

The GENESIS

Putting the **CONFLICT**
Pieces Together

Walter J. Veith

THE GENESIS CONFLICT

by

Walter J. Veith

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PREFACE

We are living in an age of unprecedented technological advances where computer wizardry and space technology are the order of the day. Our hyper-technological world is proof of the power of science, and the scientific fraternity is highly respected as a consequence. When it comes to the question of origins, however, science and religion seem to be at loggerheads, and generally the world at large accepts the ‘word of science’ over the ‘Word of God’ in these issues. The theory of naturalistic origins is virtually the only theory that is publicized in the media, the educational systems, and the museums of the world today, and the Biblical accounts on these issues are generally relegated to the realms of myths or at best a form of poetry. It is not only in the field of origins that the Scriptures are questioned, but they are also doubted with regard to their historic and prophetic content. In this regard the modern historical critical method has disseminated the Bible to such a degree that only a skeleton remains of that which is considered relevant.

The conflict between science and Scripture is severe, and many an individual has floundered on the shores of unbelief as a consequence. Many have opted for compromise in order to stay afloat in a sea of uncertainty, but the question may well be raised whether compromise is possible at all. The fact of the matter is that most of the religious world has opted for compromise and teaches that the physical world originated through naturalistic means whilst the church operates and deals with the spiritual world. The problem is, however, that the very Word they base their spiritual teaching on has much to say on the physical world as well. Moreover, many spiritual teachings have their basis in physical realities, and God’s claims regarding His relationship with man are based on ownership because, according to the Scriptures, He created all things.

In spite of the almost overwhelming support for the views expounded by the voice of science, there is a growing trend toward a literal acceptance of the Biblical accounts on the question of origins and with regard to the historic content of the Scriptures. The science of archaeology has done much in recent years to confirm the veracity of the Bible with regard to its historic content, and as more and more evidence as to the awesome complexity of living organisms emerges, more and more naturalistic scientists are leaning toward the concept of origin by design. Advances in our understanding of the genome have provided new avenues to explain the varieties of species other than by natural selection, and the information preserved in the geological and palaeontological record is being revisited in the light of new information. The sword of technology is cutting both ways and is opening up new possibilities in the study and interpretation of the origin of the natural world. The conflict between science and Scripture is not over; indeed the final battle has only just begun. The reader is invited to sift the evidence and to decide for himself or herself which side of the conflict he or she would like to stand.

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1

A BASIS FOR CONFLICT

The purpose of this chapter is to define the parameters of the theological conflict between science and the Bible and not to provide scientific data to substantiate the veracity of the Scriptural claims. The scientific aspects will be dealt with in subsequent chapters.

To most scientists in the world today, the theory of evolution is no longer just a theory, but is regarded as a fact. There are differences of opinion regarding the tempo, mode and mechanisms of evolution, but the basic concepts of the theory have become an established paradigm. Even in the religious world, old animosities between science and religion have been largely forgotten and are shrugged off as unfortunate history based on ignorance. After all, the church has made mistakes in the past and has had to acknowledge its errors in the face of overwhelming scientific evidence against its stand. Science has gained the ascendancy in this battle and in the light of the awe-inspiring discoveries and progress in the civilized world attributed to science, who is there who would dare to contradict its paradigms? The educational systems of the world bear witness to this total regard for the voice of science, as they propagate naturalistic

worldviews on origins to the exclusion of all others. Moreover, proponents of the literary critical method have questioned the Bible not only on issues concerning origins, but on historical content as well.

The theory of evolution is presented in secondary and tertiary institutions as the only feasible theory of origins and even at the primary educational levels, evolutionary concepts are imprinted in young minds as indisputable facts. Alternative models are regarded with skepticism, even ridiculed, but in spite of these odds, there still exists a large body of people, including eminent scientists, who believe in a personal creator God and support a literal interpretation of the Genesis account. This fact may astound some evolutionary scientists, but it is indeed true. In 1999, a book was published in which fifty scientists with PhD's confirmed their faith in a literal creation account. The book "*In Six Days - why 50 scientists choose to believe in creation*" was published after a research scientist at Marquarie University in Sydney challenged the concept that even one scientist with a PhD would advocate a literal interpretation of the Genesis account. Rising to the challenge, the Editor of the book sought to show that many scientists would be prepared to defend their faith on scientific grounds. All the contributors had doctorates from State recognized universities from around the world and included university professors and researchers, geologists, zoologists, biologists, physicists, chemists, mathematicians, medical researchers and engineers. Many many more would have contributed had space allowed.¹

Evolutionary scientists argue that creationism is not science, as it is based on preconceived ideologies which exclude it from the realms of science. Religious views and revelations are not subject to the scientific method and the two worldviews on origins need thus to be kept separate. This sounds like a sound argument, but what if the facts actually fit the Biblical paradigm? On the basis of them being recorded in Scripture, would they then be excluded from the realms of science and thus also from the realms of fact as well as from the educational system? Right would then be excluded on the grounds of having been preconceived and truth would be thrown to the ground.

If this scenario were indeed true, then science would be left groping in the dark outside of the defined parameters of truth. There are only these two possibilities. The world as we know it came into existence by naturalistic processes or it was created by an intelligent designer. No other possible choices exist.

In my own life, I have been confronted with this dilemma and have sat on both sides of this fence. For most of my life, I was a committed evolutionist and presented the theory of evolution to my students as an established fact. I received my training at a secular university, well known for its ground breaking research and views on evolution. World-renowned evolutionary scientists such as Robert Broom, of Mrs. Ples fame, had molded the thinking and direction of the Zoology department where I received most of my training and there was no room for any other paradigm. For twenty years of my teaching and research career, I was so committed to the naturalistic view of origins that there was no room for alternative explanations.

As a young lecturer, I was occasionally confronted by students who believed in a literal creation, but this made no impact on me. Occasionally we would even entertain creationists at the university and would then delight in tearing their arguments apart and ridiculing their efforts in our subsequent lectures to our students. It was not that we were devious in these endeavors. It was just a matter of the two worldviews being so far removed from each other that the differences were irreconcilable. Our worldview was obviously right; therefore the other had to be ridiculous. Thinking back on these events makes me realize that our worldview embraced more than just Science. It embraced religion. The Biblical paradigm was rejected in favor of ours and we would defend it vehemently even acrimoniously, but what were we defending other than a theory of origins? Yes to our minds it was not a theory, it had become a fact in spite of the fact that the origin of all things is not subject to scientific empirical research but must always remain in the realms of faith - faith in a naturalistic process or faith in God.

This conflict between these opposing worldviews is nowhere

fought as rigorously than at the tertiary institutes of the world, but it is also a conflict which rages at many other levels of society not least of which is in the minds of men. Yes, there have been attempts to reconcile the two views by propagating some form of theistic evolution, but this halfway measure is equally unacceptable to the atheistic evolutionist who has no room in his paradigm for a ‘Higher Being.’ Moreover, there are so many theological problems associated with this compromise, that the rigorous Bible believer is also not in a position to embrace this ideology. The conflict is fierce and it is not possible to resolve it peacefully, as I was to discover for myself.

Models of Compromise

Theories that have been proposed to find some form of compromise between science and Scripture have become more common as efforts to reconcile the two worldviews have increased over the last decades. Basically, there are two worldviews which are mutually exclusive if we wish to accept them in their fullness; these are a belief in a literal six-day creation or a belief in **naturalistic evolution**. In his book *Origins, Linking Science and Scripture*, Ariel Roth lists and discusses the various alternative models that have been proposed to bridge the gap between these two views.² Only a brief summary of some of these alternate models will be presented here, but the theological problems associated with them will be discussed in greater detail.

The Gap Theory - which proposes two cycles of creation. An initial six-day creation that is destroyed by God and is followed by a gap whereupon the present creation described in Genesis follows. This interpretation then allows for long time periods. However, there is no evidence of a gap in the fossil record and this model raises more questions than it answers.

Progressive Creation - which proposes that God created numerous times and that these creation episodes were spread over long ages. Scripture does not support this theory with its Day-Age concept.

Theistic Evolution - which proposes that God directs the process of evolution and helps it along when it comes to the difficult barriers.

Deistic Evolution - which adheres to the concept of some form of God, but denies Scripture and the personal nature of God. God, according to this model, is not active in human affairs.

Pantheistic Evolution - which proposes that God is part of creation and is in all things. All things are thus part of God and are sacred. Man is thus also, in a sense, God and together with God is evolving to a higher level. This view forms part of Eastern culture, earth, and Gaia worship and God becomes both the destroyer and the progenitor of life and is both good and evil or Ying and Yang. This view also directly contradicts Scripture.

Space Ancestry (Panspermia or Cosmic Creation) - which proposes that life did not evolve on earth but was transported to earth via meteorites or other stellar sources, even extraterrestrial planting of life on earth. The idea originated in view of the unlikely scenario for life evolving on earth and in a sense transports the problem to space.

The Theological Barrier to Compromise

H.G. Wells the well-known science fiction writer, historian, and Fabian Socialist wrote concerning the evolution of man:

If all animals and man had been evolved in this ascendant manner, then there had been no first parents, no Eden and no Fall. And if there had been no fall, then the entire historical fabric of Christianity, the story of the first sin and the reason for the atonement, upon which current teaching based Christian emotion and morality, collapsed like a house of cards. ³

This statement lies at the heart of the issue of compromise. Models of compromise allow room for a creator God who somehow uses naturalistic processes to direct the evolution of all life forms or a creator who created matter and stands back and allows the evolutionary process to run its own course without interference. The Biblical account is regarded as an allegory and at best the days of creation are considered to represent long periods of time in harmony with naturalistic models. Man then came about by chance or he is the product of directed evolution. This concept is still vaguely compatible with the evolutionary viewpoint that is so boldly stated by George Gaylord Simpson, one of the doyens of evolution, who in 1949 wrote the following:

Although many details remain to be worked out, it is already evident that all the objective phenomena of the history of life can be explained by purely naturalistic or, in a proper sense of the sometimes abused word, materialistic factors. They are readily explicable on the basis of differential reproduction in populations (the main factor in

the modern conception of natural selection) and of the mainly random interplay of the known processes of heredity.... ***Man is the result of a purposeless and natural process that did not have him in mind*** (Emphasis Added).⁴

The Beginning

Theistic evolutionists may not quite subscribe to this extreme atheistic view, but, in their opinion, man is still the product of a naturalistic process subject to natural selection, an end product of an eon old struggle for survival of the fittest. This, of necessity, implies that the less fit did not make it and that their lineage has been relegated to the scrap heap of extinction. This view is in direct conflict with the plainest statements of Scripture and requires substantial intellectual gymnastics in order to achieve some form of consensus. The Scriptures plainly state that the origin of the physical and biological world lies with God, and that man was created in the image of God for a purpose. The cosmology of the Bible leaves no room for a naturalistic origin of the universe or of living organisms. The very first statement in Scripture identifies God as the Creator:

In the beginning, God created the Heavens and the Earth. *Genesis 1:1*

This statement does not define when this beginning took place, and many consider it to provide room for long ages by placing this beginning into the nebulous past and allowing for a more recent biological creation. However, this would create problems with the creation of the sun and the moon, which according to the creation account were only created on day four. Verse 16 also states that God made the stars also, but this could be a parenthetical statement and could allow for the stars to have been created at an earlier time.

However, the use of the definite article ‘*the*’ in the words ‘In *the* beginning’ implies a definite time for this beginning and not some nebulous past event. The use of the same definite article in the designation of the days of creation, i.e. ‘*the* first day, *the* second day’ etc. also implies a literal twenty four hour day and not long periods of time. This is further substantiated by the designation of ordinal numbers for the days (day one, day two, ...) which also points to a literal 24 hour day (Hebrew ‘yom’).

The heavens, according to Scripture, were thus not derived from an arbitrary process but were created by God and proclaim the glory of God.

The Heavens declare the glory of God, the skies
proclaim the work of His hands. *Psalms 19:1*

When I consider thy heavens, the work of thy
fingers, the moon and the stars, which thou hast
ordained. *Psalms 8:3*

Thou, even thou, art Lord alone; thou hast
made heaven, the heaven of heavens, with all
their host, the earth, and all [things] that [are]
therein, the seas, and all that is therein, and
thou preservest them all; and the host of heaven
worshippeth thee. *Nehemiah 9:6*

Seek him that maketh the seven stars and Orion,
.... *Amos 5:8*

He telleth the number of the stars; He calleth them
all by [their] names. *Psalms 147:4*

An interesting verse on cosmology in the Bible is found in the book of Job:

Canst thou bind the sweet influences of Pleiades,
or loose the bands of Orion? *Job 38:31*

Within galaxies, there are different kinds of star clusters known as “Galactic Clusters” or ‘Open Clusters’, and practically all of them are flying apart rapidly. The reason for this phenomenon appears to be that there is not enough mass to hold them together, but the Pleiades seem to be an exception to this rule since there appears to be sufficient mass to hold the cluster together and to prevent it from disrupting. Scientists call such a cluster a ‘bound cluster’. Moreover, astronomical observations show that the belt of Orion is certainly being loosened. The stars in the constellation are moving apart rapidly, and one of the clusters in the Orion constellation, the famous “Trapezium” is flying apart so rapidly that cosmologists are astounded, since by all calculations they could have been touching just thousands of years ago. The question posed to Job only really finds meaning in our time where the science of cosmology is expanding our vision of the universe.

These verses quoted previously leave no room for compromise on the issue of who created the universe and who holds it together. The method of creation is also clearly defined:

By the word of the Lord were the heavens made;
and all the host of them by the breath of His mouth.
For he spake, and it was done; He commanded,
and it stood fast. *Psalm 33:6,9*

Creation not only points to God’s existence but also places responsibilities on us as well:

For the invisible things of him from the creation of the world are clearly seen, being understood by the things that are made, even His eternal power and Godhead; so that they are without excuse. *Romans 1:20*

The Old and the New Testament are in complete agreement on the issue of creation and introduce a personal creator who not only created man in His image, but also redeemed him after the fall. According to the Scriptures, the creator who spoke and it stood fast was none other than Jesus Christ Himself:

God, who at sundry times and in divers manners spake in time past unto the fathers by the prophets, hath in these last days spoken unto us by His Son, whom He hath appointed heir of all things, **by whom also He made the worlds.** *Hebrews 1:1,2*

And to make all *men* see what *is* the fellowship of the mystery, which from the beginning of the world hath been hid in God, **who created all things by Jesus Christ.** *Ephesians 3:9*

In the beginning was the Word, and the Word was with God, and the Word was God. **All things were made by him;** and without him was not any thing made that was made. He was in the world, and **the world was made by him,** and the world knew him not. And the Word was made flesh, and dwelt among us. *John 1:1,3,10,14*

In this verse we also have the words '*In the beginning*', but in the original Greek the definite article '*the*' is omitted, unlike its equivalent verse in Genesis 1. In the Hebrew mindset and syntax, this implies that there was no definite beginning to the Word, but that the Word was there from the beginning. It is this incredible attention to detail, which underscores the veracity of the Scriptures. Further verses showing Jesus Christ to be the Creator are:

But to us there is but one God, the Father, of whom are all things, and we in Him; and one Lord Jesus Christ, **by whom are all things, and we by him.**

1 Corinthians 8:6

For by him were all things created, that are in heaven, and that are in earth, visible and invisible, whether [they be] thrones, or dominions, or principalities, or powers: **all things were created by Him, and for Him:** And He is before all things, and by Him all things consist. *Colossians 1:16,17*

This Jesus Christ, according to the Scriptures, is none other than God manifest in the flesh who made the earth to be inhabited, for His good pleasure, and who will come again to redeem His people.

Looking for that blessed hope, and the glorious appearing of the great God and our Saviour Jesus Christ; Who gave himself for us, that He might redeem us from all iniquity, and purify unto Himself a peculiar people, zealous of good works.

Titus 2:13,14

For thus saith the Lord that created the heavens; God Himself that formed the earth and made it; He hath established it, He created it not in vain, He formed it to be inhabited: I am the Lord; and there is none else. *Isaiah 45:18*

These statements leave no room for a pantheon of gods and make God personally responsible for every detail of creation. According to *Genesis 1:27*, God created man in His own image, and He created them male and female. Moreover, the creation was a personal act, the pinnacle of His creation and not the result of evolution from chaos.

And the Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life; and man became a living soul. . . . And the Lord God caused a deep sleep to fall upon Adam, and he slept: and he took one of his ribs, and closed up the flesh instead thereof; And the rib, which the Lord God had taken from man, made he a woman, and brought her unto the man. *Genesis 2:7, 21, 22*

Man was not only created in the image of God, but he was also assigned a position of authority and was to rule over the earth.

And God said, Let us make man in our image, after our likeness: and let them have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth, and over every creeping thing that creepeth upon the earth. *Genesis 1:26*

There is not the slightest room for evolutionary ideas to be substantiated by these plain statements of Scripture. Moreover, the problem is compounded by the Scriptural account of the events subsequent to the creation of man. Life was granted man on condition of obedience to God's ordinances and would be forfeited on disobedience. The test of obedience was the tree of the knowledge of good and evil from which Adam and Eve were forbidden to eat. The day they should choose to disobey, they would become subject to death.

But of the tree of the knowledge of good and evil, thou shalt not eat of it: for in the day that thou eatest thereof thou shalt surely die. *Genesis 2:17*

For the wages of sin is death; but the gift of God [is] eternal life through Jesus Christ our Lord. *Romans 6:23*

Herein lies a further dilemma for theistic evolutionists. Death, according to the Scriptures, is a consequence of sin, but according to the theory of evolution, death is the means of advancement to a higher level. The survival of the fittest to the detriment (death) of the less fit is the means whereby progress is made. Without the constant cycle of death and survival, no evolutionary progress is possible. Once again, the two worldviews are in disharmony with each other. This however, is not the least of the compromises that the theistic evolutionists have to make in order to fit their worldview into the stranglehold of the Scriptural texts. The sequence of events portrayed in creation week cannot be synchronized with evolutionary events either.

In Six Days

Compromise models often convert the literal 24-hour days of Genesis 1 into long time periods during which evolutionary events occurred. Not only does the use of the definite article '*the*' in the designation of the days imply a literal 24-hour day, but also the specific mention of the day cycle, '*it was evening and it was morning*' further underscores a literal intent in the rendering of the text. Moreover, the order and sequence of the events of creation week portray not only a different sequence to that of supposed evolutionary events, but implies a radically different intent as well. The first three days of the creation week deal with the creation of the physical environment and the next three days deal with the filling of that environment. On day one God creates light, on day two He creates the firmament and on day three He creates the earth with food.

ORDER OF CREATION WEEK

Days 1 & 4 - Light & Bodies of Light
Days 2 & 5 - Firmament & Filling of Firmament
Days 3 & 6 - Earth with Food / Filling the Earth

The events of days one and four highlight the fact that God is the source of light and is not reliant on bodies of light for provision of that light. On day two, the firmament is divided. The waters below, which represent the earthly waters, whilst the firmament above represents the heavens and must represent the atmosphere as this is to be filled with flying creatures on the fifth day. On the third day, God creates the terrestrial environment by gathering the water into one place and letting dry land appear in another. He then creates the plants, which are to serve as food for the life forms to be created on the subsequent days. This leaves no room for co-evolution of plants and animals, which is a basic premise of the evolutionary theory. Here the plants are designed as a source of food and the animals that will make use of these for sustenance are specifically created to occupy the prepared niche. Any co-dependence is thus by virtue of design rather than by virtue of evolution.

On the fourth day, the heavenly bodies - the sun and the moon, were created, and the dilemma is that if the days of creation are to represent long eons of time, then the plants would have existed without a sun for millions of years if the time sequence of the Genesis account is to be harmonized with the evolutionary paradigm.

On the fifth day, God created all the creatures that swim in the waters and all the creatures that fly, and on the sixth day, He created the creatures that occupy the terrestrial environment. Here again there is a problem of reconciling the Biblical record of the days of creation with long time periods. According to the theory of

evolution birds and mammals evolved from reptiles. Reptiles are terrestrial animals and would have been created on the sixth day, but the creation account places the creation of all flying creatures in the fifth day. Birds and flying mammals would thus have preceded their ancestors. A similar problem is encountered when we consider the marine mammals such as the whales, dolphins, and seals which would also precede their ancestors as they were also created on the fifth day, but according to the evolutionary theory, these marine mammals are the product of a secondary incursion of the sea by certain eutherian land mammals.

According to the Scriptures, the creation of man is the crowning act of God's creation. Towards the end of the sixth day, God created man and gave him dominion over the rest of the creation. Man was also created in the image of God.

So God created man in His *own* image, in the image of God created He him; male and female created He them. And God blessed them, and God said unto them, Be fruitful, and multiply, and replenish the earth, and subdue it: and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth. And God said, Behold, I have given you every herb bearing seed, which *is* upon the face of all the earth, and every tree, in the which is the fruit of a tree yielding seed; to you it shall be for meat. And to every beast of the earth, and to every fowl of the air, and to every thing that creepeth upon the earth, wherein there is life, I have given every green herb for meat: and it was so. And God saw every thing that He had made, and, behold, it was very good. And the evening and the morning were the sixth day.

Genesis 1:27-28

These verses create even more problems for those who wish to live on common ground and embrace both Scripture and the theory of evolution. Firstly, man was created in the image of God, and in *Genesis 2:7* we read that God formed man personally. He was thus not the product of an evolutionary process, but a noble creation reflecting the attributes of God Himself. Moreover, He created them male and female with the ability to reproduce. This simple statement is one of the most difficult to explain in terms of naturalistic processes, for how did the complex genetic mechanisms, which make this process possible evolve?

According to the above passage of Scripture, man and all the animals were total vegetarians and no carnivores existed. This would of necessity be so, because according to the Scriptures there was no death prior to the fall. Some may argue that plants are living organisms and that there must therefore have been some form of death before the fall because surely the plants are killed when they are eaten, but the Scriptures define plants as food, not as living animals. Although plants consist of living cells and are thus living food, they do not represent the same category of life as the animals. Moreover, *Leviticus 17:11* defines that life is in the blood, and plants have no blood nor do they have a nervous system. This is quite the reverse of what is believed by evolutionists. The cycles of death and violence, predator and prey relationships, co-evolutionary strategies and counterstrategies, these are all vital to the evolutionary paradigm, but the Scriptures speak of perfect harmony and coexistence between species and ‘*very good*’ (perfect) adaptations to meet the niche requirements of all species. The pre-fall world, according to the Scriptures was thus radically different from what we see in the world today. This implies mega-change and not uniformitarianism. Surely, it will be argued, that the carnivores of today are admirably adapted for their lifestyle and that this must support evolution; but even here there are two sides to the coin and this issue will be discussed in greater detail later.

Finally there is the issue of the seventh day which rounds off the creation week. What was the purpose of the seventh day?

And on the seventh day God ended His work which He had made; and He rested on the seventh day from all His work which He had made. *Genesis 2:2*

The Hebrew word for 'rested' is '*Shabath*'. *Strong's* concordance defines it as:

7673. **shabath**, shaw-bath'; a prim. root; to repose, i.e. desist from exertion; used in many impl. relations (caus., fig. or spec.):--(cause to, let, make to) cease, celebrate, cause (make) to fail, keep (sabbath), suffer to be lacking, leave, put away (down), (make to) **rest**, rid, still, take away.

God also blessed the seventh day, which means that He set it aside for holy use.

And God blessed the seventh day, and sanctified it: because that in it He had rested from all His work which God created and made. *Genesis 2:3*

After the fall, the Sabbath became a sign of obedience and adherence to God, whereas before the fall the test of obedience was the tree of the knowledge of good and evil. Speaking about the Sabbath, God commanded the children of Israel to keep it for it is linked to His creative act and by keeping it, they would acknowledge His ownership.

It is a sign between me and the children of Israel for ever: for in six days the Lord made heaven and earth, and on the seventh day He rested, and was refreshed. *Exodus 31:17*

The Hebrew word used here for ‘refreshed’ is *naphash* and in this verse a different word is used for rested; it is the word ‘*nuwach*.’ *Strong’s* defines these words as:

5314. **naphash**, naw-fash’; a prim. root; to breathe; pass, to be breathed upon, i.e. (fig.) refreshed (as by a current of air):--(be) **refresh** selves (-ed).

5117. **nuwach**, noo’-akh; a prim. root; to rest, i.e. settle down; used in a great variety of applications, lit. and fig., intrans., trans. and causat. (to dwell, stay, let fall, place, let alone, withdraw, give comfort, etc.):--cease, be confederate, lay, let down, (be) quiet, remain, (cause to, be at, give, have, make to) **rest**, set down. Comp. H3241.

These verses throw some light on the purpose for the Sabbath or the Seventh day of the creation week. Firstly, it clearly points to God as the Creator during the six-day creation cycle since it was set as a memorial to His creative act. Secondly, God was refreshed (*naphash*) on that day, He breathed a breath of satisfaction or sigh of contentment. He also rested (*nuwach*); He was confederate; in other words He was in the company of His creation; He spent time with them.

If we consider the sequence of the events during the six days of creation, then there is a distinct pattern to be discerned. God created the spaces and the sustenance for His creation in the first three days and then filled these spaces in the subsequent three days, then followed the seventh day. Following the same pattern, the setting aside of the Sabbath, or the creation of a further block of time - the seventh day - was in a sense also creating a space, a space in time. What did God fill this space with? He filled it with Himself by drawing close to His creation. The basis of all relationships is togetherness, commonality, fellowship and trust. In creating man

in His own image, God had noble intentions for His new creation.

Nowhere in the Scriptures do we have even an inkling of man having evolved from a lower state to a higher state. God created man noble and for a purpose, not only did He give man dominion, but He wanted to share Himself with man and be confederate as well. The Psalmist writes:

What is man, that thou art mindful of him? and the son of man, that thou visitest him? For thou hast made him a little lower than the angels, and hast crowned him with glory and honour. *Psalm 8:4, 5*

Rather than pointing to the insignificance of man, these verses highlight his nobility. What is so significant about man that the great God of the universe should be so mindful of him? Verse 5 provides the answer. Firstly, the rendering of the text '*lower than the angels*' by the King James Version is not necessarily correct; the word translated '*angels*' in the Hebrew is *elohiym*, which means God though it is sometimes also a reference to angels, who incidentally are also in the image of God judging by their high position. Strong's concordance defines *elohiym* as follows:

0430 'elohiym {el-o-heem'} - God, god, judge, goddess, great, mighty, angels, exceeding, Godward, godly. 2) (plural intensive - singular meaning) god, goddess godlike one, works or special possessions of God, the (true) God, God

God thus created man just a little lower than Himself and shared Himself with man. He gave man dominion, glory, and honour.

Thou madest him to have dominion over the works of thy hands; thou hast put all things under his feet: All sheep and oxen, yea, and the beasts of the field;

The fowl of the air, and the fish of the sea, and whatsoever passeth through the paths of the seas. O Lord our Lord, how excellent is thy name in all the earth! *Psalm 8:6-9*

The seventh day of the creation week was thus set aside for fellowship and confederacy and God rounded off His creation by binding it to Himself. This certainly leaves no room for an impersonal God who stands back after initiating the creation process and then allows evolution to create intelligence out of chaos. Reading the Genesis account as it stands, it is apparent that it is not compatible with the requirements of the naturalistic approach to the question of origins. To overcome this problem, there have been a number of attempts to reduce the impact of the Biblical narrative to the level of mythology or allegory. This would allow for poetic license in the interpretation of the text.

Genesis 1 versus Genesis 2:

The discipline of literary criticism arose in the 18th century and questioned Biblical validity with regard to its historic and prophetic content. The creation account has been one of its prime targets both in terms of validity and authorship. Even the continuity of the narrative has been questioned and its authorship split into factions separated by centuries. Traditionally, the authorship of the book Genesis is ascribed to Moses, but critics have tried to assign the creation account in Genesis to the 10th and 6th or 5th centuries BC.

According to the Documentary Hypothesis, *Genesis 1* was written in the 6th or 5th century BC. and *Genesis 2* was supposedly written in the 10th century BC. The two narratives differ in various ways, but also have numerous points of contact as well. In his exhaustive study of the two narratives, William Shea clearly exposes the unlikelihood of these accounts ever having been written centuries apart or even by two authors.⁵ According

to Shea, *Genesis 2* essentially picks up the narrative of *Genesis 1* and although everything is not repeated in the second narrative, highlights of the account are doubled to bring these issues into view. One example is in the announcement of the creative act itself, which is doubled in the second narrative. In *Genesis 1* we read:

In the beginning God created the heavens and the earth. *Genesis 1:1*

In the second chapter we read:

These are the generations of the heavens and of the earth when they were created, in the day that the Lord God made the earth and the heavens. *Genesis 2:4*

Not only is there a doubling in the narrative, but also the divine name is employed differently in the two chapters. In *Genesis 1*, the divine name *Elohim* is used exclusively, whereas in *Genesis 2* the combination *Yahweh Elohim* is used throughout the chapter, and the literary critics believe this to be an indication of different sources. However, since there are points of contact in terms of the chiasmic structure of the two chapters and a doubling of narrative phrases and of the divine name throughout the second chapter, this indicates intent and points to one author. Moreover, it is unlikely that this doubling in *Genesis 2* can make this chapter the primary source which supposedly preceded the writing of *Genesis 1* by five centuries; rather it points to continuity and harmony between the chapters since the second chapter is schooled on the first. There is a reason why the second account seems so different to the first. *Genesis 1* provides an overview of the creation events, but in *Genesis 2* the focus is the creation of man and God's personal involvement and relationship with man. This close relationship is highlighted by the use of the personal name of God, namely *Yah-*

weh. The use of the name *Yahweh Elohim* brings God into personal contact with man and is a direct contradiction of the concept of an impersonal God who started the evolutionary process and left it to its own devices.

It is claimed by theologians critical to the literal interpretation of the Genesis account of creation that the accounts of Genesis 1 and Genesis 2 do not correspond and that they even contradict each other thus suggesting not only different narratives, but different authors for the two accounts. In Genesis 2 we read:

These are the generations of the heavens and of the earth when they were created, in the day that the LORD God made the earth and the heavens, And every plant of the field before it was in the earth, and every herb of the field before it grew: for the LORD God had not caused it to rain upon the earth, and there was not a man to till the ground. *Genesis 2:4-5*

After completing the six day creation account, culminating in the seventh day of rest, in the first chapter, the account of Genesis 2:4-5 lists four things that God had *not yet* done: the plant of the field, the herb of the field, rain, and a man to till the ground. This seems to contradict the completed creation of Genesis 1. Moreover, we read in Genesis 2:7-9

And the LORD God formed man of the dust of the ground, and breathed into his nostrils the breath of life; and man became a living soul. And the LORD God planted a garden eastward in Eden; and there he put the man who he had formed. And out of the ground made the LORD God to grow every tree that is pleasant to the sight, and good for food; the tree of life also in the midst of the garden, and the tree of knowledge of good and evil. *Genesis 2:7-9*

This sequence of events also seems to contradict the account of Genesis 1, since man now appears to precede the formation of plants which according to Genesis 1 had already been created on the third day. Randall Younker, Professor of Old Testament and Biblical Archaeology and author of *God's Creation: Exploring the Genesis Story*, succinctly analyses the reasons for these discrepancies and provides a profound solution for the apparent inconsistencies. Firstly, he points out that the transition between Genesis 1 and Genesis 2 does not appear where it is currently placed, since the division is arbitrary and, as acknowledged in many modern translations, the transition actually occurs in the middle of verse 4 after the concluding sentence: "These are the generations of the heavens and of the earth when they were created, in the day that the LORD God made the earth and the heavens." The things that God had *not yet* created thus form part of the second narrative. Secondly, he points out that the idea of multiple authors raises a number of questions which would place doubt on various other portions of scripture, especially since the Bible writers and Christ Himself refer to the Genesis account as written by Moses and considered it divinely inspired (Rom 4:17; Gal 3:8; Heb 4:4; James 2:23). Younker states:

Especially interesting is Jesus' comment to the Pharisees about the permissibility of divorce (Mt 19; Mk 10). Jesus asked, "What did Moses command you?" (Mk 10:3). When they replied by quoting Deuteronomy 24:1-4, Jesus countered by quoting from Genesis 1:27 and 2:24 (Mt 19:4,5; Mk 10:6-9). Clearly, Jesus' counter-argument was based on the assumption that Moses authored these passages - otherwise His arguments would have been devoid of authority.

What about the four things that did not yet exist after the completion of the earth and the heavens (plant of the field, the

herb of the field, rain, and a man to till the ground)? These then would form part of the second narrative and an explanation seems warranted as to why these things did not yet exist when the creation account seems to have been completed in Genesis 1. Younker points out that most scholars who had studied the creation accounts in Genesis appear to have assumed that the phrases used for the plants in Genesis 1:11,12 and Genesis 2:5 referred to the same type of vegetation, but this is not the case. He states that:

Genesis 1:11,12 actually reads "Let the earth produce vegetation [Heb. **deshe'**], seed-bearing plants [*'esev mazry 'zera'*], and fruit-bearing fruit trees [*'ets pry 'oseh pry*] with seed according to its kind." Genesis 2:5, on the other hand, reads that prior to man's creation there was no shrub of field [*siah hassadeh*], and no plant of the field [*'esev hassadeh*] "had yet sprung up."

The Hebrew terms are different in the two chapters and refer to different things. Younger continues:

The word *siah*, "shrub", appears in only three passages in the Hebrew Bible - Genesis 2:5, 21:15, and Job 30:4,7, while the full expression *siah hassadeh*, "shrub of the field", is unique, appearing only in Genesis 2:5. The context of both Genesis 21:15 and Job 30:4,7 make it clear that the *siah* is a plant adapted to dry or desert environments. As such, it is most likely a spiny or thorny plant... thus, one of the plants that did not yet exist at the beginning of the narrative of Genesis 2:4b was the thorny *xerophyte* - the agriculturist's bane.

The other botanical term used in Genesis 2, *'esev* (plant) is quite commonly used, but the full expression *'esev hassadeh* (plant of the field) is used only in Genesis 2:5 and Genesis 3:18, where it refers to the food that Adam would have to eat as a result of his sin. This food was to be obtained only through toil and thus also constitutes a new order of things and is directly a consequence of the fall into sin. Since Genesis 3:19 states that these plants were used to make bread, the term thus refers to the grains which would henceforth constitute the staple diet of man, and these could only be cultivated by tilling the ground by the sweat of the brow. The plants of the second Genesis narrative thus refer to post-fall food crops and weeds.

The Garden of Eden was largely a fruit tree orchard, since Genesis 2:9 mentions that it contained all kinds of trees that were good for food. A man to till the ground, which was also *not yet* in the Genesis 2 account, also does not come to view until after Adam's sin. It is only after the fall that the ground is cursed by God and that toil becomes necessary. Genesis 2 is thus not saying that no man existed after God had made the earth and heavens, but that no sinful man yet existed. Genesis 3 makes it clear, that "working the ground" is a condition associated with sin.

The final not yet item mentioned in Genesis 2 is rain, and this is a further circumstances that did not exist prior to the entry of sin. Only at the commencement of the flood does rain become a feature of the post-fall world and is a further judgment of God in response to the fall of man. It would henceforth be the lot of man to be dependent on rain for the successful cultivation of the staple food crops, a constant reminder of his dependence upon God. The introductory verses of the second Genesis narrative thus explain the origin of the four things that were not part of the original creation, and rather than contradicting the first narrative, Genesis 2 forms a bridge between the perfect creation account and the fall of man which is presented in Genesis 3.

The Flood

Flood narratives of a worldwide destruction of life on earth are common to many cultures around the world and common threads run through all of them. The Biblical flood account, with Noah as the central figure, is written as a historic narrative whilst the other accounts are largely mythologized. The hero of the Babylonian story is Atra-Hasis, the Sumerian hero is Ziusudra and the Neo-Assyrian hero is Utnapishtim. These names do not seem to bear any resemblance to Noah, but there is a Mesopotamian story, the Hurrian story of which the hero's name was na-ah-ma-su-le-el. It has been suggested that this name could represent a combination of Noah and Methuselah with the 'el' at the end of the name being the word for God.⁶ In the Biblical and Babylonian accounts many of the names associated with the antediluvian culture are similar, and the differences can be accounted for by phonetic shifts in the pronunciations. Both accounts thus seem to refer to the same events and William Shea summarizes these similarities as follows:

BIBLICAL	BABYLONIAN
First human – Adam	First wiseman of the city – Adapa
Name of first city – Henok	Patron god of the first city – Enki
Builder of first city – Quain	Builder of the first city – Q₄-an
Grandson of the builder - Irad of the first city	Name of first city – Eridu
Location of the first city - Nod	Title of first city's god - Nudimud

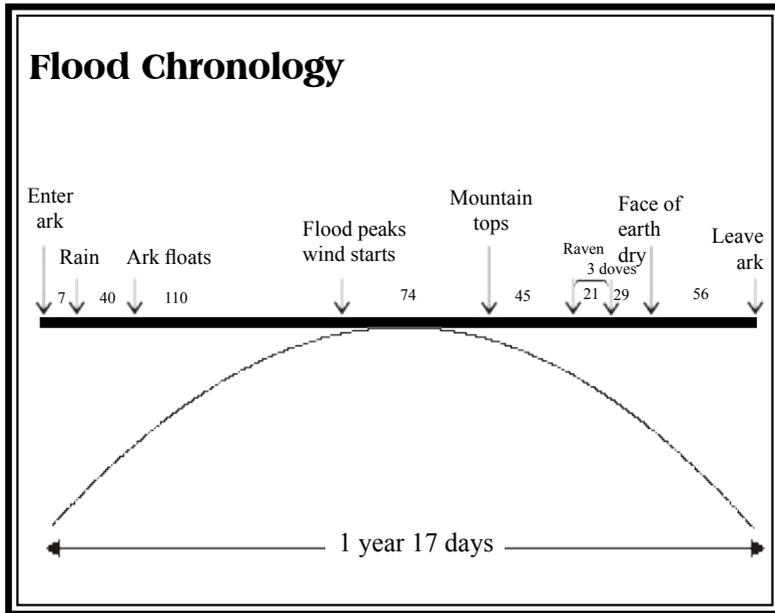
If an event such as the Biblical flood ever occurred, then it is to be expected that ancient cultures should bear testimony to such an occurrence, and this is indeed the case. However, such an event would undermine the very essence of the evolutionary paradigm, which requires continuity of life from its inception to the present time in order to allow for evolutionary change over time. There is no room in this theory for the total destruction of terrestrial life in the relatively recent past, let alone the story of the survival of representatives of antediluvian life having survived in the ark. Attempts at compromise have tended to minimize the Biblical account and to relegate the events described to a local flood in Mesopotamia. The Biblical description is however very clear on this point, with both the Old and the New Testament referring to a worldwide destruction of the earth by the flood. Relevant texts are:

And it repented the Lord that He had made man on the earth, and it grieved Him at His heart. And the Lord said, I will destroy man whom I have created from the face of the earth; both man, and beast, and the creeping thing, and the fowls of the air; for it repenteth Me that I have made them. But Noah found grace in the eyes of the Lord. *Genesis 6: 6-8*

And God said unto Noah, The end of all flesh is come before me; for the earth is filled with violence through them; and, behold, I will destroy them with the earth. Make thee an ark of gopher wood; rooms shalt thou make in the ark, and shalt pitch it within and without with pitch. *Genesis 6:13-14*

And of every living thing of all flesh, two of every sort shalt thou bring into the ark, to keep them alive with thee; they shall be male and female. *Genesis 6:19*

There then follows a detailed description of the flood events, which together with an analysis of the chronological data on the flood and the genealogy of Noah can be summarized as follows:



The chronology of the flood from the time that Noah entered the ark to the time that he placed his foot on dry land spans a time of 1 year 17 days (the exact time may vary somewhat in some manuscripts). It describes the week before the flood waters came, the 40 day rain, the fountains of the deep bursting forth and the waters peaking and covering the antediluvian mountains after 157 days. This is followed by the receding floodwaters, the drying of the earth by wind and Noah finally leaving the ark in the region of the 'mountains of Ararat,' obviously in an area of high relief. The time frame presented in the Scriptures does thus not preclude the possibility of the flood waters continuing to recede for a much longer time after this period in areas of lower relief. Moreover, since the flood waters rose for a longer period of time than the rain

fell, there must have been other sources of water involved than just the water from above, and the waters of the 'great deep' that are mentioned in the Biblical account are thus of particular interest. The waters for the flood came from two sources, the rain from above and the fountains of the great deep from below.

In the six hundredth year of Noah's life, in the second month, the seventeenth day of the month, the same day were all the fountains of the great (*rab*) deep (*t^ehôm*) broken up (*baqa*), and the windows of heaven were opened. *Genesis 7:11*

What exactly do the fountains of the 'great deep' refer to? The Hebrew for 'great' is '*rab*,' and for 'deep' it is '*t@howm*' Strong's concordance defines the word 'great deep' as follows:

07227 *rab* {*rab*}: - many, great, much, captain, more, long, enough, multitude, mighty, greater, greatly, 1a) much 1b) many 1c) abounding in 1d) more numerous than 1e) abundant, enough 1f) great 1g) strong 1h) greater than 1i) much, exceedingly

08415 *t@howm* {*teh-home*'} or *t@hom* {*teh-home*'}: - deep, depth, deep places 1) deep, depths, deep places, abyss, the deep, sea 1a) deep (of subterranean waters) 1b) deep, sea, abysses (of sea) 1c) primeval ocean, deep 1d) deep, depth (of river) 1e) abyss, the grave

This implies not only much water, but can also refer to many sources such as subterranean water and the oceans. The term '*t^ehôm*' occurs in the Old Testament 35 times of which 21 of them are in the singular as in the usage in the Genesis flood story. In *Genesis 1:2* the word '*t^ehôm*' is used in the sense of the waters of the ocean and

this agrees with its usage in *Psalms 104:6* and *Amos 5:8*

Thou coveredst it with the deep [*t^ehôm*] as [with]
a garment: the waters stood above the mountains.
Psalms 104:6

[Seek Him] that maketh the seven stars and Orion,
and turneth the shadow of death into the morning,
and maketh the day dark with night: that calleth for
the waters of the sea [*yam*], and poureth them out
upon the face of the earth: The Lord [is] His name.
Amos 5:8

As Gerhard Hasel points out,⁷ the word '*t^ehôm*' also refers to subterranean waters in the Biblical narrative. In *Deuteronomy 8:7* Moses describes the land Canaan as a land of water-brooks, fountains, and springs or 'deeps' (*t^ehômôth*) or a land watered by wells. In *Psalms 74:15* we read:

Thou didst cleave [*baqa*] the fountain and the flood:
thou driedst up mighty rivers. *Psalms 74:15*

The Hebrew word *baqa* is defined in Strong's concordance as:

01234 *baqa* ' {baw-kah'}- cleave, ...up, divide, rent,
... out, break through, rend, breach, asunder, hatch,
brake, burst, cleft, break forth, pieces, tare, tear, win
1) to split, cleave, break open, divide, break through,
rip up, break up, tear 1a) (Qal) 1a1) to cleave, cleave
open 1a2) to break through, break into 1b) (Niphal)
1b1) to be cleft, be rent open, be split open 1b2) to
be broken into 1c) (Piel) 1c1) to cleave, cut to pieces,
rend open 1c2) to break through, break down 1d)
(Pual) 1d1) to be ripped open, be torn open 1d2) to

be rent 1d3) to be broken into 1e) (Hiphil) 1e1) to break into 1e2) to break through 1f) (Hophal) to be broken into 1g) (Hithpael) to burst (themselves) open, cleave asunder

According to the context in which the word is used in *Psalms 74:15*, this implies that God split open the earth so that waters could come forth to feed the rivers. The same word *baqa* is used for the splitting of the rock by Moses in *Exodus 14:16*. The use of the same word in *Genesis 7:11* for 'broken up' thus seems likely to refer to the breaking up of the earth's crust to allow subterranean water to burst forth. Accordingly, the sources of water for the flood seem to have come from waters above, subterranean waters and waters of the antediluvian seas, thus accounting for the vast quantities required for this catastrophic event which not only covered the antediluvian mountains but also destroyed all the animals that had lived on dry land before the flood.

And the waters prevailed, and were increased greatly upon the earth; and the ark went upon the face of the waters. And the waters prevailed exceedingly upon the earth; and all the high hills, that [were] under the whole heaven, were covered. Fifteen cubits upward did the waters prevail; and the mountains were covered. And all flesh died that moved upon the earth, both of fowl, and of cattle, and of beast, and of every creeping thing that creepeth upon the earth, and every man: All in whose nostrils *was* the breath of life, of all that *was* in the dry [land], died. *Genesis 7:18-22*

The New Testament describes the same events, and in *Matthew 24* and *Luke 17*, Jesus Christ also refers to the flood as a literal event, which destroyed all mankind excepting those on the

ark. The apostle Peter also refers to the flood as a literal event.

For as in the days that were before the flood they were eating and drinking, marrying and giving in marriage, until the day that Noe entered into the ark, And knew not until the flood came, and took them all away; so shall also the coming of the Son of man be. *Matthew 24:38,39*

And spared not the old world, but saved Noah the eighth person, a preacher of righteousness, bringing in the flood upon the world of the ungodly. *2 Peter 2:5*

These plain statements of Scripture leave no room for compromise for those who wish to harmonize the Biblical account with the scientific evolutionary paradigm; neither do they leave any room for minimizing the extent of the flood to an isolated local event. Moreover, the events described in Scripture testify to a worldwide calamity of such enormous proportions as to dwarf even the greatest geological events advocated by science. It is interesting that Peter in his epistle alludes to a disbelief in the flood account, which will undermine the faith in the last days.

Knowing this first, that there shall come in the last days scoffers, walking after their own lusts, And saying, Where is the promise of His coming? for since the fathers fell asleep, all things continue as [they were] from the beginning of the creation. For this they willingly are ignorant of, that by the word of God the heavens were of old, and the earth standing out of the water and in the water: Whereby the world that then was, being overflowed with water, perished: But the heavens and the earth, which are now, by the same word are kept in store,

reserved unto fire against the day of judgment and perdition of ungodly men. 2 Peter 3: 3-7

According to this verse, issues which will be considered contentious in the last days would be the veracity of Christ's second coming, the creation account, and the belief in a worldwide flood. Moreover, the belief that '*all things continue as they were from the beginning*' alludes to a faith in uniformitarianism, which is a cornerstone of the evolutionary paradigm.

Amazingly, in spite of the total onslaught and persistent efforts of evolutionists to promote their model at all levels of society, only 9% of the general population in the United States of America believed the purely evolutionary model according to a Gallop Poll conducted in 1991.⁸ At tertiary institutes, the picture is somewhat different, Feder's (1986) study at Connecticut State University in the USA showed that 18% of students attending an introductory course believed that God created the universe in six literal days, a view that he considers to be based on pseudoscience.⁹

It is typical of evolutionary scientists to regard any alternative scientific approach to the study of origins, other than the evolutionary one, as pseudoscience. Even more amazing, in the light of the theological barriers to compromise discussed above, is the fact that even religious organizations will conduct efforts to convince students to incorporate evolutionary principles into their religious thinking. One such effort was conducted at the University of Cape Town by Anderson of the organization *Campus Crusade for Christ*.¹⁰

This study was conducted on Zoology students, and the researchers were pleased to record an increase from 47% to 70% acceptance of evolutionary ideas from their first to their third year of study. Belief in six-day creationism declined from the first to the third year from 13% to 0%. It was concluded that knowledge of evolution brought about this change, but of course no counter-arguments were ever presented to support any counterclaims. In the light of this rather one-sided approach, it is not surprising that the students were persuaded to undergo paradigm shifts. After this

very biased approach to the education of student in evolutionary theory, it was concluded that compromise theology was the way to retain religious convictions.

The Anderson study particularly singled out students who believe in a six-day creation as students most likely to lose faith when confronted with lectures on evolution. A further study conducted by Fulljames (1991) on adolescent pupils showed that those who hold to a six-day creation had greater difficulty combining science and religion.¹¹ The Anderson study consequently points out the absurdity of believing in a six-day creation in the light of the evolutionary evidence and concludes that all pastors should relent from attacking evolution. They should furthermore emphasize, that whilst the Scriptures teach that God is the Creator, it is open on the question of which natural processes He used in Creation. Theistic evolution is thus propagated as the means of retaining students in the faith whilst people believing in a literal creation are categorized as largely illiterate. Clearly the battle lines in the conflict between evolutionism and creationism are thus drawn between the six-day creation view and the naturalistic view; the one advocating total faith in the Word of God and other excluding God.

My Personal Conflict

At the university where I received my undergraduate training and where I spent a substantive part of my academic career as a lecturer and researcher in Zoology, most of my colleagues believed in the traditional model of Darwinism in that they embraced gradualism. However, the Neo-Darwinist view of punctuated equilibrium, championed by Stephen J. Gould of Harvard University and others, was also well supported as well, resulting in many a heated debate in the evolution discussion classes. In actual fact, gradualism (the idea that evolutionary change occurs gradually as organisms adapt

to changing environments and the viable and fortuitous mutations are selected through the process of natural selection) is the only model that lives up to the expectations of the traditional evolutionary model, and is representative of the view held by Darwin himself. Darwin wrote in the *The Origin of Species*:

If it could be demonstrated that any complex organ existed which could not possibly have been formed by numerous, successive, slight modifications, my theory would absolutely break down.¹²

The punctuated equilibrium model (the idea that change is not gradual over time, but that organisms experience long periods of stability or equilibrium, and that these periods of stability are interrupted by punctuated periods of rapid change during episodes of environmental change) was born out of necessity, because the fossil record does not seem to support the gradualistic model.

The fossils speak of an explosion of life forms, which is termed the ‘Cambrium Explosion’ where lifeforms literally exploded into existence, including even the Phylum Chordata to which man himself belongs (see chapter on the fossil record). The idea of punctuated equilibrium was born to deal with this dilemma. Of course, this has time implications as well, since rapid change implies shorter time periods than would be required for gradualism and it is quite incredible how flexible the scientific fraternity is in accommodating changes in existing time paradigms as long as they remain within the framework of the evolutionary paradigm. Hundreds of millions of years can be dropped out of the geological column without too many feathers being ruffled, but should a creationist dare to challenge existing time frames, then even the warring factions in the evolution camp stand united in their condemnation.

The leap from ‘Punctuated Equilibrium’ to special creation is really not that great. With creation, one would expect the sudden appearance of diverse lifeforms just as we see it in the Cambrium ex-

plosion. The sequence of change in evolutionary thinking described above is also a summary of my personal ‘evolution’ in terms of my understanding of the issues involved. As an undergraduate student I subscribed to gradualism, then as my insights were broadened at the post graduate level, I fell into the Neo-Darwinist camp and supported the punctuated equilibrium model. However, when I was challenged by the veracity of the Bible with regard to its historic and prophetic statements, I was compelled to reassess my views on the Scriptures in general. One of my greatest problems, however, concerned the question of origins, and this compelled me to study this issue in detail. I was so deeply rooted in the evolutionary paradigm that it took much research to even entertain the possibility of an alternative model of origins, but I was fortunate in that I was granted the opportunity to visit many sites around the world which provided evidence for catastrophism in line with what is recorded in the Scriptures and which contradicted the gradualistic paradigm of origins. Based on the evidence, I gradually changed my views but I was to find out that scientists do not take to this change of heart lightly. The concept of a divine origin for the universe and life is contrary to the evolutionary mindset, as the geneticist and evolutionary proponent Richard Lewontin so clearly writes:

We take the side of science in spite of the patent absurdity of some of its constructs, in spite of the failure to fulfill many of its extravagant promises of health and life, in spite of the tolerance of the scientific community for unsubstantiated just-so stories, because we have a prior commitment, a commitment to materialism. It is not that the methods and institutions of science somehow compel us to accept a material explanation of the phenomenal world, but on the contrary, that we are forced by our *a priori* adherence to material causes to create an apparatus of investigation and a

set of concepts that produce material explanations, no matter how counter-intuitive, no matter how mystifying to the uninitiated. Moreover, that materialism is an absolute, for we cannot allow a Divine Foot in the door.¹³

Indeed, the materialistic worldview leaves no room for a creator, and that is why they cannot allow a “Divine Foot in the door.”

