you have to understand that your own religious beliefs have influenced your decision. To help understand what those religious beliefs may be, I ask you to consider how the experiences and/or beliefs of the Christians described below may have influenced them to adhere to a specific theory of origins.

9.1.1 Theistic Evolution: Sir John Polkinghorne

To accept Theistic Evolution, a Christian needs to believe that either the scientific evidence supporting evolution is strong, or the Genesis account of creation can be reinterpreted as an allegory or metaphor without diminishing the importance of the Bible. If you accept Theistic Evolution, you find yourself in the company of members of the American Scientific Affiliation,¹ as well as many academics of the Christian colleges in North America.

1. The American Scientific Affiliation was founded in 1941 by a group of Christian scientists to investigate any area relating Christian faith and science, and to report the results of such investigations for comment and criticism by the Christian community and by the scientific community. In 1946 the ASA held its first Annual Convention at Wheaton College. ASA publications include *Perspectives on Science and Christian Faith*, the *ASA News* (a bimonthly newsletter), and several pamphlets and monographs including *Modern Science and Christian Faith: Eleven Essays on the Relationship of the Bible to Modern Science* (Wheaton, IL: Van Kampen Press, 1948), and *Evolution and Christian Thought Today* (Grand Rapids, MI: Eerdmans, 1959). In 1986, F. Alton Everest, one of the founding members of the ASA, wrote a history of the organization entitled: *The American Scientific Affiliation: Its Growth and Early Development*. The ASA's sympathy for evolution is evidenced by the writings of Keith Miller, a member of the 1997 ASA appointed subcommittee to the Commission on Creation. He wrote, "Since God acts through process, evolution and the theology of creation are perfectly compatible. In fact, I see them as mutually reinforcing." (K.B. Miller, "The American Scientific Affiliation and the Evangelical Response to Evolution," *Reports of the National Center for Science Education* 21, no. 1-2 (January-April 2001): 22, 27-29).

The impetus to support Theistic Evolution arises from the need to feel academically acceptable, and hence, to avoid being called anti-intellectual. This point is made clear in chapter 3, which describes how the established scientific community has attacked Creation Science. Even in the past, supporting Theistic Evolution has had practical applications. Prior to the recent onset of postmodernism, in which academics are encouraged to see the value in all beliefs, rejecting the theory of evolution could have cost you your professional career,² and could have prevented you from obtaining a doctoral degree.³ To some extent, this ethos still remains, and Christians confident in their faith, but not wanting to appear anti-intellectual to the academic community, are apt to confess that God used evolution to create. Note the following example.

Sir John Polkinghorne describes himself as a “bottom-up man,” that is, a man who uses tangible evidence as the foundation upon which to base his belief in God. Polkinghorne is a world-renowned mathematical physicist, but at the height of a prestigious academic career in Cambridge, he changed careers to become an Anglican priest. In the subsequent years as a clergyman, he made major contributions to the study of the relationship between religion and science, looking at science from a Christian perspective. For his distinguished service to science,

2. Gordon Winder (see page 29, footnote 9), a professor emeritus in Geology at the University of Western Ontario, was not a Christian until he was persuaded that the Bible actually supports the concept of speciation. He has made a considerable effort to bring Science and Christianity together by convincing the Christian community that the Bible supports evolution. In a 1992 presentation to the students at Redeemer University College, he admitted that during his early years as a professor, denying the theory of evolution and the concept of an old earth would have seriously harmed the career of anyone associated with the Geology Department of his university.

3. Arthur Custance pursued doctoral studies in anthropology at the University of Toronto. His studies progressed well, but during his comprehensive oral exam leading to a dissertation, he was asked if he believed that Adam and Eve were real historic persons. He answered in the affirmative, and because of this answer, he failed his comprehensive exam. Later, this work was accepted by the University of Ottawa, and he was given a Ph.D. in Education.

religion, learning and medical ethics, he was knighted by Queen Elizabeth II in 1997. He received the Templeton Prize for Progress in Religion in 2002 – a prize worth more than a million US dollars.

Polkinghorne is a trained scientist who has dedicated much of his life to the Church. He considers evolution a valid scientific theory since reputable scientists overwhelmingly endorse it. (Note: He does not address the biological evidence for macroevolution; instead, he places his confidence in the opinions of others.)

Obviously, Polkinghorne's beliefs about creation are in direct opposition to the beliefs of any young-earth Creationist. Yet Polkinghorne is not an atheistic Evolutionist, for he differs on one very significant point from such people as Stephen Jay Gould⁴ and Carl Sagan.⁵ Polkinghorne may believe that the universe is more than 10 billion years old, and that the first signs of life evolved four to five billion years ago, but unlike atheistic Evolutionists, he believes that immediately after the Big Bang, "the universe was already pregnant with the possibility of life."⁶ Contrary to atheistic Evolutionists, he does not believe that the universe was

4. Gould was a vocal and often controversial paleontologist who, along with Niles Eldredge, developed an evolutionary theory called "punctuated equilibrium." Gould was the Alexander Agassiz Professor of Zoology, and spent his professional career at Harvard. He wrote on many topics but was especially well known for his overwhelming endorsement of evolution. He appeared on the cover of Newsweek in 1982, and colleagues dubbed him "the bulldog of evolutionary biology" for his outspoken advocacy of his views. He died on May 20, 2002 at the age of 60, of lung cancer .

5. At the time of his death, Carl Sagan (1934-1996) was The David Duncan Professor of Astronomy and Space Sciences and director of the Laboratory for Planetary Studies at Cornell University, where he had held a professorship since 1971. Sagan was an astronomer and a committed atheist who strongly believed in the likelihood of life on other planets. He was involved with many unmanned space missions such as those of the *Mariner 9* orbiter, the *Viking* orbiters and landers, the *Pioneer* and *Voyager* probes, and the *Galileo* craft to Jupiter. In addition to his scientific work, he produced a series of publicly acclaimed books, magazine articles and television programs which promoted the evolutionary origin of the universe and life. Along with Bruce Murray and Louis Friedman, he created The Planetary Society, an organization to further space exploration and the search for extraterrestrial intelligence (SETI). Sagan died of pancreatic cancer.

6. J. Polkinghorne, "Bottom-up Thinking in Science and Religion, *Research in Science and Theology* 2, no. 8 (April 2002): 20.

created by chance, nor that chance events in nature gave rise to the world as we see it today. Instead, he believes that a greater power created the Big Bang with the specific purpose of creating humans and a world in which these humans could interact. He accepts the validity of what he thinks is the scientific evidence from biology and paleontology that supports evolution; but he believes that our evolution was not the product of chance.

Since Polkinghorne considers himself a bottom-up man who bases his faith on tangible evidence, what is the evidence that makes him consider the world to be designed? It is the fact that the physical characteristics of the universe and the world are in the one precise state that can support life. Any small deviation from this very precise condition renders the universe meaningless. As he states:

Is fine tuning a sign that our universe is just the lucky one in a vast multi-verse, containing uncountable numbers of other worlds with other laws and forces? Some say yes, but I prefer the more economic interpretation that this universe of our actual experience is the way it is because it is not just 'any old world,' for it is a creation that has been endowed by its Creator with just those laws and circumstances that have allowed it to have so fruitful a history.⁷

Thus, Polkinghorne interprets the finely tuned characteristics of the physical laws of nature as evidence that a higher being was responsible for creating the universe. He also believes that this higher being's universe was able to give rise to human beings.

Polkinghorne may accept the theory of evolution and a concept of an ancient earth, but he still considers God to be ultimately responsible for our creation. He sees in nature the hand

7. Polkinghorne, 20.

of God guiding the evolutionary process, leading from the simplest life forms created billions of years ago to the humans we are today. Although God may have infused into matter originating from the Big Bang the inherent property to evolve into a finely tuned, complex universe, Polkinghorne considers us to be more than the sum total of the chemical and physical properties of matter. We are physical beings with eternal souls; we are made in the image of God.

The evidence on which Polkinghorne bases his faith does not stop at the order of the natural world. He sees Jesus Christ as the God who, for a brief time in history, entered into the world to walk among His creatures. For Polkinghorne, Jesus is a singularity that makes Christianity stand alone among the world's religions. Polkinghorne reminds us that, unlike other world religious leaders, Jesus died young, deserted by his followers; and He was left to hang on a cross in the worst desecration which has ever been imagined. Yet despite His incredibly horrid death, Jesus came back to life, to invigorate his followers and provide hope for the future.

Polkinghorne is so convinced of the reality of Christ that he rules out the possibility that all religions provide paths to the one true God. He does not deny the spiritual or religious experiences that arise from the traditions of other religions, and he admits that the disagreement between his fellow human beings (all of whom have a common belief in the supernatural) gives him considerable pain. But for him, the basic tenets of the major religions are clearly at odds with the tenets of Christianity. By placing Christianity apart from other world religions, Polkinghorne stands in opposition to the politically correct tendency to consider that God expresses himself in many different forms. The evidence that Jesus rose from the dead convinces Polkinghorne to base his theology on the one person in history who was, in fact, God.

Polkinghorne's strong belief in the Gospels, which present Jesus as God on earth, does not extend to his view of Genesis. He

is not a young-earth Creationist who interprets Genesis 1 to mean six literal 24-hour days. Instead, Polkinghorne believes that God infused a property or law into the universe that directed it towards the evolution of humankind. His belief is a form of theistic evolution in which God has placed limits on His ability to have a direct effect on His own creation. This divine self-limitation is referred to as *kenosis*.⁸

In the concept of *kenosis*, the all-powerful God is not considered to be limited, but has allowed creatures to be themselves and to *make* themselves. A natural outcome of this ability to make themselves is the “cost of creation,” the production of organisms that are harmful to other organisms. Mutation, the mechanism which gives rise to variation in genes upon which natural selection acts, will also give rise to diseases (such as cancer). This concept explains the suffering in this world as a logical outcome of an all-powerful God allowing organisms to evolve on their own. In this way, *kenosis* is supposed to provide a theological understanding of a world created by the process of evolution. Struggles and mutations are thought to be essential for initiating the evolution of the first single-celled organism, and then for guiding the descendants of this organism through evolution to all living things that exist in the world today. In this concept of origins, humans are part of a continuous chain of ever-changing organisms over billions of years.