The battle lines are very distinct between the creationist and naturalistic views on origins. Thomas Huxley, who is famous for championing Darwin’s cause, and even received the nickname ‘Darwin’s bulldog’ for his efforts, put the issue in a nutshell when he asserted that no man could be “both a true son of the Church and a loyal soldier of science.”¹⁴

Richard Dawkins, England’s preeminent Darwinist, writes in *The Blind Watchmaker*:

Biology is the study of complicated things that give the appearance of having been designed for a purpose.”¹⁵

He then sets out to convince his readers that this appearance is deceptive and that there is no need for a designer. Scott C. Todd, of the Department of Biology at Kansas State University, states it even more boldly:

Even if all the data point to an intelligent designer, such an hypothesis is excluded from science because it is not naturalistic.¹⁶

Clearly this worldview is atheistic. As for me personally, I considered myself an atheist, but thinking about it in retrospect I was probably more like an agnostic. I did not believe in God, but

there was room in my thinking for esoteric views on the elevated status of man, though I did not practice them nor belonged to any group that did. I grew up in a Christian home but had never studied the Bible as such. At best I considered it a book of allegorical stories and myths with perhaps some valuable moral teachings. When I was confronted for the first time in my life with a more intense study of the Bible, I was astonished at some of the amazing insights that I gained not only in the realms of morality, but also in the fields of History and prophecy. Since that initial start, I came to accept the Word of God as the most trustworthy book I have ever read. This Word has power to change lives, to lift people up and to give hope in the face of human hopelessness. It challenges one to test its trustworthiness: "Come let us reason together," says the Word. My change of heart regarding the question of origins and evolution was not instantaneous - no blinding flash shifted my paradigms - it was also not emotional. It was the result of a long and often hard road in search of truth. It is my intention to share the evidence I discovered with others, and to invite the readers to sift the evidence for themselves. If it is truth, then it will stand.

The reaction of my colleagues to my change of heart stunned me. For the first time I experienced the fervor of united opposition from the other side of the battle line. The conflict has convinced me, that we are not just dealing with scientific paradigms where opposing scientific views and theories are discussed in the spirit of congeniality, but this is a spiritual war. Evolution versus creation is a religious battle, and compromise is impossible.

The first time that I presented a lecture in support of origin by design, the reaction was overwhelming. A young female post graduate student rose up and asked why in the light of all the evidence in favor of creation as presented, had it been necessary to rob her of her religious convictions which she had prior to her university career. Indeed such is the power of evolutionary training. Students are trained to disregard the teachings of the Bible in favor of the evolutionary model. The prominent evolutionist E.O. Wilson confirms this loss of faith so aptly, writing:

As were many persons from Alabama, I was a born-again Christian. When I was fifteen, I entered the Southern Baptist Church with great fervor and interest in the fundamentalist religion: I left at seventeen when I got to the University of Alabama and heard about evolutionary theory.¹⁷

The young student's boldness in our evolution discussion class caused a major furor. For the first time I witnessed the raw anger of those whose evolutionary views are challenged and from that day onward I was treated like a man with leprosy. I was senior lecturer at the time, with numerous graduate students working under my supervision, but the tide of bitter opposition and the cold war which I experienced made it impossible for me to continue my work unaffected and I offered to resign. This led to an interesting cycle of events and discussions, which finally ended in the office of the rector of the university. Surely a compromise was possible. Surely I could teach within the evolutionary paradigm without rocking the boat and keep my convictions to myself. Prosperity lay before me - academic advancement, but the price was too high and I left the university convinced that the days of my university career as Zoologist were numbered. After all, which university would appoint a Zoologist with creationist views? I had spent my life studying Biology. It was in my blood and I had worked tirelessly to get where I was. It was indeed an empty feeling that flooded through me as I left the gates of my alma mater.

Amazingly, it was not long after this event that I was approached by other universities to teach courses related to my physiological training, where my views on origins would not impact on the students. However, the topic would never quite go to rest because I was constantly invited to act as speaker on the subject of origins and to take part in panel discussions. I am grateful for the tolerance which I did find among some scientists, and for the fact that the doors of my university career did not close altogether. I was however very surprised when I was eventually appointed as

professor and chair in Zoology at one of the large universities in South Africa. This position held many challenges, particularly since my position was known to all involved. In fairness to all parties, I chose not to interfere with the teaching of the evolutionary theory by my colleagues or invited guest speakers that taught courses on evolutionary theory to our graduates. However, if asked to deliver a discourse, during extra-curricular hours, I would consent to such requests. Needless to say, this led to much unhappiness on the part of some, particularly since many of the students would change their views when confronted with the other side of the story. How can students choose between paradigms if they are not exposed to the different views whatever they may be?

After endless sparring over this issue, the final conclusion was to be expected. An investigation with outside adjudicators was conducted in an attempt to diffuse the largely underground conflict. It was amazing to hear the accusations leveled at me and to see how closely they echoed the sentiments expressed in this chapter. One of my colleagues bluntly stated that one could not conduct science if one believed in a literal creation. This statement, however, brought about considerable debate. The constitution of South Africa guarantees religious freedom, but sadly it appears that this freedom does not address the real issues since it apparently cannot grant one the right to believe what God says on the question of origins. In order to diffuse the situation I again offered to resign, but the university graciously declined my offer. My alternative request for transfer out of the Zoological firing line was however granted, and since my research is largely physiological in nature I could readily move to a more medically inclined department.

Many scientists have come to realize how immensely improbable it is that life could have developed out of non-life. Many scientists are embracing the creationist paradigm, including many graduate students and scientists from all walks of life; even

eminent zoologists have come to me personally and have admitted that they also believe in a literal creation. Some have done it secretly and some have dared to defend creationism openly. It is only to the degree that knowledge is made available, that people will be empowered to make choices. Those who are not prepared to even listen to the evidence are not reflecting the true spirit that should actuate all true scientists:

Prove all things; hold fast that which is good.

1 Thessalonians 5:21

REFERENCES:

¹ John F. Ashton, ed., *In Six Days: Why 50 Scientists Choose to Believe in Creation* (New Holland Publishers, 1999).

² Ariel A. Roth, *Origins: Linking Science and Scripture* (Review and Herald Publishing Association, 1998).

http://books.google.ca/books?id=6XHnT85y7toC&printsec=frontcover&dq=Origins,+Linking+Science+and+Scripture&hl=en&sa=X&ei=N-_2UIL8Hoe9iwKriYCIBA&ved=0CDEQ6AEwAA

³ H. G. Wells, *The Outline of History: Being a Plain History of Life and Mankind*, Vol. 2, 4th Revision. (London: Cassell & Company Ltd., 1925): 616.

<http://ia600502.us.archive.org/8/items/OutlineOfHistory/OutlineOfHistory.pdf>

⁴ George Gaylord Simpson, *The Meaning of Evolution: A Study of the History of Life and of its Significance for Man* (New Haven: Yale University Press, 1949).

⁵ W. H. Shea, "Literary Structural Parallels Between Genesis 1 and 2," *Origins* 16(2) (1989): 49-68.

<http://www.grisda.org/origins/16049.htm>

- ⁶ W. H. Shea, "The Antediluvians," *Origins* 18(1) (1991): 10-26.
<http://www.grisda.org/origins/18010.htm>
- ⁷ G. F. Hasel, "The Fountains of the Great Deep," *Origins* 1(2)(1974): 67-72.
<http://www.grisda.org/origins/01067.htm>
- ⁸ A. A. Roth, "Creation Holding its Own," *Origins* 18(2) (1991): 51-52.
<http://www.grisda.org/origins/18051.htm>
- ⁹ K. L. Feder, "The Challenges of Pseudoscience," *Journal of College Science Teaching* 26 (1986): 180-186.
- ¹⁰ Mike L. Anderson, "The Effect of Evolutionary Teaching on Students' Views of God as Creator," *Journal of Theology for Southern Africa* 87 (1994): 69-73.
- ¹¹ P. Fulljames, H. M. Gibson, and L. J. Francis, "Creationism, Scientism, Christianity and Science: A Study in Adolescent Attitudes," *British Educational Research Journal* 17(2) (1991): 171-190.
- ¹² Charles Darwin, *The Origin of Species*, (New York: Heritage Press, 1963).
- ¹³ Richard Lewontin, "Billions and Billions of Demons," *The New York Review of Books* (January 9, 1997): 31.
- ¹⁴ T. H. Huxley, *Darwiniana: Essays* (London: Macmillan, 1893).
<http://books.google.ca/books?id=Kzp7Y9pJCQ8C&printsec=frontcover&dq=T.+H.+Huxley,+%22Darwiniana%22+1893&hl=en&sa=X&ei=QxT3UPagJqX7iwLLs4H4Cg&ved=0CC4Q6AEwAA#v=onepage&q=T.%20H.%20Huxley%2C%20%22Darwiniana%22%201893&f=false>
- ¹⁵ Richard Dawkins, *The Blind Watchmaker* (London: Penguin Books, 1986): 1.

¹⁶ Scott C. Todd, “A View from Kansas on that Evolution Debate,” *Nature* 401 (423) (September 30, 1999).

<http://www.nature.com/nature/journal/v401/n6752/pdf/401423b0.pdf>

¹⁷ E.O. Wilson, “Towards a Humanistic Biology,” *The Humanist* (September/October 1982): 40.

NOTES:

2

COSMOLOGY AND THE EARTH

The question of origins has always fascinated the human mind, and from the earliest times, the existence of life has mostly been attributed to supernatural intervention. However, naturalistic models of origins based on logic and philosophy can be traced to about the fifth century BC in Greece. Plato (428-348 BC) and Aristotle (384-322 BC) were the philosophers that probably had the greatest impact on western thought. Their idealistic view of striving for perfection laid the foundations for a naturalistic view of origins and Plato's views in particular had a profound effect on biology. To him, the structure and forms of organisms could be understood from their function, which in turn was designed to achieve ultimate goodness and harmony imposed by an external creator. Aristotle, the father of biology expanded this idea to include the development of organisms and the origins of groups of organisms. To Aristotle, the adult form represented the final goal or "telos"; and the changes occurring during embryological development represented a striving towards the "telos" and are dictated

by the “telos”. Transferring this idea to the larger scale of nature, Aristotle developed a “Scale of Nature” in which he arranged the natural world on a ladder commencing with inanimate matter to plants, invertebrates and vertebrates. Among the vertebrates, he placed the fish at the lowest rung of the ladder and humans on the highest rung. This “ladder of nature” thus represents a progression from the most imperfect to the most perfect. Moreover, Aristotle suggested that natural laws existed and operated in nature, which were independent of supernatural forces.

The idea that nature acted independently of higher control set the stage for modern thought on the question of origins and the forces acting upon nature. The Greek philosopher Anaximander (611-547 BC) took the naturalistic concept of origins a step further by proposing that modern man was derived from fish-like sea creatures or mermen that eventually emerged from the water and adapted to dry land. It may be surprising to some that even the theory of natural selection was already prevalent among the Greeks. Empedocles (490- 430 BC) not only believed in spontaneous generation, but also suggested that the processes of survival of the fittest (natural selection) were operative in nature.¹ Contrary to the Darwinian concept of natural selection, which is seen as a driving force for change, the Greek philosophers, however, saw it more as a means of preservation rather than change.

The concepts developed by the Greek philosophers retained their influence well into the eighteenth century and were nurtured by prominent thinkers such as Goethe (1749-1832), who believed that the origin of each level of organism was based on a fundamental primitive plan - an archetype - from which the more complex features and finally organisms developed. Although these naturalistic models of origins have existed for many centuries, it is only since the work of Charles Darwin (1809 - 1882) that biological evolution has become both scientifically and socially accepted. The ideas propagated by Darwin were totally in conflict with the Christian worldview of his time. The biblical account of Genesis was considered by the church

authorities to be the only correct version of origins and the age of the earth was measured by the number of generations since Adam. In contrast, the Darwinian concept of evolution required millions of years for the gradual change of form and structure required for the transition of one species into another.

Aristotle still believed in fixity of species and this concept of his was transferred to Christian thinking by Augustine (354-430 AD), one of the church fathers. Ironically, it is this very concept of fixity of species, which eventually led to the discrediting of the Genesis account when the church came into conflict with the Darwinian idea of natural selection, for it contradicted the observations of Darwin and others. Darwin's observations on the finches, which he studied on the Galapagos Islands, for example, certainly did not point to fixity of species. Moreover, natural selection thrives on variation, which in turn is contrary to the concept of fixity of species which was propagated by the church. The conflict between Christianity and Darwinism thus centered largely on the issues of time and fixity of species, which contradicted the European worldview in Darwin's time - that God had created immutable, unchangeable, fixed species in the not too distant past.

Attempts at compromise between the naturalistic view of origins and the Scriptural exposition are also not confined to the era of modern science. The Jewish scholar Philo of Alexandria (ca 20-45 AD) was one of the first to attempt reconciliation between the Old Testament and the Greek philosophies by treating the Biblical accounts as allegories. Origen (185-254 AD) took this process one step further and under his influence Christian scholars sought to find symbolic meaning in the Scriptural accounts thus negating any literal interpretation. This search for symbolic meaning in numbers and events recorded in Scripture also became central to Gnostic thinking. In his book, *The Two-Tailed Dinosaur*, Wheeler states:

To help in the interpretation of Biblical allegory,
Christians employed the science and philosophy of

the ancient Greeks, Egyptians and Mesopotamians. It brought much new knowledge to the Western world, but it also put into wider circulation many concepts antithetical to Christian doctrines and beliefs. Some of the pagan concepts would help to lay the intellectual foundation for the theory of evolution even though they themselves may not have been basically evolutionary in intent.²

Uniformitarianism vs. Catastrophism

The concept that the present is the key to the past is called *Uniformitarianism*. The term means that the processes in evidence in the world today are assumed to have existed in the past, and a study of present events can be used to create models of past events. Uniformitarianism has become basic to scientific thinking, and in the science of cosmology and geology in particular, it forms the cornerstone for modern concepts in geochronology. Before 1780, Uniformitarianism was not readily accepted. The dominant doctrine was *Catastrophism*. According to this view, the earth's features and the fossil record for that matter, were the consequence of a series of global catastrophes, each of which had wrought extensive changes, both in the physical features of the earth and in all living things.

James Hutton (1726-1797) first championed the idea of slow gradual change to account for changes in the earth's topography, but it was not until about 1830 that Charles Lyell (1797-1875), an Englishman sympathetic to the views of Hutton, documented uniformitarianism in his interpretation of the origin of the rocks and landforms of Western Europe. Lyell argued that the earth must be very old for its many geological changes to have taken place by such gradual processes. The presiding worldview of catastrophism

gradually gave way to uniformitarianism under the influence of scholars who adopted the views of Lyell. It is noteworthy, however, that many features of the earth's topography are hard to explain by uniformitarian principles and so modern geologists have been forced to accept that rates of change may have varied considerably in the past, and catastrophic events have been employed more and more to explain some of the geological features of our planet. This swing in thinking even admits to short lived floods, storms and meteoric impacts as being possible agents of dramatic change. In the past few years geologists have thus come full circle, accepting the possibility that some of the catastrophic events in our geological past may have had more than local significance.³

Charles Darwin was much influenced by the work of Lyell, and during the voyage of the *Beagle*, he carried with him Lyell's *Principles of Geology* and assiduously noted the geological features of the many terrains he covered. The concepts of evolution were not entirely new to Charles Darwin, as his grandfather, Erasmus Darwin (1731-1802) had been an early popularizer of evolutionary ideas. Charles Darwin's ideas on this issue only really crystallized during the voyage of the *Beagle*, and his experiences and observations on the lava-ridden Galapagos Islands off the coast of Ecuador probably had the most profound influence on his thinking. (See Figure 2.1)

On these islands, he found the most unusual collection of organisms - giant tortoises and iguanas, many unusual plants, insects and reptiles and many varieties of finches. The finches, in particular, interested him, as these normally seed-eating birds adopted the insect-eating habits of species such as warblers, which are absent on these islands. The subtle changes in form, structure, and habit of these birds entrenched the ideas of change over time and stirred the seed of evolutionary thought in Darwin, leading him to begin his first notebook on the *Transmutation of Species* in 1837.

It seemed reasonable to Darwin that the organisms on the islands had been transformed over time and that the new structures and habits had developed over time. However, the mechanism for the transformation of species was not nearly as easy to explain as the



Figure 2.1 - Route of the 5-year voyage of the Beagle, beginning at Plymouth, England in December 1831, and ending in Falmouth, October 1836. Almost 4 years were spent in South America, including 1 month in the Galapagos Islands (September-October 1835)

assumption that such transformation had indeed occurred. It must be noted that the world at that time had no knowledge of the science of genetics. Gregor Mendel (1822-1884), the father of genetics, was a contemporary of Darwin, but his work was unknown to the world at large and unavailable to Darwin.

Lamarckism vs. Natural Selection

Lamarck was the first biologist to propose a mechanism for evolution. He proposed that organisms acquired features as they needed them. A giraffe would require a long neck because it strove to eat leaves high up in the trees, and birds that did not like swimming, but collected food in shallow water would develop long legs and become waders. Lamarck, at times, ascribed the process of evolution to some inner mystical vitalistic property of life (an ethereal fire). Darwin, on the other hand, proposed the totally naturalistic mechanism of *natural selection* as an evolutionary mechanism and this mechanism has become more acceptable to biologists. He defined the principle as follows:

As many more individuals of each species are born than can possibly survive, and as, consequently, there is a frequently recurring struggle for existence, it follows that any being, if it vary, however slightly, in any manner profitable to itself under the complex and sometimes varying conditions of life, will have a better chance of surviving and thus be naturally selected. From the strong principle of inheritance, any selected variety will tend to propagate its new and modified form.⁴

This theory provided a mechanism for change over time, but it was not until the science of genetics had developed and the concept of mutations was understood that the concept could be developed

into its present-day form where mutations provide the material for variation and variation becomes the substance upon which natural selection could feed.

The basic difference between Lamarckism and Darwinism is thus that Lamarck proposed that adaptations were acquired because organisms needed them, whereas modern Darwinism states that the adaptations developed by chance through mutations and that the sorting mechanism for determining which of these adaptations would survive, was natural selection. In a sense, natural selection becomes the driving force for change. Most biologists uphold the basic Darwinistic view of origin by natural selection today. They might vary on the mechanism of change, but the basic principles of Darwinism are deeply entrenched in current scientific thinking. Science today leaves little room for a literal interpretation of the genesis account, let alone the short chronology associated with it. At best, scientists might ascribe to some form of theistic evolution where God is seen as the originator of life and the mechanisms of evolution as the “creator” of the varied life forms in existence today. In a sense, God used evolution to create man and all the other living organisms on earth. The basic theological problems with this attempt at compromise have been discussed in chapter 1, and they can be briefly summarized in Table 2.1.

In the light of these differences, it is evident that it would take quite a degree of distortion to reconcile these two concepts. Indeed the modern concept of scientific Creationism is largely frowned upon by the scientific community and even subjected to open ridicule. Nevertheless, some new evidence regarding catastrophic origins of many geological features warrant a reappraisal of some of its tenets. Since Luis W. Alvarez, the Nobel prizewinner, proposed in 1980 that an asteroid had collided with the earth and caused widespread destruction and extinction of species, there has been a general acceptance of catastrophism as a causative agent in the shaping of geological features.

Although the concept of a worldwide flood on the scale described in the genesis account is still taboo, post catastrophic floods

EVOLUTION	SPECIAL CREATION
Life originated from non-living material under primitive atmospheric conditions in a chemically rich ocean millions of years ago	God spoke living organisms into existence a few thousand years ago
All life forms originate from a common ancestor	God created basic life forms which He called "kinds".
Organisms change because of mutations, thus giving rise to new species.	Change is limited by the boundaries defined by God.
By natural selection better adapted organisms are selected for survival of the fittest. Development is progressive.	Since the fall there has been a deterioration. Development is regressive. The modern world is a distorted remnant of the perfect world which existed after creation.

Table 2.1

are being regarded more and more as shapers of geological features that were previously considered to have developed as a consequence of uniformitarian principles over thousands or millions of years. One example of such a change of position is the story of the Columbia River Dry Falls, which are now considered to have been shaped by catastrophic floods at the end of the last ice age.

Even though catastrophism is being accepted as a part shaper of the earth's topography, the concept of vast ages for the history of the world and the universe in general is still deeply entrenched in the mindset of the scientific fraternity. Catastrophism can at best thus only receive partial acceptance, as its obvious time implications must be limited to intermittent events having little impact on the overall time scale. After all, the scientific fraternity claims that radiometric dating

clearly supports long ages and the current cosmological worldview is that the universe is between 10 and 20 thousand million years old. Moreover, the standard model for the origin and development of the universe is also entirely naturalistic in nature and does not require the intervention of a Higher Being.

The Origin of the Universe

As discussed in chapter one, the Biblical model of origins states unequivocally that God created the universe. Modern Science has, however, presented a model of origins which does not require an intervention of a Higher Being in the formation of the universe. Briefly put, the naturalistic theory states that: In the beginning there was the ‘cosmic egg’ (a very dense compressed object into which was compressed all the matter of the universe and according to various speculations could have been smaller than a pinhead or some claim that it could have been a few kilometers in diameter). This primordial egg exploded some 15 thousand million years ago and produced some atoms of hydrogen and helium, which together with photons came shooting out of the explosion with great speed. As it cooled, it clumped together to form stars, and nuclear reactions within the stars produced the heavier elements such as oxygen and iron. When these stars in turn exploded, they scattered these elements. Enriched by these elements, the gas clouds eventually spawned other objects including our sun and planets, which contain all the elements necessary for life to evolve. The evolutionary process then continued until by chance molecules arose which gave rise to life. Eventually, all the plants and animals, including man, came into existence through these naturalistic processes. This scenario also requires a substantive leap in faith, since the very essence of the theory violates the laws of thermodynamics.

The *First Law of Thermodynamics* tells us that matter cannot be created or destroyed. Since the world is here, this leaves

us with two choices, either somebody made it, or it made itself. Of course it does not answer the question: where did the initial material, or for that matter God, come from? The *Second Law of Thermodynamics* says: everything tends toward disorder. This phenomenon is known as entropy. The first law is one of conservation and implies that the substance of the universe (matter and energy) is a constant. No matter or energy is thus being added to the universe, or one could say that the 'creation' of all matter is thereof complete. The second law states that all processes in the universe will result in an increase in the entropy or movement toward a final equilibrium where all processes cease and this will lead to what has been described as heat-death of the universe. According to this law, order will tend to decrease rather than increase, but because there is so much order in the universe today this law of necessity must be violated by all theories that postulate the development of order out of chaos. This applies both to the physical and to the biological world, but in spite of these constraints, naturalistic theories of origins, with their implied long ages, are the accepted paradigms within which the educational systems of the world operate. Dr. Isaac Asimov stated in the *Smithsonian Institute Journal*, 1970:

The universe is constantly becoming more disorderly. Viewed that way, we can see the second law all about us. We have to work hard to straighten a room; but left to itself it becomes a mess again – very quickly and very easily; even if we never enter it – it becomes dusty and musty. How difficult to maintain houses and machinery and our own bodies in perfect working order... How easy to let them deteriorate – in fact, all we have to do is nothing – and everything deteriorates, collapses, breaks down, wears out – all by itself – and that is what the second law of Thermodynamics is all about.

In spite of the constraints imposed by the laws of thermodynamics, theories of naturalistic origins still continued to flourish and received a boost when radiometric methods for age determination were discovered. It was argued that given enough time these problems could be circumvented since one could find pockets of ‘inventiveness’ (chance formation of order in an overall declining system) and radiometric theories seemed to provide the proof for such long ages.

The Big Bang Theory

Ever since the discovery of radioactivity by Henri Becquerel in 1896 and the development of the technique of radiometric dating 13 years later, by Lord Rutherford, not only could age determinations of certain strata be carried out, but also elements were seen to have a finite existence. This raised the question of where the elements came from in the first place and the search for a naturalistic mechanism for the origin of matter, and the universe in general was pursued with new vigor. In the first half of the 20th century, astronomers were concluding that stars were the source of complex atoms that were being produced by nuclear processes in their interior. The process of atomic fusion could construct complex atoms from simple ones. This insight raised more questions: where did the stars come from and where did the universe come from? In the second half of the 20th century, a number of theories were put forward to address these questions.

The model that has come to be most widely accepted is called the Standard Model, as it is apparently most consistently supported by astronomical observations. It is also generally known as the ‘Hot Big Bang’ model and can be summarized as follows⁵:

The Big Bang Model

- ◆ The universe is 10-20 thousand million years old.
- ◆ It started with a rapid expansion (explosion) of super hot and dense ‘primordial matter’ comprised of subatomic particles such as quarks and antiquarks.
- ◆ The rapid expansion caused cooling.
- ◆ As temperatures dropped, other particles were formed such as electrons and positrons, protons and antiprotons, neutrons and finally nuclei of hydrogen, deuterium, helium, lithium and beryllium (the primordial elements).
- ◆ During the first 300,000 years or so, matter and radiation were coupled (they were in thermal equilibrium).
- ◆ When the temperature had dropped to 3000 K (Kelvin, the absolute temperature scale on which -273 K stands for 0 °C) the universe became transparent (matter and radiation ‘de-coupled’).

Table 2.2

This cosmological theory of the origin of the universe was largely formulated by Edwin Hubble and is based on certain astronomical observation and on philosophical assumptions. In the formulation of the theory, Hubble assumed two basic principles: *General Relativity* and the *Cosmological Principle*, and these principles lie at the heart of the Big Bang Theory.

Before the development of modern astronomical instrumentation, there had been no way of determining the status of some of the components of the universe. In fact, the question as to whether other galaxies formed part of the Milky Way system or lay outside of the Milky Way had not been settled by the dawn of the 20th century and was a question of hot debate in 1921. In 1924, Hubble (through his study of Cepheid stars in other galaxies) showed that the majority of nebulae (as all nebulous objects and galaxies were called at that stage) indeed lay great distances outside our galaxy. Moreover, by studying the spectral lines emitted by these galaxies he noted that they showed red shifts, and because of his underlying philosophical convictions, concluded that all galaxies were moving away from our own Galaxy, the Milky Way. Hubble also observed increasing red shifts for galaxies at increasing distances from the sun. This was the conclusion because the fainter a galaxy (and therefore presumably, the further away), the bigger the red shift in its spectrum (therefore, presumably, the faster it must be moving away from the earth) and this was so no matter in which direction one looked. It thus appeared as if the entire universe was dilating away from an expansion center, which, to all appearances, was the earth itself. If the universe is expanding, then it must have been smaller in the past, and so the Big Bang theory was born. The astronomical observations that fit in with the Big Bang theory of an initial explosion, an expansion, and subsequent formation of all the matter in the universe are:

- a) Almost all galaxies show red shift
- b) There exists a background radiation (a presumed remnant of the initial explosion) with a temperature of about 3 K, the so-called microwave background radiation (MBR)
- c) There is an observed cosmic abundance of hydrogen, helium, lithium and beryllium in the universe.

As noted earlier, the Big Bang theory is not only based on these empirical observations, but is intertwined with philosophical assumptions and there are numerous eminent scientists that do not agree with the interpretation of the data at hand. Let us examine the various components of the theory and the interpretations of the data.

The Philosophical Assumptions:

As mentioned earlier, the two basic principles that lie at the heart of the 'Big Bang Theory' are General Relativity and the Cosmological Principle.

Relativity: Before the modern cosmological worldview became to be generally accepted, the commonly accepted Western view was that the earth played a central part in the creation story, and it was even accepted that the earth was the center around which all other heavenly bodies revolved. This Geocentric (earth-centered) view was challenged by Copernicus, who proposed the Heliocentric view that the earth moved around the sun. Today, it is believed that the earth is a relatively insignificant planet, revolving around a relatively insignificant star, the Sun, which in turn circles around an ordinary galaxy, the Milky Way, that in turn circles around a relatively minor cluster of galaxies called the Local Cluster, which in turn is like a speck in the vastness of the universe. This is called the ‘Mediocrity Principle.’ The difference between a heliocentric theory and a geocentric theory is one of relative motion.

A number of experiments have been conducted in order to measure the absolute motion of the earth through space. In 1881 Albert A. Michelson, together with his colleague Edward Morley, designed and built an apparatus called an interferometer to measure this motion.⁶ Since it was shown that light acted also as a wave, it was assumed that, just like sound waves have to travel through

some form of material, so space must contain some form of material through which light traveled. Nobody knew what the medium was, so they called it 'aether', and their experiment was designed to measure the earth's speed through this aether. They expected the answer to be the rotation speed of the Earth at the latitude where the experiment was conducted. The two scientists intended to turn their instrument until they found a maximum fringe shift produced by light traveling in two perpendicular directions. The position of maximum shift would show in which direction the earth was moving and the size of the fringe shift would show how fast it was moving. Much to their surprise, the answer turned out to be zero. No matter how the earth moved, the 'ocean' (aether) it moved in always moved with it so that the earth was constantly in still water. What was true for the earth must also be true for every other body in the universe and this seemed incredibly improbable.

In 1905, Albert Einstein faced up to the contradictions that apparently followed from the experiment. He reformatted a theory that had been proposed by Dutch Physicist Hendrick Lorentz, and published his version of the 'Theory of Relativity' which provided a mathematical solution to the problem, thus divorcing it from the physical observations, and therefore did not require an aether. The equation $E = mc^2$ was also predicted by relativity. Two assumptions are inherent in the theory:

1. No matter how an observer is moving (uniformly), he will always come to the same conclusions about the universe. In other words, all frames of reference are absolutely equivalent.
2. No matter how an observer is moving (uniformly), he will always measure the speed at which light reaches him as being the same, a constant, 'c'.

The Cosmological Principle: This principle, in its simplest form, states that the Universe looks the same from every location within it. In an expanding universe, in which the rate of expansion increases

linearly with distance, the universe should always look the same from any location within it. Accepting this principle overcomes the appearance that everything is moving away from the earth as predicted by the red shift. However, there is no way to test the validity of this principle, because given the vastness of space, we cannot move to a sufficiently distant location to check the validity of the assumption. In fact, from all observations that are possible, the opposite seems to be true. Wherever we have been in space, and wherever we have looked, the principle seems to be violated. There is no uniformity, but rather magnificent variety. Wherever we look within the solar system - the galaxies, the super clusters, and the gas clouds - the heavens speak of anything but a boring uniformity. There is an inhomogeneous distribution of matter, which contradicts the very essence of the principle. The fact that there are structures on ever-larger scales than postulated by the Cosmological Principle does not auger well for the triumph of the principle when extrapolated to include the whole universe. If the principle is in trouble, then the Big Bang is in trouble.

The view that the universe must be uniform is central to the Big Bang theory, and Einstein and other scientists who sought to apply the theory of general relativity to the universe assumed this to be the case. This Cosmological Principle is on very shaky ground, especially since modern technology, telescopes, and space exploration opens up substantially more of the universe than was known in Einstein's day. The great chains of galaxies that curl around vast regions of empty space called 'voids' tell a different story. The astrophysicists of today are not unaware of the quandary in which this places them. As the professor of Astrophysics at Nottingham University admits regarding the problem of a non uniform universe:

Were lost ... The foundations of the big bang models would crumble away. We'd be left with no explanation for the big bang, or galaxy formation, or the distribution of galaxies in the universe. ^{7,8}

The Physical Observations:

Red shift: The principle of red shift is not a complex one. A wave emitted by a source, which is moving with respect to an observer, will have a changed frequency when observed. This is called the Doppler effect. For relative motion, where the distance between the source and the receiver is increased, the waves will have longer wavelengths, and the opposite is true if the distance is decreased. The classic example is the sound of the siren emitted by an ambulance traveling toward or away from an observer. When traveling toward the observer the waves are compressed and are shorter (high pitch) than when the ambulance is traveling away from the observer (low pitch). Astronomers examining the patterns of lines in the spectra emitted by distant stars and galaxies noted that they were slightly shifted toward the blue or more often toward the red part of the spectrum and distant galaxies were usually red shifted. This implies that the stars with a blue shift are moving toward the earth and those with a red shift are moving away from the earth. Hubble was careful not to call these shifts Doppler shifts. He called them ‘apparent velocity-displacements’, but nevertheless concluded that the universe was expanding.

The series of assumptions that have to be incorporated in the theory of an expanding universe gives apparent distances of up to 10 billion light-years for the most distant objects. There is however room for other interpretations of the red shift such as the shift being derived from a solidly rotating cosmos. Tangential, not just radial, velocities can produce red shifts, but there is no way of measuring tangential velocities for distant galaxies.⁹ According to Keith Wanser, who is professor of physics, California State University, Fullerton, other models for the formation of the universe offer acceptable alternatives to the Big Bang theory. Alternative theories have been proposed which involve ‘white hole’ cosmology, a recent creation of the earth, a bounded universe, an initial water mass, and Einstein’s theory of relativity. The earth is placed somewhere in

the center of the universe while long periods of time could have elapsed in other portions of the universe thus allowing sufficient time for starlight to have reached the earth. The theory also allows for expansion and red shifts. Other creationist theories have also been proposed which account for the background radiation.¹⁰

Background Radiation: The Big Bang theory proposes that the universe started with extremely high temperatures and cooled as it expanded. When the temperature had decreased after some 300,000 years to 3000K, matter and radiation became decoupled. In the early hot stages, matter and energy could freely change places with each other because they were 'coupled'. The high radiation (photons) would then be free to hurtle into space. However, since it is theorized that space itself is expanding, the temperature of the photons of energy falls until they have the frequency of microwaves. The background temperature of the Universe dropped to a mere 3K and this radiation is called the echo of the Big Bang or the 3K microwave background radiation (MBR). Actual measurements, however show numerous inconsistencies in these assumptions, and the temperature speculations are also problematic.

The high temperatures at the beginning would prevent gas clouds and thus stars from forming. A cloud of gas at a high temperature tends to fly apart, but the theory requires the gas to condense into stars. The gravitational forces between the gas molecules thus need to be great enough to allow for such contraction. Calculations show that unless the temperature is less than five K, the thermal energy of the cloud will tend to make the cloud expand and gravitational forces will be too low for contraction. In present day clouds where it is conjectured that stars are forming, the temperatures are far too high for this to take place, but the during the Big Bang they would have been even higher. It thus seems even more unlikely for them to have contracted in the past than is the case today.

Initial elements: The Big Bang theory does not allow for any other atomic elements to have originated from the explosion than hydrogen, helium, lithium and beryllium of which elements there is an abundance in the universe. How did this matter originate? This is one of the major problems with the Big Bang theory. It is speculated that the Big Bang originated from a quantum fluctuation of the vacuum, but experimental data shows that when particles are brought into existence from energy, something called the Baryon number is conserved. This means that when these particles are produced, they are produced in equal numbers of matter and anti-matter. For every electron there is thus a positron and for every proton, there is an antiproton. This would also have been the case in the Big Bang. Such symmetry would have resulted in the complete annihilation of both and the universe would have consisted of radiation only. The universe, however, has a complete dominance of matter over anti-matter, or else we would not be here.

Because of this problem, the GUT theories (Grand Unified Theories) have been proposed by physicists, which attempt to solve the problem mathematically, but violate Baryon number conservation. These theories in turn predict proton decay, which has not been observed experimentally. Once again, we see how ad hoc theories have to be proposed to prop up the standard model when the data does not fit the predictions. No wonder John Maddox, editor of the journal *Nature*, said in an article titled “Down with the Big Bang”:

In all respects save that of convenience, this view of origin of the universe is thoroughly unsatisfactory.¹¹

Writing in *New Scientist*, Margaret Wertheim quotes Andrej Pacholczyk:

... Much of contemporary cosmology deals with things like inflation and the big bang that have not been directly observed, and probably never will

be. Andrej Pacholczyk of the University of Arizona Tucson views cosmology as ‘non correspondence science’ – one based on almost pure speculation.¹²

The Age of the Earth

A study of the numerous Biblical chronologies available dates the earth to a maximum of 7,700 years with most chronologies advocating an age of ± 6000 years. The Septuagint is the translation of the Hebrew Pentateuch into Greek, made in Alexandria, Egypt in the third century BC. It places the creation week at 5665 BC and the flood at 3403 BC. The discrepancy between 6000 years or the Septuagint 7700 years and the scientifically accepted age of some 4,560,000,000 years is vast by all standards. Given such vast ages, the question arises as to how scientists calculate the age of the earth? One method used we have already touched on - by applying the principle of uniformitarianism, it is believed that one can derive the age of earth's strata.

For example, it can be observed how quickly sediments accumulate in a shallow lake. Assuming that we find that the rate of accumulation is 0.1 cm/year over our study period, then we could use this figure to calculate the approximate age of a sedimentary geological feature, which we consider to have developed under similar circumstances. A layer of sediment 10m thick could then have taken 10,000 years to form. Given periods of slow uniformitarian erosion, which would have removed sediment, it is easy to see that geological age can be considered vast indeed.

The conclusion reached in the above scenario is, however, only correct if the uniformitarian principle applies. What if there had been a catastrophic flood, that washed vast amounts of sediment into our shallow lake within one day? As is all too apparent from the media today, whole villages can be buried in sediment in an instant after catastrophic floods. Our assumption that the sedimentary layer

took 10,000 years to develop might be based on logic, but it need not necessarily be right. It could have formed rapidly. In fact, all models of age determination using the uniformitarian principle suffer the same restraints and can at best be used as guides. Other models besides sedimentology include the rate of orogeny (mountain uplift), erosion of continents, accumulation of volcanic ejecta, biological criteria such as mutation rates and accumulated change over time, the earth's cooling rate, rate of build up of ocean salinity, and many more.

Interestingly, the more data is accumulated, the more the various age assumptions come into conflict with each other. In fact, recent arguments on rates of evolution have produced a storm of scientific papers in the world's top journals where scientists are slashing millions if not hundreds of millions of years out of the geological time frame in order to fit and accommodate findings on the rate of evolutionary change. If it is acceptable in the scientific fraternity to slash millions of years out of the geochronological model, then surely it is an admittance that the time frames are not cast in stone. No uniformitarian method can give consistent results, and the development of radiometric dating techniques was seen as solution to this dilemma.

Radiometric Dating

A radioactive element is capable of changing into a new element by the emission of a charged particle. The parent isotope is thus transformed into a daughter product. This process will continue until a stable element is produced. The rates of decay vary from element to element and the rate is measured in half-lives. For example, if an element has a half-life of 5730 years, as is the case for carbon-14, then after 5730 years, only half the original amount of carbon-14 will be left in any non-living carbon-containing object after this time period. In order to determine the age of a substance, it is vital that the amount of parent element and its daughter product in the sample be known. The ratio of daughter to parent together

with the half-life criteria then enables one to calculate the age of the sample. Of course, one can only determine the quantity of the parent element in the present sample; the quantity of the parent element in the past must be estimated. Knowing the decay rates and using the assumption that these decay rates have remained constant over time, the age of the material can then be determined. In other words, all methods of radioactive dating rely on some *a priori* assumptions, which may not necessarily be true. These are:

1) The rate of radioactive decay and half-lives has remained constant over time. This assumption has the backing of numerous scientific studies and is relatively sound; however, conditions may have been different in the past and could have influenced the rate of decay or formation of radioactive elements.

2) The assumption that the clock was set to zero when the study material was formed. This requires that only the parent isotope be initially present or that the amount of daughter isotope present at the beginning is known so that it can be subtracted.

3) The assumption that we are dealing with a closed system. No loss of either parent or daughter elements has occurred since the study material formed.

Let us briefly look at these three assumptions with reference to specific examples.

The Rate of Decay: Let us consider carbon-14 dating as an example. Carbon-14 is formed when cosmic rays strike our atmosphere and bombard atoms, thus releasing neutrons. When nitrogen in the atmosphere captures these neutrons, the nitrogen is converted to

carbon-14, which reacts like normal carbon-12, but is radioactive. When carbon-14 reacts with oxygen it forms carbon dioxide and mixes with normal carbon dioxide in the atmosphere and the sea.

Plants utilize carbon dioxide during photosynthesis, and the ratio of carbon-14 to carbon-12 is thus the same in the plant as in the atmosphere. Animals that consume plants or the animals that have consumed animals that consume the plants also reflect this same ratio. This status quo is maintained as long as there is a turnover of carbon in the organism or, stated otherwise, as long as the organisms are alive. After death, this ratio will, however, change, as the carbon-14 will decay and revert back to nitrogen. This decay is of a random nature and after 5730 years, there will only be half as much carbon-14 in the organism as before. After a further 5730 years, only a quarter of the original amount would remain.

Evolutionists have to assume that the rate of cosmic bombardment of the atmosphere has always remained constant (resulting in the rate of carbon-14 formation) and that the rate of decay has remained constant. They thus assume that the equilibrium level has remained constant. Scientists place great faith in this dating method, and yet more than 50 % of radiocarbon dates from geological and archaeological samples of northeastern North America have been regarded as unacceptable by investigators.¹³

Although a creationist could also not prove otherwise, there are various reasons, which could be put forward as counter arguments to the constancy of the scientific assumptions:

- a) The constancy of cosmic ray bombardment might be questioned. The current high rate of entry might be a consequence of a disturbed post-flood environment that altered the carbon-14 to carbon-12 ratio. Pre-flood dates would thus have to be discarded. This shielding could be achieved by something as mundane as a higher atmospheric water content.

b) An increase in the magnetic field of the earth would have shielded the earth from cosmic rays. Some scientists argue that the magnetic field of the earth has declined over time.

c) Atmospheric carbon forms just 0.0005% of the current carbon reservoir - 99.66% of the earth's carbon exists in limestone, 0.31% in oil and gas, and 0.02% in coal. Carbon-14 comes from nitrogen and is independent of the carbon-12 reservoir. If even a small percentage of the limestone deposits were still in the form of living marine organisms at the time of the flood, then the small amount of carbon-14 would have mixed with a much larger carbon-12 reservoir, thus resulting in a drastically reduced ratio. Specimens would then look much older than they actually are.

Even if the rate of decay is constant, without knowledge of the exact ratio of carbon-12 to carbon-14 in the initial sample, the dating technique is subject to question. One of the assumptions made in employing the radiocarbon technique is that the total biosphere is in equilibrium (infinite age condition) for C-14. This assumption would of course not take into account a possible catastrophic event, in the not so distant past, which could have radically altered the C-14 condition and which in turn would mean that equilibrium has not yet been reached.

It is generally assumed that decay rates for radioisotopes have remained constant; however, there is evidence that the decay of unstable quantum mechanical systems is non-exponential.¹⁴ It is thus quite an extrapolation to assume that the decay of radioisotopes with high half lives is exponential, when experimental data is only available for short lived isotopes with half-lives of less than 100 years.¹⁵

Zero Reset: It is generally believed that when a volcano erupts, any daughter particles produced by radioactive decay are separated from the parent. Therefore, for example, any lead produced by previous decay when the lava was still inside the earth is separated from uranium by movement of the lava flow. The atomic clock is thus set to zero. Of course, one must also assume that once the lava is set, there is no movement in or out of the rock. For a time the Potassium Argon method was considered reliable until huge discrepancies were found and dates were often highly inflated. Results are accepted or rejected on the basis of whether they fit the expected age or not.¹⁶ The assumption that argon (which is a gas) is driven off when new formations are formed, is not valid and one cannot be sure whether the clock was set to zero. This point becomes clear when one considers that numerous dates derived by this method give timescales that are too old for even the evolutionary time scale. There is a gradient of argon in the geological column, with more argon in the older rocks and less in the younger rocks regardless of their potassium content, even in minerals with no potassium. This creates an instant time scale, which has little to do with actual geological age.¹⁷ The Rubidium Strontium method was also considered reliable until it was found that Strontium-87, on which the method depends, can be produced from Rubidium-87 by the emission of an electron but can also be produced from Strontium-86 by neutron capture. Since Strontium-87 is mobile it is not possible to tell from which source the Strontium-87 in the sample came from and the method in these grounds alone should be considered unreliable as Brooks *et al* pointed out:

... crystallization ages determined on basic igneous rock by Rb-Sr whole rock technique can be greater than the true age by many hundreds of millions of years. This problem of inherited age is more serious for younger rocks, and there are well-documented instances of conflicts between stratigraphic age and Rb-Sr age in the literature.¹⁸

Uranium lead dating also shows major discrepancies. When uranium decays to lead, eight helium atoms are produced for every initial atom of U-238. Helium is a noble gas with little tendency to react with other atoms and is very small. Huge quantities of helium are, however, found in zircon crystals in magma, which has consequences for the dating of the material since this implies a time span of only a few thousand years even for formations considered to be a billion years old. Both the rate of helium diffusion in a crystalline lattice and the rate of decay of uranium to lead can be determined experimentally, but the two processes yield wildly different ages for the same rocks.¹⁹

Many examples from literature show that the zero reset assumption is not always valid. Volcanic ejecta of Mount Rangitoto (Auckland, New Zealand) was found to have a potassium-40 age of 485,000 years, yet trees buried within the volcanic material dated with the carbon-14 method to be less than 300 years old.²⁰ Recent flows from Mt. Ngauruhoe in New Zealand which occurred between 1949 and 1954 were also dated as being of an upper age of 3 million years.²¹ Similarly, 10 year old rocks from the Mount St. Helens eruption were also dated at being between 340,000 and 2.8 million years old.²²

A further example from a lava flow off the coast of Hawaii shows similar discrepancies. If dated with the carbon-14 method, the flow appears to be less than 10 000 to 17 000 years old, but dating with the potassium-argon method gives dates of 160 000 to 43 million years. A rock sample from Nigeria was dated at 95 million years by the potassium-argon method, 750 million years by the uranium-helium method, and less than 30 million years by the fission-track method.²³

There are numerous examples in the literature which cast doubt on the clock-reset hypothesis. If the clock is not set to zero when a deposit forms, then there can be no starting point from which to calculate the age of a deposit.

Closed System: No scientist can guarantee that any sample can be considered a closed system unless it was isolated from its environment when it was formed. Elements can be transported into a sample or leach out of a sample. Different elements also have different solubilities. Again, scientists will reject ages that do not conform to the expected and will argue that the clock was not reset if the age is too old, or that isotopes were selectively removed if the age turns out to be too young. In the study on the Hawaii lava flow cited above, it was argued that entrapment of excessive amounts of argon gas had made the samples appear older than they were. Radiometric dating techniques are thus based on sound scientific principles, but rely on so many basic assumptions that the Bible-believing student need not have his faith shattered by data derived from these techniques.

Having established that even radiometric dating has its pitfalls, how much more questionable are the dates of geological features that cannot be dated radiometrically. The long ages attributed to the geological column, for example, are pivotal to the theory of evolution. Without these long ages, the supposed evolutionary changes leading to the development of the earth's complex life forms could never have taken place, yet evidence is mounting that the geological column and its entrapped fossil graveyards could have had a catastrophic origin. Tens of thousands of sedimentary layers, originally interpreted as having been deposited very slowly in shallow seas, are now considered as having been formed in minutes or hours.²⁴ If this is the case, then the geological column may not be as old as scientists believe.

The geological column with its palaeontological record is the main body of evidence cited for the theory of evolution. The order of the fossils is considered to be progressive and is cited as irrefutable proof for the theory of evolution. Since the fossil bearing strata cannot be dated radiometrically, the only evidence for the age of any particular layer is the presumed age of the fossils therein. This assumption is based on circular reasoning since the

age of the fossils determines the age of the strata, which in turn determines the age of the fossils. Nevertheless this is considered to be a viable dating technique. This assumption is basic to the study of fossil strata as Schindewolf already pointed out in 1957:

The only chronometric scale applicable in geological history for the stratigraphic classification of rocks and for dating geological events exactly is furnished by the fossils. Owing to the irreversibility of evolution, they offer an unambiguous time scale for relative age determinations and for worldwide correlation of rocks.²⁵

This type of circular reasoning is not only brushed aside as in the above quote, but is also openly acknowledged by the scientific fraternity as can be seen in the following statement by Rourke in an article published in the *American Journal of Science*:

The procession of life was never witnessed, it is inferred. The vertical sequence of fossils is thought to represent a process because the enclosing rocks are interpreted as a process. The rocks do date the fossils, but the fossils date the rocks more accurately. Stratigraphy cannot avoid this kind of reasoning, if it insists on using only temporal concepts, because circularity is inherent in the derivation of time scales.²⁶

A study of the strata and the fossils from a catastrophic perspective would thus drastically alter the time scales and allow for reinterpretation of the data and this could make the flood model as written in the book of Genesis a contender which could be seriously considered.

Paleomagnetism

Paleomagnetic evidence seems to point to long ages and needs to be briefly considered here. When molten rock from volcanic ejecta cools, the magnetic particles in the lava align themselves according to the prevailing magnetic field as would iron filings around a magnet. The magnetic field of the earth seems to have undergone numerous reversals over geological time and if one argues that thousands or even millions of years elapse between each reversal, then this has time implications, which need to be examined.

In studying the earth's magnetic phenomena, it needs to be noted that magnetic forces are different from electrical forces, in that the magnetic field does not tell us directly what the direction of the magnetic force is on a moving charge at any given point as in the case of an electric field. The earth contains many so called ferromagnetic elements which can form minerals, and thus rocks with magnetic properties. Sedimentary strata composed of material eroded from rocks with magnetic elements can also show magnetic inclinations, because as the particles settle out they can also orientate themselves according to the prevailing magnetic field. The magnetization that we can observe in any rock sample is composed of the primary magnetization that remains in the rock from its formation (the natural remnant magnetization), but also that of more recent secondary magnetization. The secondary magnetization can thus provide a distorted picture of the ancient or original geomagnetic field. Moreover, the rate of cooling of rocks can affect the magnetic properties of the sample. In sediments, the grain size of particles in that sediment as well as the direction of stream flow at the time of deposition can also affect the sample.

Any study of the paleomagnetism of the earth must therefore bear all these parameters in mind and it is not just a simple matter of determining the direction of particle orientation in the strata to determine whether there were magnetic reversals in the past.²⁷ How can one thus explain the 180° flips in the polarity which have given

rise to the concept that there have been many geomagnetic reversals in the earth's history which are thought to have taken place randomly every few million years? Again it is a question of perceptions molded by one's paradigm. In the case of the observed paleomagnetic information, some investigators have proposed that major magnetic changes can occur within months or days, and one has even suggested reversal within a day.²⁸ Considering that so many apparent proofs for long ages (such as the rate of rock formation from sediments, the rate of coal formation, petrification and mineralization) have been shattered by the observation that these events can occur extremely rapidly, even within days, then it becomes obvious that it is the paradigm of the researcher which sways the argument in favor of one or the other model.

The Geological Column in the Light of Genesis

For centuries, the Christian world accepted the Biblical story of a flood. A change from this Diluvial interpretation only occurred during the 19th Century as a result of ideas expounded by Lyell, Darwin, and others. The work of Charles Lyell particularly influenced contemporary thinking regarding the origin of strata, and the concept of the catastrophic flood was replaced by deposition governed by the uniformitarian principles.

In recent times, a new Science of Diluvialism has emerged and is making rapid strides. Many geological features are more consistent with catastrophic formation than with slow formation over millions of years. This new approach to the interpretation of some of the earth's features is, of course, contrary to uniformitarian thinking and was not well accepted initially. When Harlen Bretz, who was professor of Geology at the University of Chicago in 1923, advocated that some of the features of the state of Washington were more consistent with a catastrophic flood formation, they found his conclusion totally unacceptable. The debate raged for years, and it was only in 1965 that the

International Association for Quaternary Research organized a field trip to visit the area and came to the same conclusions that Bretz had propagated. The thinking had come full circle, and catastrophism was once more an accepted model of landscape development. In 1979, Bretz received the Penrose medal, the United States' most prestigious geological award.²⁹

The Geological Column and Age Implications

The currently accepted model for the formation of the geological column is that expounded in the evolutionary paradigm. According to this paradigm, each layer of the column represents a period in the earth's history comprising millions of years of time. (See Figure 2.2) It is supposed that the first microorganisms evolved between 2000 and 3000 million years ago, and that a record of their existence can be found in the Precambrian rocks. However, the oldest layer of the column that contains microfossils is the Cambrium and is estimated to be some 600 million years old.

Superimposed layers of this column are younger and contain different fossils, but each layer was once considered to represent the surface of the earth where life was enacted much as it is today. Moreover, the Uniformitarian principle implies that processes occurring today occurred in the past, including normal erosion by water, wind and weathering processes. Evidence for aerial exposure of the various layers of the column is, however, lacking, and the flat contacts between layers belie the supposition that they once represented the surface of the earth. If they had represented the surface of the earth, then they should be subject to the same erosional features that exist today on the surface of the earth. Should they be subsequently covered by new cycles of sedimentations, then the contacts would not be flat sheets but irregular in shape. This anomaly has been noted in the literature:

A puzzling characteristic of the erathern boundaries and of many other major biostratigraphic boundaries is the general lack of physical evidence of sub aerial exposure. Traces of deep leaching, scour, channeling and residual gravels tend to be lacking, even if the underlying rocks are cherty limestones. These boundaries are paraconformities that are usually identifiable only by palaeontological evidence.³⁰

It is also noteworthy that the geological layers stretch over vast flat areas which are totally unlike anything which exists today and which imply vastly different circumstances than implied by the uniformitarian principle:

The search for present-day analogues of paraconformities in limestone sequences is complicated by the fact that most present configurations (topography, chemistry, circulation, climate) are strikingly unlike those that must have prevailed when Paleozoic and Mesozoic limestone seas spread over immense and incredibly flat areas of the world.³¹

Geologists teach that millions of years are required for rock formation and to form geological features, such as erosional features, beaches and landscape development, stalactites and stalacmites, and many other geological phenomena. The rapid formation of canyons during modern catastrophic events and the appearance of new islands, such as Surtsey in the North Atlantic in recent years, belie this standpoint, since apparently mature beaches appeared on that island within months. Vast amounts of stalagmitic material can form in months, as has been a common occurrence in old mineshafts and other modern environments, and rapid rock formation, fossilization and petrification are also well documented today.

The concept of a universal flood is not only reconcilable with the geological features which we can observe today, but can also explain some of the features which are virtually impossible to reconcile with the standard model. The universality of the great chalk deposits in the geological column and the distribution of marine deposits are just some of the features which are hard to explain in terms of uniformitarian principles. There is evidence for tumultuous upheavals in the past that can only be explained by catastrophism. Megabreccias (sedimentary deposits with huge angular boulders of more than a meter in diameter) have forced some geologists at least (the so called neocatastrophists) to consider forces of enormous magnitude operating in the past.³²

Marine Deposits and Ocean Sediments

Catastrophism, such as would have prevailed as a consequence of the Biblical flood, can provide alternative models for many of these anomalies. As noted in chapter 1, the Biblical description of the flood provides information which suggests that not only rain, but also subterranean water and water from the pre-flood oceans was involved in that event. This would suggest a major geological upheaval and could explain many of the features which are apparent in the earth's topography today. If oceanic waters were also involved as implied in the book of Amos and a number of passages in the Psalms, then one would expect to find marine sediments on the continents in large quantities. Standard geological interpretations would require these deposits to have been formed in cycles of marine submersion of the continents over time. Considering the vastness of these deposits, this is a difficult scenario to envisage particularly since such deposits are often associated with other fossils as well.

It is significant that we find only young sediments in the sea and the ocean floor reveals no evidence of great age; the older layers such as the Paleozoic, for example, are missing. However, vast

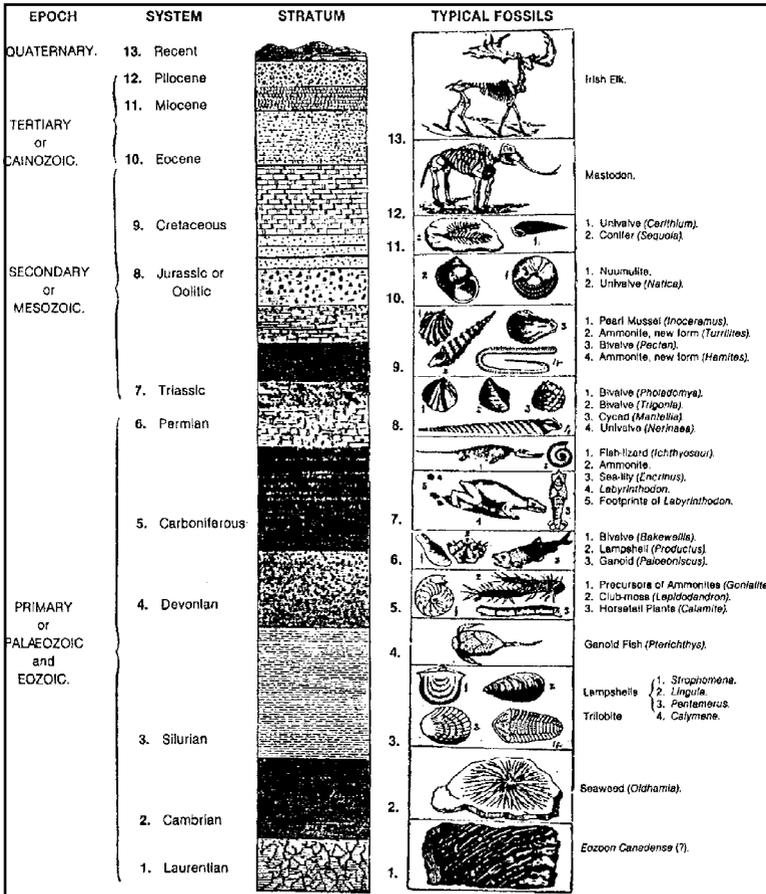


Figure 2.2 - The Geological Column with Fossil Assemblage³³

land deposits of marine material are found on our continents. These could therefore have been formed by water and sediments from the sea, being poured over the land as the Scriptures suggest, and this could have been achieved by the raising (upwarping) of the sea bed. Since great quantities of marine material are to be found on all the continents, it is as if the contents of the oceans were simply dumped on the land and the accompanying turbidites (underwater mud flows)

buried the animals to form the fossils, which we find in the strata today. This event would have been followed by a series of major upheavals as the topography of the surface was reformed, and the net result would have been that surface material was washed back into the sea as young sediments. Today we find a massive geological column on the land areas, but very little sediment beneath the sea. Considering that at least three quarters of this planet is covered by water, this is indeed remarkable.

The Earth's continents are comprised of granitic-type rocks that, being lighter, float on the heavier basalt and schists beneath. Covering the continents, there is an abundance of sediments containing marine fossils, such as marine fish and numerous invertebrates, such as corals, crinoids, and clams. The geologist J.S. Shelton described this conundrum as follows:

Marine sedimentary rocks are far more common and widespread on land today than all other kinds of sedimentary rocks combined. This is one of those simple facts that fairly cry out for explanation and that lie at the heart of man's continuing effort to understand more fully the changing geography of the geologic past.³⁴

What if the words of divine inspiration were true and God did at some stage intervene in the affairs of men and destroy the antediluvian world with a flood, but man refused to acknowledge it? Well then, even if the facts '*cry out for explanation*', there would be no answer forthcoming.

The vastness and nature of the deposits suggest geological events in the past, which must have been radically different from any present day analogous events. It is, however, not incompatible with a flood model to expect marine deposits on land if the ocean floor was raised and the pre-flood continents depressed to allow for this type of deposition. The paucity of marine sediments in

the ocean would then simply be the result of insufficient time since the flood to produce such deposits. Seismic methods that were used to determine the thickness of ocean sediments, which were once considered to be up to 22 km thick, have revealed that the major portion of the ocean floor has sedimentary layers less than 0.1 km thick while a smaller fraction largely near the continental margins has a thickness greater than 1 km. This gives an average depth of only 0.4 km, of which half would be red clay and the other half carbonate oozes consisting of coccolith and foraminiferal skeletons. Given the rate at which erosional sediment flows into the oceans today and the rate of production of the algal and unicellular organisms, which would produce the oozes, the Biblical time frame is more than adequate to account for all the ocean sediments, particularly if one allows for greater sedimentation due to the catastrophic displacement of sediments during the flood.³⁵

In order to provide an explanation for the missing sediment, there is a suggestion that the sediments are being absorbed under the Tectonic plates, as the continents are moving apart. However, the rates of subduction are several orders lower than the rates of erosion thus not accounting for the missing sediments. Estimates of sediments flowing into the oceans range from 8 – 64 billion tons per year and subduction rates are only estimated to be 2.5 billion tons per year.³⁶ The immensely long time periods envisaged by the scientific fraternity do not fit the observed rates of change even under current circumstances, let alone catastrophic ones. In order to account for the present position of the continents, very slow rates of continental drift are postulated. Rates in the order of 2 cm per year are generally accepted, however, at the rate at which sediment is being washed from the continents into the sea, that crack between continents could not have opened up, as the crack would have been filled two-and-one-half times faster than it formed. Also, the rate at which erosion is changing the continental coastal features makes it unlikely that the continental fit could have been maintained as well as it has. Even in historic times, coastal features have changed so

rapidly that, if extrapolated, they would remove or add thousands of kilometers of coastal material in the supposed geological time since the separation of the continents. The coastal features of the white cliffs of Dover are a prime example, where limpets are whittling away the coastline at an extremely rapid rate of up to 2 m per year in the case of the Suffolk coastal cliffs. In fact, over the last 800 years, the sea has claimed 1.6 km of land including the entire medieval city of Dunwich of which the last of its twelve churches toppled over the cliffs in 1919. It is conceivable, therefore, that the continents separated very rapidly after the flood.

A Model for Catastrophic Formation of the Column

There are numerous geological features that bring into question the standard view of geochronology and these have been thoroughly reviewed by Ariel Roth.³⁷ Evidence for rapid washouts is widespread on earth and these can provide insights into the geological past. One of the best areas of the world to view a section through the Paleozoic portion of the geological column is the Grand Canyon. Here it can be seen that the various layers lie like vast flat sheets one on top of each other, and each flat layer covers thousands of square kilometers. If these layers represent periods in the earth's history, then, by implication, they must have formed the surface of the earth at some stage, and one would expect to find evidence for this in the form of river channels, valleys, and erosional features between them, but these are lacking.

In the Grand Canyon series, rocks of the Ordovician and Silurian periods are missing (this is known as an unconformity), and standard geology accepts that their layers were removed from the record by erosion. Since geologists have assumed vast ages for the formation of the various layers found in the column, the layers are obviously linked to time. If a layer were missing, this would imply that the relevant time was missing, and this is, of course,

impossible in terms of the evolutionary model. They, therefore, speculate that in strata where unconformities occur, these layers must have been there in the past, but had been eroded away in those areas before the subsequent overlying strata had been deposited.

The Ordovician layer in the Grand Canyon series, that was supposedly eroded away, represents some 100 million years, which in itself presents a further problem. Standard geological publications put current erosion rates at between 6 and 1900 cm per 1000 years. Most of the eroded material is carried away by rivers and ends up as sediment in the oceans. Even at the lower figure of 6 cm per 1000 years, it would take a mere 10.2 million years for the continents to be eroded down to sea level (the continents would have eroded down to sea-level 340 times in the time period that they supposedly existed). As Lindale put it in his article on the survival of paleoforms:

Even if it is accepted that estimates of the contemporary rate of degradation of the land surface are several orders too high to provide an accurate yardstick of erosion in the geological past, there has surely been ample time for the very ancient features preserved in the present landscape to have been eradicated several times over. Yet the silcreted land surface of central Australia has survived perhaps 20 million years of weathering and erosion under varied climatic conditions, as has the laterite surface of the northern areas of the continent. The laterite surface of the Gulf region of South Australia is even more remarkable, for it has persisted, through some 200 million years of epigene attack...The survival of the paleoforms is in some degree an embarrassment to all the commonly accepted models of landscape development.³⁸

A feature of the column, as represented in the Grand Canyon series, is that it is graded coarse to fine - the lower portion consisting largely of residual gravels, followed by lime and shale deposits.³⁹ This cannot be easily reconciled with the uniformitarian model, but is precisely what one would expect if the various layers came into existence catastrophically. It seems as if the Cambrian deposits worldwide can be ascribed to one major sedimentological episode that caused graded beds. One possible mechanism of formation is through turbidimetric deposition. Turbidites are underwater mudflows set off by catastrophic events such as earthquakes, and would be expected in a diluvial event as described in Genesis. The various layers of such mudflows have flat contact zones, and missing layers can be readily explained without invoking periods of erosion. The quantity of source material would determine the thickness and the area covered. The absence of a layer would simply mean that there was not enough source material to cover the same areas as the under and overlying strata (Fig. 2.3).

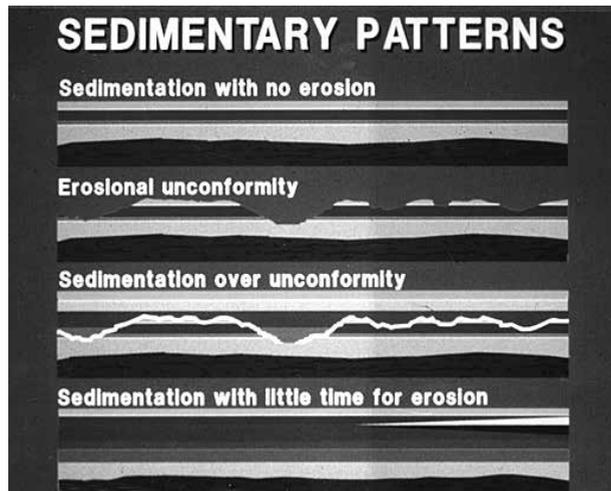


Figure 2.3

Turbidity currents could account for many of the layers found in the geological column. The abundance of sedimentary layers in the stratigraphic record speaks of extensive underwater activity in the past. Such a phenomenon was fully documented when, on November 18, 1929, a turbidity current was set off by an earthquake that shook the New England coast. The speed of this flow could be recorded as it broke a series of undersea telegraphic cables. This flow covered some 200 miles in the first 59 minutes and 500 miles in 13 hours 17 minutes. This means that the flow was traveling at speeds in excess of 100 kilometers per hour, even reaching speeds of 160 kilometers per hour. Obviously, any living organisms in the way of the flow would have been instantly buried and, being cut off from oxygen, would eventually fossilize. It is obvious that a short chronology for the formation of the geological column would destroy the very pillars on which the evolutionary paradigm rests and the evidence needs to be carefully weighed.

Evidence for Plasticity of the Column During Deposition

The Catastrophic model predicts that there would have been insufficient time between the deposition of the various layers of the column for them to turn to rock. Evidence for simultaneous plasticity of layers and intermingling of layers would thus be evidence for a short chronology. Conversely, the evolutionary paradigm would have to invoke heat and pressure in order to explain plasticity of rock plates, but most of the sedimentary layers do not show evidence of this. In fact, the folding of vast sedimentary layers evident in mountain ranges and uplifted areas suggest that the layers were soft when they were uplifted and folded, since evidence for heat plasticity in the rocks is lacking. Also, in the contact zones between layers, we find intermingling of material. This can be in the form of load casts (top layer pressed into the lower layer, compressing the lower layer without leaving signs of breakage behind), turbidimetric flames (bottom layer

being whipped up into the layer above and solidifying together), or simply intermingling of material in cracks. This again suggests that the various layers consisted of soft material when they formed, thus allowing for this intermingling.

Clastic intrusions are further evidence for plasticity. These are finger-like pillars of rock, and occur where some of the underlying rock has been forced up into the overlying layer. If the layers are soft at the time of formation and then subjected to pressure through geological disturbances, an essentially circular column of liquid mud can be squeezed through the overlying areas. Roughly similar specific gravity could ensure that the intrusion remains in the new position whilst the layers harden together. If the upper layer is subsequently more readily eroded, a pillar is left as a geological feature. Had the layers formed over

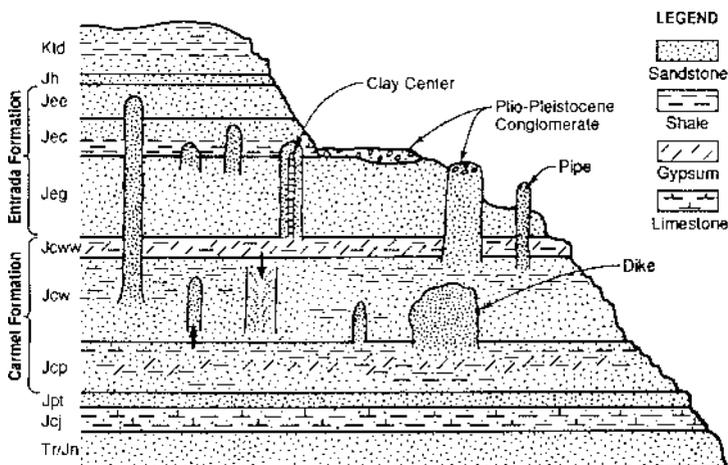


Figure 2.4 - Diagrammatic representation of a section through the pipe and dike-bearing strata in Kodachrome Basin. Legend for formations: Tr/Jn - Triassic-Jurassic Navajo; Jcj - Jurassic Carmel, Judd Hollow; Jpt - Jurassic Page Sandstone, Thousand Pockets Tongue; Jcp - Jurassic Carmel, Paria River Member; Jcw - Jurassic Carmel, Winsor Member; Jcw - Jurassic Carmel, Wiggler Wash Member; Jeg - Jurassic Entrada, Gunsight Butte Member; Jec - Jurassic Entrada, Cannonville Member; Jee - Jurassic Entrada, Escalante Member; Jh - Jurassic Henrieville Formation; Kdt - Cretaceous Dakota-Tropic Formations undifferentiated. (From *Origins* 19:44-48, 1992)

millions of years and the rocky plates been subjected to pressure, they would have broken, but not formed pillars. Moreover, downward-moving slumps are also found in areas with clastic intrusions and significantly, in the vicinity of such, there is a general downwarping of the surrounding rock strata, indicating that the material was soft at the time of the disturbance.

Another feature often seen in rock strata is extensive folding. The flood model can explain this as contortion induced in soft material during an earthquake or upheaval of a portion of the earth. In areas of mountain uplift, extensive folding of the strata is often apparent. The flood model can readily explain these phenomena. When the post flood mountain ranges were being uplifted, the still soft strata on top would be subject to sliding and folding, even doubling over of layers thus inverting them. This is precisely what is found in such areas. Inversion of strata is problematic in terms of the standard model but expected in the catastrophic model. Orogeny (mountain uplift) creates a further set of problems, because areas of high relief are also areas of rapid erosion, which would tend to remove the layers of the geological column.

Geologists suggest that mountains still exist today because the uplift is constantly pushing the range up from below. Present day average uplift of mountains is approximately 7.6 mm per year with the Alps rising at about 1.5 mm per year and other ranges such as Andes and Himalayas rising considerably faster. However, the rate of erosion in some of these areas would suggest that the layers of the geological column comprising these mountains should have been eradicated several times over. The fact that even the geologically so-called young sediments together with old strata are still well represented creates a serious problem, since one cannot use uplift as an argument to negate the rate of erosion. This is circular reasoning. The mountain is being eroded at a high rate from the top, but it is still there because it is being uplifted at a similar or higher rate than the erosion rate from the bottom. If this is so, then the youngest geological layers should not still be present; one cannot have one's cake and eat it too.

Desert Deposits in the Column

Some huge sandstone deposits, thousands of feet high, occur in Zion Canyon and many other areas of the world. Standard geology offers these as a problem to creationists, because they are supposed to represent vast dunes accumulated during long periods of desert conditions. If that is true, then they are a problem to a flood model. These dunes show cross-graining supposedly due to wind deposition. Closer examination shows that the grain size is larger than expected from wind deposition, and further, the angle at which the deposits were laid down, 20 - 30°, is the angle at which river sand is laid down under water in river deltas. Desert sands are laid down at 30 - 40°. The very size of these dunes rules against wind deposition although some of the visible erosion on their surface could be due to wind. The Bible describes a heavy wind, which followed the receding waters of the flood and helped to dry the surface of the earth.

Evidence for Rapid Washout

The Catastrophic model would further predict that there would be an abundance of evidence for catastrophic washouts. This is indeed the case. The vast canyons, valleys, and hill-relics of the world favor diluvial rather than uniformitarian formation. Moreover, the extensive inland water systems and relic lakes such as the great salt flats point to masses of water in the recent past.

Geologists have been forced to admit to catastrophic formation of some of the great landscape scars that occur on every continent. The great “Dry Falls” of the Columbia River have only recently been accepted as being of catastrophic origin, as have the Goosenecks of the Colorado River. Fast erosion is known to give a V-shaped channel, whereas slow erosion in a meandering riverbed tends to induce undercutting on the outer circumference of a bend,

but deposition on the inner circumference. This feature is distinctly visible in the 'goose necks' showing that two different mechanisms have contributed to the formation of the channel. The objection that meandering rivers are slow moving is not substantiated. There is the example of a huge canyon formed at Kanab Creek in a few hours during a relatively recent flood, and this river is also a meander. The Grand Canyon, however, is still believed to have had a slow origin assigned to the erosive power of the same Colorado River.

The Grand Canyon is particularly problematic, in that the canyon cuts through an uplifted area, and it is difficult to understand how the river cut through the uplift rather than staying in the valley. Several models have been proposed (antecedence model, superposition model, stream capture model, and the anteposition model), but each of these is plagued by the problem that the river (or rivers), cutting through the uplift, must themselves be raised to that level. The catastrophic model, on the other hand, accounts for the canyon through that uplift by proposing that the area of uplift was raised rapidly during the post flood period. The uplifted area developed a crack through which the floodwaters subsided in a massive runoff thus washing out the canyon in a short period of time. It is generally argued by those advocating long ages, that the Grand Canyon limestones are similar to those that form very slowly today, but this is not the case. Grand Canyon limestones consist largely of calcite whilst modern shallow water lime muds are comprised of argonite. The crystal size of the canyon limestones is 4 microns or less as opposed to the 20 microns of modern lime muds. Also the canyon limestones contain fossils with a dominant orientation showing deposition by flowing water. The fact that quartz sand grains are also found in the canyon limestones indicates moving water with high enough energy to transport the material. Moreover, canyon limestones contain crinoid heads, which would have deteriorated rapidly if they were not buried rapidly.⁴⁰

On a smaller scale, canyons are washed out rapidly even in our day. The canyons in Kanab Creek, and those formed after

the eruption of Mt. Alaska in 1912 and Mount St. Helens in 1981 were washed out in a matter of hours, yet the stratigraphic appearance of the formations was astoundingly similar to the features which supposedly evolved over millions of years.⁴¹ Even without catastrophes, canyon formation today is extremely rapid particularly in areas where man has practiced large scale tree felling.⁴² Modern rapid erosional features, such as dongas (erosion channels), show landscapes in miniature which are very similar to the surface topography of the earth. The receding waters leave behind them water-formed “hills” and “valleys” which are shaped by the direction of stream flow. The material between the “hills” and “valleys” is carried away by the floodwaters. The magnitude and flow rate of the flood determines how much material can be carried away. For example, if water flow increases fourfold, then 54 times as much debris can be carried in the water. A hundredfold increase in flow rate, however, means that 50 million times as much material can be carried away.

In modern landscapes, we find the same features as those produced by rapid washouts. Hills consist of layers of the geological column, and the continuity of the layers is interrupted by vast valleys. The material between hills was either eroded away by millions of years of erosion, or was carried away rapidly leaving the hills as relics. Marvelous examples of this type of erosional feature are found all over the world, but prime examples would be Monument Valley in the USA, the Karoo in South Africa, and Ayers Rock (Uluru) in Australia. Geologists believe that events that shaped Ayers Rock took place over millions of years, but the mixture of material composing the strata and evidence of massive water forces again support a catastrophic formation.⁴³ The shaping of the various geological features found in the hill straddled basins is also consistent with water erosion rather than wind erosion as is generally believed today. As the intervening material would have been soft, it is not difficult to understand how the material could have been carried away catastrophically by the receding floodwaters.

Overall, a Catastrophic flood model for the formation of the geological column, as well as for the formation of all the other topographic features of the earth as a whole, can explain those features which are difficult to explain using a uniformitarian model.

REFERENCES

- ¹ Giorgio de Santillana, *The Origins of Scientific Thought: From Anaximander to Proculus 600 B.C.-300 A.D.* (Chicago: University of Chicago Press, 1961).
- ² Gerald Wheeler, *The Two-Tailed Dinosaur: Why Science and Religion Conflict Over the Origin of Life* (Nashville: Southern Publishing Assn, 1975).
- ³ Peter W. Birkeland and Edwin E. Larson, *Putman's Geology* (New York: Oxford University Press, 1989): 28-29.
http://www.amazon.com/Putnams-Geology-Peter-W-Birkeland/dp/0195055179#reader_0195055179
- ⁴ Monroe W. Strickberger, *Evolution*, 2nd edition (London: Jones & Bartlett, 1996).
- ⁵ Mart de Groot, "Cosmology and Genesis: The Road to Harmony and the Need for Cosmological Alternatives," *Origins* 19(1) (1992): 8-32.
<http://www.grisda.org/origins/19008.pdf>
- ⁶ A. A. Michelson and E. W. Morley, "On the Relative Motion of the Earth and the Luminiferous Ether," *American Journal of Science* 34 (1887): 333-345.
<http://www.aip.org/history/gap/PDF/michelson.pdf>
- ⁷ Margaret Wertheim, "God of the Quantum Vacuum," *New Scientist* 156(2102) (1997): 28-31.

- ⁸ *New Scientist*, (August 21, 1999): 23-26.
- ⁹ Ed Holroyd, *In Six Days: Why 50 Scientists Choose to Believe in Creation*. Ed. John F. Ashton. (New Holland Publishers, 1999): 257-267.
- ¹⁰ Keith H. Wanswer, *In Six Days: Why 50 Scientists Choose to Believe in Creation*. Ed. John F. Ashton. (New Holland Publishers, 1999): 90-97.
- ¹¹ John Maddox, "Down with the Big Bang," *Nature* 340 (1989): 425.
- ¹² Andrej Pacholoczyk, qtd. in Margaret Wertheim, "God of the Quantum Vacuum," *New Scientist* 156(2102) (1997): 28-31.
- ¹³ J. Gordon Ogden III, "The Use and Abuse of Radiocarbon Dating," *Annals of the New York Academy of Science* 288 (1977): 167-173.
- ¹⁴ S. R. Wilkinson et al., "Experimental evidence for non-exponential decay in quantum tunneling," *Nature* 387 (1997): 575-577.
- ¹⁵ Keith H. Wanswer, *In Six Days: Why 50 Scientists Choose to Believe in Creation*. Ed. John F. Ashton. (New Holland Publishers, 1999): 90-97.
- ¹⁶ A. Hayatsu, "K-Ar Isochron Age of the North Mountain Basalt, Nova Scotia," *Canadian Journal of Earth Sciences* 16 (1979): 974.t
- ¹⁷ P. Giem, *In Six Days: Why 50 Scientists Choose to Believe in Creation*. Ed. John F. Ashton. (New Holland Publishers, 1999): 45-49.
- ¹⁸ C. Brooks, D. E. James, and S. R. Hart, "Ancient Lithosphere: Its Role in Young Continental Volcanism," *Science* 193 (1976): 1093.
- ¹⁹ J. R. Baumgardner, *In Six Days: Why 50 Scientists Choose to Believe in Creation*. Ed. John F. Ashton. (New Holland Publishers, 1999): 206-223.

- ²⁰ I. McDougall, A. A. Polach, and J. J. Stipp, "Excess Radiogenic Argon in Young Subaerial Basalts from the Auckland Volcanic Field, New Zealand," *Geochemica et Cosmochemica Acta* 33 (1969): 1485-1520.
- ²¹ Andrew Snelling, "Radioactive Dating Failure: Recent New Zealand Lava Flows Yield Quotations of Millions of Years, *Creation Ex nihilo* 22(1) (2000): 18-21.
- ²² K. Swenson, "Radio-dating in rubble," *Creation ex nihilo* 23 (3) (2001): 23-25.
- ²³ D.E. Fisher, "Excess Rare Gases in a Subaerial Basalt from Nigeria," *Nature* 232 (1971): 60-61.
- ²⁴ R. G. Walker, "Mopping up the Turbidite Mess," in *Evolving Concepts in Sedimentology*. Ed. R. N. Ginsburg (Baltimore: John Hopkins University Press, 1973): 1-37.
- ²⁵ O. H. Schindewolf, "Comments on Some Stratigraphic Terms," *American Journal of Science* 255 (1957): 395.
- ²⁶ J. E. O'Rourke, *American Journal of Science* 276 (1976): 47 & 53.
- ²⁷ Ivan E. Rouse, "Paleomagnetism," *Origins* 10(1) (1983): 18-36. <http://www.grisda.org/origins/10018.pdf>
- ²⁸ Ariel A. Roth, *Origins: Linking Science and Scripture* (Review and Herald Publishing Association, 1998). http://books.google.ca/books?id=6XHnT85y7toC&printsec=frontcover&dq=Origins,+Linking+Science+and+Scripture&hl=en&sa=X&ei=N-_2UIL8Hoe9iwKriYCIBA&ved=0CDEQ6AEwAA
- ²⁹ Ibid.

- ³⁰. Norman D. Newell, "Mass Extinction: Unique or Recurrent Causes?" in *Catastrophes and Earth History: The New Uniformitarianism*. Eds. William A. Berggren and John A. Van Couvering (New Jersey: Princetown University Press, 1984): 125.
- ³¹. Norman D. Newell, "Paraconformities," in *Essays in Paleontology and Stratigraphy*. Eds. Curt Teichert and Ellis L. Yochelson. (University of Kansas Press, 1967): 357.
- ³². Arthur V. Chadwick, "Megabreccias: Evidence for Catastrophism," *Origins* 5(1) (1978): 39-45.
<http://www.grisda.org/origins/05039.pdf>
- ³³. W. H. Shea, "The Antediluvians," *Origins* 18(1) (1991): 10-26.
<http://www.grisda.org/origins/18010.htm>
- ³⁴. John S. Shelton, *Geology Illustrated* (W.H. Freeman and Co., 1966): 28.
- ³⁵. Ariel A. Roth, *Origins: Linking Science and Scripture* (Review and Herald Publishing Association, 1998).
http://books.google.ca/books?id=6XHnT85y7toC&printsec=frontcover&dq=Origins,+Linking+Science+and+Scripture&hl=en&sa=X&ei=N-_2UIL8Hoe9iwKriYCIBA&ved=0CDEQ6AEwAA
- ³⁶. Ariel A. Roth, *Origins: Linking Science and Scripture* (Review and Herald Publishing Association, 1998).
http://books.google.ca/books?id=6XHnT85y7toC&printsec=frontcover&dq=Origins,+Linking+Science+and+Scripture&hl=en&sa=X&ei=N-_2UIL8Hoe9iwKriYCIBA&ved=0CDEQ6AEwAA
- ³⁷. Ariel A. Roth, "Some Questions about Geochronology," *Origins* 13(2) (1986): 64-85.
<http://www.grisda.org/origins/13064.pdf>

-
- ³⁸. Lindale, *American Journal of Science* (276): 81-1976.
- ³⁹. Harold G. Coffin, Robert H. Brown, and James R. Gibson, *Origin by Design* (Review and Herald Publishing, 1983): 82-98.7
- ⁴⁰. “Grand Canyon Limestone-Fast or Slow Deposits?” *Creation* 17(3) (1995): 50-51.
<http://creation.mobi/grand-canyon-limestonefast-or-slow-deposits>
- ⁴¹. Steven A. Austin, “Rapid Erosion at Mount St. Helens, *Origins* 11(2) (1984): 90-98.
<http://static.icr.org/i/pdf/technical/Rapid-Erosion-at-Mount-St-Helens.pdf>
- ⁴². Rebecca Gibson, “Canyon Creation,” *Creation* 22(4) (2000): 46-48.
<http://creation.com/canyon-creation>
- ⁴³. Andrew Snelling, “Uluru and Kata Tjuta: Testimony to the Flood,” *Creation* 20(2) (1998): 36-40.
<http://creation.com/uluru-and-kata-tjuta-a-testimony-to-the-flood>

NOTES:

3

THE FOSSIL RECORD

From ancient times, people had noted the fossilized remains of animals that did not seem to resemble living species. Moreover, seashells could be found in the strangest places, even on the tops of the highest mountain ranges. The ancient Greeks were aware of these fossilized remains of creatures, and Herodotus (484-425 BC) suggested that they came about as a consequence of changes in the positions of the sea and land. These changes were even associated with considerable time periods, and Aristotle believed that they took place so slowly that they could not be observed today.

Many theories regarding fossils have been propagated, ranging from *Lusi naturae* “jokes of nature” to prehistoric animals buried by catastrophic events (adherents of this view included Robert Hooke who discovered cells and Cuvier, the French comparative anatomist). Fossils were recognized as extinct species whose place has been filled by the creatures living today. Bible-believing scholars, who attributed the fossils to the destruction of animals during the Noachian flood described in Genesis, also accepted the catastrophic model. However, the gradual ascendancy of the idea of long ages, together with the numerous questions raised by the

Biblical account led many to doubt the validity of the Scriptures. Some of the questions that seemingly could not be accounted for were: How did all the animals get into the ark? Why is there a particular order in the fossil record? How did the animals get to the various continents from the ark? Why do the animals represented in the fossil record look so different from those present today?

These questions led to a search for naturalistic explanations for the fossil record and the origin of life in general. Before Darwin published his *Origin of Species*, Jean-Baptiste Lamarck (1744-1829) was one of the first of the new era of scientists to propose that the geological discontinuities in the stratigraphic record represented gradual changes in the environment and climate to which species were exposed and through their effects on organisms these changes led to species being transformed. The geologists, Hutton and Lyell, expanded this concept and Charles Darwin added the biological arm, thus laying the foundation for modern concepts on the origin of fossils. Indeed, the fossil record is today considered to be the severest blow to all anti-evolutionary ideas.

Ironically, the scientific views on the question of origins have a tendency to go full circle. Whereas exponents of the theory of evolution rejected catastrophism, many scientists are today returning to catastrophism and even to the Biblical account of the flood to explain many of the features of the geological column and the fossil record. A major problem with this view, as scientists see it, is the universality of the Biblical flood with its destruction of all terrestrial life, which would put an end to any theory of naturalistic origins. However, it is not only the Bible that speaks about a worldwide flood, but virtually every society on every continent has the story of a worldwide flood in its folklore.¹ Moreover, there is evidence that indicates that there was a universal total covering of the earth by water - compelling evidence that cannot readily be ignored. This includes:

- 1) Massive fossil graveyards with evidence of plants and animals being washed into position.

2) Huge sedimentary deposits (nearly three quarters of the earth's exposed surface is covered with sedimentary rock deposits).

3) The chalk deposits of the world are universal. Chalk is formed from the skeletons of marine unicellular protozoans and algae, and can only settle out of relatively shallow water. In deep oceans, the calcium carbonate shells dissolve on the way down to the ocean floor. The chalk deposits are thus an indication of worldwide coverage of a relatively shallow sea. Chalk deposits of the same age are found in many areas of North America, Australia, Europe, Asia, and Africa, and all of these deposits are resting on the same type of glauconitic sandstone.² For these factors to be so universal, the same conditions must have existed universally.

4) The vast coal and oil fields of the world are further evidence of a vast flood catastrophe. No process occurring today can even remotely approach the magnitude of the catastrophe necessary to account for such a vast scale of universal burial of plants and other organic material.

Order in the Fossil Record

The three eras of geological time (Paleozoic, Mesozoic, and Cenozoic) are characterized by different fossil assemblages (*Refer to Figure 2.2*). Before these eras, there was the Precambrian, which is not regarded as an era and contains fossils of blue-green algae and some fungi. The Paleozoic Era is known for its abundant marine life ranging from brachiopods and trilobites to sharks and

bony fishes in the Devonian, as well as amphibians and reptiles in the Carboniferous. This era is also known for its extensive coal beds, consisting largely of extinct plants such as giant horsetails, ferns, some seedless plants, and club mosses. The Mesozoic era is divided into three periods, the Triassic, Jurassic, and Cretaceous, and is known for its dinosaurs and many other reptiles. At the close of this era, we have the extensive chalk deposits, which we have discussed earlier. It is not surprising then that the close of this era is associated with massive extinctions. In a catastrophic flood model, this era would be associated with the close of the flood period prior to the re-emergence of the continents from the waters which covered the earth. The plants of the Mesozoic era comprise cycads, conifers, and deciduous trees many of which still exist today. In the Cenozoic era, we find largely the fossils of mammals and birds, and Cenozoic plants are essentially similar to the species that exist today.

The question arises as to why there is this particular order in the fossil record which is interpreted as a progressive advance from simple to complex organisms? The type of fossil found in the various layers changes as one ascends the geological column, from invertebrates, fish, amphibians and reptiles, to the mammals and birds in the uppermost strata. This order in the fossil record is one of the prime evidences used by scientists to establish evolution as a fact. However, the sequence is not from simple organisms to complex organisms (there is no such thing as a “simple” organism in biological terms), but rather from marine sessile to pelagic (free-swimming) to terrestrial life forms. The fact then is, that there is no such thing as a simple undifferentiated animal in the fossil record that may be cited as proof for the development of organisms from simple to complex. George Gaylord Simpson, the famous proponent of the evolution theory, already witnessed to this fact when he stated in his book *The Meaning of Evolution*:

It has been suggested that all animals are now specialized and that the generalized forms on which

major evolutionary developments depend are absent. In fact, all animals have always been more or less specialized and a really generalized living form is merely a myth or an abstraction.³

The earliest organisms in the fossil record were thus complex organisms and there is no evidence for the progressive advance required by the theory of evolution. Yes, there were many organisms such as trilobites and ammonites that existed in the past that do not exist today, but this does not make them primitive. They were just as complex as anything living today. In fact, the fossil record shows a past wealth of organisms which is staggering. Surprisingly, most of the organisms of the past were much larger and impressive than present-day animals even, where they belong to the same groups of animals. In fact, in this regard, the fossil record shows evidence for devolution rather than evolution.

There are many reasons beside progressive development which could be cited for the order in the sequence of fossils. The sequence from sessile to free-swimming to terrestrial is indicative of ecological zones being destroyed progressively as can be illustrated by a simple example. If a bulldozer rapidly covered a duck pond with soil, then the organisms in the pond would be buried in sequence. The bottom dwelling worms and snails would be at the bottom, the fish somewhat higher, and the ducks on top. The sequence represents the ecological zones in which the animals lived and definitely not the order in which they evolved. The same holds true for the fossil record. Indeed, we find assemblages of fossils e.g. radiolarians and foraminiferans in the same sequence in the fossil record as they occur in a present day ecological zonation.⁴ The ability to float or not would also produce zonation. Mammals and birds float due to bloating or trapped air in feathers and hair and are thus to be found in higher strata. Coal layers reflect this same phenomenon. The Paleozoic coal seams consist largely of non-floating plant species whereas

those found in higher strata consist of floating species. No model provides all the answers, but the flood model can provide a very satisfactory explanation for the series found in the fossil record.

Explosive Evolution

The bulk of the fossil record is found in a series of layers commencing with the Cambrian. The Cambrian is associated with an explosive occurrence of various diverse fossil forms. The sudden and almost simultaneous appearance of fossils, from even different phyla, has been termed “the Cambrian explosion”. Pre-Cambrian fossils are largely limited to microorganisms, and where macrofossils occur, they are normally at contact zones with the Cambrian and difficult to ascribe to one or the other layer.

If evolution were true, one would expect a progressive advance from simple to complex in the fossil record, but amazingly one finds that even the so called higher life forms such as the chordates appear right in the beginning. In an article entitled “The Big Bang of Animal Evolution”, Jeffrey S. Levinton, professor in ecology and evolution at the State University of New York states:

The Cambrian explosion was characterized by the sudden and roughly simultaneous appearance of many diverse animal forms almost 600 million years ago. No other period in the history of animal life can match this remarkable burst of evolutionary creativity.⁵

He goes on to say that evolutionary lawns rather than trees appear to be the norm. An evolutionary tree normally shows a common ancestor with branches leading to organisms that develop later in time. In a lawn, all the branches are parallel which means there is no so-called common ancestor. Levinton concludes:

Those stories point to a serious problem with all arguments about evolution that rely on taxonomic classification. Some of the fossils that suggest the existence of unique classes are very poor scraps from the geological table.

The fact that all the major phyla appear simultaneously in the fossil record is a strong argument for creation rather than evolution. Even Charles Darwin admitted this in the first edition of the *Origin of Species*. He writes regarding this issue:

The case at present must remain inexplicable and may be truly urged as a valid argument against the views here entertained.⁶

These facts have urged Neo-Darwinists such as Stephen J. Gould to reconsider Darwin's idea of gradualism (the slow development of one form out of another over time) and replaced it with the concept of evolution through punctuated equilibrium (periods of equilibrium followed by rapid (punctuated) changes). Whatever one wishes to term it, the fact remains that organisms appear suddenly which is in harmony with the creation account. Punctuated equilibrium has many hurdles to cross, particularly in the sphere of genetics, where it must be explained how so many useful mutations could come about so rapidly or be employed usefully in an integrated fashion without there being prior design. The idea that all major phyla could appear at once seems to be stretching it to say the least.

Current concepts require vast time periods, measured in millions of years, to accommodate changes from one life form to another. Standard geology, therefore, supposes vast time periods for each of the geological layers to account for this period of time. Historically, the time periods became longer as evidence

for the complexity of evolutionary change became greater. It is interesting that new evidence of the very rapid appearance of life on earth, and the absence of evidence for change over long periods of time, have forced scientists in the opposite direction, and they are just as willing to slash vast ages out of the geological column, as they were to insert them.⁷

The problem is so vast that it almost seems as if scientists are becoming desperate to find a solution to the problem. They are even talking of “Evolving at Supersonic Speed”. A group of researchers from M.I.T. and Harvard found it necessary to recalibrate the geological clock by chopping the time for the Cambrian in half and then cramming the evolutionary events into the first third, prompting Gould to state:

Fast is now a lot faster than we thought, and that’s extraordinarily interesting.⁸

Gould states that full diversity was reached in the Cambrian explosion, and this admittance is only one step away from special creation. Indeed creationists do just a little more chopping to the time scale. A recent discovery of even a vertebrate from the Cambrian shows beyond doubt that full diversity was reached in the Cambrian Explosion, and this further complicates the issue for naturalistic evolution over millions of years.⁹ If full diversity was there from the beginning, then that sounds like special creation.

Evolutionary Sequences

Gould states that:

The family trees that adorn our text books are based on inference, however reasonable, not the evidence of the fossils.¹⁰

This means that the evolutionary sequences are morphological sequences and do not necessarily reflect the sequence in the palaeontological record. The sequences are logical according to the paradigm or mindset of the researcher, but they are not necessarily right. If a taxonomist were given the task of determining the evolutionary development of a series of dog skulls (given the scenario that he did not know how the various dog races came into existence and that the scientist had never seen living dogs), then he or she would logically group them from small to large and also group the flat-nosed ones on one branch of the evolutionary tree and the long-nosed ones on the opposite branch with a common ancestor somewhere at the base of the tree. This would be perfectly logical, but it would not be right, since dogs all belong to one species and the variation between them is as a result of the built-in variation in the original gene pool. The dog was not bred from the smallest to the largest, but these reflect the extremes of the genetic variation within the gene pool. The dogs were in fact bred from the center outwards with wild canids as a starting point. The palaeontologist suffers similar constraints as our hypothetical researcher. He or she is also confronted with the bones of animals often from the same strata and asked to arrange them without having seen the living specimens and not knowing their origin.

Given the nature of the fossil record, many species would have been contemporaneous which means that they lived at the same time. Scientists accept that a species may evolve and then continue to exist unchanged whilst other species may have evolved out of this species (or similar species), the coelacanth being a case in point. However, the other possibility is that the coelacanth and other so-called living fossils such as *Solenodon*, a shrew-like mammal that disappeared from the fossil record some apparent thirty five million years ago, the tuatara lizard from New Zealand of which there is not a trace in the fossil record since the Mesozoic, and *Lingula*, the marine creature that was to have become extinct some five hundred million years ago are just what they represent, creatures that were there from the beginning and still exist today.

In fact, unchanged (except for size) scores of insects and invertebrates in general and hosts of plants have unchanged records from their first appearance in the fossil record to the present. The perfect preservation of many soft bodied animals such as jellyfish and the superb preservation of insects and crustaceans show that even down to the finest detail the fossil forms resemble the living creatures of today.

The fact that they appear and remain unchanged could thus be an indication of design, but this is generally too simple a solution for those seeking a naturalistic answer to origins and so, given the contemporaneous nature of many species, scientists are compelled to piece together the evolutionary puzzle from what is available to them. The fossils are then arranged in sequences consistent with their morphology and the paradigm of the researcher. Using modern biochemical techniques, it is now possible to test these fossil sequences using DNA comparisons between species. Interestingly, this often confuses the issue even more, because vastly different creatures on the morphological level often turn out more related than morphologically similar creatures. Also the sequence of development is brought into question by such determinations. For example, cartilaginous fishes, such as sharks, are considered to be more primitive than the bony fishes, but comparison of the complete mitochondrial DNA sequence of the spiny dogfish indicates that it falls between the teleosts and non-teleost bony fishes on the phylogenetic tree. This implies that cartilaginous fish have lost the swim bladder and the bony skeleton and may thus not be as primitive as supposed, but rather regressed.¹¹

A study of the major living groups of fishes and their supposed ancestry shows that their ancestral lines do in fact not link up to form a tree, but can be traced back in parallel lines (evolutionary lawns), often unchanged except for size, without any links to other life forms. Intermediaries are also missing and links are thus based on speculation, not the evidence of the fossils. The same holds true for amphibians, reptiles, birds, and mammals. Their lineages are

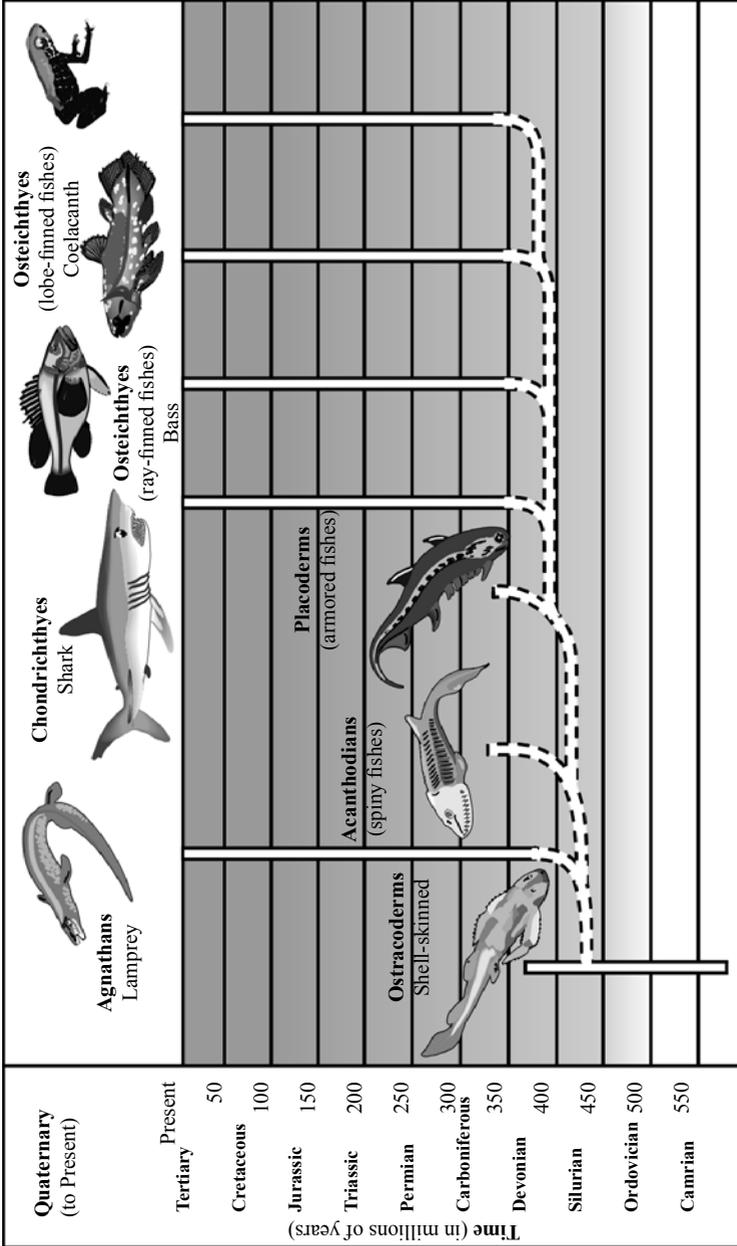


Figure 3.1 - Evolution of the Fishes. Note that the lines for each present-day species are parallel. These animals have existed from the earliest times that fishes appear in the fossil record. The branches leading to a hypothetical ancestor are inferred.

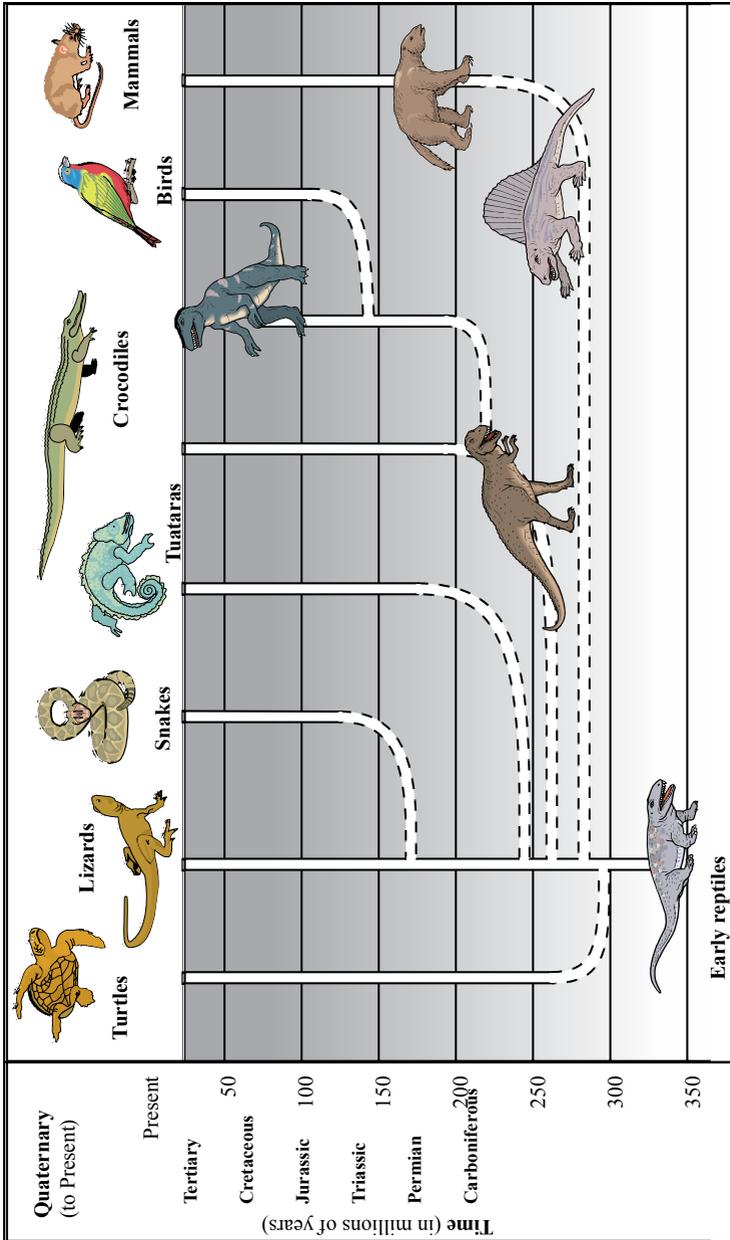


Figure 3.2 - Reptilian Relationships. Again the lines are parallel. Each group can be traced back in the fossil record to an abrupt beginning. The connecting lines are once again hypothetical.

traced in parallel lines in the fossil record and hypothetical evolutionary trees are thus based on inference (See Figures 3.1 and 3.2).