Polkinghorne’s belief in Theistic Evolution allows him to maintain his personal commitment to a living God, while at the same time accepting popular scientific theories that appear to contradict the Bible. His reasoning appears rational to many academics, and he has been very successful in careers that extend from Science to Christianity. For him, it is not important that science supports a literal interpretation of Genesis, since he does not think that origins are important. For Polkinghorne, the most important act is to accept God into one’s present life. Unless you

8. Polkinghorne, 20.

can experience God in the present, it is meaningless to worry about the manner in which God may have made space, time and matter out of nothing.

However, when asked specifically what caused him to accept Jesus as real, Polkinghorne was somewhat evasive.⁹ He responded by reiterating that the facts told him Jesus is real, but he provided no information to say why he believed this. Possibly, something rather dramatic had occurred in his life which caused him to shift from a purely academic secular career to becoming an Anglican priest. But what that something is may have eluded Polkinghorne, or perhaps it is just too personal to share with the public. This description of him does show that the driving force that encourages acceptance of Theistic Evolution can be twofold: (1) there can be a real commitment to believe in Jesus, and (2) there can be a strong desire to be accepted by the academic community. This driving force explains why most Christian academics, especially those who have had extensive university education, are usually Theistic Evolutionists.

9.1.2 The Day/Age Theory: Hugh Ross and Progressive Creation

In contrast to Polkinghorne, the Canadian-born American physicist-turned-minister, Hugh Ross, does not believe that God infused the ability to eventually form humans into the physical properties of matter. Ross does believe the earth to be billions of years old, but rather than attributing the appearance of new species in the geologic record to evolution, he believes that each new species originated from a separate creative act of God. To help substantiate this claim, Ross suggests that the appearance of newly created species in the geologic column corresponds roughly

9. This question was posed to Polkinghorne (by the author) during the question period following a lecture given by Polkinghorne at McMaster University in the fall of 2002.

to the chronology of creation as outlined in the first chapter of Genesis.

The notion that God created new creatures over billions of years is an origin theory which was popular when Christians started to believe in an ancient earth. An ancient earth can be harmonized with Scripture if you believe that God created during different epochs or ages, and that these epochs correspond to the days of Genesis. Such a theory, which assumes that a day of Genesis represented millions or billions of years, is referred to as the Day/ Age Theory. For his brand of Day/ Age Theory, Ross has chosen the label of Progressive Creation. Although it differs in some details from other Day/ Age Theories, these differences are minor, and Ross' Progressive Creation is still very much a Day/ Age theory, with its roots in Victorian England at the onset of the creation/evolution debate.

Today, Progressive Creation has become a popular origin theory among some Christian academics. On the one hand, it still ascribes to God the *de novo* creation of each major branch of living organisms, and on the other hand, it incorporates the popular scientific theories regarding the age of the earth, and the appearance of fossils in the geologic column. Progressive Creation is attractive to many Christians who are not particularly bothered by altering the literal sense of Genesis. By accepting that the earth is ancient, they avoid being considered anti-intellectual, and by giving God credit for the appearance of different life forms over ancient ages, they say they have not lessened the importance of Genesis by reducing it to a myth, fable or allegory. Proponents of Progressive Creation claim that this origin theory maintains the harmony between the "truth" as revealed by general revelation in God's "book of nature," with the "truth" as revealed by special revelation in God's written Word.

The fiercest critics of Progressive Creation are not the Evolutionists, but young-earth Creationists. Young-earth Creationists argue that the major problem with any Day/ Age

Theory, including Progressive Creation, is its inability to fit our current knowledge of science into the chronology depicted in Genesis. The order of appearance of the created things does not reflect what Evolutionists believe to be the history of our earth. The most striking discrepancy occurs with the appearance of the sun, moon and stars. These objects, according to accepted evolutionary beliefs, were created at the same time as the rest of our solar system or galaxy, shortly after the Big Bang. However, Genesis describes God forming the earth on Day 1, and not creating the sun, moon and stars until Day 4; this is clearly out of line with the chronology of cosmic evolution.

Furthermore, the appearance of the sun on Day 4 is problematic for any Day/Age Theory since the creation of the plants occurs on Day 3. Plants require the sun for energy (i.e., photosynthesis). If the days of Genesis are 24 hour days, then the plants created on Day 3 could have easily survived without the sun until Day 4. However, for a Day/Age Theory, each day represents an epoch of millions of years and the plants created on Day 3 would have lacked the source of energy needed to survive until the creation of the sun on Day 4 (Genesis 1:9-19).

When our knowledge of the universe and the cellular and molecular processes in biology were relatively feeble, the discrepancies between the Day/Age Theory and science were not as obvious. This lack of knowledge could explain why the Day/Age Theory was particularly popular for Christian academics at the onset of the creation/evolution debates. As our understanding of cosmology and biology has increased, the popularity of the Day/Age Theory has decreased. It is possible that since the chronology of Genesis 1 failed to mirror the scientific understanding of the creation of the universe or the evolution of living things, more and more Christian academics began to accept Theistic Evolution. Theistic Evolution allows a Christian to accept the recent findings of science, while still maintaining faith in God. In Theistic Evolution, Genesis 1

becomes a myth or allegory containing truth, albeit not a historic or scientific truth.

With the basic chronology of the Genesis account being in conflict with our modern understanding of the evolutionary history, it is interesting that Ross has been able, with his Progressive Creation, to re-popularize the Day/Age Theory. This resurgence of interest in the Day/Age Theory could be attributed to the pleasant personality of Ross; he has written many popular books on the subject, has produced a number of video and TV programs, and is a much sought-after public speaker. On the other hand, it could be explained by Ross' ability to incorporate new scientific information into an origin theory while still maintaining the creative activity of God through the ages.

Below is a description of Ross' Progressive Creation theory. This description, which appeared on his website "Reasons To Believe,"¹⁰ is directed toward children and youth, making it relatively easy to understand. I have indicated, in brackets, how each of these events supposedly corresponds to one of the six creation days in the first chapter of Genesis.

1. Then God spoke—suddenly creating space, time, matter, and energy. Out of this sudden beginning all the galaxies, stars, and planets formed. There was light everywhere in the universe but none on the surface of the earth. There it was dark, all the time, because the clouds of the earth would not let any light pass through. At that time, billions of years ago, the earth was totally unfit for the existence for (sic) any kind of life. [Day 1, God created light.]
2. Then God's Spirit began to work over the surface of the ocean. Perhaps this is when God first created life—simple, single-celled life in the ocean. [Day 1, God created light; or Day 2, God created heaven.]

10. H. Ross, "Reasons To Believe," <http://www.reasons.org>, accessed 2004.

3. God next worked in the clouds transforming them so that the light from the sun and stars could diffuse through. More than that, God worked in both the clouds and the ocean so that water would evaporate from the oceans and condense from the clouds as rain. [Day 2, God created heaven.]
4. Then God gathered the ocean water to one place so that the land would appear. Now there was not just water on the surface of the earth. There were oceans and continents. [Day 3, God created land and plants.]
5. Then God produced plants on the land, plants of various kinds. These plants consumed carbon dioxide and water and, with the energy from the sun, converted them into food and oxygen. [Day 3, God created land and plants.]
6. Then God worked again in the clouds, and with the oxygen from the plants transformed them so that it was not always overcast. Now the clouds would break up allowing the sun, moon, and stars to be seen. Also, a shield of ozone was established high up above the clouds so that the new species of animals would be protected from harmful radiation from outer space. [Day 4, God created sun, moon and stars.]
7. Now God created advanced animals both in the oceans and upon the continents. The first such creatures were small and soft – worms and slimy animals. Then came small animals with shells, like clams, crabs, and insects. Fish and amphibians, like frogs, were next. Then came the reptiles, such as lizards. [Day 5, God created creatures of the air and sea.]
8. Over 100 million years ago God created dinosaurs. These lizard-like creatures were as much as 80 feet long and 50 tons in weight. They were ten times larger than any other animals (sic) that ever existed upon the continents. But, a major disaster, perhaps a nearby exploding star, an asteroid collision, or a huge volcanic eruption, took place about 60 million years ago, wiping out nearly all the

dinosaur species. Only a couple of species remain, both rather small and almost extinct. [Day 6, God created land creatures and humans.]

9. Starting about 2 to 4 million years ago God began creating bipedal primates. These creatures stood on two feet, had large brains, and used tools. However, they were very different from us. They had no spirit. They did not have a conscience like we do. They did not worship God or establish religious practices. [Day 6, God created land creatures and humans.]
10. In time, all these bipedal primates went extinct. Then, about 10 to 60 thousand years ago, God replaced them with Adam and Eve. From Adam and Eve came all the people that live on the earth today. God told Adam and Eve and their descendants that they were to fill the earth and rule wisely over all the animals and all the resources of the earth. And God wrote His ten commandments on the hearts of all people. The first one is to worship Him only. [Day 6, God created land creatures and humans.]

These 10 points do not correspond to the Genesis description of the creation week, especially by not accepting biblical evening-and-morning days, but they incorporate every aspect of evolutionary history. The only distinction between this scenario and the theory of evolution is the presence of a supposed creative act of God at each major step. Where Evolutionists explain the appearance of new things as the result of natural processes, Ross explains them as the result of the creative activity of God. The appearance of the first life in the primordial ocean, which Evolutionists attribute to chance, is described by Ross as a time when God “first created life—simple, single-celled life in the ocean” (point 2 above). In addition, Ross has seemingly removed the problem of having the sun, moon and stars being created on Day 4 by suggesting that they were actually created on Day 1. That they are described as created on Day 4 is explained by the

notion that the clouds surrounding the earth from Day 1 to Day 3 were so immense that they blocked the view of the sky. When these clouds dissipated on Day 4, the sun, moon and stars became visible to the earth *as if* they had been created on Day 4.

Unlike a theistic Evolutionist, such as Polkinghorne, Ross appears to be highly motivated to apply scientific theories directly to what he believes the Bible is saying about scientific knowledge. But fitting evolutionary chronology into the creation week of Genesis is like fitting a square peg into a round hole. It can be done if a large enough force is used, but you end up damaging either the peg or the hole, or both. In Progressive Creation, the Genesis story becomes the backdrop against which to tell of the progressive development of the world as denoted by evolution. Since Ross does *not* believe in evolution, it seems illogical to me that he should promote an origin theory that accepts the scientific evidence for evolution and an old earth. Why not go one small step further in logic and accept theistic evolution as a valid means of harmonizing modern science with Scripture? Why does he need to reinterpret Genesis so that it agrees with the popular scientific theories of today? The answer to this question can be found in his own testimony.

Ross was an unbeliever who, in his quest to find the meaning behind religion, came to the conclusion that the one true God spoke to the world through the Christian Scriptures. He writes that when he initially compared the various religions of the world:

I found the Bible noticeably different. It was simple, direct, and specific. I was amazed at the quantity of historical and scientific (i.e., testable) material it included and at the detail of this material. The first page of the Bible caught my attention. Not only did its author correctly describe the major events in the creation of life on earth, but he placed those events in the

scientifically correct order and properly identified the earth's initial conditions.¹¹

This initial appraisal of the Bible by Ross differs considerably from the opinions of both theistic Evolutionists, and young-earth Creationists. Theistic Evolutionists would argue that the Bible is not a scientific text; it describes why God created, but not how God created. Young-earth Creationists would argue that the evolution of kinds of organisms cannot be implied from Genesis 1, and that modern scientific theories of origins are in complete disagreement with Scripture. Yet, in spite of these well-known opinions of many knowledgeable Christians, Ross came to the conclusion that the Bible is “scientifically correct.” After his initial discovery of the scientific merit of Scripture, Ross writes:

For the next year and a half I spent about an hour a day searching the Bible for scientific and historical inaccuracies. I finally had to admit that it was error free and that this perfect accuracy could only come from the Creator Himself. I also recognized that the Bible stood alone in describing God and His dealings with man from a perspective that demanded more than just the dimensions we humans experience (length, width, height, and time). Further, I had proven to myself, on the basis of predicted history and science, that the Bible was more reliable than many of the laws of physics. My only rational option was to trust the Bible's authority to the same degree as I trusted the laws of physics.¹²

11. Ross' personal testimony as it appeared on the website for Reasons To Believe. See Ross, <http://www.reasons.org/about-us/hugh-ross-testimony>, accessed 8 January 2010.

12. Ross, <http://www.reasons.org/about-us/hugh-ross-testimony>, accessed 8 January 2010.

It is abundantly clear that Ross' conversion to Christianity coincided with his acceptance of the Bible as a "scientifically" accurate book. The occurrence of his spiritual enlightenment in conjunction with his first experience with Scripture has instilled in him a very strong religious belief that has biased his interpretation of the Bible. For Ross, the Bible must comply with the popular theories regarding the age of the earth, the appearance of new species in the fossil record, and the progressive development of pre-human man. Therefore, the Genesis account of origins is interpreted in a way that accommodates these popular theories in order for Scripture to maintain its scientific credibility. As Ross confesses:

An honest study of nature – its physical, biological, and social aspects – can prove useful in a person's search for truth. Properly understood, God's Word (Scripture) and God's world (nature), as two revelations (one verbal, one physical) from the same God, will never contradict each other.¹³

Ross is not alone in this understanding of the Scripture. Many Christians have found his brand of Day/Age Theory interesting and plausible. The only drawback is the fact that Ross' conclusions about Scripture and science are relatively naive, and from my experience, I have found that only a few theologians and/or scientists have taken his theory of Progressive Creation seriously. In spite of this lack of support from scientific and religious communities, his organization, "Reasons To Believe," has become well-known. Possibly the fact that fewer and fewer people in North America know the Bible well enough to realize that his view of science and Scripture are diametrically opposed on many of the basic issues of origins and life has allowed this

13. Ross, <http://www.reasons.org/about-us/our-beliefs>, accessed 8 January 2010.

type of apologetic to flourish. Upon hearing of Progressive Creation, the biblically-naïve seekers (of whom Ross used to be one) drop their resistance to Christianity because they believe that the Bible seems consistent with the current old-earth worldview.

9.1.3 The Gap Theory: Arthur C. Custance

Another prolific writer on faith and science, but not as widely known as Polkinghorne or Hugh Ross, was the British-born Canadian, Arthur C. Custance (1910-1985). Before his retirement, Custance worked as a scientist for the Canadian government as the Head of Human Engineering Laboratories at the Defence Research Board in Ottawa. In this position, he pursued research in thermal regulation of the human body during heat stress under combat conditions.

In addition to his scientific endeavours, Custance, like Polkinghorne and Ross, was very active in relating his Christian faith to science.¹⁴ He differed from Polkinghorne in rejecting the validity of evolution, and he differed from Ross in believing that the Genesis account of creation was a re-creation that occurred 6,000 to 10,000 years ago. He did not believe in The Day/Age Theory, and spent considerable efforts¹⁵ in demonstrating that, in the original Hebrew, the word 'day' in Genesis 1 cannot be

14. Custance was a member of the Evangelical Theological Society, was elected a Fellow of the Royal Anthropological Institute, made a Member Emeritus of the Canadian Physiological Society, a member of the New York Academy of Sciences and, in 1971, was listed in *American Men of Science*. In addition to his scientific works, he wrote six major books and published *The Doorway Papers*—62 monographs covering a broad spectrum of knowledge, and particularly the interface between Faith and Science, as well as Christian experience and theology. He was involved with the InterVarsity Christian Fellowship in Canada, spending summers in Muskoka, north of Toronto, Ontario, helping to build InterVarsity's famous Pioneer camp sites. His vision is still actively promoted by the Arthur Custance Centre for Science and Christianity, which maintains his works on the internet, (see E. White, <http://www.custance.org>) and awards the Arthur Custance Award for Christian Perspectives in Science at the Ontario Christian Schools Science Fair.

15. A. C. Custance, *Without form and void* (Hamilton, ON: Doorway Publications, 1970).

translated to mean epochs of time. Yet Custance was not an ardent young-earth Creationist.

Custance believed that the earth had a history prior to the first day of creation, and that during this history, the geologic column with its fossil assemblages may have been formed. By placing the formation of the geologic column before the re-creation week, Custance did not need to believe in a global flood to explain the geology of the earth. He even provided an argument to support the idea that Noah's flood was a local event.¹⁶ Except for his beliefs that time existed prior to the first day of the "re-creation," and that Noah's flood was local, Custance's views were similar to those of the young-earth Creationists of his day. He believed in a historical Adam and Eve, a place called the Garden of Eden, the occurrence of original sin, and the creation of humankind only 6,000 to 10,000 years ago.

The theory of origins to which Custance adhered describes a recent re-creation occurring on a previously formed earth. This theory is referred to as the Gap Theory. Like the Day/ Age Theory, the Gap Theory was popular at the onset of the creation/evolution debate. One of its early supporters was George H. Pember, who advocated this interpretation of Scripture in his book, *Earth's Earliest Ages* (1876). Harry Rimmer's book, *Modern Science and the Genesis Record* (1937), served to make this theory popular in more recent times. Custance describes the Gap Theory in his book, *Without Form and Void* (1970), and many consider his work to be one of the best arguments for the Gap Theory that "has ever been put into print."¹⁷

There are a number of different versions of the Gap Theory, but all versions generally agree that the original creation of the world by God, as recorded in Genesis 1:1, occurred sometime before "the Spirit of God moved upon the face of the waters" as

16. A.C. Custance, *The Flood: Local or Global?* (Grand Rapids, MI: Zondervan, 1979).

17. B. Thompson, "Popular compromises of creation—the Gap Theory," *Reasons and Revelation*, 14, no. 7 (July 1994): 49-56.

recorded in Genesis 1:2. Satan, following his rebellion against God, is thought to have corrupted the original creation depicted in Genesis 1:1. This rebellion resulted in Satan being driven to earth along with his followers, and as a result, the earth became “without form and void” as in Genesis 1:2. The event that caused the destruction of the original creation can be used to explain the stratification in the rocks, the occurrence of fossils in the geologic column, and the extinction of “prehistoric” organisms such as the dinosaurs, and “pre-human” hominids. What the first chapter of Genesis 1 describes is supposedly the re-creation of the world following this cataclysmic event that left the earth completely ruined.

The Gap Theory describes the destruction of a previous world, followed by the creation of the world we now know. As such, it has also been referred to as the Ruin-and-Reconstruction Theory, the Pre-Adamic Cataclysm Theory, and the Restitution Theory. It should be noted, however, that the Gap Theory could be confused with other gap theories that are more in keeping with the Day/Age Theory. These other gap theories describe gaps in creation between the epochs of time represented by the Genesis days. In such theories, there are gaps between each of the days in Genesis. The actual Gap Theory is quite distinct from any Day/Age Theory since, in describing the origin of the earth, it posits only one gap which it inserts between Genesis 1:1 and Genesis 1:2.

What religious belief caused Cushman to accept, on the one hand, that the re-creation week is a recent event for which Genesis provides a historical record, and on the other hand, that the earth is older than 6,000 years and that Noah’s flood was a local event, is not readily apparent. His writings argue for the reality of an original Adam and Eve, for the effects of original sin, and for the necessity of God creating *de novo* species or “kinds” of organisms in the biological world, but for all that, he could not align himself with the young-earth Creationists.