Intermediaries

Intermediaries in these supposed evolutionary lines are absent, although creatures such as Archaeopteryx and the mammal-like reptiles are cited as evidence for links between reptiles and birds and reptiles and mammals. The mammal-like reptiles suffer from the same problem as the other sequences, since again they are based on morphological sequences as in the case of our dog scenario. Logical sequences can be presented, but this does not necessarily make them right. Arranging these creatures according to skull morphology suffers the same constraints as arranging the dogs on the hypothetical tree according to their skull morphology. In a sense, there is thus an element of circular reasoning, since one is using a morphological sequence to back a second morphological sequence that is also based on inference. As the theory of evolution requires links, however, scientists are obliged to fill in these gaps with hypothetical intermediaries, and these morphological sequences are used for just this purpose when in fact they can at best remain hypothetical missing links.

Archaeopteryx, for example, was found two years after Darwin published his *Origin of Species*. This fossil has reptilian and bird features, which are not unique to either group, but there is a measure of controversy regarding the fossil, since some consider it an artifact or even a hoax.¹² Generally, the fossil record does thus not provide the expected intermediaries that are required to fill the gaps in the record. As the erstwhile Professors of Zoology at Harvard University, A.S. Romer and George Gaylord Simpson, admit:

‘Links’ are missing just where we most fervently desire them, and it is all too probable that many ‘links’ will continue to be missing.⁴¹

The Genesis Conflict

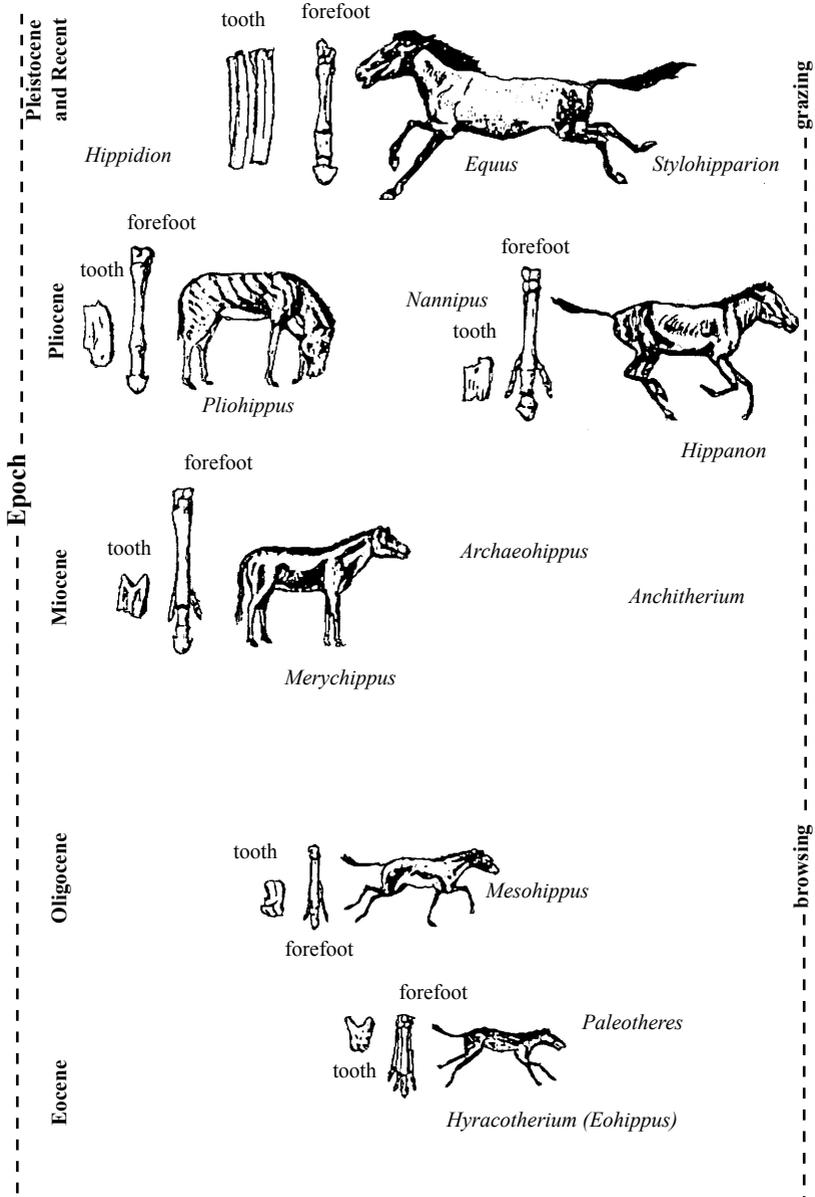


Figure 3.3 - Evolution of the Horse. This is a typical morphological sequence.

It remains true, as every palaeontologist knows, that most new species, genera and families – and that nearly all new categories above the level of families - appear in the record suddenly, and are not led up to by known gradual, completely continuous transitional sequences.⁴²

Even Dr. Colin Patterson, senior palaeontologist at the British Museum of Natural History admitted in a letter written in 1979, in answer to a question regarding the absence of intermediary fossils in his published materials:

I fully agree with your comments on the lack of direct illustrations of evolutionary transitions in my book. If I knew of any fossil – or living, I certainly would have included them. You suggest that an artist should be asked to visualize such transformations... but where would he get the information from? I could not honestly provide it, and if I were to leave it to artistic license, would that not mislead the reader?

Evolution of the Horse

Probably the most famous example cited in support of the gradual change of species over time is the evolution of the horse. This exhibit is placed in virtually all textbooks dealing with evolution and it receives pride of place in the museums of the world (Figure 3.3).

Once again, we are dealing with a morphological sequence, worked out by O.C. Marsh¹³, of contemporaneous creatures arranged from small to large. There is no evidence linking them in a continuous chain of transitional forms and controversy exists as to finer transitions such as the reduction of the number of toes as we

move from *Eohippus* (which was previously called *Hyracotherium* and resembles the rock hyrax) to the various intermediaries to *Equus*, the modern horse. *Eohippus* was discovered in 1841 in clay around London. It did not even resemble a horse, and it had sharp as well as multiple back teeth as in hoofed animals. Of course, being a morphological sequence these different fossils are found in the same strata, sometimes right next to each other. Marsh already knew that some modern horses have additional toes, which makes them similar to the extinct *Protohippus*.¹⁴ Moreover, the various species used in the horse lineage have variations in the number of ribs (they vary from 15 to 19 and *Equus* has 18) and lumbar vertebrae (vary from 6 to 8), which would require genetic reversals contrary to the evolutionary model which states that evolution cannot be reversed. Variation in horse size is not an indication of evolution, since we have large variations in the size of living breeds today. The largest horse living today is the Clydesdale and the smallest is the Flabella which is only 43 centimeters (17 inches) tall and both, of course, belong to the same species.

In my own experience when lecturing on the question of evolution and creation, I have been amazed that palaeontologists are fully aware of these details, and in one lecture given at a prominent South African University, one of the leading palaeontologists frankly admitted that: “*No one believes that anymore.*” Why is it then that the exhibits remain in the museums when ‘*no one believes that anymore*’? The speculative evolution of the horse is thus acknowledged by the scientists’ themselves¹⁵, and even Simpson admitted that:

The most famous of all equid (horse) trends, ‘gradual reduction of the side toes’, is flatly fictitious.¹⁶

Marine Mammals

Marine mammals are an enigma, since they show such perfect adaptations to a marine existence in both their anatomy and their physiology. Marine mammals are supposedly derived from eutherian land mammals, which secondarily reinvaded the sea and evolved to their present state in the short period (even in evolutionary terms) available since the dawn of mammals. In order to achieve the remarkable capacity to swim and dive as they do, some fascinating physiological changes had to take place. In the case of whales and porpoises, the hind limbs had to disappear and the posterior portions of the animals had to be transformed into a fin together with the associated muscular design capable of producing the forces necessary for the type of explosive swimming for which these creatures are known. Evidence for such an evolutionary development is lacking in the fossil record, although such profound changes should surely have left their mark in the stratigraphic record.

There have been attempts to explain the origin of whales from the fossil record, but most fossils show that they looked just like present-day whales. Variations in the position of the respiratory opening are used to show evolutionary progression, but these progressions are again based on morphological sequences and not on any sequence of the fossils and they therefore at best reflect normal variation. Evolutionists, however, tend to use three fossil creatures as evidence for whale evolution, these being *Pakicetus*, *Ambulocetus*, and *Basilosaurus*. Of these, *Pakicetus* has been reconstructed as a walking whale from a few fragments of jaw and skull. The creature was a land mammal, it was found buried with land mammals and there is no evidence to link it with whales except in the mindset of the scientists. *Ambulocetus* is a creature known from some skull and limb fragments, which is again used as an intermediary, but since true whales already existed together with this creature, we are again dealing with morphological se-

quences, not the evidence of the fossils. Moreover, no hip was found with this creature, making the entire conjecture as to its lineage even more speculative. *Basilosaurus* is an odd serpentine creature, which has little to do with whale evolution and as some scientists freely admit, they could not possibly have been ancestral to modern whales.¹⁷

Seals, sea lions and walruses present just as great an evolutionary enigma since they also make a sudden appearance in the fossil record. All these animals are grouped under the name pinnipeds (fin-footed) and are divided into three groups, the Phocidae, Otariidae and Odobenidae. The Phocidae are the so-called ‘true seals’, the Otariidae are the ‘eared seals’, and the Odobenidae are the walruses. Fossil seals appear suddenly in the fossil record and look very much like those living today.¹⁸ In fact, the similarities are so great, that monk seals are considered by some to be living fossils because of their unchanged status.¹⁹ The common features shared by the three groups has led to some interesting debates as to the ancestry of these animals, with some scientists suggesting different ancestors ranging from bear-like to otter-like creatures, but there is no evidence for such a convergent evolution and there is no fossil evidence to back it up.^{20, 21}

Catastrophism and the Fossil Record

Evidence for catastrophism is very widespread in the fossil record, and the mere fact that most fossils are embedded in deposits laid down by water thus having had to have been buried rapidly, indicates catastrophic formation. Geologists have long recognized that:

If covered by moist sediment, weathering is prevented. For these reasons quick burial is perhaps the most important condition favoring fossilization. . . . Water borne sediments are so much widely distributed than all other agents of burial that they include the great majority of fossils.²²

Some fossils show immaculate preservation of detail and these creatures must have been buried instantly to prevent decay. The state of preservation can thus be an indication of how long the animals were exposed to the elements before they were buried, and in a flood scenario, it is envisaged that some creatures would have remained uncovered longer than others. In fossil fish for example, we find perfectly preserved specimens, specimens without heads, with and without scales, and sometimes just the bones or pieces of specimens. During putrefaction, the scales and the heads of fish drop off quite rapidly, and so it is evident that some were buried instantly and some floated for some time before burial. There are four major types of fossils depending on the method of preservation. These are molds and casts, comprising footprints and molds that have been filled in with rock-forming material, petrified fossils or fossils turned to stone by replacement of the tissue with the elements of the surrounding strata, carbonized fossils, such as coal, and, lastly, unchanged fossils such as animals trapped in amber or the preserved parts of animals trapped in tar pits. Seashells and tooth and bone fragments also belong to the latter group.

Fossil Footprints

The study of fossil footprints and other fossilized evidence of animal behavior is called ichnology and the animals that made the footprints are classified by giving them genus and species names and they are referred to as ichnospecies. These tracks in stone can tell us something about the conditions under which the tracks were made and can provide useful insights regarding the nature of the strata at the time that the tracks were laid down. Interesting questions would be whether the strata was wet or dry during the formation of the tracks, in which direction did the tracks usually lead and is there correlation between actual body fossils and the tracks that these animals made.

In the Grand Canyon series, as in other areas of the world, there are parts of the stratigraphic record which scientists ascribe to periods of aridity and are thus supposed to be desert deposits. The Coconino Sandstone is one such deposit in the Grand Canyon series and it consists of fine-grained quartz sand and is up to 1000 feet thick in some areas. It is also crossbedded which is common of either desert or underwater dunes. The sandstone layer also contains tracks made by vertebrates and invertebrates and most of them tend to have been made whilst the animals were moving uphill in terms of the crossbedded layers. This is, in fact, one of the features of most of the trackways and warrants an explanation. Moreover, a desert period in what creationists would consider to be flood deposits would also be problematic. The issue of desert deposition has received some new attention from scientists, and on closer examination, it has been found that underwater deposition is a more likely model to account for their features because they are more in line with depositions that have been studied in shallow marine sediments than those that could be formed under desert conditions. These authors state:^{23, 24, 25}

Since 1903, most of the Navajo sands were assumed to represent ancient wind dunes formed on a vast Sahara-like desert; this became a ruling hypothesis.... The Navajo problem originated years ago when geologists could conceive of large amplitude cross stratification as originating only in wind-formed dunes; no other modern processes that could form it had been studied. This highlights the major shortcomings of reasoning by analogy, namely the limitation at a given time of known possible analogues. Today, knowledge of modern shallow marine sedimentation has broadened the spectrum of counterparts and analogues. Insight gained into remarkably large underwater dunes

found in very shallow shelf areas provides as attractive a comparison for much of the Navajo sands as for lower Paleozoic quartz sandstones.²³

Inasmuch as geologists are forced to interpret ancient sediments chiefly by analogies with modern phenomena, interpretations are severely biased if all possible modern analogues are not known; such was the case when the Navajo was first studied.²⁴

Studies of the actual footprints in the Coconino Sandstone and comparisons with footprints made by animals in laboratory conditions on various substrates showed that the tracks in the sandstone must have been made in wet sand consistent with underwater formation and that the animals made similar tracks when walking upgrade.²⁵ There are two possibilities here. Either the animals do not leave adequate tracks when going downhill, or they were going uphill for a reason. Laboratory experiments show that animals leave equally good tracks when going downhill as when going uphill, and so the only other logical conclusion is that the animals were going uphill because they were perhaps trying to escape rising water levels. This is consistent with the evidence, and also fits the catastrophic flood model.

Collating data of fossil footprints (from about 800 published papers) and the actual presence of the body fossils of the creatures that could have made these tracks in the same strata has also yielded some surprising results. One would expect that strata containing footprints would also contain the fossils of the animals that could have made them, but this is not always the case.²⁶ The distribution of bird and mammal footprints correlate well with the distribution of body fossils, but amphibian and reptile footprints correlate poorly with body fossils. Amphibian footprints are rare after the early Permian and reptile footprints, with the exception of dinosaur footprints, are most abundant in late Triassic and early

Jurassic rocks. The only Cretaceous reptile footprints identified in the literature are about a dozen types of dinosaur footprints. Now in contrast, the amphibian and reptile body fossils are the most abundant in the Cretaceous and the Tertiary where corresponding footprints are rare or nonexistent. This does not seem to make sense if the geological column represents strata accumulated over millions of years, since one would expect the actual creatures to abound in the same time period (strata) where their footprints are recorded. However, if the strata were deposited catastrophically and do not represent millions of years of time, then a logical explanation can be found for this anomaly.

Mammals and birds would not readily make underwater footprints since they tend to float in deep water, and the larger mammals and the birds could have sought high ground during the initial flood events. During the early flood events, large numbers of amphibians and reptiles would have been moving about and thus producing footprints, which would have been preserved by being covered by rapid deposition mud flows. Later in the flood very few live reptiles and amphibians would produce footprints, except for the larger creatures such as the dinosaurs. During the Cretaceous, when the only footprints preserved were those of a few dinosaurs, there would have been many amphibian and reptile bodies that were being buried by the catastrophic formation of these strata, and this would account for the abundance of body fossils of these creatures that are found in these layers. Footprints of 'bird' tracks have been found in deposits in Nova Scotia, but since these are carboniferous deposits, they are presumed to have been made by other creatures, since birds should not have been around yet. If the same prints had been found higher in the column, then they would have been classified as bird prints. Similar tracks have also been found in Permian deposits.²⁶

Generally speaking then, the footprints in stone support the catastrophic model better than the conventional model of long ages.

Dinosaurs in Mud

Since fossilization requires very specific, complex conditions, the vastness of the fossil record does not support the idea of uniformitarianism. Indeed when one considers the giant dinosaur fossils, then the question arises “What buried these creatures rapidly?” Dinosaurs are sometimes found in relatively large numbers and mostly they are washed into position with many of them showing distinct stream orientation. Scientists explain this by stating that these creatures lived in the flood plains and were periodically overcome. However, these fossil beds often stretch over thousands of square kilometers, which would not be consistent with such a scenario. Moreover, some dinosaurs have been found imbedded in marine deposits, suggesting that they were washed out to sea. Recently, a specimen of *Scelidosaurus* with excellent preservation of even skin tissue was found in Great Britain in marine deposits together with algal spores and bivalves.²⁷

Dinosaurs were of course reptiles (giant lizards), and their lineage cannot be determined from the fossil record. However, they have received such media attention because of their size and presumed ferociousness that they have captured the attention of young and old. Far from proving evolution, they are in fact one of the stumbling blocks, since animals of such remarkable diversity in size and form must have had a recognizable lineage. The heaviest dinosaur on record is the estimated 100-ton *Argentinosaurus*, but it was not the largest, as some sauropod specimens have been found that could have been 50 meters long and standing 14 meters high. Large numbers of dinosaur eggs, apparently from these large creatures, have also been found in Argentina, and these are being interpreted as dinosaur nurseries, but again these well preserved eggs were buried rapidly in silt from a flood.²⁸ Chiappe, one of the team leaders and principle author of the paper published in the journal *Nature* had this to say regarding the eggs:

Scientists found so many embryonic remains that it appears catastrophe struck the nesting ground, keeping many eggs from hatching . . . Floods may have penetrated the porous shells and drowned the embryos.²⁹

There are some that say that dinosaurs are not extinct, but live on in the birds of today. The evolution of birds is traced to dinosaurs, but there are major problems with this supposition. The feathered dinosaur *Archaeopteryx* resembles a small coelurosaurian dinosaur *Compsognathus* and the only distinction linking it to birds is its feathers, which have been disputed in the literature as previously noted. Other than the disputed feather link, there are other problems, which negate dinosaur lineage for birds. Birds lack the embryonic thumb that dinosaurs had, suggesting that it is “almost impossible” for them to be related.³⁰ Moreover, it is impossible to envisage how the simple sac-like lung of dinosaurs could have evolved into the highly complex avian lung with its through-flow system and countercurrent oxygen exchange. A team led by John Ruben, from Oregon State University, analysed outlines of *Sinosauropteryx* (a so-called feathered dinosaur) and concluded that its “*bellowlike lungs could not have evolved into the high-performance lungs of modern birds*”.³¹

There is no denying that floods and fossils seem inseparable, but an erstwhile world destroyed by a flood would destroy the very foundations of the evolutionary theory, which sees fossils as evidence of phylogeny. However, more and more evidence is coming to light which threatens the very foundations of uniformitarianism. One of the finest modern-day detective stories regarding catastrophism in the fossil record is to be found in the story of the petrified forests in Yellowstone National Park and other petrified forests around the world.

Petrified, Fossilized Trees and their Age Implications

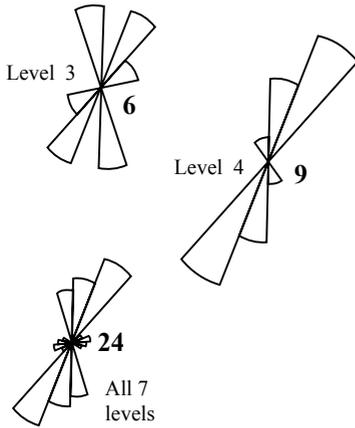
The general distribution and vertical stratification of the petrified trees in the Yellowstone National Park are presumed to represent a series of up to 40 successive forests, one on top of the other, whose combined age was estimated as being well in excess of time-restraints imposed by a flood model. It was believed that each successive forest was covered by volcanic ash in sequential eruptions, only to be replaced in the course of time by new forests. It was argued that this evidence could not support a young age for the current topography of these forests. Dr. Harold Coffin carried out a detailed investigation of these petrified forests and discovered that in spite of the long age paradigms accepted in the scientific community, these forests actually support the catastrophic model.³²

As many of the trees are standing upright in an apparent position of growth, it was accepted that they were the remains of an actual forest. Moreover, the strata in which each forest layer is situated are uniformly flat and totally unlike any modern forest which, if it were covered by volcanic ash, would show trees growing on slopes and other uneven topography. Closer examination reveals that the petrified trees have no bark, no side branches, and the rootstocks are ripped off. This is inconsistent with trees being covered with ash while in a position of growth, since the roots would be undisturbed if the tree was still in position of growth. Moreover, covering the trees with ash would certainly leave the branches at least in the vicinity of the trees that were covered.

There are not only upright trees in these strata, but many horizontal trees are also found. In places, the vertical separation is actually very small - the new layer lying just above the stumps of the older layer. Close examination of the strata reveals typical evidence of turbidite action and sorting of layers, which tend to show reverse grading with the coarser material on top. This is consistent with material which has been deposited by water-induced slides and slumps, and does not support deposition of dry volcanic ash.

Petrified Tree Area

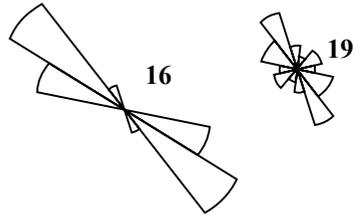
Verticle Trees



Mt. Norris

Vertical

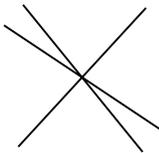
Horizontal



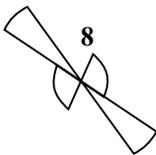
Fossil Forest

Vertical

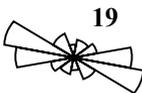
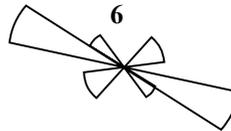
Horizontal



Level sub-1



Level 1



Level 2

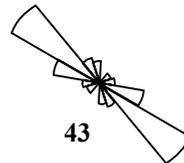


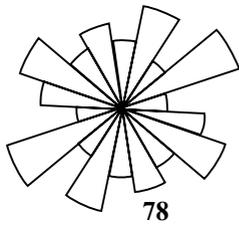
Figure 3.4 - Orientation of vertical and horizontal petrified trees in the Petrified Tree, Mt. Norris, and Fossil Forest areas, Yellowstone National Park. For levels with five or less measureable trees, each tree is represented by a line. Numerals beside rose graphs represent sample size.⁸

The organic layers, which previously were considered to represent the compacted forest floors, are also water sorted, which belies a mere forest situation. Analyses of tree orientation show that both horizontal and vertical trees are orientated in distinct directions. By comparison, the orientation of fallen trees in standing forests in Oregon, deciduous forests in Michigan and redwood forests in California show a lack of orientation (figures 3.4 and 3.5).

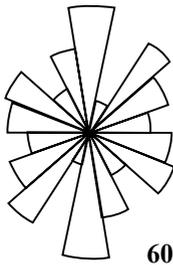
A solution to these anomalies came when, in 1980, Mount St. Helens erupted. The March 30 eruption melted the glacial ice, precipitating a flood on the south side of the mountain. Along with cold volcanic ash, the rushing water carried a large number of trees down the side of the mountain. These trees of varying sizes were stripped of their side branches, bark, and roots. The logs were buried in the volcanic ash with a predominant stream orientation. This is similar to the orientation of the petrified trees on the slopes of Mount Horniday in Yellowstone National Park.

On May 18, Mount St. Helens erupted again, with an accompanying earthquake. Tremendous pressure within the mountain was released after a rockslide, and the top 400 meters of the mountain were blown off in a catastrophic explosion. A force equivalent to 500 Hiroshima atomic bombs was unleashed. The destruction of the forest was total, with the trees literally blasted out of the ground. Debris falling in the lakes surrounding the mountain, caused tidal waves which washed uprooted trees into newly formed and existing lakes. In Spirit Lake, a study was done, and it was found that those logs that had root stumps rapidly righted themselves assuming a vertical position. A sonar scan of the bottom of the lake revealed 19,500 upright trees on the bottom of the lake.³³ If one applies this scenario to the situation prevailing in Yellowstone National Park, one can readily account for the existing situation on the basis of the catastrophic model.

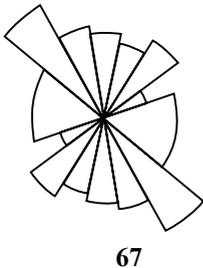
More than one eruptive cycle would cause numerous turbidity currents and account for the numerous layers superpositioned over each other. Moreover, studies on the chemical composition of the volcanic deposits show that they were from



**Fir Forest
Oregon**



**Deciduous Forest
Michigan**



**Redwood Forest
California**

Figure 3.5 - Orientation of prostrate trees in living forests from three diverse locations. ⁸

eruptive events occurring simultaneously over a short period of time. This can be ascertained because the relationship between chemical components in volcanic ejecta is constant only for single eruptive cycles. Studies on lava flows in Hawaii show that eruptive events separated by more than three months can be distinguished on the basis of the magma composition. The time implications for the formation of the petrified forests are thus consistent with a short chronology. Further evidence for catastrophism can be found in the fossil trees that are embedded in more than one geological layer simultaneously - a situation which is impossible if uniformitarian principles are applied.

How long would it take for wood to petrify? It has always been a tenet of evolutionary thinking that stone formation and processes such as petrification must have taken place over millions of years. However, as we have seen in the previous chapter, these processes can take place rapidly. Instant petrification has been achieved artificially and under natural circumstances. By impregnating wood with solutions high in minerals such as silicon and aluminium, instant petrification has been achieved and even patented.³⁴

Writing in the *Australian Lapidary Magazine*, Piggot recounts a story of natural rapid petrification of a piece of wood from a tree that had been chopped down 70 years ago, with axe marks still on it, that had been buried and dug up again petrified. The story also reports on petrified fence posts with drill holes and wires still attached.³⁵ Given the right circumstance, it would thus not take long for petrification to take place. Moreover, floodwaters together with volcanic ash would provide the perfect mineral soup for the processes to take place.

Floodwaters Covered the Earth

A catastrophe of the awesome magnitude proposed by the Biblical flood model would have totally restructured the post-flood world. According to Scripture, the whole world was submerged under water, and the restructuring of the earth to produce the present topography must therefore be a post-flood phenomenon. Evidence for total submersion of the continents is widespread on earth. Water deposition is a feature of the geological column, but one layer in particular, the Cretaceous layer, points to a transition between the pre- and post- catastrophic events postulated in this model.

The Cretaceous layer comprises of chalk deposits consisting largely of calcium carbonate derived from vast deposits of coccolith (algal) shells and other microorganisms with calcium carbonate skeletons. In view of its universal distribution, the Cretaceous layer

is evidence of a worldwide shallow sea covering the continents. The calcium carbonate skeletons of certain algae and Foraminifera would only settle out in large quantities if the seas were shallow and conditions favored algal blooms. Such disturbed ecological conditions would have prevailed in the immediate post-flood era.

The Cretaceous layer varies in thickness, a condition that could have been brought about by currents, or by differences in the time that the various areas were submerged under water. In the area of the white cliffs of Dover, the deposits are substantial, possibly indicating that these areas were submerged for a long period. This type of deposition does not occur today, as the calcium carbonate skeletons would dissolve in the deep oceanic waters presently existing. Although no present day scenario can parallel that of the deluge model, there are, however, some events occurring today which can shed some light on what might have happened in the past. The present disturbed ecology has resulted in some extraordinary algal blooms in waters rich in inorganic salts, derived from agricultural endeavors or other chemical industries. One such area is the Mediterranean, where masses of effluent and chemicals provide environments conducive to massive algal blooms.

The post-flood waters would have been rich in minerals and decaying organic materials, and in such circumstances, the algal blooms which produced the chalk layers could have been deposited in a very short time. Continental uplift would then have resulted in the drainage of water, recycling of sedimentary deposits and subsequent burial of the chalk layer, plant debris, and decayed animal remains. Further evidence supporting this model can be found in the Tertiary deposits which are packed with fossils creating fossil graveyards with numerous species dumped together. Strata with pieces of broken mammalian bones are also not uncommon in Cenozoic deposits, a condition that is difficult to explain using the standard evolutionary paradigm. Furthermore, stream-orientation of fossils is evident in the Tertiary which shows that deposition of these fossils was not only produced by water, but that the deposition was also catastrophic.

A catastrophe of this magnitude must surely have left its mark in the stratigraphic record. Indeed, the later cretaceous is associated with huge scale extinction of numerous species including the dinosaurs. An analysis of the genera that survived this great extinction at the end of the cretaceous shows that, besides the complete extinction of the dinosaurs, more than 50% of marine organisms also died in the destruction. In fact, the post cretaceous world is a shadow of what it was prior to this time period. The ammonites and belemnites suffered complete destruction, of all the swimming reptiles, only three survived. In fact, only 30% of all swimming marine organisms survived, whereas the survival rate of the fresh-water organisms (97% survival) was much higher (see Table 3.1)

Marine organisms are adapted to stable conditions, and a large-scale upheaval of the marine environment can be expected to lead to large-scale destruction. Numerous fossil beds of redistributed corals and mollusks account for massive destruction of the once stable marine environment. It is therefore not surprising that only approximately half of the bottom dwelling marine organisms survived this event. In the light of this destruction and the large-scale KT extinctions, it is not surprising that scientists have spent so much time debating the reasons for this phenomenon. Among the hypotheses suggested to account for extinction on such a massive scale are intense volcanic activity, epidemics of disease, large scale greenhouse effects with a rise in CO₂ levels leading to the death of dinosaur embryos, changes in plant composition, change in ocean salinity, high ultraviolet radiation, dust clouds caused by collisions with comets or asteroids, and ionizing radiation from supernova explosions.

Most of these theories concentrate on the dinosaurs, but fail to explain the large-scale destruction of all the other life forms. Surprisingly, a worldwide destruction by water comprising large scale upheaval of the ocean floor and submergence of the continents is totally absent from all the scientific conjectures regarding this era of extinction when all the evidence points precisely to such an event. The chalk bed deposits of the cretaceous period ('Creta'

The Genesis Conflict

	Before Extinctions	After Extinctions	Percentage of Genera After Extinc- tions
Freshwater organisms			
Cartilaginous fishes	4	2	
Bony fishes	11	7	
Amphibians	9	10	
Reptiles	12	16	
	36	35	
97			
Terrestrial organisms (including freshwater organisms)	100	90	
Higher plants	16	18	
Snails	0	7	
Bivalves	4	2	
Cartilaginous fishes	11	7	
Bony fishes	9	10	
Amphibians	54	24	
Reptiles	22	25	
Mammals	226	183	
81	28	10	
Floating marine micro-organisms	43	4	
Acritarchs	57	43	
Coccoliths	10	10	
Dinoflagellates	63	63	
Diatoms	18	3	
Radiolarians	79	40	
Foraminifers	298	173	
Ostracods			
	41	35	
	261	81	
58	95	93	
Bottom-dwelling marine organisms	87	31	
Calcareous algae	337	204	
Sponges	28	22	
Foraminifers	300	150	
Corals	399	193	
Bryozoans	32	24	
Brachiopods	69	52	
Snails	100	30	
Bivalves	190	69	
Barnacles	37	28	
Malacostracans	1976	1012	
Sea lilies			
Echinoids	34	0	
Asteroids	10	7	
	4	0	
51	70	50	
Swimming marine organisms	185	39	
Ammonites	29	3	
Nautiloids	332	99	
Belemnites			
Carliaginous fishes	2868	1502	

Table 3.1 - Table of the number of genera that lived before and after the cretaceous extinction. Note: The record for terrestrial organisms is limited to North America but is global for marine organisms. Source: Russel, D.A. 1979 "The enigma of the extinction of the dinosaurs. *Ann. Rev. Earth. Planet Sci.* 7:163-182

is the Latin for 'chalk') are proof that everything was under water. Sometimes it is difficult to see the forest for all the trees.

Surviving the Catastrophe

If one were to seek a reason for the extinction of many of the great creatures that once roamed the earth, then one might conjecture that the post-catastrophic world is not conducive to their survival. Firstly, there is evidence for a massive increase in the salinity of the oceans. As a comparative physiologist, I have always been fascinated by the fact that marine fishes (both the cartilaginous fishes as well as the bony fishes) are anatomically and physiologically adapted to a fresh water environment. Their internal salt concentration is approximately one third of that of seawater and their kidneys are adapted for the elimination of water (they retain glomeruli which would normally form ultrafiltrates, but in the case of marine fish they have become functionally aglomerular by permanent constriction of the afferent glomerular artery), although this function is not required in seawater. In fact, their low salt concentration causes them to lose water by osmosis so that they cannot afford to lose water via the kidneys. The cartilaginous fishes (sharks and rays) solve this problem by retaining urea (a toxin) to raise their osmolarity to a level higher than that of seawater so that they can gain water by osmosis, whereas bony fishes desalinate the seawater by making use of salt pumps in their gills. Obviously these organisms were adapted to much lower salinities in the past and only survive because of their ability to osmoregulate under these circumstances. The retention of toxin by a cartilaginous fish is an indication of an emergency solution to which they eventually adjusted. Only organisms that could either conform to the new conditions or regulate their salt content could survive and the more sensitive are now extinct.

One might question the possibility that marine and fresh water organisms could have survived if the waters of the earth were all dumped together during a global flood. The separation between

fresh and salt water would then only be re-established once the continents had risen above the water level. Surprisingly, however, large bodies of fresh and saline waters, or even large bodies of fresh waters from different sources can coexist side by side without much mingling along the contact zones. This is seen in the great Amazon River, where two bodies of water run side by side for kilometers on end with limited mingling at the contact zone. During the flood stage, organisms adapted only to fresh water would thus have been able to survive in large bodies of fresh water that would have remained relatively distinct. Moreover, the marine life is enhanced where great bodies of fresh water come into contact with the ocean, and many species can only spawn in fresh or brackish water thus indicating that these were the conditions to which they were earlier accustomed. Of course, one would expect large-scale destruction of aquatic life in areas where the water composition was rapidly and radically changed due to hypersalination from underground aqueducts and through catastrophic mingling of the water masses, and this is indeed what we do find. The fact that so many marine organisms use rivers and estuaries as their spawning grounds indicate that the best survival salinities for these creatures must exist under these low saline conditions and that is why they will even migrate long distances to spawn in such areas.

Regarding the land organisms, it is enlightening that there are only two categories of organisms, in terms of their ability to cope with the thermal environment, in existence today. Terrestrial animals are either endothermic or ectothermic. Endothermic animals (largely mammals and birds) control their body temperatures by increasing their metabolic rates when environmental temperatures drop, whereas ectothermic animals control their body temperatures by selectively utilizing external sources such as solar radiation and environmental heat fluxes. In the absence of solar radiation, the body temperatures of these animals are the same as that of their environment. We also speak of these categories as warm-blooded and cold-blooded animals. In a world with climatic extremes, one would have to belong to either one of these two categories to survive.

There is evidence that the great reptiles of the past were probably neither endotherms nor ectotherms, but somewhere in between. The same probably holds true for many of the now extinct giant amphibians and mammal-like reptiles. Studies of bone to marrow ratios show that the dinosaurs and other creatures were thus in this intermediary condition and would thus require stable environmental conditions. The plant life of the lower stratigraphic record shows that the earth probably had a relatively warm climate prior to the catastrophe, and the post-catastrophic climate was not suitable for the survival of the paleoforms. Moreover, the large-scale reduction in vegetation associated with the destruction means that many food sources were no longer available and precludes survival of many of these animals. The paleontological record shows that far greater varieties of plants and animals existed in the past than are living today and that at both the plant and animal level, we are thus deprived of numerous species that must have once graced the planet. One could also expect that only non-specialist feeders could survive the destruction of their preferred food source, so that many of the great creatures of the past are no longer with us because the planet does no longer provide their niche.

What Can Coral Reefs Teach Us?

Coral reefs and coral islands hold secrets which are worthy of note. Firstly, there are time implications involved in view of the supposed slow rate of coral growth. Secondly, they can also tell a story with regard to the events that may have shaped our present oceans and, by implication, the continents as well. Thirdly, fossil reefs can present a challenge to the flood model since their presence is seen to favor slow development over millions of years. Dr. Ariel Roth of the Geoscience Research Institute in California has done extensive research on coral reefs and has published a number of papers which throw light on some of these baffling questions.^{36, 37}

Coral reefs consist of a hard core built up by living organisms that can resist the wave action of the oceans and the reef in general represents one of the most complex marine ecological systems. A reef can trap ocean sediments, and the total structure can thus be quite complex, with part of the reef being constructed by the reef organisms themselves and the rest filled in from other sources.

Fossil reefs in the stratigraphic record thus appear to suggest long periods of stability whilst these reefs grew during those time periods in the earth's history. Fossil reefs can serve as a good trap for oil and they are thus of commercial interest as well. There is, thus, much interest in these reefs and hundreds of fossil reefs are reported throughout the geological column. The question is, how did these fossil reefs form and were they built by reef organisms in the same way as they are being constructed today? If so, then they would seriously challenge the Biblical paradigm of a destruction of the earth by the flood. The fossil reefs could, however, also be allochthonous reefs (formed by transported sediments) and not necessarily be autochthonous reefs (reefs formed by biological processes requiring a long time period). The fossil reefs are generally different to present day reefs since they are often much smaller (thicknesses ranging in the meter range) and the organisms are also different. The interpretation as to whether the corals in the fossil reefs grew there or were transported to their present position catastrophically is similar to that encountered in the study of the fossil trees in the petrified forests. The diversity of organisms (organisms not associated with reefs) and their orientation in the fossil reefs suggests an allochthonous origin, which would be consistent with the catastrophic flood model just as we saw in the case of the petrified forests.

The great Permian reef complex, which is 700 kilometers long and 200 kilometers wide, has long been considered a type of ancient Great Barrier Reef. However, the lack of organisms, which in living reefs construct the frame of the reef, suggests that this reef does not represent a natural reef. Moreover the sedimentary layers associated with the reef suggest a catastrophic

origin. Other fossil reefs such as the Nubrigyn Algal Reefs are now seen as massive debris flows that carried huge blocks of rock as large as one kilometer across and dumped them in their present position. The case for fossil reefs in position of growth is thus the same as for the petrified forests - the reefs are destroyed remnants of pre-flood reefs that were broken up and transported together with other organisms and deposited in layers in the geological column. They are thus recycled reefs and support the catastrophic model. Moreover, they show that the ocean floor was subjected to destructive forces as well and could have played a major role in accounting for some of the features noted in the geological column. The floor of the ocean could have been raised by up-warping during the flood, thus pouring the waters over the continents. The reverse must have happened during the time when the waters were drained off the land to form the present ocean basins. The question can now be raised - how long did this process take? And this is where living coral reefs and dead coral islands provide some interesting insights.

Living coral reefs are traditionally regarded as slow growers, and they require certain conditions in order to grow. The reefs are produced by a variety of organisms with corals and coralline algae being the main contributors. They are also largely restricted to warmer oceans and, being colonial animals, require symbiotic organisms in order to flourish. Since many of these organisms are algal plants, the reefs must also be in contact with the light and can only grow if the light reaching the reef is sufficient to sustain these photosynthetic organisms. Once the coral reef reaches the surface of the water, however, growth is retarded because of the sensitivity of the organisms to ultraviolet radiation and exposure to air. Maximum coral growth is thus achieved a few meters below the surface of the water, but the coral cannot grow from the bottom of the ocean up if the water is too deep (usually 50 meters) to allow for sufficient light to penetrate to that depth. Estimates for the rate of coral growth have usually been derived

from surface studies where growth is not maximal. But high rates have been recorded below the surface of the water, and a number of ships have floundered in charted waters where unexpected reefs had grown rapidly. Growth rates are usually considered to be in the order of 0.8-26 mm/year, but maximum rates of coral growth of up to 414 mm/year have been recorded. Studies also show that if water temperatures are increased by just 5 °C, then growth rates double.

The challenge posed by this information is as follows: How does one account for dead coral islands at the bottom of the oceans in waters that are too deep for coral to grow, and how does one account for tall coral structures that stretch from the ocean floor to the surface. The Great Barrier Reef is 2000 kilometers long and stretches up to 320 kilometers offshore and it is 200 meters thick. This does not pose any serious questions in terms of the time required to produce this reef. Drilling operations at Enewetak Atoll in the Western Pacific, however, have shown this reef material to be 1405 meters thick before reaching a basalt rock base. Applying the general rate of coral growth to this reef, it can seem as if many thousands of years would be required to reach this thickness. Using a growth rate of 414 mm/year, however, could account for this structure in less than 3400 years, which fits in well with a Biblical chronology. If ocean temperatures were higher in the past than in the present, and this seems likely, then the time required to reach this thickness would be even less.

The dead corals in deep ocean waters must have been in contact with the light at some stage in order for them to have formed at all. Moreover, the very deep corals, such as the Enewetak reef could not have grown from the bottom up, since they would have been cut off from light at those depths. The only other solution is that the ocean floor was higher in the past and that it then dropped down to its present level. The rate at which the ocean floor dropped down to its present position must have been slow enough in some areas for coral to stay alive and keep growing as in the case of the 1405 meter thick Enewetak coral reef. On the other hand, it must have been fast enough in some areas for the now submerged dead corals at the bottom of the Pacific to have died

when cut off from the light. This places a totally different time frame (in the order of thousands of years) on the great geological upheaval that the earth must have experienced. The scientific world also accepts up and down warping of the ocean floor to explain the obvious continental marine incursions, but their time frame is, of course, reckoned in million of years rather than thousands of years. Corals thus provide a model for what happened during and immediately after the flood. The ocean floor was raised, and the waters poured over the land, and this accounts for the massive marine deposits on the continents. After the flood, the new ocean basin formed by down warping of the ocean floor, which was rapid in some areas, and slow in others. This model is further supported by the fact that all continents show ancient coastlines, which were much further inland than the present ones.

The Post-Flood World

The post-flood world must have been very wet, and it is therefore not surprising to find numerous algal deposits with ferns, reeds, reed fish and dragonfly nests in these deposits. Furthermore, the numerous inland basins and relics of giant lakes imply very wet and hazardous conditions. Today's Great Salt Lake in Utah, USA is about one sixteenth of its original size, and only a fraction of its original depth. In fact, it is estimated that the lake must have been some 230 meters deep at one stage. Collapsed limestone caves from this time period also contain fossils of bats, which date from the post-flood era. Interestingly, these creatures are identical to present-day forms.

After the flood, recolonization of the continents would have commenced, and this must have taken place quite rapidly. Moreover, the continents must still have provided land bridges for the animals to cross. There is also evidence that the conditions were considerably warmer than those of today, as indicated by the numerous temperate-adapted fossil plants and animals found in regions currently climatically unsuitable for their existence. Recolonization of

the new earth would have had to take place in such a way as to be consistent with current concepts on ecological succession. It is to be envisaged that the earth must have been relatively unstable in the immediate post-flood era because of changes in the continents and ocean basins which were still ongoing. Moreover, earthquakes associated with the rise of the continents would have provided further chances for regional catastrophic formations by the rapid drainage of inland basins and later by the breaking up of glacial barriers. There is evidence in the youngest geological layers of succession, and even distribution patterns of animals suggest colonization patterns consistent with a Biblical perspective. For example, genetic studies have shown that species colonization routes in Africa and the Americas occurred in a north-south direction, and in Asia from a west-east direction. (See Figure 5.12)

Once recolonization had largely been completed, ecological barriers caused by desertification, mountain uplift, or climatic changes could have separated populations. An example here could be the African and Indian elephant populations, which are probably relics of a larger population with its origin midway between the two, a scenario to be expected if the story of Noah's ark has any credence. Animals would have redistributed themselves quite rapidly, but in view of his great generation length, man would have been the last organism to spread across the new world. Even in spite of man's long generation time, the time frame for the human population to have grown to present levels is more than adequate to explain current human population levels. In fact, there must have been a number of additional epidemics besides the known ones to explain the low level of the current human population. Growth rates of only 0.5% per year (more than 4 times lower than present rates) would have been sufficient to produce the present human population since the time of the flood some 4500 years ago according to the Scriptures.

Subsequent to the reoccupation of the post-catastrophic world, the earth must have experienced a further cycle of catastrophism. Evidence for this can be seen in the vast volcanic

deposits present in the youngest layers of the geological column. Volcanism of this scale was probably unleashed when the super-continent “Pangaea” split up to form the present-day continents. It is estimated that 50 000 volcanoes (The mid-Atlantic Ridge and The Pacific Ring of Fire) were active at this time. The volcanoes spewed vast amounts of volcanic ash into the air, thus shielding the sun and causing a rapid drop in temperature. Even relatively minor present-day volcanoes influence global weather patterns after eruption. The combination of warm oceans and sudden drop in radiant energy is ideal for the formation of glaciers, as it can provide the necessary sustainable precipitation to allow glacial advance. This could have induced the Ice Age.

Studies at the Athabasca glacier and glacial bed F26 show that complete glaciation and deglaciation need not have taken more than 600 years. Moreover, evidence for more than one ice age is scant in the geological record, and most of the assumed features in the geological column ascribed to ancient ice ages could equally well have been caused by catastrophic mudflows. The glaciers formed during the Ice Age would have separated populations such as the woolly mammoth into a northern and southern population, but conditions must still have been relatively warm in coastal areas, as evidenced by coexistence of animals adapted to different climatic conditions (disharmonious species distribution). An example would be hippopotami and reindeer coexisting in England at that time, as evidenced from the fossil record.

In Siberia, woolly mammoths are found in the ice in such a state of preservation that the flesh is intact. They must therefore have been buried and frozen instantly because such large animals have large heat stores and would have rotted had they not been frozen rapidly. Moreover, they are found in deposits known as Muck. Muck is a geological mystery. It covers one-seventh of the earth's land surface, is in excess of 4000 feet thick in places and surrounds the Arctic Ocean. It is difficult to explain where it came from, since it occupies flat terrain with no surrounding mountains

from which the muck could have eroded. Oil prospectors have even discovered frozen tree chunks in the muck, and submerged tropical forests up to 1700 feet down have been recorded as well. The muck, now frozen solid, contains the remains of thousands of mammoths and other mammals and shows that they must have succumbed rapidly to a calamity which involved freezing. Judging from plants and animals buried with them, their surroundings must have been more temperate and moist in the past. The animals also found in the muck are rhinoceroses, tigers, bison, horses, antelope, fruit trees, and temperate species of grasses, as well as burrowing animals, such as voles, that could not have burrowed in rock-hard permafrost. It therefore seems logical to propose that the muck originated from flood deposits (particularly since they contain submerged forests) and that the freezing of these animals occurred during the Ice Age events some time after the flood. This timing would allow for population numbers to have reached the levels necessary to account for the numbers associated with the Mammoth remains that have been found or estimated.

Generally, the mammals of the Cenozoic layers are depicted as bizarre and very different to the animals existing today. Common illustrations are those of the sabre-toothed tiger, giant land sloths, and the woolly mammoth. A feature of these animals is their size and diversity. Of all the sabre-toothed tigers removed from the tar pits at Rancho La Brea, the long-toothed variety represents an extreme of the range. Obviously, in a post-catastrophic world with low population densities, the potential for variation would have been great until increase in population density increased the selective pressures and weeded out the extremes of the range. The supposition that these large mammals existed very long ago and must have represented ancient ancestral forms of modern mammals is not consistent with the facts, since pelts of these animals are still found in caves where skeletons of these creatures have been found. In South America, pelts have been found of giant sloths indicating a very recent existence. Today we know that reduction in size need not take millions of

years, but can be achieved rapidly by increases in competition or changes in climate. Animals on islands frequently undergo large-scale reduction in size within the space of a few generations. The potential for rapid change must therefore exist in their gene pool.

Human Evolution

Human evolution is a contentious subject and is governed more by the opinions of the researchers than by the facts reflected in the fossil record. Contentions amongst researchers have led to acrimonious accusations which throw little light on the actual phenomena contended. David Pilbeam, from Yale and Harvard summed the situation up as follows:

I have come to believe that many of the statements we make about the hows and whys of human evolution say as much about us, the paleoanthropologists and the larger society in which we live, as about anything that ‘really’ happened.³⁸

The fossils, upon which human lineages are based, are relatively scarce, and one wonders why so few human fossils have been found. Humans are gregarious, and the bulk of the population would have tended to live close together. Legends concerning pre-flood civilizations and master races abound in folklores around the world, and the legend of the lost continent of Atlantis is one that to this day is generally held in high esteem even in occult circles. These sources believe that Atlantis represents the antediluvian world and that this world disappeared under the sea. Be that as it may, the possibility thus exists that the bulk of human fossils could now be buried in sediments at the bottom of the ocean.

The evidence for man's evolution is extremely scant, and the main role players are Australopithecines, which are small to medium sized ape-like creatures, which some researchers believe to have walked upright. Remains of these creatures have been found in eastern and southern Africa and the famous Lucy belongs to this group. Then there are the so-called archaic *Homo sapiens*, which include forms such as the Neanderthals. It is noteworthy that all the forms on which human evolution is based were contemporaneous, which means that they lived at the same time. In fact, all the primates existed at the same time, and the evolutionary tree is once again a morphological sequence pieced together by the scientists according to their perceptions. Australopithecines thus existed side by side with humans and are thus regarded as a side branch from which information can be inferred but that could not have been on the ancestral line of modern humans.

As more information becomes available, more and more intermediary forms are removed from the family tree. *Australopithecus*, as the name suggests, was an ape, but supposedly walked upright. This conclusion is based on footprints in stone that were discovered at Laetoli in Tanzania, which were supposedly made by Lucy-types. However, 'Lucy-types' had curled toes and the same knuckle walking wrist anatomy as chimpanzees and gorillas.³⁹ Everything about australopithecines points to the stooped gait of a rolling knuckle-walking chimp-like creature. CAT scans of their inner ear canals (which reflect posture), and their long curved fingers and toes also show that they did not walk upright. The evolutionist Dr. Russel Tuttle of the University of Chicago studied the footprints made by a tribe of people in Peru who walk

barefoot. Based on casts that were made from their footprints, he concluded that the Laetoli prints are in fact identical to those made by humans who habitually walk barefoot. Considering that humans and australopithecines lived at the same time, the most logical conclusion would then seem to be that humans made the prints. Some elements in the literature even suggest that the variation between the three forms (*Australopithecus afarensis*, *A. africanus*, *A. robustus*) is no greater than the normal intra-specific variation experienced in modern ape species.

Lucy is another intermediary under fire, and recent statements in the journal *New Scientist* suggest that she resembled the pygmy chimp. The debate that raged between Johanson and Leaky concerning the suitability of either of these fossils as an intermediary between man and the ape ancestors underlines the uncertainty and scantiness of the information on which bold scientific suppositions are based. Evidence for Lucy's intermediary status is extremely fragmentary and cannot stand up to serious scientific scrutiny. Indeed, there is no evidence that these creatures were anything other than apes. The evidence for Lucy's intermediary status is based on arm to leg length ratios that are supposedly midway between those of apes and man, but in the light of the fragmentary nature of the bones available for study, such a ratio cannot even be determined. The hip is apelike but is claimed to be distorted when there is no 'undistorted' hip to compare it with, so on the basis of the evidence it must be an ape hip. The knee of the Lucy fossil, which is also used to substantiate an upright gait, was not even found together with Lucy.

Neanderthal man is also shrouded in controversy, but these fossils show no other evidence than that of Neanderthal being fully human, with a larger brain capacity even than modern man. *Homo erectus* and Neanderthals are basically the same but the Neanderthal fossils show evidence of bone deformity produced by rickets, which could be the result of conditions that prevailed in the post-flood Ice Age. Of course, the time frames on which all these speculations are based are also not in accord-

ance with the catastrophic model, but then there has been such a huge disparity of dating attempts on the hominid fossils that a discussion on the issue is not even warranted, particularly since the dating techniques are open to question.