Unlike Hugh Ross, Custance has offered very few clues in his writings about his personal experiences to allow us to identify any particular event or set of experiences that would have predisposed him to promote the Gap Theory. In spite of this lack of personal information, Evelyn White, his associate for over 30 years, has written his biography (*The Biography of Arthur C Custance: A Christian in the World of Science* [Hamilton, ON: Doorway Publications, 2007]). In it, Custance is described as an indifferent university student until he had a dramatic conversion experience during his second year at the University of Toronto. This experience completely changed his attitude toward studying, and he became an avid student who took great delight in relating his university studies to Scripture. Possibly his conversion experience instilled in him an unshakeable confidence in Christianity which allowed him to adhere to the Gap Theory, a theory which suggests that Noah's flood could have been a local event.

As a result of Custance's commitment to the Gap Theory, he became somewhat isolated from most of the Christian scientists in North America, who aligned themselves with either Theistic Evolution, or Young-earth Creationism. He did not accept the Theistic Evolution endorsed by the America Scientific Affiliation (ASA),¹⁸ which he considered was making science the cornerstone of truth, and he disliked the dogmatic belief in a young earth and flood geology that is so much a part of the Creation Research Society, the organization co-founded by Henry Morris.¹⁹

18. Refer to footnote no. 1, p. 243.

19. The Creation Research Society (CRS) was founded in 1963 by a group of scientists who were unable to publish in established journals scientific information favorable to the creation viewpoint. To overcome this difficulty, these men formed the CRS in order to publish a journal (the *Creation Research Society Quarterly*) committed to scientific creation. The first issue was published in July 1964. Henry Morris, one of the founding members of the CRS, was trained as a hydraulics engineer. From 1957 to 1970 he was Head of the Department of Civil Engineering at the Virginia Polytechnic Institute and State University (Virginia Tech). He authored *Applied Hydraulics in Engineering* (New York, NY: Ronald Press, 1963; rev. 1972), which is still used today as an important text in some university

Custance spent little effort in promoting the Gap Theory although, in his opinion, it was the theory best suited to integrate the scientific facts and biblical revelation. For him, it even provided a confirmation of the rebirth experience in Christ since:

The necessity and reality of the new birth is some indication of the necessity and reality of the re-creation which seems to be the subject of Genesis 1:3ff.²⁰

Nevertheless, Custance's main focus was to "present *unique* connections between scientific research and biblical understanding bringing together faith and reason."²¹ He may have felt that the Gap Theory was a logical choice, but it was not a theory that all Christians were obliged to accept.

9.1.4 Young-earth Creationism: Ken Ham

Young-earth Creationism is the main antagonist in the creation/evolution debate. Theistic Evolution, the Day/Age Theory, and the Gap Theory may proclaim that God is real, but it is the young-earth Creationists who have generated the greatest concern for science educators, and indeed, for all others who do not adhere to their interpretation of reality. For many young-earth Creationists, it is not sufficient to believe that God exists, or even to believe that Jesus rose from the dead. You must also believe in six days of creation and a global flood, or else you are seriously undermining your faith in Christianity. Herein lies the major

classes. He also authored *The Genesis Flood*, (Philadelphia: Presbyterian and Reformed Pub., 1961) which explains the geology of the world based on the forces of water during Noah's flood. Morris was the founder and president emeritus of the Institute for Creation Research, a graduate-level institution devoted to scientific creationism.

20. A.C. Custance, *Time and Eternity* (Grand Rapids, MI: Zondervan, 1977).

21. White, http://www.custance.org/Library/Volume6/Part_III/Chapter3.html, accessed 10 January 2010.

religious belief associated with Young-earth Creationism: Only those scientific theories that support a young earth and a global flood are given any consideration. Advocates believe that those theories contradicting their beliefs will someday be proven incorrect when enough scientific knowledge has been gained. As Gary Parker, a well-known speaker on creationism, confidently proclaims: “[...] *evolution is a faith that the facts have failed*. **Biblical Christianity is a faith that fits the facts.**”²²

Using their “biblical Christianity” as a backdrop against which to place the scientific facts, young-earth Creationists claim that all scientific facts can be explained by their literal interpretation of the biblical story. Theistic Evolution is rejected because it contradicts how God created and when. The Day/Age Theory is likewise rejected because it interprets the days of Genesis as long periods of time, not 24-hour (evening-and-morning) days. Interestingly, the Gap Theory could have been an allowable alternative for many young-earth Creationists except for one peculiar troubling detail. Many Gap Theory proponents, such as Arthur Custance, suggested among other things that Noah’s flood was a local event. Hence, the Gap Theory, by being associated with a different view of Noah’s flood, is also unacceptable to the young-earth Creationists, because Genesis indicates that even the highest mountains of the earth were covered in water (Genesis 7: 18-23).

The strong beliefs held by young-earth Creationists are loudly proclaimed. Their religious beliefs are clearly stated, and they know that they are promoting a particular brand of Christianity. Many even admit that creationism is a religion, although this is the very reason Judge Overton refused to allow creationism taught in the public schools (see Chapter 3, section 3.4, above). Yet Creationists also point out that evolution is a religion as well.

22. G. Parker, *Creation: Facts of Life* (Green Forest, AR: Master Books, 1998), 210.

Evolution is basically a religious philosophy. We in creation ministries are explaining to people that both creation and evolution are religious views of life upon which people build their particular models of philosophy, science or history. The issue, therefore, is not science versus religion, but religion versus religion (the science of one religion versus the science of another religion).²³

As I noted earlier, when evolution is compared to creationism (rather than creationism being compared to science), "it is easy to see that the scientific theory of evolution is as much a religion as Creation Science."²⁴ By treating a theory like a religion, the religious belief of the believer becomes evident. Their presuppositions applied to their theory of choice makes the theory an absolute truth, and it becomes a pillar of their faith.

On the other hand, evolution and creationism may have religious overtones, but I believe it is more useful to recognize these theories as doctrines or tenets of a faith, and not religions *per se*. Neither stand on their own as *bone fide* religions, and each is an important tenet for a particular brand of religion. The theory of evolution is a doctrine of Naturalism, the belief that all phenomena can be explained by natural causes. This belief is applied to all aspects of science, not just the science of origin studies. Similarly, young-earth creationism has been adopted as a tenet of a certain brand of Christianity. Not all Christians adhere to this doctrine, but for many who do, this one interpretation of Genesis is foundational to their belief in Christianity. Because of their staunch biblical belief in this theory of origins, it is virtually impossible for them to consider any other explanation for the scientific facts.

23. K.A. Ham, *The Lie: Evolution* (El Cajon, CA: Master Books, 1987), 16

24. See chapter 8, section 8.3, above.

One prominent young-earth Creationist is Ken Ham. There are many creation ministries throughout the world, but the organization of which Ham is currently the president, *Answers in Genesis*, is probably one of the best known. Ham began as a biology teacher in the public school system in Australia, and became founder and director of the Creation Science Foundation ministry in Australia. He came to America in the late 1980's and worked with the Institute for Creation Research. He started *Answers in Genesis* in 1994, is heard daily on the radio program, *Answers... with Ken Ham*, and receives hundreds of requests for public speaking each year. His organization recently opened a creation museum, and has started "Creation College" as "basic training for creation ministry."

Ham does not appear to have had any mountaintop experiences that converted him to Christianity, as did Hugh Ross or Arthur Custance. Instead, he was raised as a Christian and a young-earth Creationist, and his religious opposition to evolution started at an early age. Even before he knew any of the scientific facts that supposedly support evolution or an ancient earth, he already considered these ideas wrong:

I did not know from a scientific perspective why I did not believe in evolution – but I knew from a Biblical perspective it had to be wrong or my faith was in trouble.²⁵

Although his faith in Jesus Christ may be solid, his confidence in Christianity appears to be predicated on origins occurring precisely as he thinks Genesis describes it. As he notes, "If God did not mean what He said in Genesis, then how could one trust Him in the rest of the Scriptures?"²⁶

25. Ham, xiii.

26. Ham, xiii

Young-earth Creationists like Ken Ham not only consider evolution to be contrary to their interpretation of Scripture, they also believe that the acceptance of evolution is the reason society has become more morally corrupt. By making Young-earth Creationism the foundation upon which their Christianity is based, belief in evolution is blamed for the rise in the acceptance of abortion, pornography, homosexuality, and lawlessness.²⁷ Nazism, racism, illicit drugs, cruel business practices and male chauvinism are all considered direct consequences of believing in evolution, a theory that has eroded away the foundations of Christianity.²⁸

Regardless of how valid or ridiculous these accusations may be, understanding that these concerns are very real to young-earth Creationists helps us to appreciate why they attack evolution so ferociously. As Ham writes, "We are out to convince people[...] that Jesus Christ is Creator. Why? Because we want a good fight? Because we like controversy? No, because we know that those who do not trust the Lord will spend eternity separated from Him."²⁹

For a young-earth Creationist like Ken Ham, evolution is not simply a scientific theory that can explain our origins. It is a lie perpetrated by Satan himself, a lie that is designed to keep Christ out of the lives of his people. By encouraging the world to accept evolution, the Evolutionists (including the theistic Evolutionists) are allowing Satan to take over this world, and with this takeover, there comes an increase in human corruption. Given that this is the mind set of many young-earth Creationists, it is little wonder that they insist on explanations of scientific facts that agree with their interpretation of the six days of creation and Noah's flood.

27. Ham, 83.

28. Ham, 85-95.

29. Ham, 129.

9.2 The Choice is Yours

The four individuals described in this chapter, Polkinghorne, Ross, Custance, and Ham, have a number of characteristics in common. They have all been involved in some aspect of science, they have all been prolific writers, and they have all been followers of Jesus Christ with their ultimate goal to make the salvation of Jesus real to everyone. Yet the variation in their stance on how much scientific theories should influence the interpretation of the Genesis account of creation has been quite distinct.