Interestingly, there has been an ongoing debate as to the origin of man. Did man originate in Africa or Asia? Protagonists of the two viewpoints have been at loggerheads since the first fossils of so-called human ancestors were discovered on the two continents. In recent times, the theory that man evolved in Africa held sway, but recent evidence again supported the view that man evolved in Asia. The compromise viewpoint that man appeared almost simultaneously in both regions is even more surprising. Again it can be argued that the data is consistent with a distribution from an area midway between the two disputed regions, making the story of Noah's ark even more plausible.

In his book *'Bones of Contention: controversies in the search for human origins'*,⁴⁰ Roger Lewin, research news editor of the journal *Science* at the time, sums up the main issues of contention in the saga of human origins. He sites competition amongst researchers and their passions as some of the reasons for the confusion in the field of hominid evolution. The main controversies in his report revolve around: 1) the Taung child found in South Africa and originally rejected but now accepted as an intermediary ancestor in man's evolution; 2) the Piltdown Hoax where a human skull and an Orangutan's jaw were 'doctored' to lend credence to the naturalistic origin of man and which was unchallenged for almost four decades; 3) Nebraska man who was based on a tooth which turned out to be a pig's tooth; 4) the distortions towards primitiveness in the original description of Neanderthals; 5) the battle over the dethroning of *Ramapithecus* from the level of human ancestor to a relative of the orangutan; 6) the heated controversy over the dating of the volcanic layer associated with the hominid fossils in East Africa; 7) the controversy between Richard Leakey and Donald Johanson over the

position of the newer australopithecine finds; 8) the conflicts about what constituted the force that brought about human evolutionary change (was it predation, hunting, or cooperation). Lewin's own feelings are revealed in the following statement:

In the physical realm, any theory of human evolution must explain how it was that an apelike ancestor, equipped with powerful jaws and long, daggerlike canine teeth and able to run at speed on four limbs, became transformed into a slow, bipedal animal whose natural means of defense were at best puny. Add to this the power of intellect, speech, and morality, upon which we 'stand raised as upon a mountain top' as Huxley put it, and one has the complete challenge to evolutionary theory.

REFERENCES

- ¹. Herbert Spencer Robinson and Knox Wilson, *Myths and Legends of All Nations* (New York: Bantam Books, 1950).
- ². Derek Victor Ager, *The Nature of the Stratigraphic Record*, 2nd ed. (London MacMillan Press Ltd., 1983).
- ³. George Gaylord Simpson, *The Meaning of Evolution: A Study of the History of Life and of its Significance for Man* (New Haven: Yale University Press, 1949): 326.
- ⁴. Tammy Tosk, "Foraminifera in the Fossil Record: Implications for an Ecological Zonation Model," *Origins* 15 (1) (1988): 8-18. <http://www.grisda.org/origins/15008.pdf>
- ⁵. Jeffrey S. Levinton, "The Big Bang of Animal Evolution," *Scientific American* (November 1992).

⁶ Charles Darwin, *The Origin of Species*, (New York: Heritage Press, 1963).⁶ Darwin, Charles (1963) *The Origin of Species*, Heritage Press (reprint), New York

⁷ S. Bowring from M.I.T. and Harvard's Knoll in *Time Magazine* (December 1995).

⁸ *Time Magazine* (December 4, 1995).

⁹ D. G. Shu et al., "Lower Cambrian Vertebrates from South China," *Nature* 402 (1999): 42-46.
<http://www.efiko.org/material/Lower%20Cambrian%20Vertebrates%20from%20South%20China%20D-G.%20Shu.pdf>

¹⁰ Stephen Jay Gould, "Return of Hopeful Monsters," *Natural History* 86 (June/July): 22-30.
http://www.andrew.cmu.edu/user/jksadegh/A%20Good%20Atheist%20Secularist%20Skeptical%20Book%20Collection/Gould_The_Return_of_Hopeful_Monsters_sec.pdf

¹¹ Ann-Sofie Rasmussen and Ulfur Arnason, "Phylogenetic Studies of Complete Mitochondrial DNA Molecules Place Cartilaginous Fishes Within the Tree of Bony Fishes," *Journal of Molecular Evolution* 48(1) (1999): 118-123.

¹² R. S. Watkins, et al., "Archaeopteryx – A photographic study," *British Journal of Photography* (March 18, 1985) and the two subsequent issues.

¹³ Alfred Sherwood Romer, *Genetics, Palaeontology and Evolution* (Atheneum, 1963).

¹⁴ George Gaylord Simpson, *The Major Features of Evolution* (Touchstone, 1967).

¹⁵ O. C. Marsh, *American Journal of Science* (1879).

¹⁶ O. C. Marsh, "Recent Polydactyle Horses," *American Journal of Science* 43 (1892): 339-355.

<http://marsh.dinodb.com/marsh/Marsh%201892%20-%20Recent%20polydactyle%20horses.pdf> York and London; Columbia University Press, p. 263.

¹⁷ Dr. Niles Eldrege, curator at the American Museum of Natural History, qtd. in Luther Sunderland, *Darwin's Enigma: Fossils and Other Problems*, 4th ed. (Santee: Master Books, 1988): 78.

<http://www.creationism.org/books/sunderland/DarwinsEnigma/>

¹⁸ George Gaylord Simpson, *The Major Features of Evolution* (New York: Columbia University Press, 1963): 263.

¹⁹ B. J. Stahl, *Vertebrate History: Problems in Evolution* (New York, Mc.Graw-Hill, 1974): 489.

²⁰ D. Miller, *Seals and Sea Lions* (Stillwater, MN: Voyageur Press, 1998): 7.

²¹ "Hawaiian Monk Seal." ><http://www.kilaueapoint.org/education/naturefocus/hnfl3/index.html>>*Hawaii Nature Focus*, No. 13.

²² John J. Flynn, "Ancestry of sea mammals," *Nature* 334(6181) (1988): 383-384.

²³ Andre R. Wyss, "Evidence from Flipper Structure for a Single Origin of Pinnipeds," *Nature* 334(6181)(1988): 427-428.

²⁴ C.O. Dunbar, *Historical Geology* (New York: John Wiley and Sons Inc., 1957).

²⁵ R. H. Dott and R. L. Batten, *Evolution of the Earth* (New York: Mc.Graw-Hill, 1971): 359.

²⁶ K.O. Stanley, W. M. Jordan, and R. H. Dott, "New Hypothesis of Early Jurassic Paleogeography and Sediment

Dispersal for Western United States,” *American Association of Petroleum Geologists Bulletin* 55 (1971): 10-19.

27. Leonard R. Brand, “Footprints in the Grand Canyon,” *Origins* 5(2) (1978): 64-82.

<http://www.grisda.org/origins/05064.pdf>²⁵. Brand, L. 1978. Footprints in the Grand Canyon. *Origins*, 5(2):64-82.

28. R. H. Dott, and R. L. Batten, *Evolution of the Earth* (New York: Mc.Graw-Hill, 1971): 359.

29. K.O. Stanley, W. M. Jordan, and R. H. Dott, “New Hypothesis of Early Jurassic Paleogeography and Sediment Dispersal for Western United States,” *American Association of Petroleum Geologists Bulletin* 55 (1971): 10-19.

30. Leonard R. Brand, “Footprints in the Grand Canyon,” *Origins* 5(2) (1978): 64-82. <http://www.grisda.org/origins/05064.pdf>

31. Leonard R. Brand and James Florence, “Stratigraphic Distribution of Vertebrate Fossil Footprints Compared with Body Fossils,” *Origins*, 9(2): 67-74. <http://www.grisda.org/origins/09067.pdf>

32. Ibid.

33. D. M. Martill, D. J. Batten and D. K. Loydell, “A New Specimen of the Thyreophram Dinosaur cf. *Scelidosaurus* with Soft Tissue Preservation,” *Palaeontology* 43 (2000): 549-559.

34. Luis M. Chiappe et al., “Sauropod Dinosaur Embryos from the Late Cretaceous of Patagonia,” *Nature* 396(6708) (1998): 258-61.

35. >http://www.canoe.com/CNEWSScienceArchive/981117_dinosaurs.html> May 25, 2000.

36. A. C. Burke and A. Feduccia, “Developmental Patterns and the

Identification of Homologies in the Avian Hand,” *Science* 278 (5338) (1997): 666-8, with a perspective by R. Hinchliffe, “The Forward March of the Bird-Dinosaurs Halted?” (596-97).

³⁷ Quoted in Ann Gibbons, “Lung fossils suggest dinos breathed in cold blood,” *Science* 278(5341) (1997): 1229-1230. Ruben’s paper was published in the same issue, “Lung ventilation in Theropod Dinosaurs and Early Birds,” 1267-1270.

³⁸ Harold G. Coffin, “Orientation of Trees in Yellowstone Petrified Forests,” *Journal of Paleontology* 50(3) (1976) :539-543.

³⁹ *Time Magazine* (December 4, 1995).

⁴⁰ Harold G. Coffin, “Erect Floating Stumps in Spirit Lake, Washington,” *Geology* 11 (1983): 298-299.

⁴¹ *Time Magazine* (December 4, 1995).

⁴² P. McCafferty, “Instant Petrified Wood?” *Popular Science* (October 1992): 56-57.

⁴³ Roy Piggott, *The Australian Lapidary Magazine* (January 1970): 9.

⁴⁴ Ariel A. Roth, “Fossil Reefs and Time,” *Origins* 22(2) (1995): 86-104.

<http://www.grisda.org/origins/22086.pdf>

⁴⁵ Ariel A. Roth, “Coral Reef Growth,” *Origins* 6(2) (1995): 88-95.
<http://www.grisda.org/origins/06088.pdf>

⁴⁶ D. Pilbeam, “Rethinking Human Origins,” *Discovery* 13(1): 2-10.

⁴⁷ Mark Collard and Leslie C. Aiello, “Human Evolution: From Forelimbs to Two Legs,” *Nature* 404(6776) (2000): 339-340 and Brian G. Richmond and David S. Strait, “Evidence that Humans

Evolved from a Knuckle-Walking Ancestor,” *Nature* 404(6776) (2000): 382-385.

⁴⁸. Roger Lewin, *Bones of Contention: Controversies in the Search for Human Origins* (New York: Simon and Schuster, 1987): 312-313.

EVIDENCE IN STONE

For the invisible things of Him from the creation of the world are clearly seen, being understood by the things that are made, even His eternal power and Godhead; so that they are without excuse: *Romans 1:20*

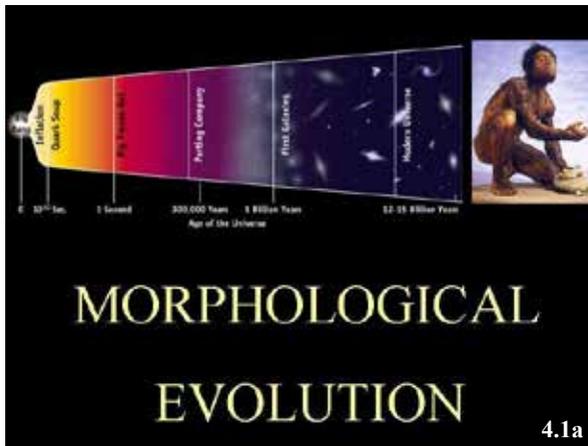
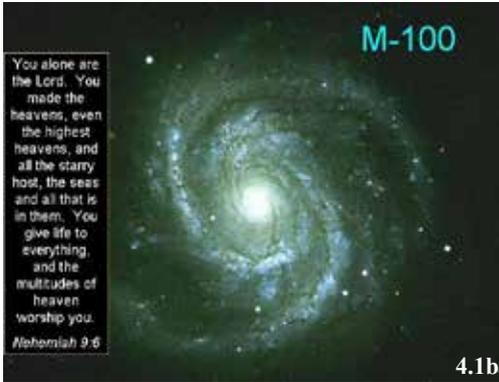


Figure 4.1a) The morphological evolution of the universe as proposed in the standard scientific theory of origins from the Big Bang to the evolution of life.



4.1b & 4.1c Spiral galaxies which illustrate that matter and systems are organized in the universe and not evenly distributed throughout the universe as predicted by the cosmological principle which is the basic philosophy on which the Big Bang theory rests.



4.1d-4.1f The Pleiades and the Orion constellation and nebula. The Pleiades is a 'bound cluster', meaning that the stars are bound in their position by the high forces of gravity prevalent in the system. Orion on the other hand contains systems which are flying apart rapidly. Amazingly, this very condition is described in *Job 38:31*.



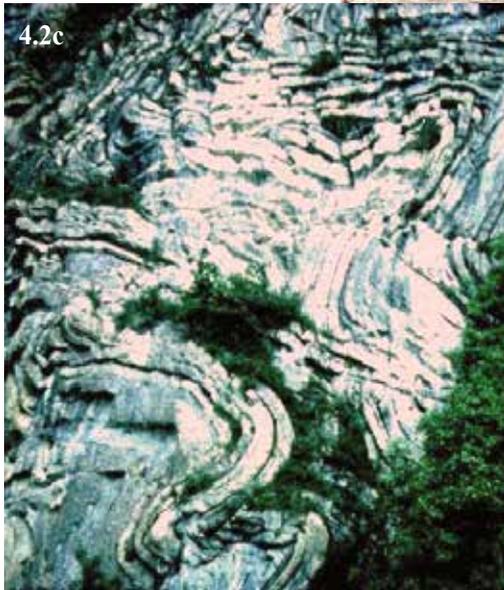


Figure 4.2a The Grand Canyon. Each layer supposedly represents a period of time in the history of the earth when that particular layer was the surface of the earth. However, there is no evidence for erosion between layers as can be seen by the flat contacts between layers. Between some of these layers unconformities exist, which means that layers are missing and, according to standard geological interpretation, that means that there is time missing (up to 100 million years between some of the layers). Geologists claim that these missing layers were eroded away before subsequent layers were deposited, yet there is no evidence of this erosion.



4.2b Three layers of strata in the Cederberg in South Africa; note that the top layer is subject to erosion and that there is no evidence for long periods of erosion in the underlying two layers. This implies that they were deposited rapidly and not slowly as suggested by the evolutionary paradigm.

4.2c-4.2e If layers of strata



ta were deposited rapidly, then this would suggest that they were still soft when uplifted to form continents. During continent and mountain uplift, these layers would fold because they had not yet turned to rock. The folding we see here can be seen in the Alps **4.2c** and in the Swartberg range **4.2d & 4.2e** in South Africa.



4.2f-4.2g These two photos from the Grand Canyon series show a load cast and a flame between two layers of strata. In the first of these, material from the upper layer is pushed into the underlying layer, and in the second, material from the bottom layer is whipped into the top layer.

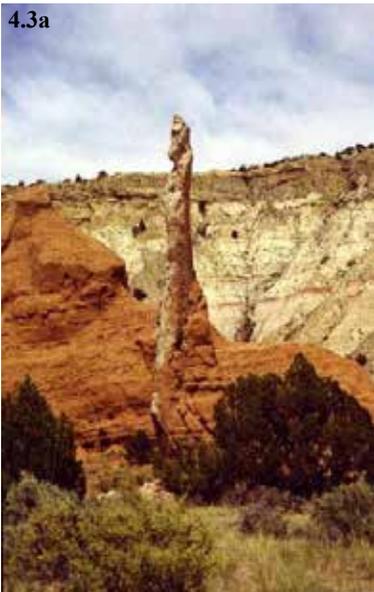




This suggests that both the layers were soft at the time of formation and is also strong evidence of catastrophic deposition.

Figure 4.3a-c Clastic intrusions from Kodachrome basin, USA (see figure 2.4). These pillars

of stone were thrust up through the underlying strata and are evidence that all the layers must have been soft mud of liquid consistency as would be expected in flood deposits.



4.3c



In **4.3c**, mingling between the layers can be seen which is further confirmation of soft layers.

4.3d-4.3e Turbidites from Texas, USA and New Zealand. These massive deposits were laid down rapidly and later uplifted.



4.3d



The material is graded course to fine as can be seen in 4.3e, showing that these deposits were laid down rapidly under water as the heavier stones and pebbles will settle out

first followed by the lighter sands and muds.

Figure 4.4a – 4.4b A mountain on pillars. ‘Town Hall Formation’, Cederberg in South Africa. The most likely explanation is that rapidly flowing receding water undercut the massive deposits, as they were uplifted after the flood. The strata must have been soft and the water must have drained into the newly



forming basin before the entire structure collapsed, leaving it standing on pillars. The tunnel formation also shows the direction of stream flow. Further amaz-

ing evidence of rapid washout by rapidly receding water in the area is seen in **4.4c**–**4.4d** where the base of the strata has been washed out leaving the layers resting on narrow points of rock.



4.4e–**4.4f** show giant cracks with collapsed or tilted pillars known as ‘Wolf Cracks’ which also testify of rapid washout.



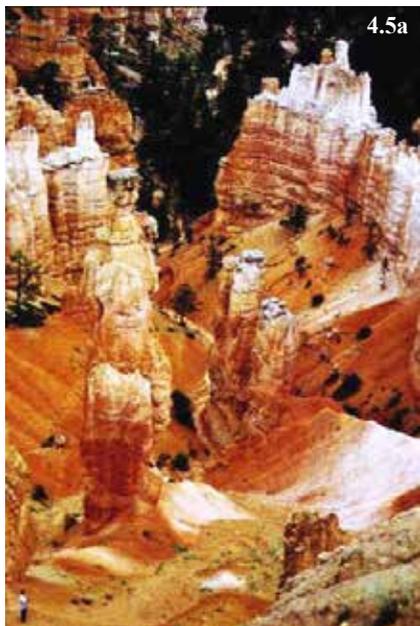
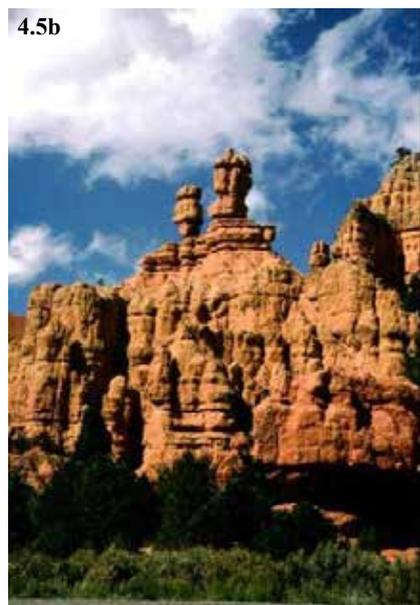


Figure 4.5a - 4.5b Bryce Canyon, evidence of giant washout.

4.5c - 4.5e Navaho twins, Monument Valley and erosion relics in the USA which all indicate rapid erosion of the strata between these relics.





A model in miniature for the formation of such features can be seen in **4.5f** where soil erosion from rainstorms has carved the landscape in similar fashion.



4.5g



4.5g The Three Sisters in the Karroo, South Africa,

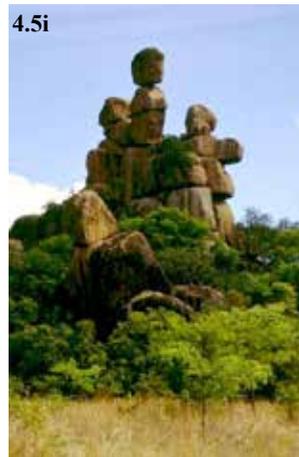
4.5h



4.5h
Ayer's Rock in
Australia,

and the boulder relics of Zimbabwe **4.5i** can also be ascribed to flood relics rather than relics caused by millions of years of erosion.

4.5i





4.6a



4.6b



4.6c

Figure 4.6a-4.6d
The Goosenecks in the Colorado River and the Fish River Canyon in Namibia show evidence of rapid washout in view of the V-shape. The great canyons of the world testify of catastrophic formation rather than millions of years of slow erosion. Rapid canyon formations and strata developments such as these have been witnessed in recent times as can be seen in the catastrophic canyon and the strata which resulted from the eruption of Mt. St. Helens in the USA **4.6c-4.6d.**



Previously, such features would have been considered to have formed over very long periods of time.

Figure 4.7a-4.7b Malachite crystals which were formed rapidly. These authentic semi-precious stones were bought from dealers in the Congo who obviously found a way of growing them rapidly in the malachite mines by allowing the seep-

age to crystallize on copper wires. Note the copper wires in the broken fingers of the crystals. Formations of crystals, stone or fossils can thus be very rapid and does not require millions of years. Reports of fossilization and rapid rock formation are well known, with fossil hats having formed in mines and ships bells and bottles being encased in solid rock.¹



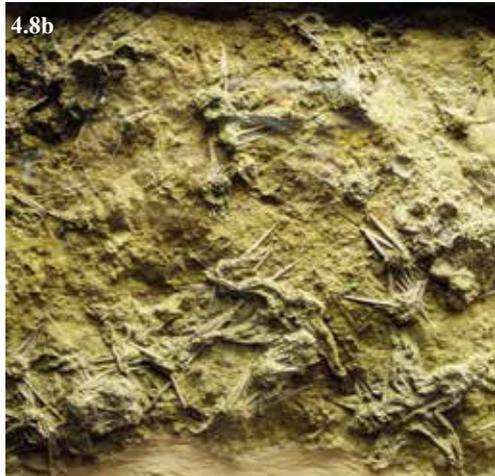


Figure 4.8a Fossil ammonites buried in a mass grave. Only catastrophic burial can account for such large-scale burial.

4.8b Fossil sea urchins, starfish and sea lilies all buried together in a mass grave (*British Museum of Natural*

History). The description given to this display states that these creatures were “buried very rapidly retaining their spines.

4.8c-4.8d perfectly preserved fossil fish showing rapid burial to prevent decay. The school of fish is on display in the *British Museum of*



Natural History where the explanation given states that these fish were trapped in a lake that dried out. However, no modern counterpart exists since the fish would then decay or be eaten by scavengers.



A far more likely explanation is that they were buried alive rapidly by mudflows during the flood.

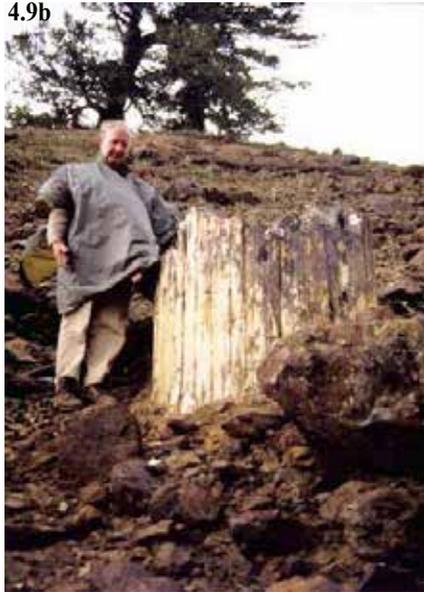
Figure 4.9a A coal seam. Coal formation can readily be explained by catastrophic deposition of vast quantities of plant material during a flood. Present day processes similar to coal production

include peat formation from plant material in marshy areas. It is estimated that some 0.6-6.1 meters of peat would be required for the production of 0.3 meters of coal. This would mean that it would take on average 91 meters of peat to

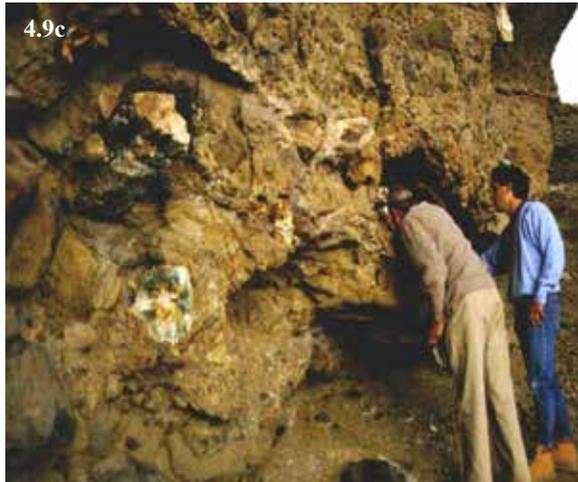


produce a 9.1-meter coal seam, but only a few peat bogs, marshes or swamps in the world reach even 30 meters let alone 91 meters. Uniformitarian principles cannot explain the vast coal deposits in the world which rather seem to bare stark evidence for flood deposition. Moreover, there is the problem that *Spirobia*, a marine spiral tubeworm (which only occurs in sea water and never occurs in peat bogs) is often associated with coal deposits. This fits perfectly with the flood model but to explain it by way of the conventional model is highly problematic. Some scientists have proposed that *Spirobia* must have then been a fresh water organism in the past, but this is not consistent with the data and still requires burial of the material in water. Also it does not provide an explanation for its presence in so-called peat derived coal deposits.

4.9b Petrified upright tree in Yellowstone Park, USA. These trees have long been used as an example of stable periods of growth, since they appear to be in a position of growth. However, they are now known to have been washed into position by catastrophic floods since they are orientated in the direction of stream flow as can be seen in



4.9c where the horizontal trees all face into the mountain;

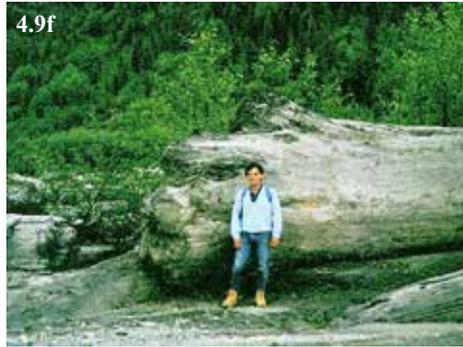




4.9d-4.9e show that the upright trees have no root systems, no branches and can stretch through various layers of strata (see explanation in Chapter 3);

4.9f-4.9i show similar circumstances produced in the Mount St. Helen's eruptions. Trees ripped out by catastrophic

floods were orientated in the direction of stream flow. They had their roots ripped off, had no branches nor bark since they were stripped in the rolling and bash-



ing actions experienced during transport in the flood waters. Trees that gathered in the lakes after the second eruption rapidly floated upright and



provide a model for the catastrophic deposition of the petrified forests of the world.

4.9j A petrified tree from the Petrified Forest in Namibia where the trees show similar features and are also stream orientated. These petrified forests were long used as an argument against any catastrophic flood model, but the currents status overwhelmingly supports flood deposition.

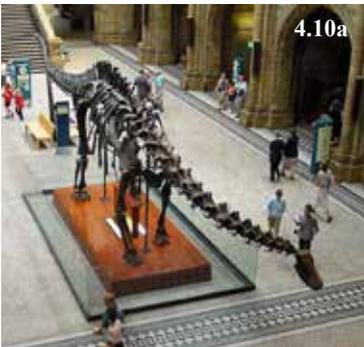
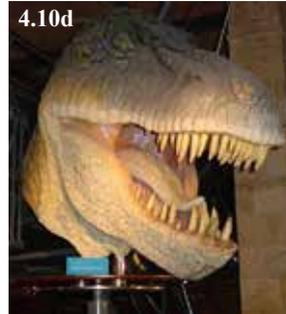


Figure 4.10a Brontosaurus



4.10b Triceratops



4.10c Albertosaurus **4.10d** Tyrannosaurus (all from the *British Museum of Natural History*). Dinosaurs are extinct reptiles and they are mostly depicted as ferocious killers. In fact, most dinosaurs (including Brontosaurus and Triceratops) were probably plant eaters and some were as small as a duck (*Compsognathus*). Albertosaurus is the smaller relative of Tyrannosaurus and they are usually depicted as vicious meat eaters on the strength of their teeth. Shredding teeth are not necessarily an indication of meat eating, just as many animals today have teeth which would put them in the category of meat eaters, yet their main diet consists of plants (bears, including Panda bears). Albertosaurus and Tyrannosaurus had weakly rooted teeth which would have been good for shredding tough vegetation but not much good for tearing and ripping out flesh. They also had short arms, which could not reach the mouth and were probably quite useless for catching prey. Evidence also points to inagility in these cumbersome animals so that they would not be very adept in catching prey. Dinosaurs need not have lived millions of years ago. In fact, some of the fossil finds show so much original material such as actual bone and even organic remains that it seems unlikely that long ages are involved. Dinosaurs are often found in positions of stream orientation and so the evidence points to burial in mud during a catastrophic flood. Dinosaurs are also not the only creatures that became extinct during the KT transition, but numerous marine and terrestrial animals including all mammal-like reptiles, giant amphibians and all flying reptiles shared this fate. It is possible that these large reptilian and amphibian creatures (as evidenced by bone to marrow ratios) had a metabolic capacity which would place them midway between ecto-

therms (cold blooded) and endotherms (warm blooded). This would mean that they would have to live in stable climatic regions. The post flood world with its extremes in temperature and climate would thus not be the most suitable for their survival.

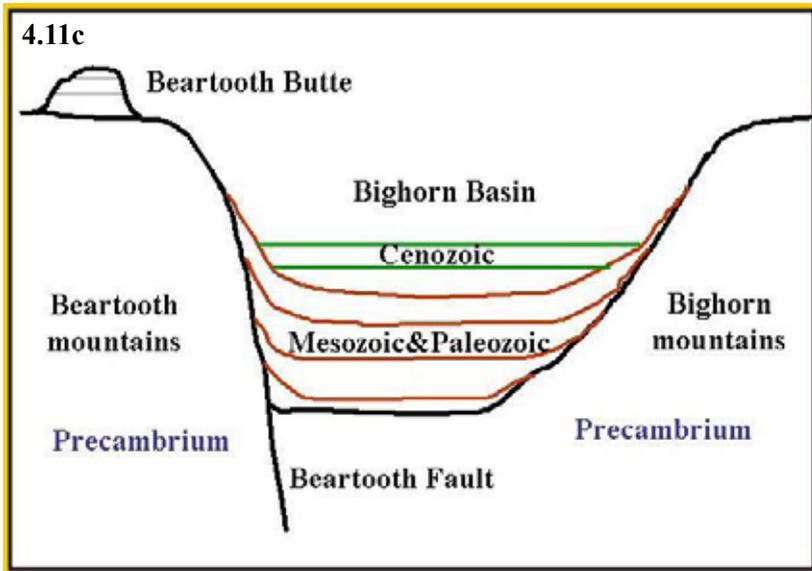
Figure 4.11a The White Cliffs of Dover consist of the carboniferous skeletons of marine organisms and show that this region was under water. Chalk strata identical to the White Cliffs of Dover can be found all over the world including France, Germany, Scandinavia, Poland, Bulgaria, Russia, USA (Texas, Arkansas, Mississippi and Alabama), Australia, and Africa. Moreover, the deposits are of the same age and are all situated on top of the same type of glauconitic sandstone. Surely this must indicate that all these continents were submerged at the same



time, which is exactly what the Bible claims. These chalk deposits are thick in some places and thin in others, indicating that all areas were not submerged for the same length of time. Upon the raising of the continents and the down warping of the ocean floor, the waters drained from the emerging continents and recycled much of the sedimentary material, burying plant and animal remains in the process. Since Mammals and birds float in water due to bloating, one would expect fossil remains of these creatures in the top Cenozoic layers, which in fact there are.

4.11b Diagrammatic section of the Beartooth and Big Horn Mountains and Bighorn Basin.





4.11c Beartooth Butte in Wyoming, consisting of an isolated block of Paleozoic sediments on uplifted Precambrian igneous rocks. It consists of the same type of strata as found in the Grand Canyon (Cambrian, Ordovician, and Devonian with Silurian missing).

Beartooth Butte is a remnant of the vast sheets of strata that must have covered the area, but is now uplifted 20,000 feet above the Precambrian layers at the bottom of the basin. In diagram **c**, it can be seen that the Mesozoic and Paleozoic sediments in the basin are tilted up against the mountain ranges and they must have folded in this fashion when the mountains rose. The sediments that were originally on top of the uplifted area are eroded away and now fill the basin and this helps us to determine how the events occurred. The Cretaceous is the last layer still to be tilted up the side of the mountain, and must have thus been on top when the uplift occurred. The subsequent layers comprising the Cenozoic (Paleocene, Eocene, and Oligocene) are flat and were thus deposited after the uplift. The lower layers were thus deposited during the flood and the top layers were deposited when the continents and mountains rose. The fact that the lower layers are all bent up along the mountains also implies that they were all soft when they were bent up, or else they would have shattered and not been

bent up. Of course, this implies that they were formed approximately at the same time thus not allowing for millions of years to form rock nor allowing for them to belong to vastly different ages. If the Cenozoic layers were thus deposited during the re-emergence of the continents, then these sediments would cover and bury the remains of the floating plant and animal remains that must have been present at the time, if the universal flood model is correct. Indeed, this is exactly what is found in the Cenozoic layers. Vast fossil graveyards are found in these deposits with all kinds of animals collected into vast assemblages, which defy any uniformitarian model of fossil formation. These layers are also associated with mammalian bone pieces as if masses of disintegrated bodies had been churned, broken and buried **4.11d - 4.11f**.

4.11d shows an amazing fossil displayed in the *British Museum of Natural History*, and the description of the fossil is equally astounding. It reads:



Mammal graveyard; the fossilized remains of an antelope, gazelle, horse, and carnivore are preserved in this slab. The fossils are surrounded by flood-plain deposits, suggesting that the animals were swept together by torrential floods. There is no weathering and little damage to the fossils, so they must have been buried quickly.

In **4.11e** and **4.11f**, a vast fossil graveyard and a chunk of Cenozoic rock can be seen which is packed with mammalian bone chips. Such deposits are consistent with the catastrophic flood model, but are totally inconsistent with a uniformitarian model.

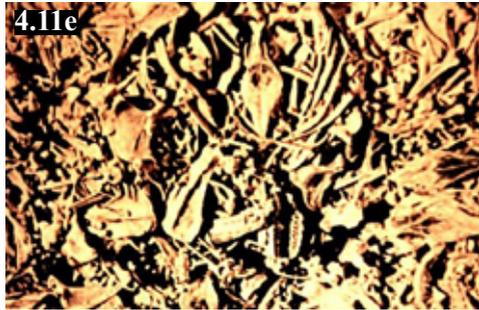


Figure 4.12a-4.12f La Brea Tar Pits in California with fossils of the giant sloth, saber tooth tiger, giant mammoth, giant wolf and giant bison which were found in these tar pits. All these creatures apparently lived millions of years ago, but skeletons of giant sloths have been discovered in caves in South America with their pelts still intact (incidentally, giant kangaroos have also been found in caves in Australia with their pelts still intact which shows that they could not have existed millions of years ago in spite of the slow weathering





under these cave conditions). The fact that all these creatures are larger than their modern counterparts is contrary to evolutionary thinking. Evolution proposes development from simple to complex and from small to large, not the other way round. In fact, one of the amazing features of the fossil record in general is the large size of the animals represented in the fossil record. The fossil saber tooth tiger with its long teeth is also not the only variety of tooth size found in the tar pits, but represents an extreme of the range that includes small to large teeth. This is consistent with a world in which competition was still low. But once population numbers increased, then selection would favor an intermediate tooth size with the extremes of the range being cut off by stabilizing selection.

The tar pits themselves are also evidence of vast deposits of buried organic material, which turned to tar in much the same way

that oil deposits are formed. If these deposits are millions of years old, then why are they still producing gas bubbles (as can be seen in **a**), which were produced from the decay process? The gas in fields such as these would long have dissipated through the porous rocks and cracks in the strata had they been millions of years old.

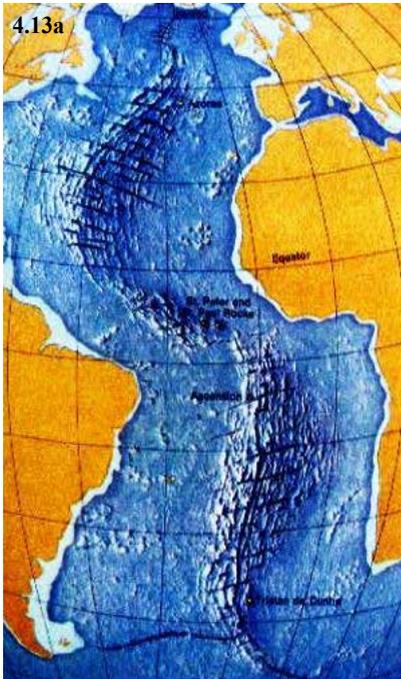


Figure 4.13a Mid Atlantic Ridge, showing evidence for continental drift. Since land animals are distributed on all continents, then these animals must have been able to cross land bridges after the flood. The continents show almost perfect fit, particularly if the puzzle uses the continental shelf rather than the areas of the continents, which are above water. The question is not whether drift took place, but how and when. The Mid Atlantic Ridge shows huge volcanoes as are also present around the Pacific Rim. A possible explanation is that huge meteors struck the earth post flood and ripped the newly established continents apart causing massive volcanic action.

This could explain why there is so much evidence of recent large-scale volcanism on the earth as can be seen in **4.13b** Sheets of volcanic material in Washington State, USA.. Meteoric impacts and materials seem to be in evidence only at the Precambrium-Cambrium boundary, and then they occur again on the surface of the earth as impact craters **4.13c** Arizona meteor crater., but other than this there is no evidence of meteoric impacts in the geological column. The Iridium layer associated by some as evidence of asteroid impact, which led to the demise of the dinosaurs, could also be from volcanism as iridium is also found in such materials. Astronomers believe that meteors are be-

4.13b



ing swept out of space by the gravitational forces of stars and planets, and that there should have been more meteors in the past than now. However, with all the large-scale mining operation, particularly coal mining, there should have been evidence of this, but meteors are not found in these operations. The large surface impact craters, such as the Arizona Crater and craters in Namibia and Siberia indicate recent large scale impact which could have provided the means of breaking up the continent, with massive outpouring of volcanic material and drift of the continents resulting from these impacts.

The separation of continents could not have been as long ago as science postulates, since current rates of continent erosion indicate that the continents should have eroded away several times over (if standard geochronology is applied) since the continental drift started.



4.13d



In **4.13d** Coast of Southern Australia, the massive erosion on the edges of the continents is illustrated in this photograph of the Australian coastline. The fact that the continental puzzle still fits, points to short rather than long chronology.

The result of such large-scale volcanism would have a profound effect on the climate, since volcanic dust would have caused a massive drop in global environmental temperatures (as caused on a small scale by modern eruptions) and this could account for the ice ages. There is evidence that the ice age could have been short and intense. Glaciations could have occurred due to high precipitation and due to evaporation from relatively



warm post flood oceans and sudden intense cold due to volcanic ash shielding the sun. Studies at glaciers around the world **4.13e - 4.13f**

Athabasca glacier and markers of glacial recession - show that glacial recession is much more rapid than originally

thought and the time required for an Ice Age could be reckoned in centuries rather than thousands of years. Also, evidence for more than one ice age is scant, particularly since the evidence cited for other time periods in the geological column could be due to massive debris flows rather than glacial deposits.²



4.13g - 4.13h Woolly Mammoth trapped in Siberian ice and cave drawings of such creatures.

Sudden freezing and rapid burial could also explain the demise of the mammoths that have been found trapped in ice in Siberia **4.13g - 4.13h**. There are three curious problems associated with these mammoths; firstly, northern Siberia today is cold and dry, so how could



thousands, if not millions, of mammoths and many other animals have survived under these conditions, and how did they feed themselves? Their surroundings must have been more temperate and moist as testified by



the plant material and other animals buried near these creatures. In the case of the mammoth, these include rhinoceroses, tigers, bison, horses, antelope, fruit trees, and there are also frozen remains of burrowing animals, such as voles, which could not have burrowed in permafrost. Larvae of the warble fly identical to those found in tropical elephants today, have been found in a frozen mammoth intestines, and this indicates a temperate climate.

Second, the well-preserved animals must have been completely frozen almost instantly, or else internal tissues would have decomposed. Since mammoths had such large bodies, they also acted as reservoirs of heat, and freezing temperatures must have been extremely low to account for the perfect state of preservation of some of these creatures. In some cases, the meat of these mammoths discovered in recent times was still edible and was fed to dogs and even humans ate thereof. Finally, they must have been buried rapidly to protect them from predators, so burial could not have occurred if the ground were frozen as it is today. The climate must have changed rapidly to account for these features and the rapid Ice Age model provides a plausible alternative to the long Ice Age proposed by the scientific fraternity. The fact that cave drawings of Woolly Mammoths have been found is a further blow to the standard evolutionary paradigm, which would rather have these large creatures separated in time from the emergence of man.

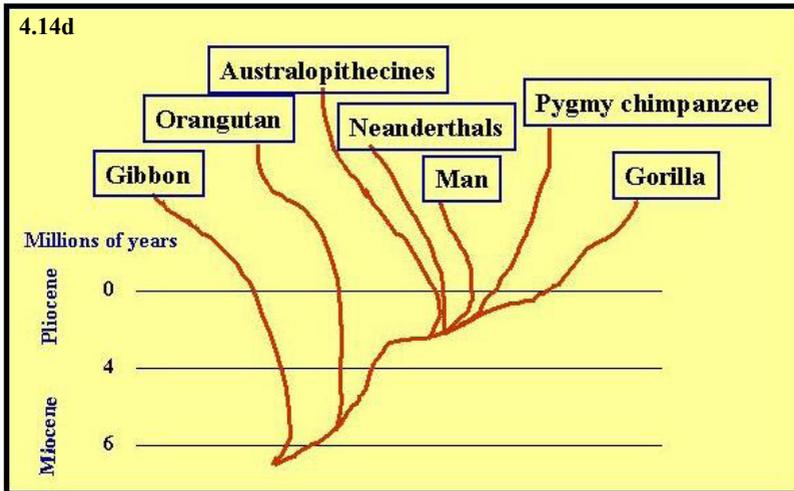


Figure 4.14a - 4.14d Primates are considered to have evolved from primate ancestors such as the tree shrew to modern non human primates and hominids. Non human primates and man are thus end products of this evolutionary scenario, and are related to each other but did not evolve from each other. The ancestors are the missing links some-

where in the past. Fossils which are used to piece together the origin of man, such as the Australopithecines, of which the famous Lucy **4.14b** and skull 1470 of the Kenya Museum **4.14c** are examples, were also

from creatures that were already contemporaneous with man and could thus not have been ancestral. The picture that is pieced together is thus based on a morphological sequence where fossil remains of contemporaneously existing creatures are grouped into what is considered a possible evolutionary development and is not based on sequential fossil assemblages.





In 4.14d the primates are seen to be contemporaneous (living at the same time) and the roots to common ancestors are based on speculation only. Moreover, each of the fossils placed in the sequence are either 100% ape or 100% man and intermediaries are based on a series of assumptions, which are not verifiable by the fossils.

REFERENCES

- ¹ *Creation Ex Nihilo* 17(3) (1995) & 20(2) (1998).
- ² M. R. Rampino, "Ancient 'Glacial' Deposits are Ejecta of Large Impacts: the Ice Age Paradox Explained. EOS," *Transactions of the American Geological Union* 74(43) (1992): 99.

5

THE ORIGIN OF LIFE AND VARIABILITY

One of the great hurdles facing evolutionary biologists is the transition from non-life to life. Nobel laureate, Max Delbruck, wrote:

There has been an immense conceptual gap between all present-day life and no life....the how of the transition of the earth from no life to life is perhaps the fundamental question of biology.¹

Nevertheless, the naturalistic origin of life from non-living material is a cornerstone of the modern evolutionary paradigm. Indeed, from their perspective it has to be, since the great majority of scientists consider Biblical interpretations of origins as non-scientific today.

The Scientific View of Origins

If life was to evolve from the non-living, then organic molecules had to evolve from inorganic matter and the building blocks

of life would then somehow have formed the first cell. In the 1920's, Oparin, a Russian biochemist, and Haldane, an English geneticist, independently suggested that the primitive atmosphere was reducing, and that organic molecules formed in such an atmosphere might be the key to answering this question of origins. In 1953, Stanley Miller actually tested this hypothesis by putting together a glass apparatus (Figure 5.1) in which he passed sparks through a simulated primitive reducing atmosphere. When isolated, among the 35 different compounds identified, 9 were amino acids, the building blocks of proteins.²

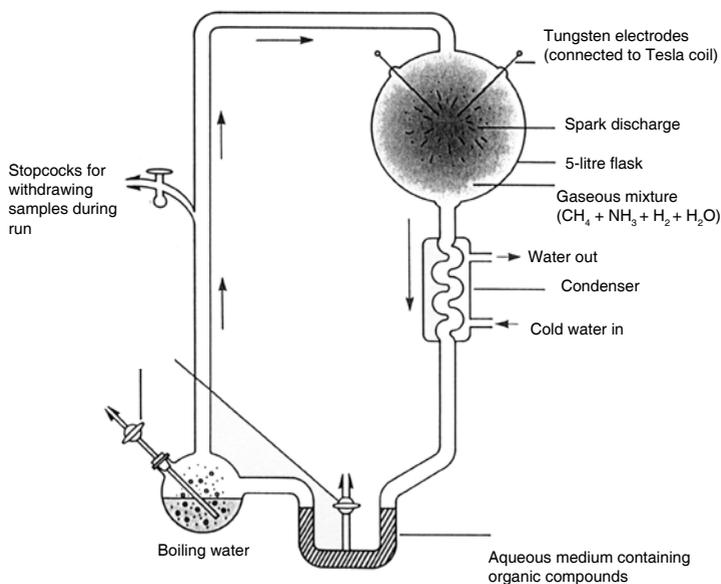


Figure 5.1: The apparatus used by Miller to demonstrate the formation of organic compounds under simulated primitive earth conditions.

Numerous experiments have since been carried out in many laboratories around the world under varied simulated conditions in which 19 of the 20 amino acids, the 5 nitrogenous bases necessary for nucleic acid formation, and a number of sugars have been produced. These experiments are considered irrefutable proof of the origin of

organic molecules by naturalistic processes. These molecules are then considered to have accumulated in the primitive ocean, forming an organic soup. To arrange these simple compounds into more complex structures, requires polymerization, which Sidney Fox proposed could have developed around the rim of equators where heating and evaporation could create the necessary conditions for these reactions. He demonstrated that a mixture of amino acids heated at 200° C for up to 7 hours formed protein-like structures, which he termed *protenoids*, which show weak catalytic activity and when cool form microspheres resembling primitive cells. These experiments may collectively seem to lend credence to the evolutionary paradigm of origins, but in reality they suffer serious deficiencies.

Probability and Naturalistic Origin of Life

The Reducing Atmosphere

In order for organic molecules to accumulate, all scientists agree that the primitive atmosphere must have been devoid of any oxygen. This had to be the case, since oxygen would react with any organic compound formed in such a primitive atmosphere and oxidize them thus converting them to carbon dioxide and formic acid. The assumption is thus that the primitive atmosphere was devoid of oxygen since oxygen would only be produced once photosynthetic organisms had evolved after millions of years of biochemical evolution. The earth's original atmosphere must then have been derived from volcanic gases. The atmosphere postulated by Miller, however, does not resemble volcanic gases, since even they are oxidizing even if molecular oxygen is absent from such gases. Volcanic gasses are rich in carbon dioxide and water and also contain some nitrogen, hydrogen sulfide, and sulfur dioxide. Gas mixtures such as these yield ammonia, nitric acid or formaldehyde under experimental conditions similar to those used by Miller.^{3,4}

The 20% oxygen present in our current atmosphere is supposed to have accumulated after photosynthetic organisms evolved. However, without oxygen there would not have been a shield of ozone to protect the earth from the sterilizing high-energy ultraviolet rays that would have bombarded the earth. The ozone layer prevents this bombardment and is thus necessary to preserve life, so the question arises as to how the early organisms evolved under these hostile conditions and how they managed to evolve to the level of complexity inherent in even the most primitive photosynthetic or any other living organism for that matter?

Since life requires water, the existence of water is vital to the evolutionary process. However, if water was present (as it must have been) then there was water vapor in the atmosphere. This creates a further problem, since if water vapor was present in the atmosphere then photo-dissociation of that water by ultraviolet rays would have produced oxygen, and if oxygen was present then the molecules of life would not have been able to form. Even in our time, the photo dissociation of water takes place in our upper atmosphere and the Apollo 16 mission showed that the earth is surrounded by a gigantic hydrogen cloud extending 40 000 miles into space. This hydrogen is formed by the photo dissociation of water vapor.⁵ It is thus not only probable, but a fact, that oxygen must always have been present in the atmosphere if there was water and this precludes the accumulation of organic molecules. It is a catch 22 situation, no water no life, with water there will be oxygen in the atmosphere and the atmosphere will not be reducing, therefore organic molecules would not form and there would be no possibility of life. It has been calculated that photo dissociation would account for 32 times the amount currently found in our atmosphere and that a minimum of one fourth of this atmospheric oxygen level must have been present for more than 99% of the earth's history.⁶

The Organic Molecules

In experiments simulating primitive conditions, the apparatus used to determine the production of organic molecules all make use of a trap to remove the accumulated products from the sparks or radiation used to produce them. In a primitive earth situation, it is hard to envisage a trap, which could remove the compounds from the conditions required to form them. Nevertheless, some form of trap (or protective mechanism) would need to have existed, because the same conditions that lead to the formation of the molecules also lead to their destruction. Nevertheless, in spite of these constraints, it is envisaged that organic molecules accumulated until the primitive oceans were transformed into a veritable organic soup. Assuming such organic molecule accumulation, some scientists estimate the concentration of organic compounds in the “soup” to have been as high as 0.001 Molar. However, if the destructive effect of ultraviolet radiation on amino acids is taken into account, then the upper limit could only have been one ten millionth Molar in the primitive ocean, which also happens to be the actual concentration of amino acids in the North Atlantic Ocean.

Yet another problem is that random biochemical reactions outside of cells result in the production of equal proportions of optical isomers of amino acids and sugars. Many organic molecules occur in two forms, either left-handed (L form) or right-handed (D form). Living organisms can use only L forms of amino acids and D forms of sugars, but racemic mixtures produced under simulated primitive earth conditions are 50:50 mixtures of L and D forms. In order to utilize just one or the other of these forms (as required by living organisms), there must have been a mechanism to select for just one of them, and this is extremely unlikely. Thus it is not only improbable that the molecules would be produced in the first place, it is also impossible to select only the right ones even if they had formed.

Assuming that molecules of life did form, and that somehow only the right racemic mixture was produced (which is contrary to all logic and contrary to scientific evidence), then there would be yet

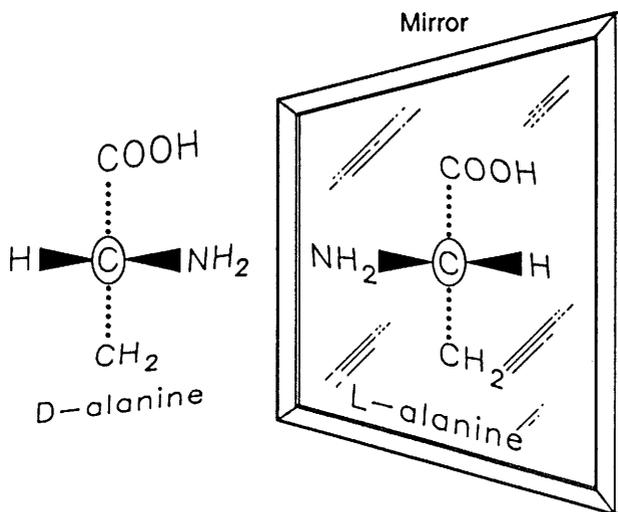


Figure 5.2: The structure of L and D forms of the amino acid alanine. The two molecules are not identical as they cannot be superimposed on each other.

a further hurdle to cross, because isolated organic molecules do not constitute life. These molecules would have to polymerize to form macromolecules such as proteins and nucleic acids and this is a major hurdle in the absence of enzymes or catalysts that still needed to evolve. If L and D forms were present, as would have to be the case, then the problem becomes even more complicated, for how would they polymerize selectively choosing only the L or only the D (Figure 5.2) forms for proteins and sugars respectively? In order to polymerize, one needs to split out water. In an aqueous medium, this is however thermodynamically impossible. In order to solve this problem, scientists point to the “volcanic rim” approach of Sidney Fox who proposed that the heat of volcanoes heated and periodically evaporated the “soup”; leading to the formation of the protenoids discussed earlier.