Polkinghorne is a Theistic Evolutionist. He believes that God created this world and its inhabitants by way of evolution, and evolution is supported by the general scientific community to which he belongs. Ross is a Day/Age Creationist who believes that the days of Genesis represent long time periods during which God created new things. He says he believes very strongly that the Bible is a scientific text, and this belief may be a direct result of his conversion experience. Custance, like Ross, believed that the earth was older than 6,000 years, but unlike Ross, he believed that the days in Genesis were 24-hour days, and that a period of indeterminate length existed between Genesis 1:1 and Genesis 1:2. Finally, Ham as a six-day young-earth Creationist, represents the view that is farthest removed from evolution and an old earth. He believes in a young earth and a global flood, and these beliefs are foundational to his faith. If these events did not happen as told in the Bible, then he would question the validity of the rest of Scripture.

Regardless of their differences, these four Christian individuals have been equally convinced that their interpretation of reality is closest to the truth. Since the scientific evidence for any of these particular views is circumstantial or ambiguous, this difference is explained best by their religious beliefs, which have fostered a bias or prejudice for a particular explanation. This

prejudice has influenced the worldview lens through which the facts are embedded into theories.

If you are a Christian, you will embrace one of these theories of origins. Remember, however, that regardless of how convinced you are that scientific and biblical facts support your theory of choice, it is also your preconceived beliefs that have influenced you to adhere to any particular one. Recognizing that these beliefs can give rise to prejudice will help you to avoid being prejudicial when considering the scientific and biblical merits of other theories. Moreover, understanding the basis of our prejudices should allow us as Christians to engage in a serious discussion about Science and Christianity without the fear of its exploding into a volatile debate.

Among Christians, the origins question concerns how God created, not the question of His existence. On the other hand, the choice of origins theory in the broader society often determines whether a person accepts or rejects the spiritual nature of mankind. In the struggle between atheistic evolution and creationism, the atheistic Evolutionist who believes that “the cosmos is all there is, ever was, or ever will be”³⁰ needs to appreciate that the nonphysical elements of the universe are as real to a Creationist as the physical elements of the universe are to the atheist. The Creationist must also come to the realization that the monumental scientific evidence pointing to the existence of an intelligent designer will never be enough to convince an atheistic Evolutionist of the existence of God and an afterlife. As Evolutionist Stephen Jay Gould has argued, the design in nature is not evidence for an intelligent designer; it is simply a byproduct of the completely random process in evolution.³¹

Whatever your choice may be, you are not alone. Even if you choose not to commit to any of these theories, according to a 2001

30. This sentence is attributed to Carl Sagan who used it to introduce his PBS television series *Cosmos: A Personal Voyage*.

31. S.J. Gould, “Creating the creators,” 54.

Gallup Poll (survey # GO 133064) you are still among 10% of North Americans who are likewise reluctant to take sides on this issue. Although you may want to understand the origins debate, the question of origins is simply not a major concern for you. However, if you are among the remaining 90%, you have made a choice, and this choice has been influenced by your religious beliefs which helped determine how you interpreted the facts. Keep this in mind as you consider, in the final chapter, some theories of reality that integrate scientific and biblical data.

Finally, whatever you decide is the most appropriate theory of origins for you, remember the following point. Two books of the Bible start with the phrase "In the beginning." One is, of course, Genesis, the first book of the Bible. This beginning has been the subject of debate for more than a hundred and fifty years, as the facts of science have been brought to bear on the interpretation of the creation week. The other book is the Gospel of John in the New Testament. John does not provide us with details about the creation of the world. Instead, he describes the One who created the world, and how this One relates to the physical universe and humanity.

The first beginning found in Genesis emphasizes the power of God to create; the second beginning found in John emphasizes the ability of God to love. This love compelled him to enter into this physical world as a full and complete human in the form of Jesus the Christ. As many theologians and philosophers have confessed, Jesus was either history's greatest liar, or he was who he said he was—the God of this universe who stands as the intermediary between us and the world beyond. A non-Christian may deny the existence of the supernatural, but he cannot deny the possibility that a prejudice causing him to accept only a naturalistic explanation of the scientific facts may be limiting his acceptance of another possible reality.

If you encounter non-Christians who believe that the Bible is irrelevant to them because Genesis cannot be supported by

modern scientific theories, you might point out that the scientific facts do not negate biblical revelation. On the other hand, you might also suggest to them that they may be focussing too much on Genesis. If they are truly interested in discovering the reality existing beyond our natural world, direct their attention to the first chapter of John. There they will find proof for God, a proof that does not depend on our knowledge of the scientific facts, but on the greatest power that exists in the universe – the power of unconditional love.



Appendix 1

MODELS OF ORIGINS CATEGORIZED

Origin models can be placed in categories ranging from atheistic evolution to young-earth creationism (see Figure 9.1). Other authors divide origin theories into more categories (e.g. Evolutionary Creationism; the Framework Hypothesis), but increasing the number increases overlap between categories. From my experience, I have found that the following scheme is the most useful. (Note: Some individuals cited as examples may have altered positions since printing.)

1: Atheistic evolution (naturalistic evolution):

The universe and all the physical laws of nature were created by chance during the Big Bang about 15 to 20 billion years ago. We exist through a combination of random processes known as "evolution." There is no purpose or supernatural force which has directed our evolution. We are here only by chance; religion is a natural development in our evolutionary "progress." When we die, we no longer exist.

Examples: Isaac Asimov, Carl Sagan, Stephen Jay Gould, Stephen Hawking, Richard Dawkins.

2: Deistic evolution:

A supernatural force created the Big Bang, and set down all the physical laws. This force is no longer involved in the day-to-day operation of the universe. We exist via "evolution", and although a supernatural force may have initiated the process, we are here by chance.

Examples: Charles Darwin, Albert Einstein, Fred Hoyle, Robert Jastrow.

The following is a famous quotation attributed to Robert Jastrow :

"For the scientist who has lived by his faith in the power of reason, the story ends like a bad dream. He has scaled the mountains of ignorance; he is about to conquer the highest peak; as he pulls himself over the final rock, he is greeted by a band of theologians who have been sitting there for centuries." (R. Jastrow, *God and the Astronomers*. [New York: W. W. Norton, 1992], 107.)

3: Theistic evolution:

God is the supernatural force who created the Big Bang and set down all the physical laws in order for evolution to occur. He used evolution to "create" the right environment and the right vehicle in which to place a living soul. When the time was right for Adam to appear, God took an evolved pre-man, and gave him a spirit and/or soul, thus creating man in the image of God. This category differs from Deistic evolution by giving evolution a purpose. Evolutionary creationism falls in this category.

Examples: B.B. Warfield, James Orr, C.I. Scofield, Derick Kidner, Howard Van Till (professor emeritus of Calvin College, and author of *The Fourth Day*).

4. Old-Earth Creationism:

This category describes theories that allow for an earth that is older than 6,000 to 10,000 years, and for the belief that God created more or less, as described in Genesis 1. In these theories, an interpretation of Genesis provides the time needed for fossil formation and radioactive dating. There are two subcategories under Old-Earth Creationism which vary depending on how literally Genesis 1 is interpreted. They are: a) The Day/Age Theory; b) The Gap Theory

a) **The Day/Age Theory:** The creation days in Genesis describe creative periods of time, not six literal days. During each creative period, God increased the complexity of life by creating new life forms while changing the earth to accommodate these forms. Variations on the Day/Age theory differ according to how much the appearance of new organisms in the fossil record is attributed to God's direct intervention, due to the process of microevolution – genetic variation within a species. Some proponents of the Day/Age Theory believe that we are currently in the seventh day (D.A. Young, G. Schroeder). Progressive Creationism, a popular theory among Christian academics, is a variation of the Day/Age Theory.

Examples: Bernard Ramm, Kenneth Taylor, Millard J. Erickson, James Montgomery Boice, Gleason Archer, Hugh Ross (*Reasons to Believe*), *Christianity Today*, Davis A. Young, Robert C. Newman, Pattle T. Pun.

b) **The Gap Theory:** The belief that an indeterminate period of time exists between Genesis 1:1 and Genesis 1:2, and that the original creation was altered to become "without form and void." The subsequent verses of Genesis 1 describe God "re-creating" the earth and telling mankind to replenish it. Some proponents of the Gap Theory believe that geological strata were created during the time before the re-creation of the world, and do not believe that Noah's flood was world-wide. This theory was promoted by the founders of modern geology (e.g. T. Chalmers, H. Miller), and is referred to by some as the "ruin-reconstruction" view. This view is found in the Scofield Reference Bible, Dake's Annotated Reference Bible, and the Newberry Reference Bible.

Examples: Thomas Chalmers; Hugh Miller; G.H. Pember (*Earth's Earliest Ages*, 1876); Arthur Custance (*Without Form and Void*, 1970).

5: **Young-Earth Creationism**

(Scientific creationism, Creation Science):

God created all matter in six 24-hour days, about 6,000 years ago. This theory disagrees with dating methods that show the earth to be older than 6,000 years, but it agrees with a literal translation of the creation week in Genesis 1. It also agrees with the chronology of the genealogical lists which appear both in Genesis and in other books of the Bible.

Examples: Henry Morris, Duane Gish and those associated with the Institute for Creation Research and the *Creation Research Society*; Ken Ham (*Answers in Genesis*); John Mackay (*Creation Research*, Australia).

Chapter 10

SCIENCE RESCUED FROM PRECONCEIVED BELIEFS

This book brings to light the important role that a bias fostered by preconceived beliefs plays in constructing and accepting scientific theories. By doing so, it reassures Christians that the intellectual barrier between science and Christianity is not due to the scientific facts, but due to human reasoning that determines how the scientific facts are interpreted. As I pointed out in chapter 2, the facts of science may be objective and relatively free of the effects of religious beliefs, but as the facts are placed into theories, they are examined through a worldview lens which is modified by the beliefs of the scientist (refer to figure 2.1).

Today, science appears to be at odds with the Bible only when we choose to rule out any theory that might be used to support the revealed truths of Scripture. The same data that support theories contradicting biblical data can be used to develop a holistic view of the world. During my years in biological research and teaching, I have never found any objective fact of

science to conflict with the Bible. In practical terms, the barrier between science and Christianity exists only in our minds.

Despite the considerable resources used to wage the wars that keep science and Christianity apart, these two ways of knowing, i.e., the scientific and the biblical, are compatible with each other. Scientific and biblical data can be integrated to form theories that are interesting and logically sound. This integrated approach to science and Christianity has the potential to greatly increase our understanding of both the natural world and the revealed truths of the Bible, and a few examples of this potential are provided in this chapter.

These examples take biblical revelation, such as the creation story described in Genesis, to be more or less historically correct. As a consequence, the significance of these theories may be difficult to appreciate if your preconceived beliefs have biased you to regard the Genesis account of creation to be an allegory or metaphor. However, I am not asking the reader to accept these theories, just to consider the logic of their construction in light of our own beliefs. They are described only in a cursory form to encourage Christians to delve more fully into the science associated with them, and to use scientific data and biblical truths to develop a comprehensive and coherent picture of our world.

10.1 Importance of the Virgin Birth

One scientist who pioneered an integrated approach to science and Christianity was Arthur C. Custance (1910-1985). In his comprehensive work, *The Seed of the Woman*,¹ Custance applied the scientific facts of conception, cell lines, fertilization and embryonic development to the Christian doctrine of the virgin birth. Assuming that the virgin birth actually occurred, he carefully worked out its implications for the creation of the

1. A.C. Custance, *The Seed of the Woman* (Hamilton, ON: Doorway Publications, 2001).

physical body which was to be occupied by our Lord. He reached an intriguing conclusion.

Given that the scientific facts for a virgin birth and the biblical prediction of a virgin birth are equally valid, then Jesus *had* to be the product of a virgin birth. This condition was necessary in order for Him to avoid being contaminated by the sin (or its effects) that was passed down to all offspring from Adam. If Jesus were conceived in the normal manner, He would also have been affected by this sin inherited from an earthly father, and had this occurred, he would have needed a saviour like all others. He would not have been fit to serve as a sin offering.

This scenario is based on an often forgotten concept from embryology (see Figure 10.1). First, it is important to realize that our bodies are made up of two types of cells. One type is the *somatic* cell, which constitutes the vast majority of cells in our body. The other type is the *germ* cell, which is the cell type that enables us to reproduce. The germ cell can undergo meiosis, thereby reducing its chromosome number from 46 to 23, to give rise to the gametes (egg or sperm). Fusion of the gametes creates a new cell with 46 chromosomes (23 plus 23). This cell is the zygote. In each new generation, the zygote (the cell that will divide to become the embryo and eventually the fetus) divides to form the female “seed” (the germ cells that will give rise to the new egg), before it actually starts to form the cells that will make up the body of the new individual. Therefore, when fertilized by the sperm, the female germ cell first reproduces itself before it starts to make the somatic cells which will form the body. As noted by Custance:

The order here is crucial to a proper understanding. The successive bodies are temporary vehicles which death lays aside—but not until the seed in the next generation has had time first of all to reproduce *itself*, and then to

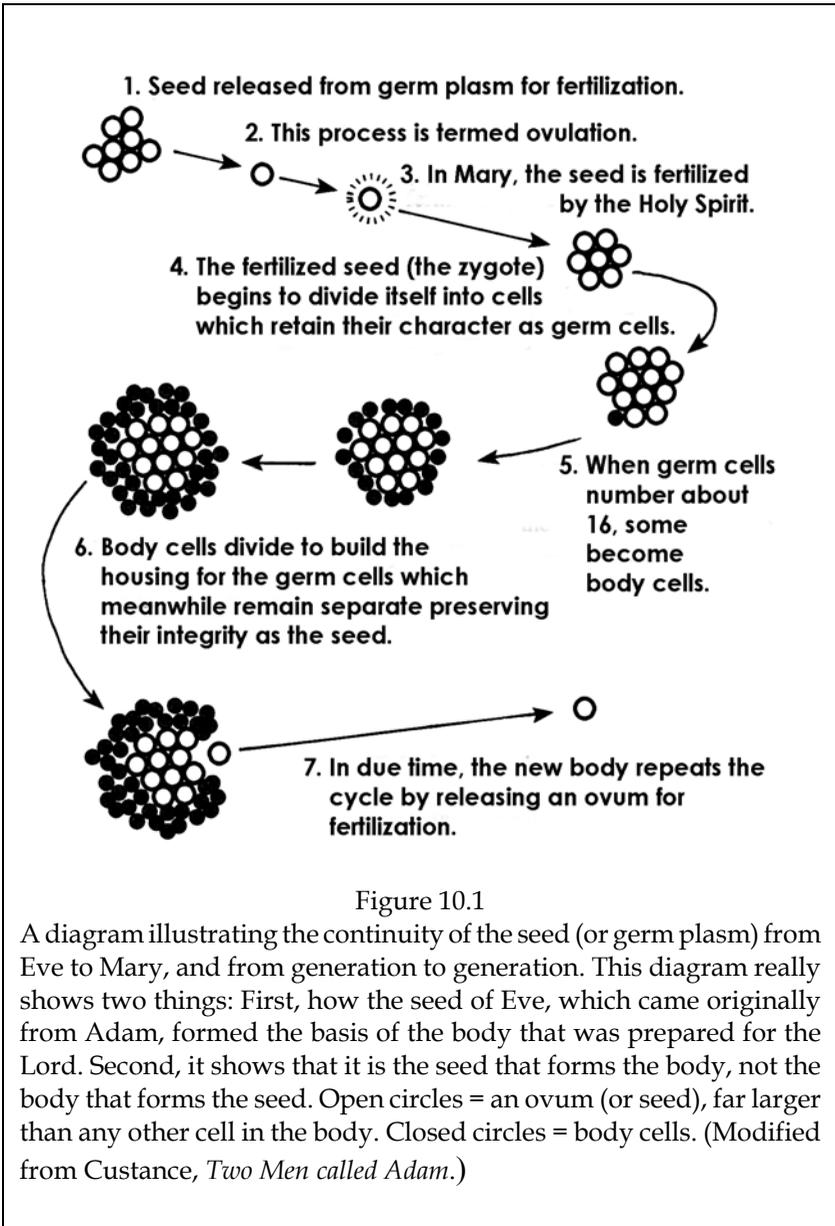


Figure 10.1

A diagram illustrating the continuity of the seed (or germ plasm) from Eve to Mary, and from generation to generation. This diagram really shows two things: First, how the seed of Eve, which came originally from Adam, formed the basis of the body that was prepared for the Lord. Second, it shows that it is the seed that forms the body, not the body that forms the seed. Open circles = an ovum (or seed), far larger than any other cell in the body. Closed circles = body cells. (Modified from Custance, *Two Men called Adam.*)

repeat the rest of the cycle. The body is the ovum's way of perpetuating itself.²

Hence, both biologically and theologically (as meticulously reasoned in *The Seed of the Woman*), it is quite logical that the body of Jesus would have been the product of a virgin birth. If it is the seed of man (the sperm) that contaminates the body cells to which the ovum will give rise, then a human father must be avoided. This concept is particularly intriguing when we know that the idea of a virgin giving birth was totally foreign to the men who reported its occurrence in the Bible. Thus, the virgin birth viewed as a scientific fact on the one hand, and held by faith on the other, finds its explanation and meaning through the disciplines of biology *and* theology.

10.2 Genetic Engineering and Biblical Revelation

Custance wrote extensively on the relationship between science and theology, and his works cover a broad range of topics from the evolution/creation debate to the meaning of time.³ When Custance died in 1985, the field of molecular genetics and/or genetic engineering was just beginning to blossom. Today, considerably more is known about the genetic machinery in the cell, but without Custance's initiative, there seems to have been little done to integrate this information with biblical revelation.

What I provide in this section are two examples of theories that integrate knowledge gained from genetic engineering with biblical revelation. These examples are presented with little supporting documentation, and they assume a basic understanding of biology and Scripture. It is not my intent to convince the reader of their validity. They are presented as a

2. A.C. Custance, *Two Men called Adam* (Hamilton, ON: Doorway Publications, 1983), 125.

3. The collected works of Custance are published on the internet at <http://www.custance.org>

means to generate interest in developing an integrated approach to science and Christianity.

10.2.1 The Creation of Eve

Genesis 2 provides the details of the creation of man and woman. Most Christians know that before Eve came along, Adam was busy naming the animals that God brought to him. I was taught that this was Adam's first job – to be a biologist. However, the reason Adam was naming the animals was not simply to categorize the biological world. God knew it was not good for Adam to be alone, so God set about to find company for him (Gen. 2:18). The creatures that Adam named were being made specifically to see if one could be a companion for him. However, of all these animals, "there was not found an help meet for him." (Gen.2:20) If you are familiar with the biblical account, you know what happened next.

And the Lord God caused a deep sleep to fall upon Adam, and he slept: and he took one of his ribs [...]; and the rib, which the Lord God had taken from man, made he a woman. (Gen 2: 21,22, KJV)

I was raised to think that God, like a sculptor, made Adam from the dust of the earth, then took some of this material from Adam (his rib) to form Eve. This concept has been so persuasive that some scholars argue that the word *rib* could be translated as Adam's whole side. In this way God had a lot of material to work with, and could make Eve almost as large as Adam. Yet recent advances in biology provide a very different possibility for this whole process.

From what we now know about genetic engineering, all you need to create an entirely new individual from another organism is a single cell. Most cells within an animal contain all the genetic

The Creation of Eve as depicted by Michelangelo



This fresco on the ceiling of the Sistine Chapel in the Vatican illustrates Eve being created as a whole person from a sleeping Adam. Could modern knowledge of cloning provide a scientific explanation of how God brought about this miraculous event? The answer is yes!

information that was present in the very first cell from which that organism developed. As development occurs, many more cells are made, and these cells differentiate into specialized cells, such as liver cells, or kidney cells, etc. These cells still contain all the genetic information that was present in the original cell, but they use only the information necessary to carry on their particular role in the body.

Cloning occurs when a cell from a donor organism is prompted to use its genetic information to make more cells, and eventually to reconstruct an entirely new organism. Interestingly enough, all you need is one cell, and the cell that tends to be best suited for producing more cells is that which is found in the bone, and the best bone tends to be the rib!