The protenoids of Fox are, however, totally inappropriate for life, not only because they contain both L and D amino acids, but because of a further problem which arises from naturalistic

formation of organic molecules under simulated primitive conditions. Besides using only L amino acids, living organisms also only use alpha-amino acids (which means that the amino group is always attached to the first carbon after the carboxyl group- see figure 5.3). Amino acids formed outside living organisms are however, a mixture of alpha, beta, gamma and epsilon amino acids and Fox's protenoids consist largely of the varieties of amino acids other than alpha-amino acids and are therefore useless to living organisms. Moreover, all the other properties attributed to these protenoids, such as the ability to grow and to bud, are merely as a consequence of attractive forces and the breaking up as a consequence of changes in heat or acidity and have nothing to do with life or living organism. It is akin to playing with balls of plasticine. The breaking up and recombining of the balls is merely a physical process and cannot be compared with the complex processes of cell division or compartmentalization. The challenges that face the organic soup theory do not end here. The conditions required for the production of the different varieties of molecules alone presents insurmountable problems.

Molecular Problems

For amino acids to form, the primitive atmosphere must have been rich in ammonia, yet ammonia is rapidly destroyed by ultraviolet radiation, and if the primitive atmosphere was to contain no oxygen, then there was no ozone layer and the ultra violet radiation levels must have been extremely high. Some amino acids require heating to over 1000° C (tyrosine and phenylalanine) to form spontaneously, yet heating causes decomposition by irreversible decarboxylation. In short, the reactions that form the amino acids also destroy them in the absence of a trap. The pH requirements for protein formation are also different from those of other molecules that require a more alkaline medium.

Even if proteins could have formed, in order for them to be

of any value, they would have to contain not only the right type of amino acids (L - alpha amino acids) but the sequence in which the amino acids occurred would have to be right also in order for them to form useful proteins. The probability of this occurring is extremely remote as illustrated in the following Table:

The Total Number of Different Proteins Resulting From Random Combinations of 20 Amino Acids⁷

Table 5.1

<i>No. of Amino Acids</i>	<i>Description</i>	<i>Total No. of Protein Chains Possible</i>
10	Short Chain	10^{13}
100	Polypeptides	10^{130}
250	Typical	10^{325}
1000	Cell Protein	10^{1301}

If one considers that 10^{80} is considered to be the equivalent of the number of particles in the universe (the sum total of all the atomic particles in the entire universe) then these statistics are indeed awe-inspiring. Should the formation of polymers have been random, the existence of a single molecule of every possible sequence even if we assume a chain consisting of only 12 different amino acids would result in a mass of 10^{280} grams (which is more than could fit into the universe). The chances of this happening are hopelessly remote, and even if it did arise, what would have maintained it, and what would have allowed it to replicate?

Some scientists argue that these statistics mean nothing, as the facts show that life exists, therefore it must have happened. This certainly is one way of getting around the problem, but it certainly places the theory in the realms of faith. One needs a lot of faith to believe that it happened once, let alone millions of times over and over again.

Not even the organo-clay theory (The theory that primitive molecules could have accumulated on clays which would have afforded them some protection and brought them into close proximity for further reactions) can provide a solution for the dilemma, as this merely provides a possible solution for how information can be stored, and passed on, but does not say how it originated, and neither does it provide a solution for the polymerization or racemic mixture dilemma.

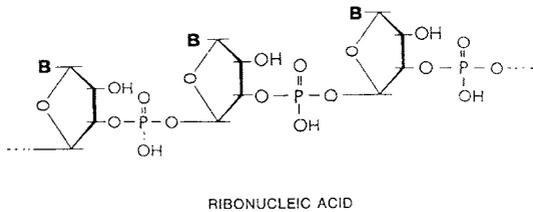
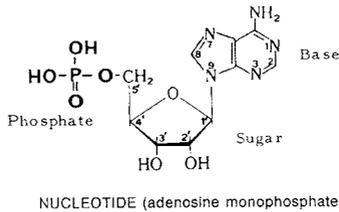
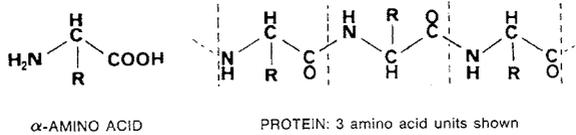


Figure 5.3 - The structure of some of the basic organic molecules required by living organisms.

Nucleic Acid

The conditions required for the formation of nucleic acid are different again to those of the other organic molecules required for life. Condensing hydrogen cyanide in concentrated ammonia (1-10M) yields adenine. If all the nitrogen in the atmosphere were converted to ammonium cyanide and dissolved in the ocean, it would not exceed 0.2M and the prebiotic conditions are thus severely restricted in accounting for the formation of nucleic acid. It is true that purines and pyrimidines have been formed under simulated prebiotic conditions, but phosphorylation has never been demonstrated. Moreover, condensation of ribose with adenine or guanine yields unnatural nucleosides. The formation of nucleic acid requires that nucleotides (a purine or pyrimidine base linked to ribose or deoxyribose and phosphate) be linked together to form the large biopolymers called nucleic acids (figure 5.3)

Nucleic acids are made up of four different nucleotides (thymine, cytosine, adenine and guanine are the bases that form part of the nucleotides of DNA and uracil replaces thymine in RNA) and the sequence of nucleotides carries the genetic information which determines the structure of proteins and finally, through these, the whole structure of the organism. This relationship between proteins and nucleic acids raises a chicken and the egg question: Which came first? The traditional view was that proteins came first, but the discovery that ribonucleic acids had enzymatic activity prompted the idea that perhaps enzymatically active RNAs (ribozymes) came first, thus providing both the chicken and the egg. The problems with this theory are numerous. Ribose is formed only in very minor concentrations in prebiotic circumstances, and is very rapidly destroyed. Moreover, where did all the cyanide come from to produce the purines? As pointed out by Kasting, the source of cyanide is a major problem in the "RNA World" hypothesis.⁷ Pyrimidines are for all practical purposes not formed in prebiotic conditions.

The question of sequence is another major problem, just

as in the case of proteins. In order to function in biological systems, DNA and RNA must have the nucleotides arranged in a particular sequence, and these sequences would have had to come about by chance. The probabilities again are staggering as shown in Table 5.2.

**The Total Number of Different Nucleic Acids
Resulting from Random Combinations of 4 Nucleotides⁸**

<i>No. of nucleotides in the chain</i>	<i>Description</i>	<i>Total No. of Nucleic Acid Chains Possible</i>
77	Transfer - RNA	10^{46}
1500	Ribosomal - RNA 16 S-unit	10^{903}
3000	Ribosomal - RNA 23 S-unit	10^{1806}
6000	RNA of TM - virus	10^{3613}
30 000	Bacterial DNA	$10^{18,100}$

Table 5.2

Once a molecule such as DNA has formed, the number of chicken and egg scenarios increases. How did replication or transcription become possible? Enzymes are required to unravel the DNA molecules, but where did these come from? If they came about by chance, then how did the genes coding for their construction come into existence - by chance also? This is an impossible situation, particularly since natural selection has no role to play here since chance is the “force” operating at the genetic level. Genes supposedly came about by chance. The level of faith required to accept this scenario is staggering, but still the problems do not end there.

Since nucleic acids need to contain the correct information for the construction of proteins, great care is taken to ensure that errors do not creep in during their construction. The constructing enzymes are known as polymerases, but a group of enzymes known as editases are also involved in this process in that they correct any errors that are made in the construction of the nucleic acids. These enzymes act as proofreaders and they check the work of the polymerase enzymes and painstakingly correct any errors encountered. This is not only profound, it is awe-inspiring and yet how did such a complex system of checks and balances evolve? By chance?

This poses a major problem to the theory of naturalistic origins. The formation of such complex systems of correction and formation cannot be selected for but must develop by pure chance. An error will only be revealed as an error once the message in DNA has been transcribed into a protein. Correction takes place prior to this process and thus cannot be selected for. Selection works at the level of the phenotype and not the genotype. This issue will be discussed in greater detail later, but in short it can be explained as follows. A book containing errors cannot be corrected unless the proofreader knows that there is an error. Of course it also requires a proofreader who not only reads the book but who also corrects it and this implies that this proofreader knows what he or she is doing. Intelligent design is inherent in the process. If the book however contains blueprints for the construction of an aeroplane, for example, and the blueprint contains design errors, these will only become apparent once the plane has been built and tested. The book by itself cannot know that there is an error and the testing can only take place once the plane has been built. The same applies to the gene. How can the correction take place without the product having been built or tested – it therefore requires foreknowledge, and this implies (or rather requires) design. Or else, chance and chance alone must account for the complex systems of replication, transcription and proof reading of the polynucleotide strands. Again, this requires a great deal of faith, - an awesome faith - in the god of chance.

Even if we were to accede to the possibility of the necessary molecules evolving, their mere existence is still a far cry from life itself. These molecules would have to be placed in such a fortuitous arrangement that life could arise spontaneously. In all the scientific endeavors to this end, no one has ever succeeded in creating life, but scientists argue that natural selection is the means whereby organization was brought about. This places natural selection on the level of a “god”, since all the problems inherent in the system are eventually ironed out by natural selection.

Natural Selection As a Creative Force

Natural selection in itself is not a scientific principle, as it is based on circular reasoning. By natural selection, less fit organisms are eliminated and fitter organisms survive to propagate the species. Organisms thus survive the process because they are fitter, and one concludes that they are fitter because they survive. Moreover, the process operates by elimination not addition. In order for the *fitter* to survive, there must have been a *less fit* that did not survive. In the process, the less fit eventually becomes extinct and the better of the two survives thus it is argued, that natural selection has improved matters. But, natural selection does not create features, adaptations, or even life, it merely selects for the feature that provides greater survival value. The features themselves must still come into existence by random chance processes or by creation. Natural selection did thus not ‘create’ anything. It just selected from what was already there.

Because the mechanism of natural selection operates by eliminating the less fit (this is just the reverse side of the coin of selecting the more fit), it must eventually lead to less and less diversity, unless the random chance “creation” of features outstrips natural selection in pace. This is an extremely unlikely scenario. The question therefore arises, how can a mechanism that creates less and less, create

more and more diversity? After all, this is what the evolutionary paradigm requires, in order for more and more complex diverse life forms to have evolved from a simple ancestor. If natural selection is to take the place of God, then it is a god of elimination. In fact Platnick (1977) already wondered if there is any difference in the noted evolutionist Ernst Mayr's concept of "an all-powerful natural selection" and that of an all-powerful Creator.^{9,10} Considering our reasoning above, there is one difference that comes to mind, the creator God produces, whereas 'natural selection' eliminates. In fact, left to itself natural selection will eventually succeed in ridding the planet of life at the rate at which species are disappearing in our time alone. In fact, a look at the palaeontological record will reveal a far greater diversity of life in the past than in the present, and as environmental pressures increase, more and more species will become extinct. Natural selection appears to be doing a good job at eliminating life forms and, if given a little bit more time, might complete the job faster than we might wish.

If variation did not come about by natural selection, the question arises, where did it come from? Before discussing this vital question, we need to elaborate on the level at which natural selection operates. As noted earlier, natural selection operates at the level of the phenotype and not the level of the genotype. This is a cardinal rule in evolution. Processes that produce changes in the genes occur by chance through mutation, and only once the gene has been transcribed and produced the phenotype can natural selection come into play. Mathematical models show that the probability is zero for selection operating at the level of the phenotype to bring about changes when random mutations are performed at the level of the genotype.¹¹

Let us illustrate our previous analogy and expand it somewhat. If we now look at a book, which contains instructions on how to build a number of model aeroplanes, how will I know which one flies best? Well, I build the aeroplanes, test fly them and select the one that flies best. The book with instructions is the genotype and the actual aeroplanes are the phenotype (Figure 5.4a).

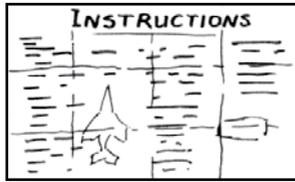


Figure 5.4a

Genotype



Phenotype

Building only one aeroplane can tell me whether the plane can fly, but selection requires at least two aeroplanes to be built. Selection asks the question which one flies best (is the more fit), but building only one aeroplane and finding it unfit to fly would still leave me with nothing. Selection can only take place once the aeroplanes have been built and can be tested. There have to be at least two variants or else there is nothing to choose from (Figure 5.4b).

Figure 5.4b



Selection cannot take place at the level of the book (the genotype), as this only constitutes letters of the alphabet in a particular sequence, which only becomes meaningful once they have been translated into the aeroplane. A number of questions now arise:

- 1) If the book remained closed on the shelf, would I know which aeroplane flies best?
- 2) How are the instructions translated into the product - the aeroplane?
- 3) Who wrote the book?

Let us start with the last question first. The book is the genotype, so according to the evolutionary paradigm it came about by chance and the variants on the original (more than one set of blueprints for the aeroplane) also came about by chance through mutations. This might sound ridiculous, but is precisely what the theory of evolution proposes. Only, the genotype of even the simplest organisms is far more detailed and complex than our book. To believe this thus requires a *great* deal of faith. The other possibility is, of course, that an intelligent designer wrote the book.

Turning to the first question, the answer to this is obviously no. A mechanism must thus exist to unravel the instructions in the book. This requires that the book be opened (the equivalent of enzyme systems that unravel the DNA molecules so that transcription can commence). Does this tell me which aeroplane flies best? No, they are still not built at this stage. Where did the mechanism to unravel the DNA molecules (open the book) come from? As natural selection will only come into play at the level of the phenotype (the aeroplanes have to be there), once again our only solution must be *by chance* or *design*.

Finally, we turn to the second question, how are the aeroplanes finally built? The answer obviously is, by an intelligent human or by robot assembly mechanisms designed by an intelligent human. In the case of the cell, the complex “robot assembly line” is the complex transcription process using RNA and ribosomes to construct proteins. The proteins that are constructed are the equivalent of our aeroplanes (actually it is even more complex than that, because the proteins can also be enzymes that can be used in the construction of even more complex structures). So how did the assembly process come into existence that built the final product (the phenotype)? The answer must once again be chance or design. DNA and RNA contain only the equivalent of letters of the alphabet, their validity cannot be tested until translated and transcribed. To believe that these mechanisms come about by chance random processes requires more than faith - it requires extraordinary faith. Indeed, the handiwork of an intelligent designer is written all over it. This also requires faith, but faith of a different kind. Given the

complexity of the systems of transcription and protein synthesis, once again it cannot be under-emphasized that this requires an astounding amount of faith. It is the equivalent of believing that the Boeing assembly line with all its complex machinery came into existence after a fortuitous windstorm assembled it by chance.

The Origin of Higher Life Forms

If we move from the level of molecular evolution to the evolution of simple organisms and eventually to more and more complex ones, the problems associated with the process do not become less, no indeed they become even greater. Ernst Haeckel (1834 - 1919), one of the great proponents for the evolutionary theory in Germany, was one of the first scientists to propose a model for the development of multicellular organisms from unicellular ancestors. He proposed that the embryological development of animals today reflects the past development in terms of its evolution. This concept is termed the *biogenetic law*, which states the following:

Ontogeny [development of the individual] is a concise and compressed recapitulation of phylogeny [the ancestral sequence]... The organic individual repeats during the rapid and short course of its individual development, the most important of the form changes which its ancestors traversed during the long and slow course of their palaeontological evolution according to the laws of heredity and adaptation.¹²

Haeckel proposed that organisms go through a series of stages during their ontogeny (embryonic development) which resemble the adult forms of phylogenetic ancestors. However, since the facts do not always fit this proposal, the suggestion of von Baer that young stages

resemble young ancestral stages enjoys wider acceptance. Haeckel's theory is largely discredited today on various morphological grounds, but genetically it is also not tenable. Evolution is based on genetic change through mutations over time and recapitulation requires both retention of the ancestral features **and** change (having ones cake and eating it). Just because homologies appear to exist (homology refers to the similarity of biological features in different species or groups because of their descent from a common ancestor) does not mean that structures are indeed homologous. As Michael Denton points out, homologous organs and structures may develop by radically different embryogenic routes, and that "the evolutionary basis of homology is perhaps even more severely damaged by the discovery that apparently homologous structures are specified by quite different genes in different species, and that they may even develop by radically different embryological routes."¹³

Besides his biogenetic law, Ernst Haeckel also proposed a mechanism whereby unicellular organisms may have evolved to form multicellular, and eventually multi-layered organisms. This theory is known as the *Gastraea Hypothesis*. Today, the *Planula Hypothesis*, a variant of the *Gastraea Hypothesis*, is more popular, but the problems remain the same as for the *Gastraea Hypothesis* of Ernst Haeckel (Figure 5.5). Using the embryology of metazoans as a model, Haeckel proposed that multicellular organisms evolved from hypothetical unicellular organisms, which he called *Cytaea*. Eventually these cells remained attached after cell division and a multicellular organism, which he termed *Moraea* evolved. The *Moraea* gave rise to a jelly-filled hollow ball of cells termed a *Blastaea*, which developed an indentation on one side and thus gave rise to the *Depaea*. Through completion of the indentation, the *Depaea* gave rise to the *Gastraea* and the *Gastraea* then underwent further differentiation in that a third layer of cells developed between the original germ layers. It is proposed that this layer, the mesoderm, arose through cellular migration from the outer ectoderm and inner endoderm, thus giving rise to triploblastic organisms (animals with three layers) which

would then also have evolved bilateral symmetry after becoming bottom dwellers. Associated with the change in structure there would also have occurred cellular differentiation and specialization thus giving rise to complex organisms where cells became arranged into organ systems.

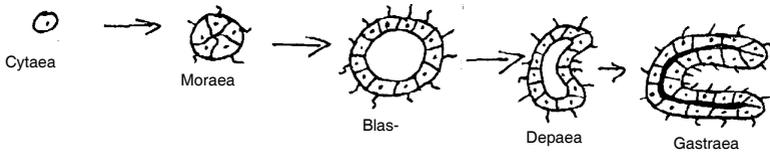


Figure 5.5 - The Gastraea Hypothesis

For most of these proposed ancestral forms, analogous living forms are presented as evidence for the viability of such organisms. In a sense, we are thus once again working with a morphological sequence where we use existing creatures (rather than contemporaneous fossils) to reconstruct the puzzle of their origins. Of course, the puzzle is influenced by the philosophy of the scientists themselves. The cytaea could have resembled living protozoans of the Class Mastigophora, the Moraea represents colonial protozoans such as *Pandorina*, and the Blastaea in turn can be compared to colonial protozoans such as *Volvox*. The evolution of subsequent stages would have required some complex changes, and it is proposed that the modes of feeding and locomotion of the ancestral types would have affected further differentiation. The bottom dwelling triploblastic animals (animals with three body layers – ectoderm, mesoderm and endoderm), which developed bilateral symmetry, could be compared to present day flatworms.

The original single celled organism thus became multicellular, then converted from a radially symmetrical simple clump of cells to a radially symmetrical hollow ball of cells which developed cell specialization, became indented and even more specialized. This indented organism then developed a third layer of specialized cells between the folds of the indented layers. The indentation then eventually went

right through the creature so that a primitive gut developed with a front and rear entrance. The creature then developed bilateral symmetry and then all the complex organ systems developed which we find in living animals. Subsequently, the methods of locomotion, such as complex jointed leg structures with either internal or external skeletons developed and the intricate sophisticated nervous systems evolved which could record all parameters, both internal and external, using highly complex sense organs such as eyes and myriads of sensory structures to monitor everything from temperature to metabolic status to pressure and stature.

Not only was it necessary to monitor all of these parameters, the machinery to maintain and correct any imbalances had to develop and they had to function in a coordinated fashion with a level of cooperation which is beyond human understanding. Moreover, the information for all of these systems had to be carefully recorded and encoded in a blueprint (the genes) so that it could be replicated and passed on to future generations. These codes needed to not only contain the information on the structures themselves, but also needed the highly complex information on how the embryonic development needed to progress and how the structures would interact with each other in order to produce the right product in the end. Even more mind boggling is the fact that all of these systems had to be activated differentially, that is they had to develop means to activate only one set of genes in one type of cell and other sets of genes in other cells although all had to be endowed with all the information for all the cells or else they could not develop embryologically from a single cell. To crown it all, there had to develop the capacity to reason, to store unlimited amounts of information (the hardware of the brain can never say 'disk full'), to have a sense of virtue, appreciation for beauty, to have emotions such as love, to have a creative spirit and principles of morality. Surely, all creatures are 'wonderfully and fearfully made'.

On the basis of morphology and using simple living creatures existing today as a model, Haeckel's theory seems to provide

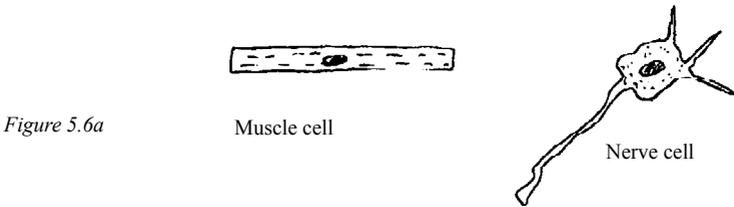
a progression of how events may have proceeded during the evolution of multicellular organisms. At the genetic level, however, there are insurmountable obstacles with regard to this model. In order to survive as living cells, the early ancestral cells needed a genotype (complement of genes) capable of producing all the relevant proteins required to fulfill their physiological and structural needs. These early cells would have had genes coding for all the essential enzymes required to maintain the physiological processes and genes coding for all the necessary proteins involved in the structure or morphology of the cells. Previously, we discussed the problems which would have precluded the evolution of such a cell, but for the sake of this argument, we will assume that such a cell did in fact arise. Furthermore, it is not too difficult to imagine that a situation could have arisen where cells remained stuck together after cell division, thus resulting in multicellular colonies with the cells embedded in a common matrix. Genetic problems are encountered, however, when the evolution of cell differentiation and eventual specialization are considered. If the colony arose through cell division, then each of the original colonial cells would have had the same genetic composition, coding for the simplest of cells. The evolution of specialized cells requires that the different cells also evolve different morphologies and specialized structures dictated by their function. New and diverse morphological and physiological features had to develop as the organisms became more and more complex. The simple colonies would thus eventually consist of more than one cell type. In order to ensure continuity, the genetic changes would have to be transferable to subsequent generations, which in turn require a far more complex gene arrangement than existed in the unicellular organism. All the variants would have to be located in each cell, with the possibility for selective activation of one or the other batteries of genes.

Assuming that the new genes somehow did evolve (by chance, of course, since we are dealing with genotype), and the organism was now endowed with different sets of genes governing the different morphological expressions, there would then be an even greater

obstacle to overcome, namely how to select between the options. The genes of cells in particular situations would have one set of genes activated, and cells in another situation would have different genes activated. Let us use a simple example where we discuss only two different cells working together (of course higher living organisms have thousands of different cell types working in unison). In organisms living today, nerve cells must have a set of genes activated which distinguish them morphologically and physiologically from liver cells or muscle cells or any other type of cell, which have different parts of the genome activated although all these cells possess the full gene complement.

The differential activation of either the one battery of genes or the other requires a complex system of controlling genes, which would all have to come about by chance since natural selection can only operate at the level of the phenotype. The chances of all the new genes and controlling genes coming into existence by chance are so remote as to be nonexistent. The probability of just one functional gene arising by random chance processes are so remote as to be less than one in the number of particles in billions of universes (if there was such a thing). In fact, it is more probable for an explosion in a woodpile to construct a functional mansion by chance, than it is for just one such new gene to come about by random chance processes. Moreover, one would have to postulate the same scenario thousands of times over as cell differentiation increased. Again, this requires a great deal of faith and the evolutionary paradigm is thus based on faith and is in fact a religion.

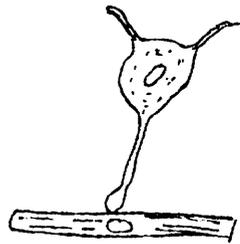
The complexity of the genetic requirements for just two different cell types to coexist within an organism is awesome as can be illustrated by the following example. If we look at the relationship between a muscle cell and a nerve cell, then it is obvious that there is a great deal of morphological and functional difference between the two. This requires different gene complements to be activated in the two cell types (Figure 5.6a)



Of course, these two cell types would have to cooperate with each other in the living organism in order to be of any value to the organism. Also one must remember, that at the level of the genotype, the processes occur by chance and natural selection can only come into play once the phenotype has been produced. We are not dealing with just a simple genetic variant to achieve these goals. A host of new genes is required to allow just these two cell types to coexist, let alone the thousands of cell types present in complex multicellular organisms. For just these two cells the following genes are required at minimum:

- 1) Two sets of structural genes coding for the two cell types. These include all the specialized genes for the structure and function of the cells.
- 2) Promoter genes enabling the selective activation of either the one or the other battery of genes. In nerve cells, only those genes of the total genome will be activated which are required for nerve cells, and in muscle cells only those that are required by muscle cells.
- 3) Genes, or DNA sequences which are sensitive to the environmental cues which will determine which of these two options need to be activated, plus genes that produce the chemical compounds (inducers) which will activate cell differentiation.

4) Genes, which will govern the cooperation between the two cell types. This is a very complex arrangement. The two cells will have to link up morphologically (Figure 5.6b), in order



Linked Cells

Figure 5.6b

for the one to activate the other, and there would have to be receptors that enable transfer of information from one to the other as well as systems to recognize the nature of the impulse as well as systems to set in motion a set of responses.

5) Genes to govern the embryology of the cell types and to ensure that every sector of the body is integrated into the system.

Where did all these genes come from? The first simple organism required none of these genes, since they did not contain specialized cells but supposedly consisted of only one undifferentiated simple cell. As natural selection does not operate at the level of the genotype, and cannot create anything anyway (only sort out that which is already there), these genes had to come about by chance or design. These are the only two options available and considering the complexity of the system, design seems to be the only likely option. The probability question also now becomes ludicrous; we cannot think as small as an explosion assembling a mansion, we have to imagine a nuclear explosion assembling a fully functional city with all its operating systems such as electricity and water supplies, pumps and generation and whatever it takes to have a functional city, to come about by chance as a result of the explosion. Haeckel's *Gastraea* theory is thus based on a simple morphological sequence, which looks good on paper, but genetically it is untenable.

The Origin of Variation

Without variation, evolution by natural selection would be impossible. It is precisely the variation which Darwin observed in the finches and other organisms on his voyage of the *Beagle* that led to the concept of evolution by natural selection. In the time of Darwin, the Christian European concept of creation was that God had created immutable unchangeable species. Each species was created

individually by God and could not change. In fact, the classification of species utilized this concept to a large extent. Aristotle was one of the first to attempt a logical system of classification. Using characteristics such as structural complexity, behavior and development, he classified about 500 organisms into 11 categories. He placed organisms into a hierarchy of categories, each more inclusive than the one before - a concept that has remained with us to the present day.

Carolus Linnaeus (1707 - 1778), the father of the modern classification system, placed each organism into a series of hierarchically arranged categories based on its resemblance to other life forms, and he also introduced the *binomial nomenclature* whereby the scientific name of an organism is based on the genus and species. Linnaeus still believed in the immutability of species, and classified thousands of life forms into different species even on the grounds of relatively minor variations between them. It was not till nearly 100 years later that Charles Darwin added a new dimension to the categories created by Linnaeus and other taxonomists, which now also reflected the evolutionary relatedness of organisms.

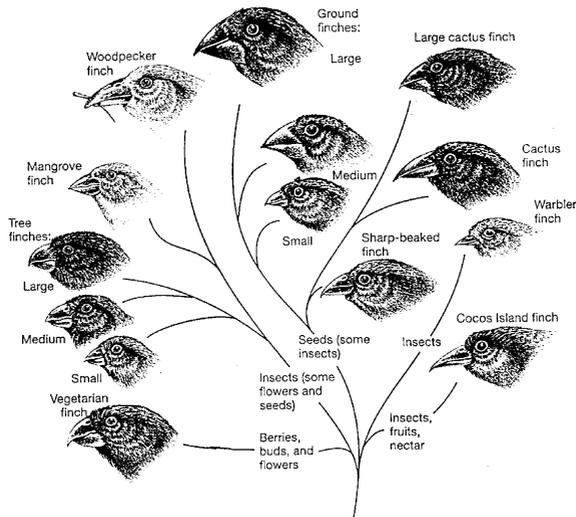
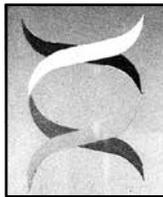


Figure 5.7 - Darwin's finches. The variation in form and behaviour was used by Darwin to argue for the concept of evolution by natural selection.¹⁴

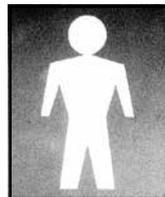
What Darwin saw in the finches was so different to the concept of immutability, that he felt he had no option but to reject this concept. These finches were obviously related and must have shared a common ancestor (Figure 5.7). This conflict led him to reject special creation and develop the concept of evolution by natural selection. It must be remembered that the science of genetics had not yet come into existence and that Darwin's conclusions were based on what he saw in the phenotype.

If Darwin had known what we know today about the genotype, his conclusion might have been quite different. The genome is endowed with a marvelous capacity to produce variation, and all of these are governed by very complex mechanisms. Moreover, mechanisms that induce variation at the level of the genotype are not subject to natural selection, as natural selection only operates at the level of the phenotype (Figure 5.8). (The two aeroplanes in our previous example must first exist before we can select the one that flies best).

Figure 5.8



Genotype



Phenotype

If the vast increase in genetic information from the unicellular to the complex multicellular organisms had to come about through chance mutations, the process would have required extraordinary complex changes. Even assuming that there were gene duplications to increase the number of genes, one would still have to have the two duplicates mutate independently and advantageously in order to bring about new functional genes. The integrating genes would, however, still have to come about independently since they would not have formed part of the original gene pool. So where did all the

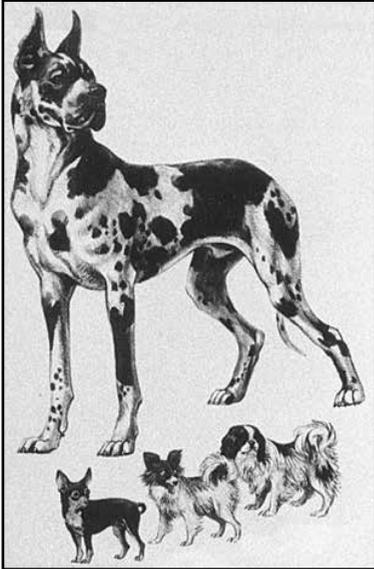
variation in the gene pool come from? There are a number of mechanisms whereby variations in the gene pool are achieved, but none of them are simple or haphazard and again require extremely complex circumstances to be realized. The main mechanisms known today are:

1) Built in variation in the gene pool: For most character traits present in organisms, more than one allele (one of several alternative forms of a particular gene) exists. The different genes must have come about by chance alone, because we are dealing with genotype. The genotype of an organism includes both latent and patent genes. Only structural genes that have been activated are expressed in the phenotype and a new gene must first be expressed before natural selection comes into play. If the gene remains latent, then that would be like our closed book that nobody reads and therefore the information is not usable and will never create anything.

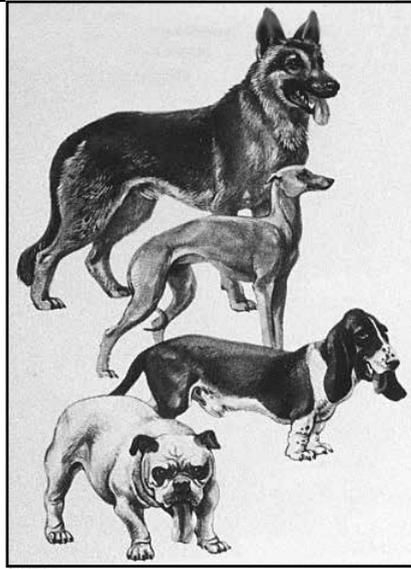
As far as alleles are concerned, expression is governed by a complex system of dominance versus recessiveness. Furthermore, the frequency of genetic expression can also alter the phenotype. For example, if the gene coding for growth hormone is frequently expressed, this can have a marked influence on the size of the organism. Variation in size does thus not necessarily require new genes, just differential expression of the same genes. An example of built-in variation in the gene pool can be seen in the various breeds of dogs (Figure 5.9). The alleles must have been present in the wild dogs and wolves from which the domestic dog was bred. These striking differences were there in these animals but no one ever saw them because they were not expressed in the wild type. How did they get to be there? The answer is chance or design. If one chooses to believe that chance provided the additional genes, then that is one's perfect right, but one must realize that the chances are the same (for each gene) as the explosion constructing a functional mansion.

By selecting from the built-in natural variation of the gene pool, not only the various dog breeds, but all domestic races of farm animals, such as domestic cattle as well as other animals such as

The Genesis Conflict



5.9a



5.9b



5.9c



Figure 5.9 - Variation in a) dog size, b) dog shape, c) dog ears

domesticated birds were produced. Great changes in physiology and morphology are involved and, being a human selection over a relatively short period of time, evolution is here certainly excluded. Just on the morphological scale, differences in dog breeds (where no one would argue that we are dealing with one species), are greater than the differences in the genera of the family Canidae.¹⁵

From a creationist perspective, the vast initial gene pool makes possible a vast range of adaptive morphologies and physiologies within a pre-existing gene pool. This general gene pool is termed “kind” in the Bible. Adaptive radiation as observed by evolutionists is thus nothing other than the end product of sorting the gene pool by extraneous factors, such as differences in climate, habitat, etc., or in the case of domestic animals by human selection (and recently by gene manipulation). Gene patterns suited to the environment are selected and change is rapid.

Genetic expression is also influenced by e.g. hormonal modulation so as to bring about differences in structural expression by the genes in terms of size, and length of induction during development. Moreover, differential hormonal modulation in response to “Zeitgebers” (an environmental stimulus that initiates a hormonal process) can alter the time and magnitude of response thus effectively producing reproductively isolated communities which would be regarded as different species by evolutionists but are in effect merely extremes of genetic expression within an existing gene pool. Evolutionists recognize that changes in genotype frequencies do occur which produce changes in gene distribution as predicted by the Hardy-Weinberg law. They, however, explain most changes as resulting from chance mutations and this requires an enormous faith.

Even evolutionists admit that pre-adaptation must have played a major role in enabling organisms to survive environmental changes. Pre-adaptation, however, requires pre-existing genes capable of responding to environmental stimuli, which is precisely what creationists claim. Where did these fully expressional genes come from? Once again, chance or design are the only options.

2) Variation is increased by reproductive exchange: This statement is more than a mouthful in terms of its genetic implications. Through sexual reproduction, genetic material is exchanged, thus inducing genetic recombination. The significance of this is obvious - the exchange of material increases the variation. This holds particular advantages to populations and is considered by evolutionists to be an innovation, which greatly enhances the evolutionary process. 'Innovation' is the understatement of the millennium. The genetic, physiological, embryological and morphological implications of the reproductive process are of the most awe-inspiring wonders of the universe. To brush them off as a chance innovation of nature displays extraordinary faith in the god of chance. How would rocket scientists feel if you walked up to them and asked them how it happened that the space station and the shuttle fleet came into existence by chance? Of course, we know how they came about. They were designed, and we can duplicate them and operate them. The processes which govern the reproductive process are even more complex and the best minds in the world have barely scratched the surface of the secrets they still embody. We know what sexual reproduction achieves - it increases the variation. However, increased variation in the genotype is of no value until it is expressed in the phenotype. The new varieties must be expressed in the offspring before natural selection can feast on this increased variation. **The process that brings about the variation (sexual reproduction) is not subject to selection; only the result thereof (the increased variation in the offspring) is subject to selection.**

The exchange of gametes (sex cells) requires a modified form of cell division, which is the process of meiosis. During meiosis, the number of chromosomes is halved, resulting in the gametes having a haploid number of chromosomes. Sexual fusion of two gametes then restores the diploid number of chromosomes. Variation in the genome is greatly increased by two processes occurring during meiosis, these are *independent assortment* and *crossing over*. Both these processes are extremely complex, but in themselves

are not subject to selection. They rearrange the genetic material which results in new combinations of the material, but as this reshuffling occurs at the level of the genotype, it is not subject to natural selection until the new combinations have been expressed in the phenotype. It is the same as reshuffling the information in the book on aeroplanes will not tell us which aeroplane flies best until the aeroplanes have been built.

i) Independent Assortment: Independent assortment is achieved when chromosomes line up in homologous pairs and move independently to the one pole or the other. The process is governed by complex enzyme systems, which in turn must also have come about by chance.

The possible variation that can be achieved by independent assortment depends on the number of chromosomes present. In humans, there are 46 chromosomes, which would arrange themselves in 23 homologous pairs. The variations that can be achieved are thus: $2^{23} \times 2^{23} = 80$ trillion. (23 pairs of chromosomes of which each chromosome could move in either of two directions). Once again, there are very complex processes and very refined structural necessities that are required for this process to proceed without a hitch. There is the lining up of the chromosomes and the formation and contraction of the spindle all of which proceed like clockwork, and yet the result of this process will only be seen once offspring has been produced. Then only will natural selection be able to come into play; so the process itself had to come about by chance or design.

ii) Crossing Over: This process leaves one breathless. When homologous chromosomes are lined up during meiosis, they can, in a very precise way, exchange genetic material. To achieve this, a number of processes have to be completed, the highlights of which can be summarized as follows:

a) Enzymes open the double helix of DNA in

the aligned chromosomes to permit intermolecular base pairing.

b) One strand of each helix is cut at equivalent positions.

c) The enzyme ligase joins them to form a half chromatid chiasma (because only one strand of each chromatid crosses over) resulting in a cross-shaped molecule.

d) The cross-shaped molecule is cut in half by an enzyme, leaving a break in one strand of each recombinant.

e) The break is sealed by ligase.

f) Complex enzyme systems unwind and rewind the molecules in extremely complex three-dimensional fashion with stress relieving enzymes ensuring that no breakages occur, which could lead to loss of information.

g) Hundreds of these reaction occur simultaneously and then the reconstituted chromosomes split without having lost even a nucleotide in the process. If even one nucleotide were transferred incorrectly, then subsequent genes could become dysfunctional.

As one textbook on genetics describes it:

A normal crossover is really a miraculous process. Somehow the genetic material from one parental chromosome and the genetic material from the other parental chromosome are cut up and pasted together during each meiotic division, and this is done with complete reciprocity. In other words, neither chromosome gains or loses any genes in the process. In fact, it is probably correct to say that neither chromosome gains or loses even one nucleotide in

the exchange. How is this remarkable precision attained?..... However, the process is complex (especially in eukaryotes) and the genes controlling it must be many.¹⁶

It might be safely said that the process is more complex than anything man has ever designed, yet it would have had to come into existence by chance if the evolutionary paradigm is accepted. Chance or design are the options at this level and chance requires more faith than most could muster.

If we consider the process of reproduction in even a simple bacterium, where two sexes are not even an issue, we will see that the process requires a level of complexity that is staggering. Large numbers of enzymes are involved in the reproductive process of even the simplest of organisms. In the bacterium *Haemophilus influenzae*, for instance, there are 87 genes that deal with the process of DNA replication alone, besides all the other mechanisms that are required for reproduction.¹⁷ Moreover, each gene must work in unison with all the others in order to achieve successful replication, which means that 87 steps must take place in the right sequence. The probability of this happening by chance is 1 in 10^{170} , a number so huge that it is incomprehensible (considering that 10^{80} is the considered number of particles in the entire universe).

3) *Transposable elements increase the variation:* Transposable elements are sometimes called “jumping genes”. They consist of segments of DNA, which can move from one position on a chromosome to another. As early as 1951, the Nobel Prize winner, Dr. Barbara McClintock, proposed that genes are not fixed on chromosomes, but that they can move around on the chromosome. At first, her findings were discarded because they contradicted the genetic concept of the day. Today her discovery of what she calls transposable elements has an established place in science. Through transposable elements, we know that R factors can transmit antibiotic

resistance and increased variation. The genes move because they are part of a small circular auxiliary genome called a plasmid, which enters and leaves the main genome at a specific place where there is a nucleotide sequence that is also present on the plasmid. Other genes move within small fragments of the genome called transposons. Together, transposons and plasmids produce genetic recombinations.

Integration at a new position also transfers the gene to that new position. The repositioning may be random, but occurs at sequence-specific insertion points, which means that the process is orderly. The splicing and repositioning is carried out by enzyme systems and involves the transfer of complete information. The mechanisms that carry out the transposition had to once again come about by chance because the result of the transposition is not subject to natural selection until it has been expressed in the phenotype. The process is also precise and again, there are only two options as to the origin of the mechanism - chance or design.

4) Variation is increased by the recombination of chromosomes:

Changes in chromosomal structure have been cited as important contributing factors in providing variation and as a mechanism for speciation. Changes in chromosomes can include changes in chromosome number, arm number, translocation, deletions, duplications, inversions or even radical reorganization of the genome. It is important to note that none of these create any new material; they just rearrange or duplicate the existing material.

To summarize the mechanisms that produce variation, it could be stated that all of them rely on existing genetic material, none of them were subject to selection, and each of them had to come about by chance or design. The known mechanisms are (Table 5.3):

Mechanisms Which Produce Variation in the Gene System

- | |
|---|
| <ol style="list-style-type: none">1) Built-in variation in the gene pool2) Reproductive exchange3) Independent assortment during meiosis4) Crossing over during meiosis5) Transposable elements6) Recombination of chromosomes |
|---|

Table 5.3

The faith required to believe that any one of these mechanisms, let alone all of them came about by chance is extraordinary. If, however, they came about by design, then variation among organisms and variation within organisms are hallmarks of creation. God did not then create immutable unchangeable species, but created them with an enormous capacity for change. The question is then no longer whether change can take place or not, but rather **how much change** and where are the limits to this change. Well, if we take the dog breeds as an example, then the capacity for change is demonstrated to be enormous since on the issue of size alone all sizes from the Chihuahua to the St. Bernhard are built into that gene pool. A further question is **how rapidly can the change take place** and what does it entail?

The modern classification system is largely based on resemblances of species on the morphological level, and current biochemical approaches often contradict the morphological approach. Examples are inconsistencies between molecular and morphological data in the classification of mice,¹⁸ contradictions in molecular and morphological phylogenies of rodents, rabbits and primates,¹⁹ and even conflicting classifications in whales.²⁰ Present-day reproductive isolating

mechanisms among species that prevent most species from cross-breeding are cited as mechanisms that have evolved over long periods of time to maintain the integrity of a species. There are, however, many ways in which these could develop rapidly by re-shuffling the existing genome. The flexibility of the genome allows for very rapid change, which has nothing to do with evolution, but rather with the built-in capacity for variation.

One example of rapid reproductive isolation might illustrate the points above. About 100 years ago, bird biting mosquitoes called *Culex pipiens* entered the tunnel system being dug for the London Underground and rapidly changed from feeding on birds to feeding on rats and human beings who worked the Underground. In the short time since going underground, they are now incapable of breeding with those living above ground and this has astounded evolutionists who would have deemed longer periods necessary for such isolation mechanisms to evolve. Dr. Jenny Graves of La Trobe University in Melbourne, Australia said the following about jumping genes that could induce reproductive isolation:

We thought it took millions of years of long-term selection for a jumping gene to be activated. We've now shown that it can happen in five minutes after fertilization.²¹

The Biblical concept of a “kind” must also be re-examined in the light of the above data. A “kind” can obviously not be equated with a species, but rather with that of a higher taxonomic level such as the generic level and in some cases even the family level. In terms of Darwin’s finches, Darwin was thus right when he postulated a common ancestry. The mechanism of change was, however, neither microevolution (in the sense of mutations within individual genes, since these are harmful) nor macroevolution, but merely differential activation and reshuffling of the existing genome. No new material was added to the genome, as the capacity to produce variation was more than ample to provide the material for all the finch vari-

ants, just like there was enough genetic variety in the wild type canid to produce all the varieties of domestic dogs. The change would seem to be what scientists would call microevolution, but since it is based on selection and activation of existing genes it does not involve real change at the genetic level. Perhaps we can liken it to a piano; the keys on the piano are the genes, and the sequence in which the keys are played (the genes activated and expressed) provides the music (the variants). How many tunes can be played on the piano? An unlimited number, and therefore no two tunes need be the same. However, one is restricted to piano music (the kind), and if one should wish to hear a different kind of sound one would have to play another instrument such as the violin. Now we can see why no two people need be exactly the same or why there can be so many races. It is because of the enormous capacity for variety that is built into the gene pool.

There are thus genetic mechanisms in place which can produce unlimited variety, and the questions can now be asked: how long did it take for present day animals to achieve their current level of diversity, how many 'kinds' were involved (or from a creationist perspective - was there an ark and how many 'kinds' were needed to account for the variety of creatures that grace the planet today), and how did they disperse themselves over the planet?

Post Deluge Speciation and Redistribution

L. James Gibson of the Geoscience Research Institute carried out an extensive literature review on some of these issues, and fascinating possibilities exist to account for the varieties or creatures that exist today.²² Briefly, the main mechanisms for change and speciation can be summarized as follows:

1) Breed selection from existing built-in variation: Examples would be the breeding of the various breeds of dogs, cats, domestic cattle, pigeons and poultry. Some naturally occurring species show similar differences in clines (gradient of change in population or species correlated with the direction or orientation of some environmental feature, such as a river, mountain range, north-south transect, altitude, etc.) such as the corn snake *Elophe* that differs in color and scale number along a cline. Further examples of built in variation in general are variations in color, fur thickness, body form and size, and seasonal variations.

2) Loss of genetic material: Loss of genetic material (or the deactivation of genetic expression) has led to so-called speciation. Loss of flight is common in birds, particularly in island birds where flight can be a distinct disadvantage, as the birds can be blown out to sea in storms and not make land again. Often related species retain the capacity to fly. Examples are the flightless rails (marsh hens), flightless cormorant of the Galapagos Islands and the flightless goose from Hawaii, loss of eyes in blind cavefish and many cave dwelling insects. In fact, the loss of eyes in Hawaiian cave dwelling cockroaches points to exceptionally fast transformation (a few months) in these insects when they start to inhabit these newly formed caves. It is highly unlikely that the genes for eyes have mutated or disappeared from the gene pool in such a short time, and one could rather envisage the deactivation of the genes responsible for eye development under the conditions prevalent in these caves. Since environmental cues such as changes in light cycles and seasonal temperature changes exert a direct influence on genes and can lead to gene activation and deactivation, this route for bringing about rapid, even major changes seems highly plausible.

In terms of the standard classification paradigm, loss of genetic material leads to new species or genera but not higher categories. Given our current understanding of the way in which the genome

works and how genes are activated and deactivated, it is doubtful whether the genetic information is really lost in these species. Probably, it is just deactivated, as the circumstances do not require the features in question. Mechanisms must obviously exist to deactivate even structural genes coding for morphological features should the need arise. These changes may be perceived as examples of microevolution, but in real terms, they merely reflect quite standard activities common to the genome. There is thus, for example, no justification in classifying eyeless cave dwelling fish as new species just because they look different. The cave dwelling eyeless and river dwelling eyed forms of the Central American 'banded tetra' fish (*Astyanax fasciatus*) freely interbreed and produce viable offspring and must thus be the same biological species.

3) Hybridization: Most hybrids are not viable because of loss of fertility, particularly in mammals. Some taxa are, however, prone to hybridization, and thus can lead to viable species in some animals (for example, fish and insects) as well as in numerous plants. Hybrids of cattle also occur (seven species of the genus *Bos* hybridize) and *Bos* and the North American buffalo *Bison bison* also hybridize. Hybrids have also been formed between horses and zebras, camels and llamas, leopards and jaguars, lions and tigers, dolphins and false killer whales (different genera), different genera of snakes, and even hybrids between sheep and goats have been achieved, although in the case of the latter, cell linkages between embryos of the two species were implanted in a surrogate mother to achieve the hybrid. There are various ways in which genetic information can be reshuffled rapidly to produce reproductive isolation, but since information is not necessarily lost or gained in the reshuffling process, these isolated forms do not represent new 'kinds' but just related species of the same 'kind' that have now become reproductively isolated. In the past, the different species within genera, and even possibly families,

could thus all have belonged to one ‘kind’.

4) Changes in chromosome structure and number: Chromosomes are classified on the basis of the position of the centromere (condensed region on a chromosome where sister chromatids are attached to each other after replication). When the centromere is in the middle of a chromosome and the two arms are thus of equal length, it is called a *metacentric chromosome*. If the centromere is located at or near one end of the chromosome, it is called an *acrocentric chromosome* and any changes in chromosomal structure can be detected by a special staining technique known as *G - banding*.

Rearrangement of the chromosomes may entail changes in the number of chromosomes, number of chromosome arms, as well as other changes produced by translocation (movement of chromosome segment to another location), deletions, duplications, inversions and drastic rearrangements. Sometimes, chromosomes can fuse with each other to form much longer chromosomes or they can split at the centromere to form two shorter chromosomes. One such rearrangement is known as *Robertsonian rearrangement* and is the result of either the fusion of two centromeres into one, or the splitting of the centromere into two. A *tandem fusion* on the other hand is a fusion of two chromosomes, in which one end of a chromosome fuses with the end or the centromere of another chromosome (see Figure 5.10). In all such recombinations, the information is shuffled, but comparisons between chromosome banding of the chromosomes of related species with different chromosome structures show that the information is still the same. It is just rearranged. Moreover, the types of rearrangements which occur in different animals are quite group-specific, and one type of rearrangement doesn't necessarily occur in another group.

Robertsonian Fusion: Robertsonian fusion changes the chromosome number, but not the arm number. When chromosomes line up during meiosis 1, a metacentric chromosome lines up with two acrocentric chromosomes. Examples are: The house mouse *Mus Musculus* which has 40 chromosomes. A population of mice from the Italian Alps was found to have only 22 chromosomes. This population

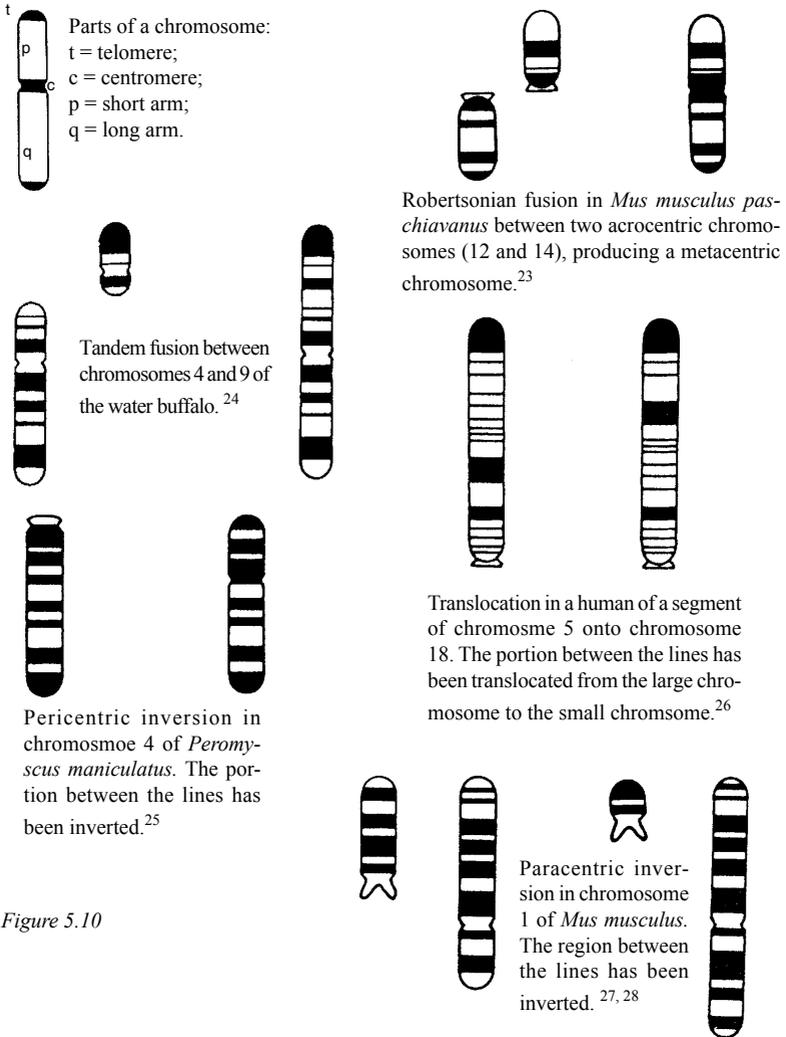


Figure 5.10

differs slightly from the normal house mouse in morphology as well and is classified as a different species *Mus paschiavanus*. Other populations have been discovered with chromosome numbers varying between 22 and 40 yet the number of chromosome arms is the same, and banding studies reveal the genes to be homologous. Obviously, in terms of their relationship, these different species are all one group.