Given our knowledge of genetic engineering, and assuming that Gen. 2: 21-22 is historically correct, then the Bible story falls right into line with our present understanding of the process of cloning. Using the language of modern science, we could paraphrase Genesis by stating that Adam was first put into an induced sleep – he was anaesthetized. Then his body was opened, a rib removed, and his body closed. A single cell was taken from

the rib. This cell was placed into the appropriate growth chamber, allowing it to produce many more cells. And from these cells, Eve was formed.

Obviously, Eve was not an exact clone of Adam. Therefore, some modification of the genetic information present in the chromosomes of the original bone cell had to occur in order to create a woman from the cell of a man. Interestingly, from our modern knowledge of genetics, we can also suggest a possible mechanism by which this could have happened.

Today we know that normal human males and females possess 46 chromosomes in their cells (refer to figure 10.2). These chromosomes can be arranged into 23 pairs, and of these 23 pairs, one is responsible for determining sex. This pair consists of the sex chromosomes. In females, the sex chromosomes are similar in appearance. They are referred to as X chromosomes, and the pair is designated XX.

In males, the two sex chromosomes differ from one another in appearance. One looks like the X chromosome, as found in the female, and the other is a much smaller Y chromosome. This pair is designated XY.

Assuming that Adam was created having XY sex chromosomes, then to create Eve by way of cloning, the Y chromosome in the original bone cell taken from Adam was either replaced by a new X chromosome, or genetic information was added to the existing Y chromosome, to produce another X chromosome. In either case, the genetic condition of the female would have been created.

Of these two possibilities for creating the female condition, the present biological data support the latter possibility—the X chromosome was created by building onto the existing Y chromosome. By comparing the structure of the X chromosome to that of the Y, it appears that the X chromosome is made up of repeated layers of the Y chromosome. From an evolutionary perspective, molecular geneticists suggest that the X chromosome

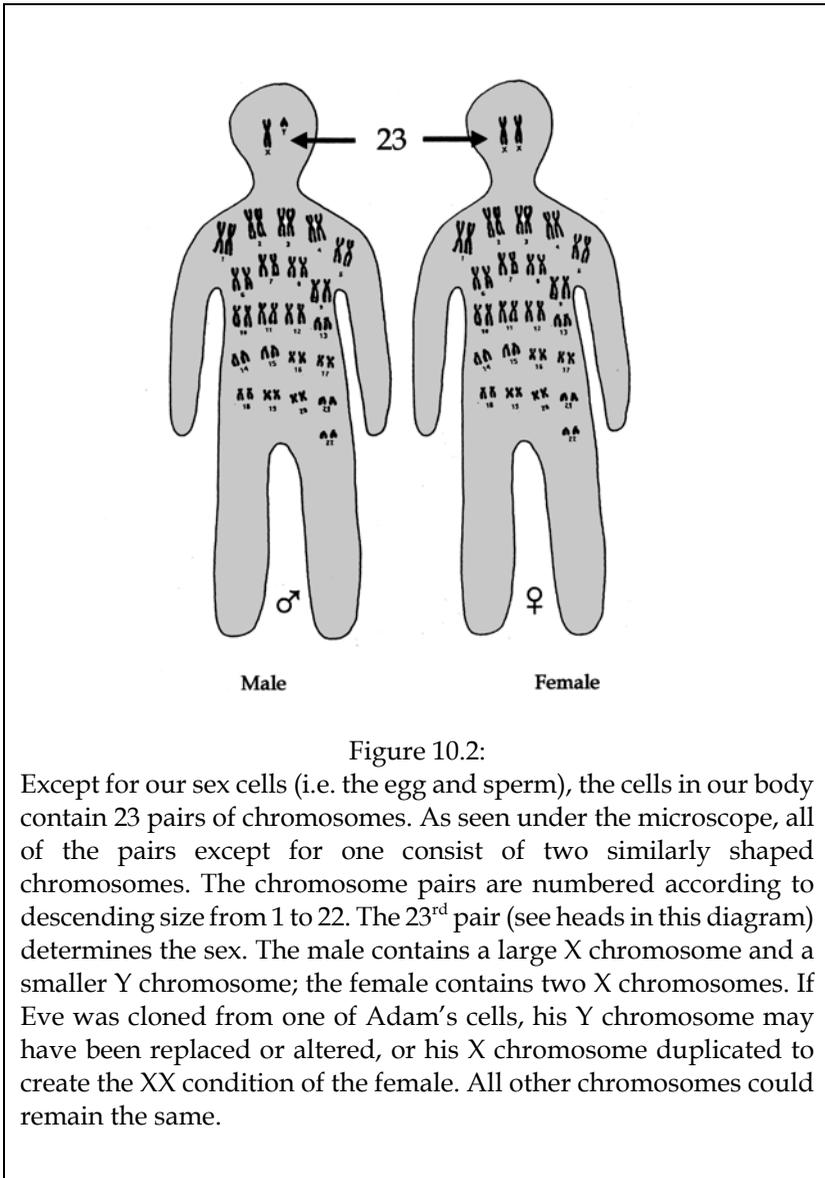


Figure 10.2:

Except for our sex cells (i.e. the egg and sperm), the cells in our body contain 23 pairs of chromosomes. As seen under the microscope, all of the pairs except for one consist of two similarly shaped chromosomes. The chromosome pairs are numbered according to descending size from 1 to 22. The 23rd pair (see heads in this diagram) determines the sex. The male contains a large X chromosome and a smaller Y chromosome; the female contains two X chromosomes. If Eve was cloned from one of Adam's cells, his Y chromosome may have been replaced or altered, or his X chromosome duplicated to create the XX condition of the female. All other chromosomes could remain the same.

evolved over millions of years as parts of the Y chromosome were added onto itself to eventually produce the X chromosome.⁴

By whichever means the female was formed, this integration of both scientific and biblical knowledge in understanding the formation of Eve gives rise to two interesting questions. First, is it possible to alter the sex chromosomes within a donor cell to clone an individual who is opposite to the sex of the donor? This technique could have practical implications especially for endangered species. If males and females could be cloned from a single individual, this could serve to increase population size, and to help save a species from extinction.

Second, would cloning be more successful if scientists concentrated on cells removed from the bone? Although cloning has become a reality, the techniques used are very unreliable. Few, if any, modified cells can give rise to the adult form, and the adult form has proven to be far less viable than the parent. In current cloning techniques, the cells that are used do not come from the bone, although for cell culture techniques, bone cells tend to work best.

10.2.2 An explanation for the stability of species

As I noted in chapter 4, the study of genetics provides some of the strongest biological evidence against evolution. For instance, species or different “kinds” of living organisms behave as if they will always remain the same; the offspring of a set of parents always inherits those features that identify it as belonging to the same kind or species as its parents. This observation, which has been repeated over and over again for as long as we have recorded biological data, has been articulated as the Law of Limitation of Variation in Progeny. Evolution needs minute variations to accumulate, generation after generation, until a

4. B.T. Lahn, and D. C. Page, “Four Evolutionary Strata on the Human X Chromosome,” *Science* 286, no. 5441.

completely new species or basic kind appears, but there is no biological data to support this mechanism. Variations of individuals in a kind do occur, but each kind has remained the same from generation to generation, varying only within a limit preset by its genetic machinery.

Biblical revelation tells us exactly what we see occurring in nature today. The Bible describes animals as being created in “kinds,” and as reproducing after their own kinds (Gen. 1:11-12, 21, 24-25). Irrespective of the fact that variations within a kind always appear to occur within a set limit, Evolutionists assume that natural selection working on small variations over time have given rise to new basic types of living things (dogs, cats, apes, humans, etc.). In other words, evolution theory encourages biologists to examine the variations that occur within a given species or kind, rather than to focus on why these groups remain stable. However, if we concentrate our attention on the *stability* of these groups, instead of on their variation, and give equal consideration to *biblical* and scientific information, the following thought comes to mind.

I suggest that kinds of organisms are able to remain stable because each sexually reproducing kind began as a single individual from which was created the male and the female. The Book of Genesis does not give us any specifics about the creation of animals, but as noted above, it describes Eve coming from Adam. Since there is no reason to believe that God would not have used this same mechanism in the creation of animals, it is possible that God created the first individual of each kind (e.g., the first ape, first cat, etc.), and from the genetic information in that original or “master copy” for that kind, the female was produced.

In this scenario, the male and female of each kind of organism arose from the original of that kind, and as such, they shared complementary genes and chromosomes. The similarity in their genetics endowed them with the ability to mate, their close

proximity gave them the opportunity to mate, and most importantly, their common ancestry ensured that successful matings occurred only between individuals that could trace their lineage to the original set of information that was created by the original Genetic Engineer.

10.3 Nuclear Energy and the Shroud of Turin

As I noted in chapter 6, the Shroud of Turin is a religious relic that has imprinted on it the photographic image of a crucified man (see figures 6.1, 6.2 and 6.3). If we suppose that this imprint is a picture of the dead body of Jesus as it lay in the tomb, we can begin to ask some fascinating questions about the nature of His body, and the significance of the image. From a Christian perspective, the answers to these questions are intriguing, and provide an interesting insight into the wide-ranging effects of original sin.

Whether or not the image was intentionally placed on the Shroud by a supernatural event, its appearance is still the consequence of a *physical* event, an event that caused the surface fibres on the Shroud to burn. This burn could have resulted from a burst of low-level energy that produced enough heat to scorch the surface of the cloth, but not enough to burn right through it. Further, this energy must have been generated by the surface of the body since the image represents the entire naked body, both the front and back, and the image is not confused by the image of anything from inside the body. Assuming that such a physical event did happen, then a theological question comes to mind: Why would the dead body of Jesus produce a burst of energy? To formulate a logical answer to this question, it is necessary to direct our attention to the Book of Genesis since the answer depends on what really happened to the creation when Adam introduced sin into the world.