Figure 5.11a - Eland

Figure 5.11a-d shows the similarities in stripes and horns between various antelopes that have the same tandem fusion.



Figure 5.11b - Nyala



Figure 5.11c - Kudu



Figure 5.11d - Bongo

Tandem Fusion: Tandem fusion changes arm number and chromosome number. Tandem fusions have been found in some antelope species where a sex chromosome fused with an autosome. This is rare, and one can assume that the organisms probably had a common forerunner. The antelope displaying this fusion range in size from the eland (the largest of all the antelopes) to smaller species such as the sitatunga and the bushbuck. They all share common features, however, such as similar shapes of the horns and stripes on the body which may be prominent, as in the case of the bongo, or less prominent, as in the case of the eland. Species with this type of fusion are: the eland, bongo, lesser and greater kudu, bushbuck, sitatunga and nilgai (Indian antelope) where the y-chromosome is fused to an autosome. Some of the ungulates with a tandem fusion are shown in Figure 5.11.

Tandem fusions are found in Malaysian swamp buffalo and Asian river buffalo. A further very interesting example of this type of fusion is also found in the Asian deer. In the species *Muntiacus muntjac*, the females have only 6 chromosomes and the males have 7 chromosomes (this is the smallest chromosome number in mammals). However, in a different species of the group, *Muntiacus reevesi*, both the males and the females have 46 chromosomes. Banding studies show that the same genetic material is present in both species. The chromosomes in *M. muntjac* are just fused together to form very long chromosomes. Once again, no new information is added, it is just reshuffled, thus providing differential expressions and increased variety. Just like many tunes can be played on the same piano, but the music remains piano music.

Pericentric Inversions: These inversions provide changes in arm number but not chromosome number. The number of arms depends on the position of the centromere. If it is located at the end, then there is one arm, and if in the middle, there are two arms. The inversion can change acrocentric chromosomes to metacentric chromosomes. The rodents *Neotoma* and *Peromyscus* differ by this inversion.

Translocation: Translocations can lead to reduced fertility, or in some cases in humans, Down's syndrome can occur where part of chromosome 21 gets translocated to another autosome. In some insects and plants that have meiotic drive, however, viable offspring can be produced.

Paracentric Inversion: In this type of inversion, the centromere is not included. This inversion is relatively uncommon, but has been proposed for some species of bats, hares and apes.

Drastic Rearrangements: Under certain circumstances of severe environmental stress, drastic rearrangements can produce greater varieties, which could enhance survival. These changes can be rapid when new adaptive zones are entered (canalization model). Such rearrangements have been proposed for the mole rat *Spalax*

In summary, it can thus be said that the organismic genome is endowed with an enormous capacity for variation. Under conditions of stress, or where organisms enter new adaptive zones or experience low selective pressures, there are built-in mechanism for creating rapid change and tremendous variations. The organisms must have been endowed with this potential for change from the beginning and were created at the same time. The fact that phyla appear suddenly in the phylogenetic record suggests that these groups did not share a common ancestry, and the absence of ancestors in the underlying strata is thus not due to an inadequate fossil record, but rather indicates separate origins for the various groups. If all these creatures formed part of the original 'kinds' and were endowed with unique gene pools, then one could perhaps expect elements of common design, but the genomes would not form a continuum of advanced genetic features from the lowest to highest, since all the 'kinds' would be unique, although each group would have inbuilt potential for variety. Commonality of ancestry would thus not exist and neither would it be reflected in the fossil record and this is exactly what the fossil record reveals (there are no common ancestors). In the genetic phylogenetic studies that have been conducted,

the search for a common ancestry of organisms is equally as disappointing to the scientific community as is the evidence of the fossil record. No wonder that some phylogeneticists have considered abandoning the search for the roots of the phylogenetic tree in view of the vast genetic anomalies in the molecular phylogenies of organisms. They argue that lateral gene transfer has confused the situation beyond recognition,²⁹ but perhaps they are looking in the wrong place and are overlooking the one solution that is not only consistent with the data, but with the Scriptures as well.

The fantastic array of mechanisms available to produce change and variety would be particularly useful in a changing environment or when stabilizing selective pressures would be low, and after the deluge, precisely such a situation would have existed. The new adaptive zones that were created provided the nurturing ground for rapid adaptive radiation in the post flood period (using built in genetic variety and potential) and competition for habitats would also have been low initially, thus allowing for low stabilizing selection pressures. These circumstances could thus rapidly induce changes in form and structure until such time as population levels were stabilized. The large mammals with the extremes in variation such as the woolly mammoths and sabre-tooth tigers are just some examples. Moreover, given this tremendous potential for change, and the obvious relationship between even species with totally different chromosome numbers, a situation can be envisaged where a relatively small number of 'kinds' can account for large number of 'species' in a very short time. For those with faith in the Biblical account of the ark, the problem of fitting the animals into the ark would no longer seem as daunting. Not all the species existing today would have had to enter the ark, but only the representative 'kind' of much higher categories than the species level. For example the antelopes mentioned above would only have needed to be represented by one of the variants, not all those that are now classified as different species.

The canids of the world illustrate this point dramatically. Dogs and wolves of the genus *Canis* have 78 chromosomes, while foxes

have a varied number of chromosomes ranging from 38-78 chromosomes. The uniformity of chromosome number in dogs and wolves can be due to free interbreeding over a wide range, whereas foxes live in small family groups and smaller territories, so that new arrangements will persist. Although the chromosome numbers in many species of canids may thus be lower than the 78 found in wolves, the chromosomes of those species with smaller chromosome numbers are longer and chromosome banding shows that they have the same basic genetic material. The longer chromosomes are thus as a result of chromosome fusions which have thus changed the chromosome number and reshuffled the information, but the same genetic information still exists. If the "kind" is thus penned at the level of the family Canidae, then the implications in terms of the number of animals required to produce the present varieties are not as daunting as many fear. The great variety of form and structure found in all the wild canids, is no greater than the variety which human selection has achieved in the domestic dog, and all the members of the family could thus have belonged to the same 'kind' originally.

The potential for change certainly exists; nevertheless, there are certain barriers which cannot be transgressed. There is plenty of evidence that all canids originally must have belonged to one kind. In Canada, there is a variation of size in coyotes from the west to central Canada. The larger coyote of central Canada occasionally interbreeds with the wolf, and the smaller coyote of the west freely interbreeds with the other coyotes in the range. It is thus likely that they all belonged to the same 'kind'. The same holds true for even the so-called unique canids such as the dingo from Australia that is in danger of extinction, not because of competition, but because its gene pool is being swallowed up by the domestic dog with which it readily interbreeds.

Geneticists have manipulated the genome of the fruit fly *Drosophila* to such an extent that some believe that all evolutionary events in the history of the earth do not exceed the amount of manipulation to which fruit flies have been subjected. Nevertheless,

although bizarre forms have been created, the barrier, which constitutes “fruit flies”, has never been broken. Similarly, a great deal of change from chromosomal rearrangements has probably taken place since creation, and the time frame can be consistent with a short chronology. It is, therefore, possible to envisage the changes, which brought about the large number of ‘species’ existing today to have taken place rapidly. Indeed, numerous chromosome homologies have been identified in animals today, which are probably just the result of chromosome fusions, as in the case of kangaroos, where Robertsonian fusions can account for much of the variation between the different species. Rearrangements can account for differences in insectivores, bats, primates, marine mammals, rodents, rabbits and hares, and ungulates.³⁰

Similarities between genetic linkages do not, however, always have to reflect close relationships; they could just reflect similarities in design based on functional requirements. For example, genes for specific enzyme systems are often situated on chromosomes with similar banding patterns in different species.³¹ Similarities can thus also be explained on the basis of function rather than ancestry. In fact, similar linkage patterns between cats and humans are almost as consistent as between humans and chimpanzees,³² and similarities in chromosomes of humans and apes could also be explained on this basis. Interestingly, the human karyotype seems to be closest to the primitive condition, which does not support an ancestral position of the apes.³³

From a creationist perspective, redistribution of ‘kinds’ must have taken place from the ark along three distribution lines (figure 5.12)

James Gibson of the Geoscience Research Institute in California carried out an extensive literature survey of mammalian distribution patterns on the various continents and showed that many mammalian species exhibit distribution patterns consistent with an ark distribution. In order for this type of distribution to have taken place, the various continental and geographic barriers that exist today must be considered to be post-flood phenomena. Initial redistribution

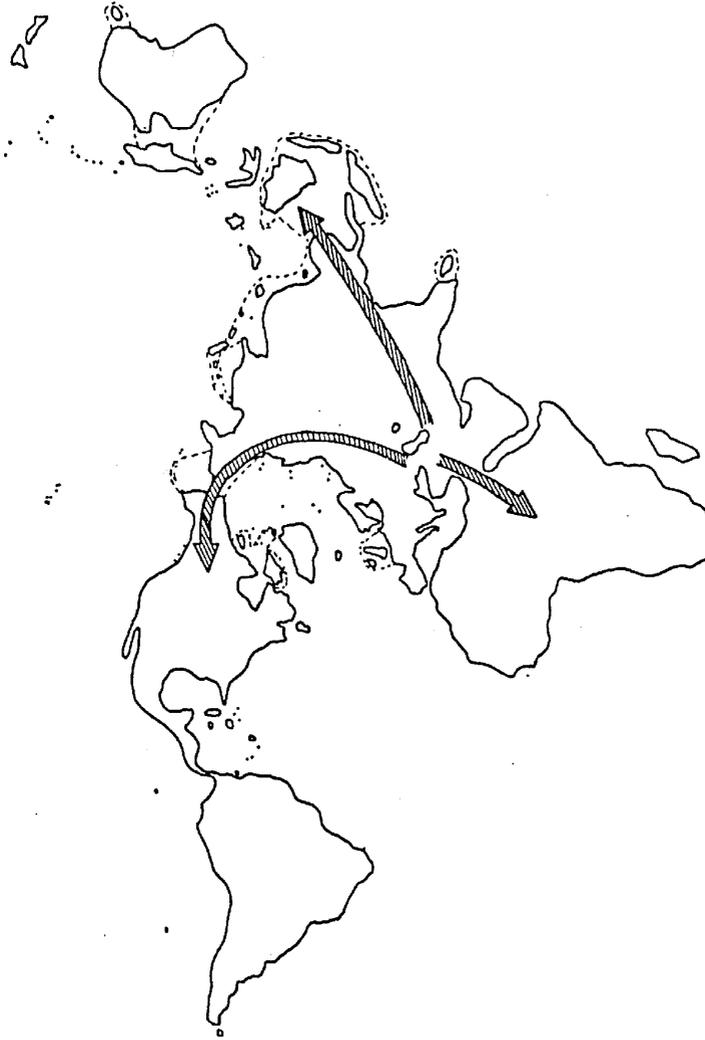


Figure 5.12 - Potential post-catastrophic dispersal routes. The dotted lines represent former land areas now submerged.
(Source: L.J. Gibson - Geoscience Research Institute)

and population growth must thus have been rapid and the various barriers must have arisen subsequent to these events. If we take the two elephant populations in the world today as an example, then they can be considered relics of a much wider distribution of elephants that became separated by the deserts of North Africa and Arabia into the African and Asian populations. It is also interesting that the distribution of mammals on earth is consistent with a north-south distribution in Africa, and a west-east distribution in Asia. There is also genetic evidence for migration across the Bering Strait, thus indicating that this barrier did not hinder the earlier distribution of animals. The antelope ground squirrel (*Spermophilus undulatus*) and the American species (*S. columbianus*) are chromosomally identical, but separating them and living on both sides of the Bering Strait is another species, *S. parryi*, which has a different chromosome number.

The Australian Problem

More difficult to explain is the problem of endemic families of animals. Endemic families occur largely in a few distinct orders, the marsupials, primates, and the rodents. The fact that most of the endemic species occur in positions further from the ark position (86% of endemic families occur on the southern continents or on islands, which may account for some of their strange features), points to relatively early isolation. During the initial distribution from the ark, small groups that became isolated from the main body due to geographic barriers or other reasons would have exhibited a high potential for variation, given the challenges of the new environments, together with low competition rates due to small population sizes. The unique fauna of Australia, in this regard, presents a challenge to the scientific fraternity. The accepted paradigm is, that the marsupial populations of Australia represent a relic of the once primitive fore-runners of placental mammals, but none of the Australian endemic families have a fossil record outside of the Australian realm. In other

words, the unique forms of not only the living animals but also of that of the immediate ancestors were already confined to the Australian realm. Perhaps the answer lies elsewhere.

Why should a marsupial be considered primitive just because of the way the young are born and raised? Why can it not be considered adaptive? Placental mammals occur on continents where seasonal migration is viable. Young are born in the favorable season and are capable of independent movement from an early age. This is very important to ungulates that require stable seasonal food supplies and have to undergo long migrations between seasons. The same cannot be said for Australia. The food position is far less predictable, migration is not an option, and the unique reproductive style might have been an early answer to the challenges of the environment. The gene pool thus needed to be sufficiently varied to allow for such developments.

Marsupial reproduction is not primitive (unless the premature birth is considered primitive). The young of marsupials receive the best protection whilst at the same time, the parent is not as bound as in the case of placental animals, which have to carry fetuses to full term. Marsupials are thus reproductively more flexible and therefore capable of meeting extremes of environmental circumstances. Surely a situation where two young being raised simultaneously and receiving differential treatment according to need (two types of milk from two different mammary glands in the same mother) must be considered adaptive rather than primitive, particularly since under conditions of environmental stress, development can even be arrested. Moreover, why should the injection of milk (as in the case of marsupials) be considered primitive, and the suckling of milk (as in placentals) be considered advanced? Are the two mechanisms not just two sides of the same coin since both require complex structural and physiological adaptations in order to be effective?

The particular challenges of the post-flood isolated island communities may have indeed led to some novel organismic types, and rather than reflecting primitive conditions, they could be demonstra-

ting the wonders of the superb adaptability of organisms and the built-in capacity of the genome to produce and supply variation when needed. No model of origins can supply all the answers, particularly if our knowledge of many biochemical and genetic mechanisms is still so incomplete. The creationist model does, however, supply many plausible answers to some of the many questions that plague us in terms of origins. There will be areas where faith must supply the lack of knowledge, but the same is true for the evolutionary paradigm. In the final analysis, both paradigms thus require faith. The question that everyone must ask himself is, which of the two requires more faith?

REFERENCES

- ¹. Max Delbruck, *Mind From Matter?* (Palto Alto: Blackwell Scientific Publications, 1986): 31.
- ². Stanley L. Miller, "A Production of Amino Acids under Possible Primitive Earth Conditions," *Science* 117(3046) (1953): 528-529.
http://www.abenteuer-universum.de/pdf/miller_1953.pdf
- ³. J. B. Pollack and D.C. Black, "Implications of the Gas Compositional Measurements of Pioneer Venue for the Origin of Planetary Atmospheres," *Science* 205 (1979): 56-59.
- ⁴. J. P. Pinto, G. R. Gladstone and Y. L. Yung, "Photochemical Production of Formaldehyde in Earth's Primitive Atmosphere," *Science* 210 (1980): 183-185.
- ⁵. George T. Javor, "Origin of Life: A look at Late 20th Century thinking," *Origins* 14 (1987): 7-20.
<http://www.grisda.org/origins/14007.pdf>
- ⁶. R. T. Brinkman, "Dissociation of Water and Avolution of Oxygen in the Terrestrial Atmosphere," *Journal of Geophysical Research* 74 (1969): 5355-5368.

- ⁷ James F. Kasting, "Earth's Early Atmosphere," *Science* 259(5097) (1993): 920-926.
http://www.csun.edu/~hmc60533/CSUN_311/article_references/Sc_Feb93_EarthEarlyAtmos.pdf
- ⁸ John C. Walton, "Organization and the Origin of Life," *Origins* 4 (1977): 16-35.
<http://www.grisda.org/origins/04016.pdf>
- ⁹ Ernst Mayr, *Evolution and the Diversity of Life: Selected Essays* (Cambridge, Belknap Press, 1976).
- ¹⁰ N. I. Platnick, "Review of: Evolution and the Diversity of Life: Selected Essays, by Ernst Mayr," *Systematic Zoology* 26(2) (1977): 224-228.
- ¹¹ Marcel Schützenberger, "Algorithms and Neo-Darwinian Theory" in *Mathematical Challenges to the Neo-Darwinian Interpretation of Evolution*. Eds. Paul S. Moorhead and Martin M. Kaplan (The Wistar Institute Symposium Monograph No. 5, 1967): 73.
- ¹² M. W. Strickberger, *Evolution* (Jones and Bartlett Publishers, 1996).
- ¹³ Michael Denton, *Evolution: A Theory in Crisis* (London: Burnett Books, 1985): 149.
- ¹⁴ Slightly modified from *Biology* by Karen Arms and Pamela A. Camp. 4th edition (New York: Saunders College Publishing, 1995): 365.
- ¹⁵ R. K. Wayne, "Cranial Morphology of Domestic and Wild Canids: the Influence of Development on Morphological Change," *Evolution* 40 (1986): 243-261.
- ¹⁶ David Suzuki, Anthony Griffiths and Richard Lewontin et al, *An Introduction to Genetic Analysis* (San Francisco: W. H. Freeman and Company, 2000): 690-701.

- ¹⁷ R. D. Fleischmann, M. D. Adams et al., "Whole Genome Sequencing and Assembly of *Haemophilus Influenzae* Rd," *Science* 269(5223) (1995): 496-512.
- ¹⁸ P. Chevret, C. Denys, J. J. Jaeger, J. Michaux, and F. M. Catzeffis, "Molecular Evidence that the Spiny Mouse (*Acomys*) is More Closely Related to Gerbils (*Gerbillinae*) than to True Mice (*Murinae*)," *Proceedings of the National Academy of Sciences* 90(8) (1993): 3433-3436.
- ¹⁹ D. Gaur, "Molecular Phylogeny and the Higher Classification of Eutherian Mammals," *Trends in Ecology and Evolution* 8(4) (1993): 141-147.
- ²⁰ M. C. Milinkovitch, G. Orti and A. Meyer, "Revised Phylogeny of Whales Suggested by Mitochondrial Ribosomal DNA Sequences," *Nature* 361(6410) (1993): 346-348.
- ²¹ Dr. Jenny Graves, *La Trobe Bulletin* (September 1998): 7-8.
- ²² L. James Gibson, "Chromosomal Changes in Mammalian Speciation: A Literature Review," *Origins* 11 (1984): 67-89.
<http://www.grisda.org/origins/11067.pdf>
- ²³ E. Capanna, M. Cristaldi, P. Petricone and M. Rizzoni, "Identification of Chromosomes Involved in the 9 Robertsonian Fusions of the Apennine Mouse with a 22-Chromosome Laryotype," *Experientia* 31(3) (1975): 294-296.
- ²⁴ T. A. Bongso and M. Hilmi, "Chromosome Banding Homologies of a Tandem Fusion in River, Swamp, and Crossbred Buffaloes (*Bubalus bubalis*)," *Canadian Journal of Genetics and Cytology* 24(6) (1982): 667-673. <http://www.nrcresearchpress.com/doi/pdf/10.1139/g82-070>
- ²⁵ L. K Dixon, B. A. Nelson and R. L. Priest, "Chromosome Differences in *Peromyscus maniculatus* Populations at Different Altitudes in Colorado," *Genetica* 52 (1984): 63-68.

- ²⁶. J. Schultz-Shaeffer, *Cytogenetics* (New York: Springer-Verlag, 1980).
- ²⁷. Muriel T. Davisson and T. H. Roderick, "Chromosomal Banding Patterns of Two Paracentric Inversions in Mice," *Cytogenetics and Cell Genetics* 12 (1973): 398-403.
- ²⁸. M. C. Milinkovitch, G. Orti and A. Meyer, "Revised Phylogeny of Whales Suggested by Mitochondrial Ribosomal DNA Sequences," *Nature* 361(6410) (1993): 346-348.
- ²⁹. W. F. Doolittle, "Phylogenetic Classification and the Universal Tree," *Science* 284(5423) (1999): 2124-2129.
- ³⁰. L. James Gibson, "A Creationist View of Chromosomal Banding and Evolution," *Origins* 13 (1986): 9-35.
<http://www.grisda.org/origins/13009.pdf>
- ³¹. P. A. Lalley and V.A. McKusick, "Report of the Committee on Comparative Mapping," *Cytogenetics and Cell Genetics* 40 (1-4) (1985): 536-566.
- ³². S. J. O'Brien and W. G. Nash, "Genetic Mapping in Mammals: Chromosome Map of Domestic Cat," *Science* 216(4543) (1982): 257-265.
- ³³. J. J. Yunis, and O. Prakash, "The Origin of Man: A Chromosomal Pictorial Legacy," *Science* 215 (1982): 1525-1530.
http://www.rpgroup.caltech.edu/courses/PBoC%20GIST/files_2011/articles/Science-1982-Yunis-1525-30.pdf

NOTES:

6

CREATION TO RESTORATION

A Perfect World

It is written in the book of Genesis that God pronounced everything that He had created to be good, indeed very good:

And God saw every thing that He had made, and, behold, [it was] very good. And the evening and the morning were the sixth day. *Genesis 1:31*

There could have been no disharmonious note in this new creation, and according to the Scriptures, this creation was also not subject to death. Man was created in the image of God, and he was to be the ruler over everything that God had created.

And God said, Let Us make man in Our image, after Our likeness: and let them have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth, and over every creeping thing that creepeth upon the earth. So God

created man in His [*own*] image, in the image of God created He him; male and female created He them. And God blessed them, and God said unto them, Be fruitful, and multiply, and replenish the earth, and subdue it: and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth.

Genesis 1:26-28

The creation of man was thus the crowning act of God's creation, and God endowed man with nobility and honor by granting him dominion of the newly created world. Of all the creatures God had created, man was different from all the other animals in that he was created in the image of God. To man was granted the gift of intellectual capacity, a creative spirit, and a sense of morality. He was also created a free agent in that he was endowed with a freedom of choice. The creation of man was to bring glory to God throughout eternity.

I will say to the north, Give up; and to the south, Keep not back: bring my sons from far, and my daughters from the ends of the earth; [*Even*] every one that is called by my name: **for I have created him for my glory**, I have formed him; yea, I have made him. *Isaiah 43:6-7*

These verses show that the children of men are called sons and daughters of God (heavenly princes), and that they were created for the glory of God. Man was to reflect the glory of God and to ever increase in knowledge and wisdom, and to ever reflect the glory of God. In the book of Hebrews, Paul picks up the theme of the creation of man and sheds some interesting light on this subject.

Thou madest him a little lower than the angels; thou

crownedst him with glory and honour, and didst set him over the works of thy hands. *Hebrews 2:7*

The Greek word *brachus* (for a little) literally means ‘for a little while’ or ‘short time’ and this implies that the full meaning of the text is actually ‘for a little while lower than the angels’. Man was thus to grow in stature, and in the restored world it would not be the angels that would rule upon the earth restored, but restored man would be granted the privilege of sitting with Christ in His throne. This implies even greater glory, since Christ is the ruler of the universe.

For unto the angels hath He not put in subjection the world to come, whereof we speak. *Hebrews 2:5*

To him that overcometh will I grant to sit with Me in My throne, even as I also overcame, and am set down with My Father in His throne.
Revelation 3:21

Before being restored, there is, however, some overcoming to be done, for man has forfeited his great privilege through sin, and has lost that glory with which he was originally endowed.

For all have sinned, and come short of the glory of God. *Romans 3:23*

The Scriptures teach that the change of status and the suffering which this planet and mankind have had to endure since the fall of man would, however, be transformed back to the original through the purchase of the blood of Christ. Through Christ and in Him, man can overcome and be conquerors together with Him. What was lost in Eden can and will be restored through Christ through justification and sanctification to the glorification of those who accept the gift of

His purchase, and then only will the full potential of man be realized.

For I reckon that the sufferings of this present time [are] not worthy [to be compared] with the glory which shall be revealed in us. *Romans 8:18*

And that He might make known the riches of His glory on the vessels of mercy, which He had afore prepared unto glory. *Romans 9:23*

The earth is also to be restored to its original status and sin will be eradicated from the universe.

For, behold, I create new heavens and a new earth: and the former shall not be remembered, nor come into mind. *Isaiah 65:17*

For as the new heavens and the new earth, which I will make, shall remain before me, saith the Lord, so shall your seed and your name remain. *Isaiah 66:22*

Nevertheless we, according to His promise, look for new heavens and a new earth, wherein dwelleth righteousness. *2 Peter 3:13*

The Scriptures also teach that the whole creation is groaning whilst we wait for the restoration that has been promised. It is at this point that the sons of God will be revealed and that the bondage to corruption (death) will come to an end. Not only is man suffering from the consequences of sin, but the entire creation is also groaning under the burden of decay.

For the earnest expectation of the creature waiteth for the manifestation of the sons of God. For the

creature was made subject to vanity, not willingly, but by reason of him who hath subjected [*the same*] in hope, because the creature itself also shall be delivered from the bondage of corruption into the glorious liberty of the children of God. For we know that the whole creation groaneth and travaileth in pain together until now. *Romans 8:19-22*

The Genesis account of the creation and the fall is the exact opposite of the naturalistic view of origins. Genesis portrays a decline from perfection to degeneration and decay, and the naturalistic approach propagates an advance from chaos to order and perfection. Genesis gives explicit details as to the consequences of sin and fall, all of which are denied by the naturalistic approach, and these details are, in fact, reversed and used as the very means to create the advance from imperfection to perfection. Death is used to ‘create’ better-adapted forms, and the cycles of death, which are enacted on the planet through prey and predator relationships, are the nurturing ground for adaptive radiation. According to the Scriptures, however, this was not so from the beginning and prey predator relationships originally never existed and will also not exist in the earth made new.

The wolf also shall dwell with the lamb, and the leopard shall lie down with the kid; and the calf and the young lion and the fatling together; and a little child shall lead them. And the cow and the bear shall feed; their young ones shall lie down together, and the lion shall eat straw like the ox. And the sucking child shall play on the hole of the asp, and the weaned child shall put his hand on the cockatrice’s den. They shall not hurt nor destroy in all my holy mountain: for the earth shall be full of the knowledge of the Lord, as the waters cover the sea. *Isaiah 11:6-9*

These verses portray an order of things, which is totally different to what we currently experience on the planet. Firstly, there will be no carnivores and the current predators will thus revert to vegetarian diets, and secondly, all harmful creatures which sting or are venomous will revert to non harmful forms. Moreover, even a child will be able to lead the now dangerous predators, so all aggressiveness will be removed from the natures of these animals and man will once more have total control over the animal kingdom. This restoration is in line with what the book of Genesis portrays about the beginning and about the original diet of all the creatures on the planet.

And God said, Behold, I have given you every herb bearing seed, which [*is*] upon the face of all the earth, and every tree, in the which [*is*] the fruit of a tree yielding seed; to you it shall be for meat. And to every beast of the earth, and to every fowl of the air, and to every thing that creepeth upon the earth, wherein [*there is*] life, [*I have given*] every green herb for meat: and it was so.
Genesis 1:29-30

According to this verse, all creatures were thus vegetarian, and man's diet consisted of seeds and fruits and all animals ate the plants of the fields. There could have been no harmful bacteria, no parasites, in fact, no creatures with harmful effects at all. What happened then to mar this perfection? The Scriptures teach that sin entered in and that as a consequence, the order of nature was radically changed. Without the sustaining power of God (for He 'upholds all things'), the second law of thermodynamics would henceforth ensure that only by the sweat of one's brow could order and harmony be obtained. Disorder, according to the Scriptures, is the work of the enemy. According to the parable of the sower, it was the enemy that sowed the bad seed among the good.

An Imperfect Planet

After the fall, the order of nature was changed. According to Scripture, the serpent was cursed and lost some its original abilities, even undergoing dramatic anatomical changes in that it would henceforth move on its belly. The statement that it would eat dust is a reference to death since all creatures would return to the dust from whence they came. Also the fact that some snakes still have rudimentary legs could be an indication of a genetic change which deactivated the genes responsible for the development of the original locomotory structures.

The relationship between man and woman was also changed through the entrance of sin and in order to deal with the changed circumstances there was a shift in role distribution which has become the object of much debate and in some cases much misery. The ground was cursed and would henceforth not yield its strength and it would take toil to glean its treasures. Adam would henceforth earn his bread by the sweat of his brow, which means that the provision of the necessities of life was to become his burden in the transformed world. Eve, on the other hand would find the raising of children with right characters a task that would require concerted effort and a task that would require patience and many tears. Eve did not receive the lesser role in this new situation, for the raising of descendants with right characters is the noblest of all tasks.

Not only did the role distribution change, but physical aspects of human and animal existence also changed. In a world that would not yield its strength, plants would produce thorns and thistles and the diet and lifestyles of all the created creatures would be affected. To the diet of man, the plants of the field were added in order to augment his diet, and the animals must have also undergone dramatic changes in diet, as their food supply must also have been affected. After Cain killed Abel, there was a further decline, which was to mar the once perfect planet. Cain was cursed and the ground was to yield even less of its strength (*Genesis 4:12*). Both animals and man must have been affected by this change of circumstances

and wickedness increased until God destroyed the world by bringing about the flood.

Prior to the flood, the animal world had already changed to such an extent that animals were already classified into clean and unclean categories since Noah was instructed to take seven pairs of clean animals and one pair of unclean animals on board the ark. The flood brought about a further radical change, and the diets of man and beast must have been further affected, since God added flesh to the already changed human diet. After the flood, there was a rapid decline in the life expectancy of man (and by implication in the animals as well). Life expectancy of man was approximately halved after the flood. After the time of Peleg (when the earth was divided), life expectancy was halved once more, and by the time of Moses the average life span was down to 120 years. By the time of David, it had declined to 80 years, and today it is still lower.

Scientific Evaluation

The existence of evil in a world created by the God of light and love is one of the principle reasons why many reject God. However, God has given all the reasons for the state of affairs and has also provided a solution in Christ to repurchase the lost possession. This same issue plagued Darwin, and he once wrote a letter to his friend Dr. Asa Gray regarding this matter:

I am bewildered. I had no intention to write atheistically. But I own that I cannot see so plainly as others do, and as I should wish to do, evidence for design and beneficence on all sides of us. There seems to me too much misery in the world. I cannot persuade myself that a beneficent and omnipotent God would have designedly created the *Ichneumonidae* with the express intention of their

feeding within the living bodies of caterpillars, or that a cat should play with mice.¹

He also wrote in 1844 in his initial draft of *The Origin of Species*:

It is derogatory that the Creator of countless Universes should have made by individual acts of His will the myriads of creeping parasites and worms, which since the earliest dawn of life have swarmed over the land and in the depths of the ocean We cease to be astonished that a group of animals should have been transformed to lay their eggs in the bowels and flesh of other sensitive beings; that some animals should live by and delight in cruelty; that animals should be led away by false instincts; that annually there should be an incalculable waste of the pollen, eggs and immature beings...²

Charles Darwin was thus swayed to reject the hand of God in nature and to accept the naturalistic approach, but his conjectures and conclusions were based on the assumption that the present biological interactions apparent in nature, must have existed since the inception of life. This is not necessarily true, and we could ask the question: Does the evidence point to decay with elements of perfection and design serving as reminders of a once perfect situation, or does the evidence point to past imperfection and progress toward greater and greater perfection? The fossil record already reveals greater diversity in the past than in the present, and life also exploded on the scene in what has been termed the Cambrian explosion. These two factors alone point in the exact opposite direction to what naturalistic evolution would propose and they are consistent with the creation account. Let us examine some of the issues involved.

Wherever we look we find evidence for design. The marvel of life, the great variety of life forms, the miracle of flight in birds and insects all have inspired designers and engineers to try and emulated the successes so apparent in nature. The flight of birds has inspired the aeronautical world and even the so-called primitive dragonfly has inspired flight engineers to design the helicopter. Even the feathers that are used in flight present design features that could not possibly have evolved gradually. The list of biological wonders in the organism and cell organelle world that smack of design is endless, but for the purpose of this discussion we will only look at a few examples.

The genome: The greatest evidence for design in the biosphere lies in the genome. Genetics and evolutionary principles are at loggerheads with each other. From the beginning of these sciences they were opposed to each other, since Mendel clearly demonstrated that individual characteristics were carefully conserved and Darwin, not being aware of Mendel's work, proposed change of inherited characteristics as the nurturing ground for evolution. Today we know that variations induced by the environment are not passed on to the next generation, as Darwin believed in his time. Individuals exposed to the sun get darker, physical activity enhances muscular development etc. but these traits are not inherited. Mendel also showed that genetic recombinants may have latent features which can resurface at a later stage, thus showing that the traits were not lost but could enhance or decrease variation in the phenotype in accordance to the level in which they were expressed. The genome is thus conservative yet versatile.

The scientific fraternity proposes that mutations are the nurturing ground for providing new and exciting genetic material, but only the opposite has been shown to be true in actual observations and experiment. In the fruit fly *Drosophila* alone, some 3000 mutations have been identified,³ and all of them are either

harmful or have no effect but none of them produce more successful fruit flies. The most important nurturing ground for evolution thus seems hopelessly inadequate, or rather counterproductive, to the evolutionary process. In addition, we need to remind ourselves that, as noted in the previous chapter, natural selection cannot create anything. It can only select from what is already there and then only if it is expressed in the phenotype. The entire genome thus exudes design, yet DNA is not alive. It is a dead molecule and needs the machinery of the living cell to make copies of itself. The information for that cell is, however, in the genome, and the DNA is simply the carrier of the information. In order to read the information, you need the equipment to unravel it and translate it and the information for that equipment is in the DNA itself. No matter how one looks at it, design is the only solution for the dilemma.

The cell: If we progress from the genome to the cell, we see that the cell is not just a chance blob of fortuitous molecules come together to form protoplasm. It is rather an intricate machine with marvelous order and elements of design. In 1996, Michael Behe, a working biochemist, published the book *Darwin's Black Box*.⁴ Behe pointed out that the cell, far from being a 'simple little lump of albuminous combinations of carbon', as thought in Darwin's day, was actually an entire factory, filled with molecular machines of astounding precision and complexity. Within these complex structures, there are numerous individual microstructures and cellular systems in which vast numbers of parts and enzyme systems work together in such a way that they will only function *if every single piece is in place*. Removal of even one link in the biochemical systems does not reduce the efficiency; it eliminates the function of the organelle entirely. He called this situation 'irreducible complexity', and it is totally inconsistent with the evolutionary concept of gradual change over time. Only design could account for such complexity.

Darwin himself, in *The Origin of Species*, stated that precisely such a situation would disprove his theory:

If it could be demonstrated that any complex organ existed which could not possibly have been formed by numerous, successive, slight modifications, my theory would absolutely break down.⁵

The living machinery of cells proves precisely this point. There are myriads of processes that are of this nature and that require closely coordinated biochemical sequential reactions, each governed by intricate feedback systems, which in turn require receptors which will activate them at precisely the right point in time. It is not within the scope of this book to elaborate on the finer details of these processes, but even some of the simpler biochemical pathways such as the production of some amino acids which require closed systems are highly complex and organized. The enzymes involved in the production of these amino acids are also coded for by genes and need the very amino acids which they themselves have to produce in order to exist in the first place. As discussed in the previous chapter, the probability of the complex machinery such as RNA or DNA or viable enzymes coming about by chance is so mind bogglingly remote as to be non-existent. To cite just one example, the probability of just the smaller of the ribosomal subunits (consisting of 1500 nucleotides) coming about by chance is 10^{903} and this figure is so large that it is beyond comprehension (remember that 10^{80} is the estimated number of particles in the known universe).

Organs: Organs such as the eyes, ears, kidneys and others show levels of complexity that smack of design. The brain is a mystery of ingenuity that baffles the greatest intellects on earth and makes even the world's super computers look like feeble toys by comparison. The electrical design and storage capacity of the nervous system is a further mystery which is astounding. There may be up to one hundred trillion synapses in the brain, and each one acts as a filter, a signal disseminator, and a calculator ensuring the flow of and the

filtering of information. The capacity to store information is infinite and to crown it all, the brain makes it possible to appreciate beauty, it makes us creative and makes us beings capable of moral judgments.

A comprehensive study of all the intricate design details in the various organ systems found in the animal kingdom would require untold volumes of books, and then we would still be limited by our incomplete knowledge of these systems. As a comparative physiologist, I have always been fascinated by the numerous complex systems, which require clockwork precision at both the anatomical and physiological level. Systems such as the countercurrent exchange and multiplier systems, which are found in the gills of fish, the lungs of birds and in the kidneys of mammals also require full structural development before they will function. One wonders how such systems could have evolved gradually over time since in the case of the counter current multiplier system in the kidney, for example, no halfway developed system would work. These counter current systems make for highly efficient oxygen exchange, and in the case of the countercurrent multiplier systems of the mammalian kidney, they create the capacity to concentrate urine against concentration gradients. The systems have to be complete before they work and this implies design.

The Eye: For the sake of this discussion, let us limit ourselves to some of the organ systems that have produced lively discussions in scientific circles. One such system is that of the **eye**, which has received much attention from evolutionists, and some claim that they have solved the issue of its evolutionary development and have found mechanisms to explain how such an intricate organ could have evolved naturalistically.⁶ On a comparative morphological level, one can arrange the various light sensitive organs found in the animal kingdom in a sequence from simple eyespots found even in protozoans to the highly complex structures found in vertebrates and invertebrates. There is a vast difference, however, between arranging a simple sequence

of light sensitive organs, and putting together the complex structure which constitutes the vertebrate eye with its auto-accommodation, complex iris structure (somewhat like a video camera), and highly complex nervous connections. The eye in itself does not even explain how one sees, since what happens in the brain to convert the simple nerve impulses into images is a mystery. Scientists have used computer models to reconstruct the possible evolution of the eye, but notoriously absent from these models are the intricate retina, which contains more than 100 million light sensitive cells called rods and cones which enable us to see in dim light, bright light and provide color vision. Also absent from their models are the mechanisms which control the lens and iris and of course the mechanisms which lead to the perception and translation of the information. The biochemical reactions associated with sight are also fascinatingly intricate.

The retina of the eye has been an issue of hot debate, since it seems to be inside out with the light sensitive disks facing away from the light source and several nerve cells lying in the path of the light. This has prompted numerous derogatory statements, such as '*in fact it is stupidly designed*'⁷, from evolutionists with regard to the concept that the eye needed to have been constructed by intelligent design. The eye works perfectly as it is, and is a marvel of engineering in spite of the malicious remarks to the contrary which some scientists dare to make. Dr. Steve Jones, Professor of Genetics at University College, London, has even ventured to say regarding the eye: '*The feeblest designer could improve it*'⁸ and he calls it the work of an '*an insensible drudge: an instrument, like all others, built by a tinkerer rather than by a trained engineer*' (one wonders why he does not trade it in for something better). In fact, the eye is brilliantly designed and the retina is inside out for a very specific purpose. In the area of the retina which is responsible for sharp vision, the fovea, the nerve cells, which elsewhere in the retina lie between the cones and the light source, are almost completely absent, and the nerve fibers radiate away from the central region thus allowing clear vision.

Also there is a good reason for the orientation of the rods

and cones toward the pigment region and not towards the light source, which lies on the outside of the retina. These rods and cones are constantly replacing the visual pigment disks and the old ones are disposed of by being absorbed by the pigment epithelial cells. In the rhesus monkey, for example, each rod produces 80 to 90 new disks per day⁹ and since the human eye probably experiences the same rate of replacement, that would mean that some 9000 million disks are replaced daily. Should the retina not be 'inside out', then the pigment epithelial cells would not absorb the disks and the vitreous humor of the eye would rapidly become murky and lead to rapid visual impairment. The pigment epithelial layer could obviously not lie on the other side of the retina so that the light sensitive bits would face the incoming light, since then there would be even more cells between the light source and the retina. Of course, the pigment epithelium must lie exactly where it does lie, since it not only absorbs old disks, it also supplies the nutrients needed for the production of new ones and receives these nutrients from the rich blood supply in the choroids layer right next to it. Obviously, without the blood supply the whole system would break down. If the retina really was 'stupidly designed' and were orientated the other way round as these scientists claim, then the blood supply would also have to be on the inside of the eye between the light sources and the rods and cones, and that would totally disrupt vision.

Crustacean eyes are equally astounding, particularly since they work on a different system. They focus light by reflection rather than refraction by a lens. Within these eyes, there are tiny perfectly square tubes with flat and shiny mirror sides, which perfectly focus the light to a central point. The square arrangement is crucial because only with this arrangement can a perfect image be derived from light rays striking from any direction.¹⁰ Scientists have emulated this design in their space programs by incorporating these intricate design features in their telescopes so that they could observe a quarter of the sky at any one time¹¹, but nature is supposed to have produced it by chance.

Ears are a further example of intricate design, and some species in the animal kingdom show absolute phenomenal abilities of hearing and tracking. The sonar systems of whales, porpoises, and bats are some of the most amazing structures on earth, and engineers have studied these systems in order to create detection devices and sounding devices to use for military or other purposes. Scientists have learnt amazing things, but still have not been able to duplicate the precision achieved by some of these organisms. The US Navy, in fact, uses dolphins to find and track submarines or other submersed objects. The design of the seal's hearing apparatus is equally baffling, and the so called earless seals, as well as dolphins, have only tiny pinprick holes for ears, but fat bundles in the jaws and ear canals are shaped like trumpets and conduct the sound extraordinarily well.¹²

Ears do not only record sound, they also provide information about where that sound is coming from. This is achieved by separating the ears spatially so that there will be a time difference and a slight difference in intensity in the recording of the sound by each ear. This information is then used to calculate where the sound is coming from. In tiny insects with incredible capacities for hearing and directional sourcing this becomes an engineering feat, which is astounding since their ears are often only fractions of a millimeter apart. In the tiny fly *Ormia ochracea*, the ears are only 0.5 mm apart yet the fly can source the direction that sound comes from with pin point accuracy.^{13, 14} The difference in the time between the two ears hearing the sound is only 1½ microseconds (millionths of a second) with practically 0% intensity difference. This amazing ability is achieved by coupling the eardrums with a flexible lever, resulting in resonance, which increases the time difference 40 times. The drum nearest the sound then also vibrates some 10 decibels stronger. Finally, the nerves also respond in coded fashion creating a further five fold increase. These masterful design features are already being incorporated into hearing aids and could be used in directional microphone technology.

Co evolution or design? If we look at the marvelous relationships that exist in nature between animals and plants then it is hard to envision how such harmony could have come about by strategies and counterstrategies of co-evolution. Numerous plants can only be pollinated by specifically adapted insects that in turn are nurtured by the plants themselves. Evolutionists explain these relationships by suggesting that the two co-evolved. However, what if the fortuitous mutations were out of synchronization? Then the species would not survive. Moreover, considering the millions of such relationships which exist in the world, the likelihood of them having come about by chance are so remote as to be non-existent. In the protea flowers and fynbos flowers in general (the most diverse group of plants in the world), each of the thousands of species is pollinated by highly specific beetles which inhabit only those types to which they are adapted. These highly specific symmetrical arrangements speak of design. Further examples are the highly specific species of wasps that pollinate the various species of figs. Then there are further significant problems with some of the evolutionary paradigms regarding the co-evolution of plant insect relationships. Petrified forests in Arizona contain what are apparently bee's nests, but these nests were then made more than 100 million years before the supposed evolution of the flowering plants on which the bees depend for survival.¹⁵

The co-evolution of so-called anti herbivory phytochemicals (secondary compounds that plants produce to prevent herbivores from eating them) is a further problem, since the various herbivores would then have to evolve counterstrategies in order to still be able to continue utilizing these food sources. Evolutionists envisage a constant strategy and counterstrategy between plants and animals. Some plants produce toxic substances which some animals seem to cope with and others not. Moreover, plants produce secondary compounds which prevent overgrazing as well. These compounds (such as tannins for example) are concentrated in the ephemeral tissues (young leaves and buds) and the animals tend to avoid these tissues, thus ensuring growth of the plants. Moreover, plants can increase

the levels of these compounds in the older leaves as well, which happens when the leaves are broken, eg. during grazing. The broken leaves release pheromones which induce the non-broken leaves of even nearby trees to increase the levels of these deterring compounds. Generally speaking, this ability thus prevents overgrazing, since the animals find the higher levels less palatable and move on to non affected areas.

Instead of supposing such delicate strategies as evolving over millions of years, it seems logical to assume that such a finely balanced system is the result of a superb design. Firstly, only certain animals are adapted to certain specific compounds and they choose the plants with those compounds as their food source, thus ensuring even distribution over the wide varieties of food sources (for example, the specialized feeders such as the koala bears that are attracted to the eucalyptus oils which other species avoid). Secondly, by concentrating deterrent compounds in sensitive tissues, the plants ensure continued growth and propagation, and thirdly, by increasing the levels in areas that are generally eaten only after the grazing has actually begun (such as when the older leaves produce pheromones that induce them to increase the levels of deterrent substances), overgrazing is avoided. This is a brilliant system that speaks of design. If it was really a case of anti herbivory strategies, then surely plants would have developed toxic compounds that would kill the herbivore and thus prevent all further herbivory.

Evidence for Transformation

We have already seen that the genome is endowed with a vast capacity for variation and that even more variety is possible through the differential expression of the genes. It is thus possible to produce dramatic changes in form and structure by just modifying the way in which the genes are expressed, or by changing the developmental expressions, or by the activation or deactivation of genes

within the genome. If environmental conditions were to change, plants and animals could adapt to these new conditions by differentially employing the genes and gene controlling mechanisms available in order to survive. There would be no need to wait for some fortuitous mutation to occur in order to overcome new obstacles because, in a sense, all organisms would have been preadapted to deal with change within the limits set by their genetic composition. Moreover, some animals could survive even drastic changes provided they were preadapted with the tools that would allow them to enter entirely new adaptive zones, such as the transition from a herbivorous to a carnivorous lifestyle.

Plants: After the fall, according to the Genesis account, the ground was cursed, and plants and animals were transformed. Some plants were to bring forth thorns and thistles, and it is to be presumed that changes in seasons could have brought about deciduous trees in order to cope with the new conditions. Weeds are nothing other than plants that compete strongly with cultivated forms. Isn't it strange that most of the plants that man uses for food are the plants that have to be nurtured and pampered in order to yield their crops, and if left to themselves, they rapidly get pushed aside by other plants which readily out-compete them? If all these plants existed so long before man, why are these food plants are still around? It certainly seems as if sweat of the brow is what keeps the food supply coming in, and that hard work is what is necessary to ensure the survival of the necessary food plants. According to Genesis, work was also necessary before the fall because the plants were to be dressed and kept, how much more so after the fall.

God said that thorns and thistles would appear. Thorns are really just modified stems in which the growth process has been modified (differential expression of the developmental genes), and spines are modified leaves which have followed the same pattern. There is no new information here, just a modification of the existing pattern. Originally, according to the Scriptures, plants were watered

by rising levels of subterranean water and by a morning mist. Such conditions are often simulated in greenhouses today where it has been found that watering the root systems alone prevents leaf fungus whereas wetting the leaves with sprayers can be detrimental. Misting of plants, however, has beneficial effects, and even micronutrients can be absorbed this way through the leaves. Early in the morning, the stomata of the leaves are open under certain conditions, and this allows for uptake of water and nutrients. What is very interesting is that even music has an effect on the capacity of plants to absorb moisture and nutrients through their leaves, and soft classical music or the music of birds tends to enhance absorption. Is it possible that the beauty of nature has been so designed to create such superb harmony, and that in many instances we see only a fraction of the original perfection?

Parasites and venomous creatures: Some organisms can become dangerous by just being placed in different habitats to which they are not accustomed. Bacteria, for example, are very specific as to where they live in the gastro-intestinal tract and if they end up elsewhere they can wreak havoc by undergoing physiological changes which could induce them to produce harmful substances such as certain metabolites or proteins that can have negative effects, such as inducing diarrhea.¹⁶ Here is a mechanism for the development of disease organisms. Originally, bacteria could all have had highly specific roles to play in assisting numerous processes in the body and in the environment, just as the myriads of useful bacteria still do today, and their original role could have been only beneficial. Moreover, changes in bacteria that are already out of their original habitat could be rapid and ongoing, since the mechanisms for gene modification through plasmid transfers were already in place.

The same could be said for all the organisms that eventually turned to parasitism. A changing environment with a drastically altered habitat could induce organisms to exploit new and different food sources and thus parasitism and carnivory could develop.

Protozoa that assist in the nutrition of numerous animals could have been transformed into deadly pathogens and fungi that were to assist in the decomposition of plant debris (remember plants were created as food) could have parasitised living organisms. Parasitic worms show dramatic levels of degeneration of organs, and the tapeworm and numerous other species of parasitic worms have been transformed into little other than reproductive organisms. *Sacculina*, a parasite of crabs, has no digestive tract, but its larva is still a free-swimming nauplius larva. Instead of maturing into a normal barnacle, it is transformed into a mass of filaments in its crab host. The loss of organs is not necessarily the result of mutations, but could just be the result of deactivation of the gene systems that are not required under the new circumstances. There is no evidence here of evolution, only of devolution.

Insects too could have been modified to develop mechanisms of defense and means of parasitism. Mosquitoes use their syringe-like mouthparts to suck blood from a host, but the male of the species uses the same mouthparts to extract plant juices from plants. Is it possible that plant juice was no longer sufficient to provide the necessary energy that the female needs for the maturation of her eggs, and that the same apparatus that was used for sucking plant juices could be equally effectively employed to suck blood? The sting of a bee is nothing other than a modified ovipositor. The versatility of a bee's genome is demonstrated by the fact that the type of food that is fed to the larvae will determine whether a bee will develop into a worker or a queen. If a queen should die, then workers can develop into queens if fed differently, and this obviously activates latent gene systems that enable the non-reproducing worker to be transformed into an egg-producing queen. The various secretions associated with oviposition could equally well have been transformed into the venom that is injected by a bee's sting.

Venom, in general, is nothing other than modified normal secretions. The venom of poisonous fish is a product of the glands that normally produce protective slime to coat the fish, and the spines that

deliver the venom are modified fin rays. The venom injected by snakes and spiders could be nothing more than modified digestive proteins. As to what constituted the original diet of spiders and other venomous creatures, that is a question open to speculation. There are spiders such as the orb-weaving spider that subsist on pollen that is captured in their nets¹⁷ and it is quite possible that certain wind carried seeds could also have constituted part of the original diet.

Carnivores: Carnivores kill and eat other animals and in the case of carnivorous mammals, they are classified as such on the strength of their teeth. A carnivore is equipped with the necessary weapons to kill and catch other animals, but this equipment need not necessarily have been designed for that purpose. Yes, possessing the equipment pre-adapts an organism to become a carnivore but this need not have been its original disposition. Panda bears, for example, are classified as carnivores on the strength of their teeth, but they eat bamboo. The same type of teeth can kill and tear flesh, but as in the case of the Panda bear, that need not be what they were designed for. The same can be said for the whole family Ursidae, the bears, that subsist largely on a vegetarian diet eating mainly berries. It is true that they will eat fish if available and can be opportunist carnivores, but they are equally at home on the fields grazing alongside buffalo.