According to Genesis, God made the creation good, and He also made Adam perfect. When Adam sinned, this sin apparently affected more than the physical and spiritual natures of Adam. It affected the entire “good” creation (for example, by the appearance of thorns and thistles; Genesis 3: 18).

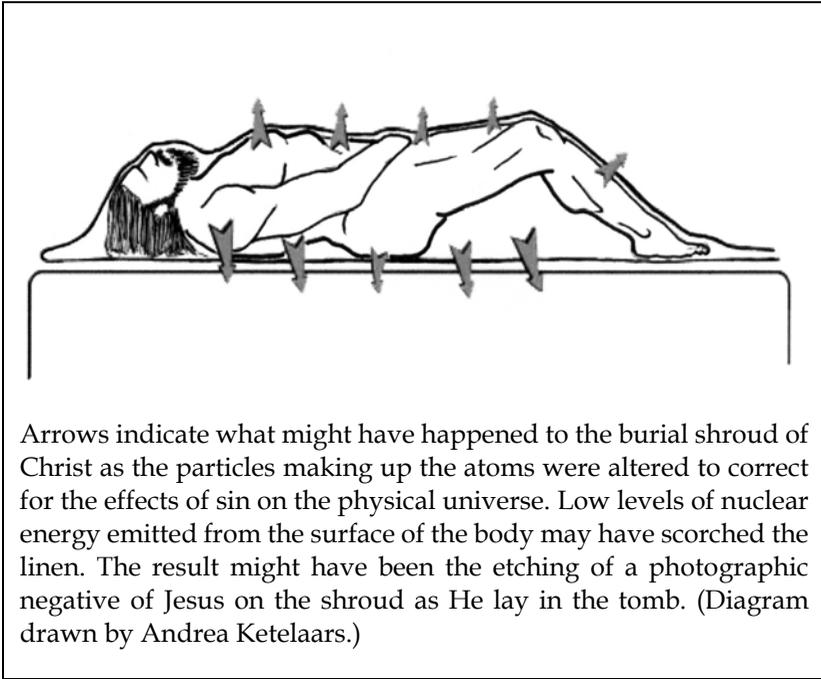
Our current scientific knowledge tells us that all physical matter is composed of small structures called atoms. Each atom, in turn, contains a central core, called the nucleus. Around the nucleus are smaller particles, called electrons, which orbit the nucleus like planets orbiting the sun. Moreover, the nucleus contains within itself particles, as well as a considerable amount of energy. When this energy is released from the nucleus, it creates the forces that generate the power for nuclear power stations, and the explosions for nuclear bombs.

I propose that one of the effects of sin was to cause a change in the makeup of the forces that hold the particles of the nucleus together. Since all matter is made up of atoms, then every single bit of the entire physical universe would have been affected if sin caused an alteration in the forces in the nucleus. Nothing would have escaped untouched.

The Bible tells us that God had to enter this world as Jesus the Christ, a real human being, in order to redeem us from sin. Although Jesus Himself was not affected by sin, the body that He occupied would have been constructed from the atoms obtained from this physical universe. These atoms may have suffered from the effects of sin, but they would not have been “sinful,” for Jesus was without sin.⁵ However, the redemptive power of the crucifixion made it possible to eliminate (or overcome) sin, and without sin, the atoms of Jesus’ physical body were transformed into those atoms that constituted His resurrected body.

In other words, the redemption not only raised Jesus from the dead, it caused a change in the forces that hold together the

5. For a full discussion of the meaning of “SIN” and “SINS,” see A.C. Custance, *Man in Adam and in Christ* (Grand Rapids, MI: Zondervan, 1975).



particles in the nucleus of the atoms making up His earthly body. This transformation back to the original state of the atom was a physical event whereby the forces holding the particles in the atom together were reconfigured. Moving particles around in the nucleus can be very dangerous and, as noted above, is the basis for nuclear power and nuclear weapons. On the other hand, if a nuclear event resulted from the transformation of the earthly body of Jesus into a glorified resurrected body, such an event could have released a short-lived burst of low-level energy, thus burning the image on the burial cloth.

If there is any truth in this conjecture, there are two significant insights that apply to science and the interpretation of some scientific facts. First, if a low-level burst of nuclear energy occurred in the tomb, it is very possible that, given the right

physical conditions, this event can be repeated. That is to say, it might be possible to create nuclear reactions that release very small amounts of energy. Such reactions would be safer than other forms of nuclear energy, and could be used as a viable energy source in our world which is quickly using up fossil fuels.

Second, if original sin caused some alteration in the forces of the nucleus that hold the atom together, then it is quite conceivable that the effects of original sin also resulted in the creation of radioactivity, the energy released by unstable atoms. This event would have a major impact on the validity of radioactive dating methods that have been used as scientific proof for an ancient earth.

As I have mentioned in section 7.2.2, radioactive dating of rocks is the best means of showing that the earth is ancient, but it makes some very significant assumptions. First, it assumes that radiation has always been present, and existed at the time the rocks were first formed. Second it assumes that the radioactive atoms found in the rocks decayed into the non-radioactive daughter atoms found in the same rocks. Although I am describing these assumptions in simplified terms here, it should be noted that, due to the presence of various forms (or isotopes) of each element, some complicated scenarios have been suggested. Yet the logic followed is the same. By knowing how quickly the radioactive atoms decay into their corresponding daughter atoms, and assuming that all the daughter atoms now in the rock were once the parent radioactive atoms at time zero, you can determine the time when the rock was first formed. For example, when radioactive uranium-238 decays to lead, it takes approximately 4.5 billion years for any amount of radioactive uranium-238 to decay to half its original amount. If the amount of radioactive uranium in the rock equals the amount of lead that it was supposed to have produced, then that rock is 4.5 billion years old. This is the period of time needed for any amount of uranium to become equal to the amount of lead to which it gives rise.

However, if Sin did affect the nucleus of the atom, it is very possible that about 6,000 years ago, when God made everything "good," the rocks had no radioactivity in them and all atoms were then stable. Indeed, there is currently nothing known to be biologically good about radioactivity, a form of energy that kills. With the introduction of Sin into the good creation, some of the stable, non-radioactive atoms in the rocks became unstable, radioactive atoms. For the uranium-lead example, this means that some of the stable lead atoms created at time zero became radioactive uranium atoms. Over the last 6,000 years, these unstable atoms have been decaying back to the stable form they once were. So rather than the ratio of uranium to lead in a rock representing how much uranium has decayed into lead, this ratio may actually represent the amount of uranium that was produced from the lead just 6,000 years ago.

This reasoning can be applied to the analogy of the falling sand in an hourglass (see section 7.2.2). The time at which an hourglass was turned over to start afresh can only be accurately estimated if at time zero (the time when the hourglass was turned) no sand was present in the lower chamber. If some sand (i.e., the lead) were already present in the lower chamber, but all this sand was thought to have originated from the upper chamber (i.e., from radioactive uranium), then the estimate for the length of time the hourglass was running would be longer than it really is.

Similarly, if only minute amounts of radioactive parent atoms are found in the rocks compared to large amounts of the non-radioactive daughter atoms that have resulted from the decaying process, the calculated time spans could extend into billions of years. Such a length of time would be needed for enough of the parent radioactive atoms to decay into the daughter non-radioactive atoms now present in the rock. But if only some atoms became radioactive as a result of original Sin, this event would make the ratio of radioactive to non-radioactive atoms very low, and these radioactive dating techniques would consistently

provide an overestimation of age. The vast amount of radioactive dating data that appear to agree with each other is often used as support for the validity of the method. Unfortunately, consistency in results may also reflect a common and persistent error in the methodology.

10.4 Daring to Dream

What I have described in this chapter are explanations of reality that integrate scientific knowledge and biblical revelation. These are fascinating explanations made possible only after we overcome the intellectual barriers separating science and Christianity. I find these theories intriguing, but do not base my faith on them. They are intended primarily as springboards for further discussion and should not threaten the faith of any Christian. Nevertheless, they do have scientific and biblical support, and as a scientist interested in relating science and Christianity, I am interested in pursuing them.

New scientific information continues to be discovered. I encourage Christian students, scientists, and other academics to take this information and to develop an integrative approach to explain reality. It is important to be speculative, and not to allow societal beliefs to generate a prejudice that might stop us from pursuing this goal. Let us dare to dream as we carry on our pursuit of knowledge into the unknown. Let us rescue science from unsubstantiated preconceived beliefs and explore what is really true about the world and the universe that we were born into!



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Gary Chiang's interest in the origins debate began at an early age. His faith in the Genesis account of Creation has remained steadfast throughout his education and career in the field of science.

His experience in biological research has resulted in over 30 scientific papers in peer-reviewed journals, as well as numerous scientific presentations. In the prestigious scientific journal, *Science*, he reported on his discovery of a novel sensory receptor that enables a blood-feeding insect to measure the size of the blood-meal remaining in its stomach as digestion progresses. He also discovered a sperm transport system in female plant-sucking insects, and rhodtestolin, a testicular chemical that stops the female heart of blood-feeding insects.

While some Christians who have entered the academic world of science may have been persuaded by their peers to accept Theistic Evolution and to consider the Genesis account of Creation as a myth or allegory, Dr. Chiang's experience and success in biological science has fortified, not weakened, his belief in this truth revealed by Scripture. He attributes his confidence not only to his scientific success, but also to spiritual experiences that have made the Lord Jesus as real to him as the 'air he breathes.' He hopes to convince Christians that you do not have to give up the basic tenets of fundamental Christianity and conform to the ideology of the world to make a significant contribution to science.

Dr. Chiang received his B.Sc., M.Sc, and Ph.D. from the University of Toronto. He spent eight years in research at York University before accepting a professorship at Redeemer University College in 1990. He and his wife, Jennifer, teach biology courses at Redeemer, and they have also taught at McMaster University, the University of Toronto, and Tyndale University College (Toronto). They also initiated the Ontario Christian Schools Science Fair, the first science fair ever to judge for Christian perspective in the science project. They have four wonderful children.