Carnivores are not only adapted for meat eating in terms of their teeth, but their intestines are also shorter than those of herbivores. It is very interesting that diet has an amazing effect on intestinal structure. Intestines have a tremendous capacity for growth, and if sections are removed during operations, some parts can regenerate and grow back to their original length. Carnivores have short intestines because meat does not contain fiber and a short intestine is thus advantageous so that the food does not remain trapped in the intestines for long periods of time. Also, the food of carnivores is high-energy food that is absorbed rapidly. Carnivores whose diets are changed to herbivorous diets adapt rapidly to these diets and subsist

very well on them. Lions will also preferably eat the contents of the rumen of a kill first. The rumen contains fermented plant products, and there are numerous accounts of lions and other carnivores that were raised on plant diets such as grains and would not touch meat even if presented to them. Dogs and cats can also subsist very well on vegetarian diets and in fact live much longer and are less aggressive on such diets. The teeth of these animals that act as shears could equally well have been used to shred tough plants in the past, and the fact that they don't do so now could simply be as a result of the destruction of their original food source. There is plenty of evidence in the palaeontological record that far greater varieties of plants existed in the past than exist today.

Destruction of habitat changes the diets of animals even in our day. Chipmunks traditionally eat seeds in the forests, but with acid rain leaving its mark, food sources are often becoming inadequate, and it is not unusual to see these cute herbivorous animals tearing away at road kills to augment their diets with meat. This is a case of a herbivore becoming a meat scavenger as a result of changing circumstances. Kea parrots in New Zealand ordinarily grub for roots, but dwindling food supplies will encourage them to attack sheep. They will use their sharp weapons, their beaks and claws, to tear open the backs of the sheep so that they can eat the fat around the kidneys.¹⁸ This is an amazing transformation, and if their habitat and food source is restored, they will go back to calmly eating their roots. They have the same equipment as birds of prey (sharp talons and a powerful beak) but they use them for harmless purposes. How did they know that tearing open the backs of sheep would provide the type of food they could subsist on? That is a mystery, but lack of needs normally leads to aggression and this could be one of the reasons why they aggressively attack a creature that will or cannot defend itself. A further example of such change is found in the so-called Vampire Finches of the Galapagos Islands. These normally vegetarian birds have recently been shown to raid nests and suck blood from nesting booby birds,^{19,20} a change in diet induced by increasing competition for

vegetarian resources. The finches feed on these sea birds during extended periods of drought. They peck at the base of the feathers until the blood flows and then they sip it. Other finches queue up and resume the process when the previous finch is satisfied. This is a change in diet and behavior induced by negative environmental circumstances and did not require millions of years to develop.

Aggression is a trait that potentially exists in all creatures, but it need not have been there in the beginning. Out of the wild species from which the domestic dog has been bred, there have been developed incredibly docile, friendly and loving dogs of all shapes and sizes. But selective breeding can also produce the most vicious killers out of the same gene pool. Aggressive natures thus have a genetic basis and can be reduced rapidly through selection. The capacity to defend oneself need not ever be displayed if the need for defense should never arise. The Russian scientist Dmitry Belyaev and others who studied the process of domestication of foxes found that changes in behavior could be selected for rapidly.²¹ Out of a variety of foxes, those that responded without fear to humans were selected and the fearful ones discarded, and by the sixth generation the foxes were displaying behavior patterns similar to domestic dogs, whimpering to attract attention and licking their keepers. This behavior increased to one pup in 6 by the tenth generation and to 3 pups in 4 by the 30th generation. The changes were accompanied by anatomical changes and by a reduction in adrenal hormone secretions (fight and flight hormones) and increases in serotonin levels. Serotonin is an important chemical (one of the monoamines that functions in neurotransmission, regulation of pain thresholds and modulation of vascular muscle tone) in brain function, and highly aggressive or schizophrenic people in mental institutions are known to have low serotonin levels and are treated to compensate for this condition. The development of aggression and fear of humans need thus not have developed over millions of years but could have come about very rapidly.

Transformation of animals into killing machines, seen from a creation perspective, is thus an adaptive condition which points to

degeneration rather than evolutionary advance. In evolutionary thinking, the carnivorous condition is an advanced condition through which survival pressures are brought into the playing field, which in turn lead to evolutionary advance, through natural selection, in both the prey and the predator. In a sense, the constant battle for survival brings about strategy and counterstrategy, but any changes would still have to come about through mutations, which happen by chance, and this scenario is highly unlikely. Looking at it from the opposite perspective, carnivory is a sad consequence of the introduction of death and violence into the system. This point is perhaps well illustrated by the famous piranha, the fish renowned for its razor sharp teeth and its capacity to strip an animal to bone should it haplessly end up in the water. There is, however, evidence that the ancestors of the piranha were once plant eaters.

Many species of South American *Pacu* fish, which are closely related to the piranha, use their powerful jaws and strong teeth to eat aquatic plants and fruits that fall into the water. The two groups are morphologically very similar, and it is noteworthy that the piranha will also eat plant material. Young stages (just as in the case of many pelagic fishes) are largely plant feeders and genetically, much to the surprise of researchers, there is no clear distinction between the vicious piranha and the vegetarian species,²² with some species even merging.²³ It is interesting that the pacu species that is most like the piranha in appearance, *Pygocentrus denticulate*, lives on plant foods. Actually, piranhas are not as vicious as most believe, and they generally only clip off pieces of other creatures and don't devour them entirely. It is conceivable that the same scenario as evident for the piranha could apply to all carnivorous fish including the sharks, which also have herbivorous cousins. The modifications of the feeding structures could thus be ascribed to modification or lack of genetic expression and can be considered secondary rather than primary.

Clean and Unclean

The terms clean and unclean for certain categories of animals are used for the first time in *Genesis 7:2* and these categories were thus applicable before the flood. The terms thus have nothing to do with Jewish laws but existed long before the Jews. Noah was also instructed to take aboard the ark seven pairs of all the clean animals and only one pair of the unclean animals.

Of every clean beast thou shalt take to thee by sevens, the male and his female: and of beasts that *are* not clean by two, the male and his female. Of fowls also of the air by sevens, the male and the female; to keep seed alive upon the face of all the earth. *Genesis 7:2,3*

For the sacrificial system, which incidentally was instituted in Eden after the fall as demonstrated by the offering of Abel, only clean animals were permitted, and Noah sacrificed one of every clean animal after the flood.

And Noah builded an altar unto the Lord; and took of every clean beast, and of every clean fowl, and offered burnt offerings on the altar. *Genesis 8:20*

Precisely why some animals were classified as clean and others as unclean is an open question, but it is noteworthy that those animals that are classified as unclean all seem to occupy ecological niches which differ substantively from what they must have been in the beginning. The listing of these creatures together with some additional data is first presented in *Leviticus 11* and in *Deuteronomy 14*. The precise classification of all the various animals is not certain, since some of the Hebrew names cannot be precisely applied to modern classification systems. However, there is general

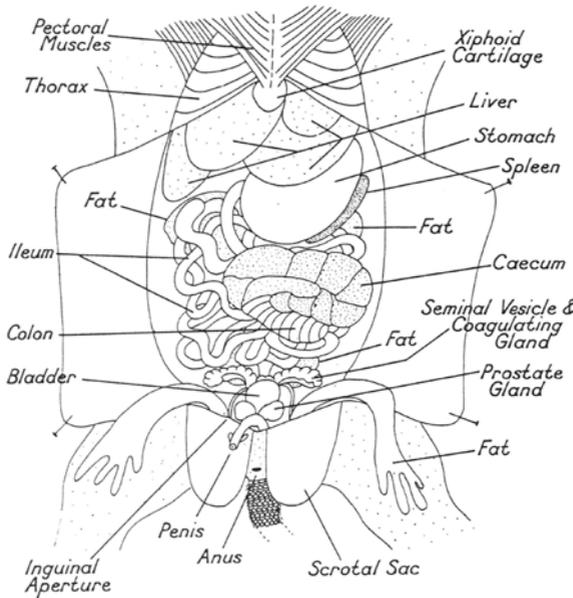
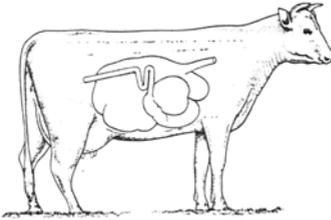
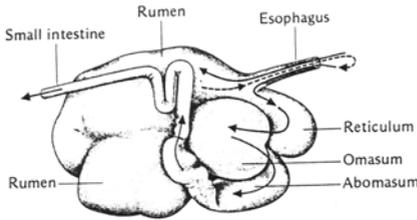
consensus regarding the most common animals. Different Bible versions will thus vary when it comes to species which cannot be clearly identified. Let us examine the list presented in Leviticus 11.

And the Lord spake unto Moses and to Aaron, saying unto them, Speak unto the children of Israel, saying, These [*are*] the beasts which ye shall eat among all the beasts that [*are*] on the earth. Whatsoever parteth the hoof, and is clovenfooted, [*and*] cheweth the cud, among the beasts, that shall ye eat. Nevertheless these shall ye not eat of them that chew the cud, or of them that divide the hoof: *as* the camel, because he cheweth the cud, but divideth not the hoof; he *is* unclean unto you. And the coney, because he cheweth the cud, but divideth not the hoof; he [*is*] unclean unto you. And the hare, because he cheweth the cud, but divideth not the hoof; he [*is*] unclean unto you. And the swine, though he divide the hoof, and be clovenfooted, yet he cheweth not the cud; he [*is*] unclean to you. Of their flesh shall ye not eat, and their carcase shall ye not touch; they [*are*] unclean to you. *Leviticus 11:1-8*

The quadrupeds that were regarded as clean (those with cloven hoofs and that ruminant) belong to the suborder Ruminantia, which means that they have a rumen and they chew the cud. The diet of these animals all consist of plants and they include all the domesticated animals such as cattle, sheep, and goats, as well as all the species of antelope, deer, and giraffes. Camels also ruminant, but they do not belong to the same suborder, as do the clean animals. They belong to the group known as Tylopods, which also includes the other members of the camel family, namely the alpacas, guanacos, llamas, and vicunas. These animals show some interesting differences when compared to other mammals. Unlike most mammals

which have round biconcave red blood cells, the camel family has elliptical red blood cells, which means that they have different rates of gas diffusion. These elliptical red blood cells allow the camel (which has been studied in some detail) to survive high blood osmolarities under which other mammalian erythrocytes (red blood cells) would crenate, causing the blood flow to cease. Camels can also recycle water from the kidneys, which other mammals cannot do, and when placed under similar desert conditions as camels, they would face kidney failure.²⁴ Obviously the camel is adapted to cope with extreme desert conditions and can accumulate levels of metabolic toxins that other animals would not be able to survive and these factors alone would make it inadvisable to use the animals as food sources.

Coneys (rock Hyrax) and hares are unclean and according to the Levitical verse, the hare is unclean even though it chews the cud. This verse is sometimes used to discredit the Bible, since rabbits do not chew the cud in terms of our present definitions. Ruminants have a compartmentalized stomach in which the rumen serves as a fermentation chamber where cellulose is broken down by bacteria and the bacteria also provide nutrients such as proteins and vitamins when they in turn are digested in the abomasom, which is the only chamber that contains gastric enzymes (see Figure 6.1). Rabbits and hares, as well as rodents in general (animals with paws), do not possess pre-chambers for the digestion of cellulose, but they ferment the plants in the cecum, where the microbial fermentation of cellulose takes place. Since this fermentation takes place after the intestines, the only way in which these nutrients can be absorbed is through coprophagy, which is the re-ingestion of the feces. Obviously, this entails the re-ingestion of other metabolites that would normally be excreted and through the process of biological magnification these animals will thus be subjected to higher toxic loads than would be the ruminants. This could disqualify them from being 'clean' animals in spite of the fact that they are herbivorous. Moreover, in a sense they thus chew the cud, with the difference that the 'cud' is eaten directly from the anus. Other animals that fall into the



category of coprophages are the horse, zebra and donkey (their hooves are not cloven hooves), which also ferment their food in the cecum and will practice coprophagy in the wild. These animals would thus also be classified as unclean.

The pig is listed as unclean and although it is a potential carrier of trichinosis (particularly under unsanitary conditions) the level of transfer of this parasitic infection to humans is relatively low.

A study carried out at Iowa University School of Medicine in 1962 showed that some 17% of human subjects had been infected by the parasite, and that the levels of infection were generally

too low for concern. Pigs are, however, also carriers of viruses

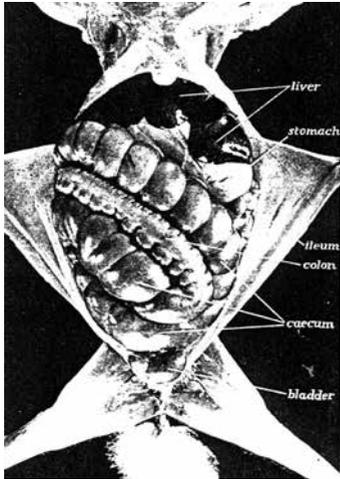


Figure 6.1c

Figure 6.1 (a) The digestive organs of ruminants, (b) rodents, (c) rabbits (in situ) and (d) rabbit (unraveled), showing the chambers, which precede the stomach (abomassum) in ruminants and the extended cecum of rodents and rabbits.

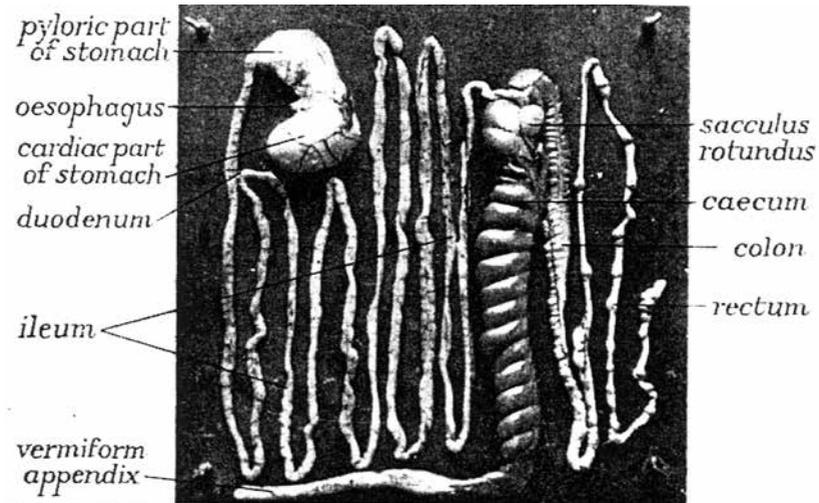


Figure 6.1d

that cause human encephalitis, a potentially deadly and disabling disease. In 1999, Malaysia experienced an outbreak of this disease and the government undertook a large-scale eradication program by even bringing in the military to kill and bury more than 300,000 pigs. Tissues, such as heart valves, from swine, that are used in human transplant operations, can also potentially transfer the disease

to humans and this has prompted scientists to seek a ban on swine tissue for such operations.

Pork is also associated with toxins that collectively are called suetoxins and many people are allergic to these compounds and are thus not able to eat pork without experiencing allergic reactions such as the development of hives. Moreover, pork connective tissues are high in mucoid compounds that are rich in sulphates, and it is this combination that allows the pork tissue to adhere and spread and why it is used frequently in smears and sausages. However, these high sulphate compounds also place a considerable acid load on the system, which could be one of the contributing factors in the development of degenerative diseases such as gout and other joint diseases. Finally, being an omnivore as well as an opportunist scavenger, the pig is far more likely to accumulate environmental toxins than animals that feed on plants. The reason for this lies in biological magnification, which increases at the higher trophic levels.

In one fascinating study, conducted by David Macht MD, Phar.D., a scientist in the Research Pharmacological Laboratories of Sinai Hospital in Baltimore, Maryland, it was found that a definite relationship exists between levels of toxicity and the clean versus unclean categorization. He used a 2% muscle extract from various animals as a growth medium for seedlings of *Lupinus albus* and recorded the response in terms of the plant root growth compared to seedlings grown in a standard growth media. He then recorded the result as a 'phytotoxioic index', where 100% indicated no impairment of growth.^{25, 26} The results for mammals are presented in the Figure 6.1.

It is noteworthy, that the clean animals had the lowest toxicity index, whereas from the dog onward, in all the animals that walk on paws, the toxicity increased dramatically. The index for the camel and the horse also shows a high level of toxicity.

The next category listed in Leviticus 11 is that of the aquatic animals, where everything that does not have fins and scales is categorized as unclean.

Phytotoxic Index of Various Mammals.^{27,28}

Animal	Phytotoxic Index	Animal	Phytotoxic Index
Sheep	94%	Cat	53%
Ox	91%	Ground Hog	53%
Goat	90%	Opossum	53%
Deer	90%	Silver Fox	50%
Calf	82%	Hare	49%
Dog	62%	Guinea Pig	46%
Black Bear	59%	Hamster	43%
White Rat	55%	Camel	41%
Grizzly Bear	55%	Squirrel	39%
Pig	54%	Horse	39%

Table 6.1

These shall ye eat of all that *[are]* in the waters: whatsoever hath fins and scales in the waters, in the seas, and in the rivers, them shall ye eat. And all that have not fins and scales in the seas, and in the rivers, of all that move in the waters, and of any living thing which *[is]* in the waters, they *[shall be]* an abomination unto you: They shall be even an abomination unto you; ye shall not eat of their flesh, but ye shall have their carcasses in abomination. Whatsoever hath no fins nor scales in the waters, that *[shall be]* an abomination unto you.

Leviticus 11:9-12

Fish that lack scales are generally carnivorous or they are scavengers and one would expect higher levels of toxins in these creatures

due to biological magnification. Fish that have very loose scales were also generally considered unclean in orthodox Jewish circles. Even in modern fish breeding programs in Israel, the fish that are raised for human consumption must have firmly attached scales. The skin of fish is a vehicle for the elimination of toxins via the mucoid secretions and it could be for this reason that scavenger fishes and many fish in the higher trophic levels have either totally or partly lost their scales. All creatures in the waters that did not have fins or scales were considered unclean, therefore all aquatic invertebrates such as mussels, crabs, crayfish, squid, etc. were considered unclean. Many aquatic creatures are filter feeders and are highly prone to the accumulation of environmental toxins. Also, they contain allergenic compounds to which consumers can sometimes exhibit violent reactions. In red tide situations, these organisms also accumulate high levels of the toxins produced by the dinoflagellate blooms, and low levels of these toxins can always be present in these aquatic animals. In terms of healthful living, it would thus be wise to avoid these foods. The Phytotoxic index of various fish species is again presented in the Table 6.2.

Phytotoxic Index of Various Fish.^{29,30}

Animal	Phytotoxic Index	Animal	Phytotoxic Index
Sea Bass	103%	Rainbow Trout	81%
Herring	100%	Shark	62%
Pike	98%	Porcupine Fish	60%
Salmon	96%	Sand Skate	59%
Cod	90%	Puffer	51%
Tuna	88%	Moon Fish	51%
Halibut	82%	Catfish	48%
White Perch	81%	Eel	40%

Table 6.2

It is once more noteworthy that from the shark down there is a dramatic drop in phytotoxic index. Sharks, of course, accumulate urea in their tissues to compensate for osmotic water loss, since they do not have the same capacity as the bony fishes to deal with the salt load of the marine environment. Because urea is readily metabolized by soil bacteria other compounds in the shark must account for its phytotox effects . Parasite infestation is usually also highest in those fish that belong to the higher trophic levels or that are scavengers and these, as noted earlier, would tend to have loose scales or no scales.

The birds and flying creatures in general (listed as fowl) that are listed as unclean are also generally those that are carnivorous.

And these [*are they which*] ye shall have in abomination among the fowls; they shall not be eaten, they *are* an abomination: the eagle, and the ossifrage, and the ospray, And the vulture, and the kite after his kind; Every raven after his kind; And the owl, and the night hawk, and the cuckoo, and the hawk after his kind, And the little owl, and the cormorant, and the great owl, And the swan, and the pelican, and the gier eagle, And the stork, the heron after her kind, and the lapwing, and the bat. All fowls that creep, going upon [*all*] four, [*shall be*] an abomination unto you. Yet these may ye eat of every flying creeping thing that goeth upon [*all*] four, which have legs above their feet, to leap withal upon the earth; [*Even*] these of them ye may eat; the locust after his kind, and the bald locust after his kind, and the beetle after his kind, and the grasshopper after his kind. But all [*other*] flying creeping things, which have four feet, [*shall be*] an abomination unto you. *Leviticus 11:13-23*

The phytotoxic index for birds is presented in the following table, and again it is clear that the birds of prey have lower indexes, thus pointing to the principle that the higher the trophic level, the more toxic the tissues. There is uncertainty about birds with webbed feet as to whether they should be considered clean or unclean. The German Luther Bible refers to the goose and its kind as being unclean, but other translators do not seem to find consensus on the issue.

Phytotoxic Index of Various Birds^{31,32}

Animal	Phytotoxic Index	Animal	Phytotoxic Index
Pigeon	93%	Canada Goose	85%
Duck (Mallard)	90%	Wild Duck	85%
Quail	89%	Chicken	83%
Coot	88%	Sparrow Hawk	63%
Swan	87%	Owl	62%
Goose	85%	Crow	46%
Turkey	85%	Red-Tailed Hawk	36%

Table 6.3

Zoologically speaking, some may argue that the Bible is at fault because it speaks of insects that walk on four legs when it is plain that all insects have six legs. However, many insects do, in fact, walk on four legs whilst the front pair is really comparable to arms. Beetles generally fall in this category and so do the members of the order Dictyoptera (to which the cockroaches and the preying mantids belong). Flies in general also use their ‘front legs’ more like arms and all these insects were thus classified as unclean. The beetles and mantids use their front ‘arms’ to hold and capture prey and many of them occupy niches which would expose them to high levels of toxins, particularly the scavengers and dung beetles.

The fact that working with carcasses and corpses qualified one for being unclean for a period of time and necessitated washing is also a very logical health law which, if upheld, could prevent the spread of disease. It is, in fact, this law that helped the medical profession to escape the high death rates in hospitals in the middle ages when hand washing after contact with sick people or corpses was once more practiced as a consequence of this Biblical advice.

And for these ye shall be unclean: whosoever toucheth the carcass of them shall be unclean until the even. And whosoever beareth [ought] of the carcass of them shall wash his clothes, and be unclean until the even. [The carcasses] of every beast which divideth the hoof, and [is] not clovenfooted, nor cheweth the cud, [are] unclean unto you: every one that toucheth them shall be unclean. And whatsoever goeth upon his paws, among all manner of beasts that go on [all] four, those [are] unclean unto you: whoso toucheth their carcass shall be unclean until the even. And he that beareth the carcass of them shall wash his clothes, and be unclean until the even: they [are] unclean unto you. *Leviticus 11:24-28*

All mammals with paws were regarded as unclean, and the correlation between the phytotoxic index (as shown in the table of mammals) and some of these creatures is extraordinary. Most of the species are in addition also coprophages to a lesser or greater degree. Not all of them are aut-coprophages (animals that eat their own excreta), but many of them are sin-coprophages (animals that eat the excreta of other animals). All reptiles were also considered unclean and, given the fact that many of these animals also fall in the carnivorous category, they would be exposed to high levels of toxins. The meat of reptiles, in general, even that of herbivorous reptiles, is highly acid forming, which could possibly be ascribed

to their mode of metabolism since they are terrestrial ectotherms and subject to great fluctuations in metabolic rates.

These also [*shall be*] unclean unto you among the creeping things that creep upon the earth; the weasel, and the mouse, and the tortoise after his kind, And the ferret, and the chameleon, and the lizard, and the snail, and the mole. These [*are*] unclean to you among all that creep: whosoever doth touch them, when they be dead, shall be unclean until the even.
Leviticus 11:29-31

Other restrictions placed on the Israelites regarding the issue of clean and unclean were that any earthen vessel or oven or material that came into contact with dead unclean animals had to be washed or destroyed. They became unfit for use. Chemical compounds and pathogenic bacteria can often survive in earthenware and cause illness when these utensils are used later. What was true then is equally valid today. Many infectious diseases have been transferred by vehicles as mundane as a cracked cup.

And upon whatsoever [*any*] of them, when they are dead, doth fall, it shall be unclean; whether [*it be*] any vessel of wood, or raiment, or skin, or sack, whatsoever vessel [*it be*], wherein [*any*] work is done, it must be put into water, and it shall be unclean until the even; so it shall be cleansed. And every earthen vessel, whereinto [*any*] of them falleth, whatsoever [*is*] in it shall be unclean; and ye shall break it. Of all meat which may be eaten, [*that*] on which [*such*] water cometh shall be unclean: and all drink that may be drunk in every [*such*] vessel shall be unclean. And every [*thing*] whereupon [*any part*] of their carcase falleth shall be unclean; [*whether*

it be] oven, or ranges for pots, they shall be broken down: [for] they [are] unclean, and shall be unclean unto you. Nevertheless a fountain or pit, [wherein there is] plenty of water, shall be clean: but that which toucheth their carcass shall be unclean. Leviticus 11:32-36

The prohibition on seed planting in the case of seeds that have become contaminated with the carcasses of unclean animals is particularly interesting, especially with regard to the phytotoxic index as recorded by Kenneth MacDonald. Seeds that were exposed to extracts of muscle tissues from unclean animals stunted the growth of the plants he used in his experiments. Is it possible that compounds in these animals interfere with genetic expression or interfere with enzyme activities? More research will have to be done in order to answer these questions, but nevertheless the results of the experiments are quite astounding.

And if [any part] of their carcase fall upon any sowing seed which is to be sown, it [shall be] clean. But if any water be put upon the seed, and [any part] of their carcase fall thereon, it [shall be] unclean unto you. Leviticus 11:37-38

Two further prohibitions in terms of dietary laws are also worthy of note and these are the prohibition of the eating of blood and fat, a law that also applied to any stranger among the people. These laws also must have existed before the Jewish system, because we find elements of them in the book of Genesis.

But flesh with the life thereof, [which is] the blood thereof, shall ye not eat. Genesis 9:4

[It shall be] a perpetual statute for your generations

throughout all your dwellings, that ye eat neither fat nor blood. *Leviticus 3:17*

And whatsoever man [there be] of the house of Israel, or of the strangers that sojourn among you, that eateth any manner of blood; I will even set my face against that soul that eateth blood, and will cut him off from among his people. *Leviticus 17:10*

Moreover ye shall eat no manner of blood, [whether it be] of fowl or of beast, in any of your dwellings. Whatsoever soul [it be] that eateth any manner of blood, even that soul shall be cut off from his people. *Leviticus 7:26-27*

The prohibition did not only apply to the Old Testament, but was also applied in the New Testament.

But that we write unto them, that they abstain from pollutions of idols, and [from] fornication, and [from] things strangled, and [from] blood. *Acts 15:20*

Some argue that the laws regarding clean and unclean were rescinded by Christ when He said:

Not that which goeth into the mouth defileth a man; but that which cometh out of the mouth, this defileth a man. *Matthew 15:11*

Jesus here was not referring to clean or unclean animals, but to rules and regulations regarding ritual cleansing which the Pharisees demanded from the Jews. These laws were man-made and very exacting, so the lesson conveyed in the words of Jesus was that cleansing of the soul temple was more necessary than

upholding these exacting pharisaical demands. If Jesus had taught His disciples to disregard the laws regarding clean and unclean as recorded in the Old Testament then surely Peter would not have protested so vehemently after receiving the vision of the sheet filled with unclean animals which he was commanded to eat. His response was:

But Peter said, Not so, Lord; for I have never eaten any thing that is common or unclean. *Acts 10:14*

When he was admonished twice more to eat because he was not to consider unclean what God had declared to be clean he still did not purchase unclean foods but wondered what the vision meant.

And the voice [*spake*] unto him again the second time, What God hath cleansed, [*that*] call not thou common. This was done thrice: and the vessel was received up again into heaven. Now while Peter doubted in himself what this vision which he had seen should mean, behold, the men which were sent from Cornelius had made enquiry for Simon's house, and stood before the gate. *Acts 10:15-17*

He sought a meaning for the vision, because he knew that God would not contradict what had gone out off His mouth before. The men sent from Cornelius provided him with the answer to his question and we read his conclusion in the following verses:

While Peter thought on the vision, the Spirit said unto him, Behold, three men seek thee. Arise therefore, and get thee down, and go with them, doubting nothing: for I have sent them. Then Peter went down to the men which were sent unto him from Cornelius; and said, Behold, I am he whom ye seek: what [*is*] the cause wherefore ye are come? And they said,

Cornelius the centurion, a just man, and one that feareth God, and of good report among all the nation of the Jews, was warned from God by an holy angel to send for thee into his house, and to hear words of thee. *Acts 10:19-22*

If the Spirit had not prompted Peter to go with the men to the house of the centurion, he would never have gone, since the Jews regarded those not of Jewish descent as unclean.

And as Peter was coming in, Cornelius met him, and fell down at his feet, and worshipped [*him*]. But Peter took him up, saying, Stand up; I myself also am a man. And as he talked with him, he went in, and found many that were come together. And he said unto them, Ye know how that it is an unlawful thing for a man that is a Jew to keep company, or come unto one of another nation; but God hath shewed me that I should not call any man common or unclean. *Acts 10:25-28*

The centurion regarded Peter so highly that he fell at his feet to worship him, but Peter admonished him not do it, since according to the commandments, only God was worthy of worship. Moreover, he also explains the meaning of the vision which he had received. The vision concerned the practice of regarding anyone other than a Jew unclean, because he says “God has shewed me that I should not call any man common or unclean”. The vision of the sheet filled with unclean animals thus had nothing to do with the Levitical laws, but concerned human relationships. The gospel was to be preached to all men and not only to the Jews. Salvation embraced all of mankind and not only a select few.

There are excellent health reasons for the observance of the Levitical laws, and the Jews were not alone in observing at

least some of these laws. Islamic laws to this day forbid the eating of pork, and the method of slaughter is similar to that practiced by the Jews. In many societies, the eating of pork was prohibited. The Navahos and the Yakuts of Northern Turkey, as well the Laplanders had prohibitions on the eating of pork, and Iranians were not allowed to eat fish that did not have both fins and scales. Also the inhabitants of the South Pacific will not eat eel.³³ Similar laws to the Levitical code existed among the ancient Hindus, and the 'Code of Manu' (Manu was the Hindu equivalent of Noah) forbade the eating of all carnivorous birds and all animals that did not have a cloven hoof. These laws suggest that there was a common origin to these laws³⁴ and that they reflect the position just after the flood and can thus not be regarded as strictly Jewish.

As we have seen, the prohibition regarding the consumption of fat and blood also applied to the New Testament church and there are good scientific reasons why they should. Fat consumption is associated with numerous health hazards and degenerative diseases ranging from cardiovascular diseases to cancer. The correlation between fat consumption and cancer is well established. Blood, on the other hand, contains metabolic waste products such as ammonia and urea, as well as secondary metabolites. A further problem is created by the exposure of certain blood proteins to glucose, which is also carried by the blood. When these proteins combine with glucose, molecules known as Advanced Glycated End Products (AGEs) are formed. It is thought that these products are responsible for much of the deterioration that accompanies aging. When these products are present in high concentrations as in the case of diabetics, the aging process is enhanced. AGEs form naturally in the blood when glucose levels are elevated for extended periods of time.^{35,36} Outside the body, these compounds are formed when sugar and protein are heated together to produce the browning so coveted by cooks. These compounds, when ingested, enter in the blood stream and consequently lead to elevated blood AGE levels.³⁷

When one considers how meat was to be butchered, then

the method was a far cry from what is common practice today. The Talmudic law prescribed the precise methodology. The jugular was severed, allowing the heart to continue pumping out the maximum quantity of blood, and after the slaughter, the meat was washed and soaked for half an hour. The meat was then placed on an inclined grooved board and salted on both sides with coarse salt and allowed to remain like this for a further hour while the salt absorbs the blood. It was then rinsed twice and was then only ready for cooking.³⁸ This process would leave the meat white and tasteless, and is obviously the reason why this method is not practiced generally today.

The categorizing of animals as clean and unclean must represent a post fall condition. Those animals most affected by the new circumstances were considered unclean (defiled by circumstances). This does not mean that these animals could not be associated with as pets and work animals. It simply means that they were not fit for human consumption. All animals that occupied trophic levels higher than herbivores were considered unclean, and numerous herbivores were also considered unclean in view of their particular mechanisms of dealing with the changed environment which put them at a physiological disadvantage. If we now consider modern methods of animal husbandry where even so called 'clean animals', such as sheep, cattle in general and poultry are fed carcass meal, fecal matter, blood meal and bone meal, then none of these animals could be considered clean anymore. The eating of animal products in general is not the healthiest lifestyle and the original diet as proclaimed by God (grains, seeds nuts, fruits with vegetables added after the fall) in the book of Genesis is by all scientific standards the most healthful.³⁹ Nations that follow largely vegetarian lifestyles have far lower incidences of degenerative diseases and switching to vegetarianism has been found to benefit even the advanced in age. Moreover, the quality of life can be greatly enhanced and if rightly conducted the vegetarian lifestyle is extremely satisfying.

The Animal Production Problem

As noted above, it is unlikely that under present circumstances any domesticated food animal can still be considered as clean, since production strategies have totally altered the status of these animals. Modern farming techniques totally change the feeding patterns of animals and force them into categories to which only unclean animals belong. In order to conserve energy and to make the production and distribution of animal products a viable proposition, the science of modern animal husbandry has been developed into a fine art. The space and energy requirements associated with free-range farming have forced the industry to adopt an in-house method of animal production. This, in turn, has produced its own set of problems and introduced a new dimension in terms of the hazards involved in feeding the masses.

Modern animal husbandry is geared towards production and profit more than to any other consideration and the effect on the well-being of the animals and the ultimate effect on the consumers are merely secondary considerations. Using the chicken industry as an example, the salient points of modern animal husbandry strategies can be readily demonstrated. In order to conserve energy, chickens are cramped together to restrict movement and housed in dimly lighted, ventilated buildings designed to keep the animal calm and to maximize the energy going into growth whilst restricting the energy going into thermoregulation and other vital functions. Laying hens are crowded into tiny cages where they stay for approximately one year until they are sold to poorer communities for meat. Broilers and laying hens are fed abnormal diets such as fishmeal, carcass meal, bone meal as well as the dried and recycled remains of the slaughtering process. In this regard, the entrails, other unused body parts, and the feathers are fed to the next generation of chickens, effectively turning them into cannibals.

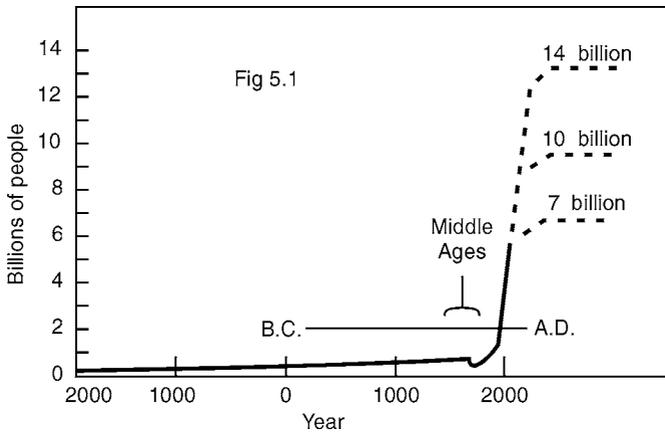


Figure 6.2 - The world population growth. Three possible projections are presented. The bottom figure of 7 billion assumes that the average birth rate will drop due to birthcontrol, the top figure represents no drop and the middle figure of 10 billion may be the most realistic.

In order to prevent the spread of infectious diseases under these circumstances, the animals are fed subtherapeutic doses of antibiotics, besides being fed growth stimulants, digestion aiding enzymes, and a host of disease preventing chemicals. Moreover, the animals are genetically selected to maximize the features for which they are required. In the case of broilers, the new breeds that have now been produced have incredible growth rates and efficiencies of feed conversion. Under modern husbandry conditions, it takes only six weeks for a chicken to increase in mass from 35 grams to 1.5 kilograms. In the past, it would take 17 kilograms of food to increase the mass of a normal chicken by this amount, whereas the new breeds achieve this growth on just 3.5 kilograms of feed. The result is a chicken that grows fast, converts most of what it eats into muscle tissue, but is compromised in terms of all its other developmental features.

These chickens have highly compromised immune systems, poor development of internal organs such as heart, lung and excretory system, and must be raised under virtually sterile conditions to prevent epidemic diseases and death from handling. Indeed, their

hearts are so poorly developed that they readily die from shock when stressed. The legacy does not end there, as the cycle of efficiency in feed utilization is filtered down to other animals used for human consumption.

Piles of chicken manure are processed into feed for cattle (particularly dairy cattle) and sheep as a cheap form of nitrogen to be converted by the rumen bacteria into protein. In this way, not only the nitrogen reserves, but also potentially lethal doses of growth stimulants and other chemicals are passed down the food chain to end up eventually in man. Indeed, it is more than likely, that the great *Bovine Spongiforme Encephalitis* (mad cow's disease) fiasco started in this way. A further legacy of the animal husbandry industry in general is that, through the standard use of antibiotics, a new breed of antibiotic bacteria have been produced over time that are reversing human victories over infectious diseases. New drug resistant bacteria have been responsible for epidemics of food poisoning which have left first and third world countries reeling under the impact. Already bacterial infections of the respiratory system and diarrhea have been identified as the top two killers in the world today.

Ecology: A planet in peril

It is evident from what we hear in the media that all is not well with our planet. The situation is indeed so grave that various pressure groups have arisen in an attempt to influence governments to change their policies regarding environmental issues. Scientists have warned that if drastic measures are not implemented to reverse industrial damage to the environment, then damage may become irreversible. Indeed some scientists believe that damage to the environment is in many cases already irreversible.

To meet the challenge, there have been a number of international "earth summits" where governments and scientists have put their heads together to draw up global programmes to avert a catastrophe. Sadly, most of the agreed upon protocols have either

not been implemented or are running way behind schedule. As early as 1985, the Mediterranean nations set themselves ten objectives to be reached by 1995 to clean up their environment, but according to Ljubomir Jeftic, the deputy coordinator of the Action plan, none of these objectives have been achieved.⁴⁰

Ecological disasters seem to have multiplied over the last decades, and each year seems to record either record heat waves, record cold spells, record rainfalls, record wind speeds, record depletion of the ozone layer or record levels of air and aquatic pollutants and their consequences. Already in 1989, *Time Magazine* carried an article in which it referred to the year 1988 as: “This year the earth spoke, like God warning Noah of the deluge” where they listed the devastating global natural disasters which had occurred, ranging from the consequences of pollution to killer hurricanes to monstrous earthquakes that affected various parts of the world. A statement in the article sums up the inherent problem which lies at the root cause of the mayhem the world is experiencing:

Spurred by poverty, population growth, ill-advised policies and simple greed, humanity is at war with the plants and animals that share its planet. Entire ecosystems are declining and nearly every habitat is at risk.⁴¹

In many cases, human greed and selfishness seem to be the main cause of the demise and mankind has largely itself to blame. In the beginning, God gave man dominion over the planet and when he squandered that privilege, the writing was on the wall. The prognosis of Scripture is:

Of old You laid the foundation of the earth, And
the heavens are the work of Your hands. They will
perish, but You will endure; Yes they will grow

old like a garment; Like a cloak You will change them and they will be changed. *Psalm 102:25,26*

The same sentiment is expressed in the book of Isaiah where the prophet states:

...The earth will grow old like a garment. And those who dwell in it will die in like manner. *Isaiah 51:6*

These texts indicate that the only hope of planetary restoration lies in an intervention from God in the affairs of earth. The second law of thermodynamics will take its toll eventually and even man's best efforts will eventually prove futile. The inherent greed, selfishness and indifference to the needs of others which mankind so often displays towards others will further undermine all attempts at salvaging the situation. The state of the planet is in ecological terms precarious, and a survey of the immediate issues will show that there is indeed no quick fix solution. Natural phenomena, such as raging fires, storms, soil erosion, desertification and disease have also played their part in the deterioration of the planet, but man's impact on the biosphere has also been profound. Human impact on the biosphere has affected virtually every level from the atmosphere to the oceans and even to the deepest ground waters.

Human Impact on the Biosphere

The human population explosion and the impact of expanding technology have altered the delicate balance of our environment. Carbon dioxide and other pollutants have damaged our atmosphere and solid pollutants have entered our soils and waters to an alarming extent. In recent years there has consequently been an increase in global warming, destruction of the ozone layer and profound changes in the global weather patterns.

The Growing Population: In 1650, the world population stood at 500 million and today it exceeds 6 billion. The birth rates over the last

300 years have remained relatively constant and range between 25 and 30 births per thousand people per year, yet the exponential nature of the growth curve means that the rate of increase is enormous and ever increasing as the population size increases. Better medical care and sanitation have led to a decrease in the death rate, which in 1995 stood at 9 deaths per 1000 people. The overall increase in the population rate thus amounts to a 1.6% increase per year. This figure looks deceptively small, but would lead to a doubling of the world's population in a mere 43 years.

The annual increase of about 90 million people per year (the current population of Mexico) implies that 250,000 people are being added to the world's population every day. At this rate of growth, the world population could reach 18 billion by the end of the next century and this has led to international debates on birth control as emphasized in the UN sponsored 'Conference on Population' held in Cairo in September 1994. At that meeting, the Roman Catholic Church and the Islamic world voiced strong opposition to contraceptive birth control, emphasizing the deep divisions in human viewpoints on how to control the massive increase in the human population.

The world is, theoretically, capable of sustaining such a population, but the distribution of know-how and technology is unfortunately not equal to the task. Third world countries do not produce enough to sustain themselves, particularly in times of drought, and the lack of infrastructure coupled with factional differences lead to difficulties in the distribution of food even if it should be supplied by affluent countries. In 1950, for every person living in an industrialized country, there were two people living in non-industrialized countries. In the year 2020, this ratio will more than double and is estimated to increase to five. With 85% of the world's wealth concentrated in the industrialized nations (Europe, Former East block countries, Japan, United States, Canada, Australia, and New Zealand) and a 20 times higher standard of living, it is a matter of grave concern.

Starvation and disease are rampant in undeveloped countries and it is estimated that 40,000 babies die of starvation each day.

In India, 37% of the population cannot buy enough food to sustain itself, and in drought stricken areas of the world, the situation is often beyond comprehension. The age distribution in countries with rapidly growing populations is a further matter of concern. The bulk of the population in these countries falls into the infant and juvenile categories and it is the little ones who suffer most. Clearly, given all these constraints, the world population is currently already larger than can be supported with current technologies. Moreover, AIDS has added a further dimension, leaving whole communities of juveniles without parents or proper supervision because the parents have died from this disease and this in turn leads to a breakdown of society.

Atmospheric Change: There are six major categories of atmospheric pollutants: Nitrogen oxides, sulphur oxides, carbon oxides, suspended particles, volatile organic compounds, and photochemical oxidants. The United States alone pumps 700,000 metric tons of atmospheric pollutants into the air every day. The industrial race for world supremacy has made the air we breath unfit for respiration in many areas of the world. In Russia, the levels of pollutants that are pumped into the atmosphere are staggering. One city alone (Nizhni Tagil) pumps 700,000 tons of atmospheric pollutants into the air per year. Vast quantities of metals, including heavy metals, are also pumped into the air by metal processing plants in Russia, resulting in extremely polluted soils in some areas.

In Russia's Kola Peninsula, the quantities of metals pumped into the air are so high as to make even mining of the fall out in the topsoil a viable proposition. The area around Monchegorsk has been defined as a "technogenic desert". Clemens Reimann, the leader of the Norwegian team investigating the extent of the pollution comments that every sample of water from streams in the area exceeds safe limits for drinking water. "I would not like to live there," he says, "Everything is dead. There is nothing except a few small birch trees with yellowing leaves. It is a desert."⁴² Some results show that the contamination of moss with nickel is in the order of 100,330

parts per million, whereas in British moss the level is only 2.2 parts per million.⁴³

The death of the vegetation in other Russian industrial zones has led to vast erosion and desertification leading to a drop in fresh water reserves. It is estimated that the Aral Sea, the world's sixth largest fresh water sea, may not exist in twenty years time considering the rate at which the water levels are dropping. Pollution of the soils, atmosphere, fresh water resources, and the oceans is not a local government issue as the whole world is affected sooner or later. Pollution is not containable, but is distributed through dynamic global circulation patterns of water and air.

Nuclear Power: On April 26, 1986, one of the four reactors of the Chernobyl nuclear power plant experienced a destructive meltdown. Chernobyl was one of the largest nuclear power plants in Europe and produced enough power to meet the needs of a relatively large city. The explosion sent up a plume five kilometers high and several tons of uranium dioxide fuel were distributed over a wide area. Over 100 megacuries of radioactivity were released, making it the largest nuclear accident in history. The band of radioactivity contaminated a broad band across Europe, stretching from Scandinavia in the north, to Greece in the south. Over 24,000 people in the immediate area were subjected to serious radiation doses, and in areas outside the immediate area, in the rest of Europe, it is estimated that up to 75,000 people will die from cancer caused by exposure to radiation.⁴⁴ The direct effect on human lives is not only measurable in deaths from cancer, but also in the legacy of hundreds of deformed children born as a consequence of radiation exposure. Moreover, the soils over vast areas are contaminated with radiation, making them useless for agriculture.

If the world is to enjoy safe nuclear energy, then it must learn to not only prevent and control nuclear disasters, but must also deal with the storage of radioactive wastes and deal with the threat of international nuclear terrorism. Already in 1990, some

35 nuclear plants were more than 25 years old and not one has been safely decommissioned.

Carbon Dioxide and Global Warming: The atmosphere consists of approximately 0.03% carbon dioxide and 0.0002 % methane. These tiny quantities of so-called greenhouse gases, together with others, absorb infrared radiation reflected from the earth's surface and prevent it from escaping into space. Without greenhouse gases, the earth would be too cold to sustain life, and with too high a concentration of these gases, the earth would experience global warming. Both the concentrations of methane and carbon dioxide are increasing in the atmosphere as a consequence of man's indiscriminate burning of fossil fuels. Methane is also added to the atmosphere by ruminants and sewage works. Acid rain and deforestation have decimated the world's forests, which act as traps and reservoirs of carbon dioxide, thus increasing the chance of global warming. It is estimated that there will be a 1-5% increase in global warming during the next century. In figure 6.3, the increase in global temperature and carbon dioxide levels during the last century are represented.

If this increase in carbon dioxide concentrations of more than 11% in the last 30 years is maintained, then the amount will have doubled to 702 ppm by the year 2075. An increase of just 3°C to 4°C in atmospheric temperature will have a profound effect on weather patterns. Some models predict the melting of polar ice caps and the flooding of coastal cities, as ocean waters rise by more than 100 metres. Other models predict denser ice and a drop in ocean levels. Whichever model is accepted, it is evident that extremes in weather patterns will develop, as is already evidenced by current changes in weather patterns.

Worldwide, the glaciers are disappearing, the sea level has risen 20 metres in the last century, and US satellites show that the rate of rise is on the increase. Fresh water lakes have warmed, and hot spots have appeared in the oceans leading to intensified El Niño phenomena. These conditions have led to an unprecedented increase

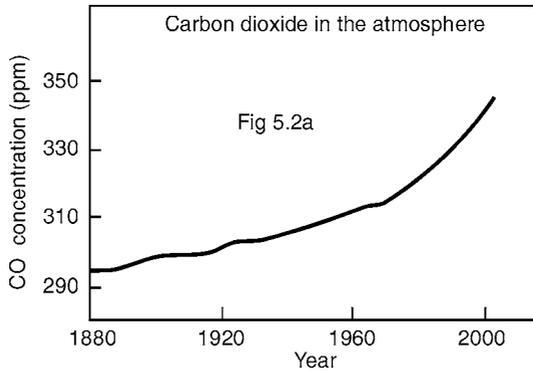
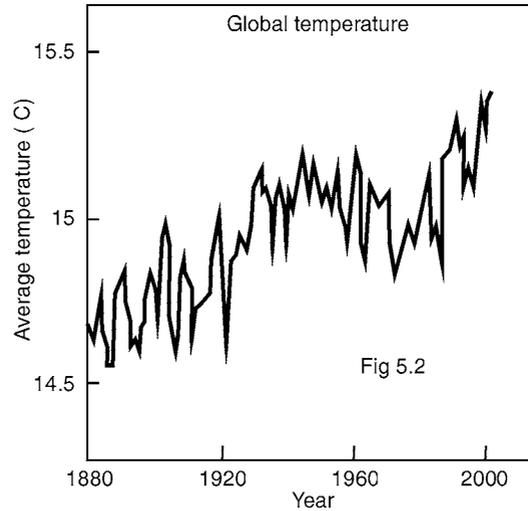


Figure 6.3 - Global warming and Carbon Dioxide increases during the last century.

in windspeeds, violent tropical storms, severe droughts and unheard of floods in many areas of the world. Since 1960, there has been a steady increase in massive natural disasters worldwide from storms, flooding, fires, droughts, mudslides and avalanches. The yearly damage cost in US dollars has increased from 8 billion in 1960 to almost 60 billion in the late '90s.

In February 1995, *New Scientist* carried an article titled "El Niño goes critical" in which the opening paragraph states "What's happening to the Pacific? We are used to climate causing havoc around the world - but not every single year." In 1982-83 El Niño caused damage estimated at 8 billion US dollars. There is a new trend to these phenomena: "This is a new regime. What is happening is unprecedented in the last 100 years" says Ants Leetmaa, a climatologist at the National Meteorological Centre in Camp Springs, Maryland.⁴⁵ El Niño tends to cause severe storms and flooding, particularly on the west coast of the American continent, whilst it is responsible for severe droughts in parts of Australia and the African continent.

Chlorofluorocarbons (CFCs and ozone depletion): CFCs are used as propellants in aerosol cans, reactants in industrial solvents, ingredients in plastic foams, and coolants in refrigeration equipment. The presence of these substances in the atmosphere has been linked to the destruction of the ozone layer and the formation of the ozone hole over the arctic zones. Ozone absorbs harmful ultraviolet rays which would cause increases in skin cancer, cataracts, and would weaken the immune system of animals and humans exposed to these rays. Also harmed by ultraviolet rays are the vast quantities of phytoplankton, which sustain the world's aquatic ecosystems and represent the largest group of photosynthetic organisms on earth.

In 1992, the leaders of the world's industrial nations met at the Earth Summit conference in Brazil and signed a treaty to phase out the use of CFCs. However, economically hamstrung nations are finding it hard to adhere to these guidelines. In 1996, both the northern and the southern hemispheres recorded record depletions of ozone. In 1996, the hole that was first thought to be confined to the Antarctic region, stretched over the northern hemisphere with record low levels of ozone being recorded over Britain.⁴⁶ The usual annual ozone hole over Antarctica was also the greatest since it was first recorded in the 1980's,⁴⁷ this in spite of the reduction of more than 30% in production of CFCs since their peak in 1988.

Acid Rain: The burning of fossil fuels not only increases the CO₂ levels, but also produces sulphur dioxide and nitrogen. In the United States alone, over 24 million metric tons of sulphur dioxide are emitted into the atmosphere annually. Most of the sulphur entering the atmosphere is from power stations (70%) whilst vehicles emit 30% of the nitrogen. Sulphur introduced into the upper atmosphere combines with water vapour to produce sulphuric acid resulting in a drop in pH. The pH of normal rain is slightly acidic (between 4.0 and 5.6), but in the industrialized countries of the world the rain is up to 40 times more acidic than usual. One of the lowest pH levels recorded was at Pitlochry, Scotland where the level dropped to 2.4 and in South Africa, the level in some areas drops as low as 2.92. In South Africa, the emission of SO₂ is some 220 tons per kilometre per year in some areas from power stations alone. Acid rain is associated with respiratory problems in humans and animals, corrosion of buildings, and the death of trees and animals in fresh water systems.

Hydrogen ions in acid rain tend to displace essential minerals, such as calcium, potassium and magnesium, which are required for healthy tree growth. As a result of this leaching, the trees start to die. In the United States and Europe, more than 7 million hectares of trees have been lost due to acid rain. The effect in some areas is devastating and in some countries more than 50% of the forests have been affected or destroyed by acid rain. A further factor is that the biomass per acre of spruce has fallen by more than 73%.

Our fresh water systems have been negatively affected by acid precipitation and the thresholds required for sustaining life have been crossed in many areas. Even coastal waters are affected by acid in river runoffs. Lakes and rivers most affected are those with poor buffering capacities. Due to its leaching capacity, acid rain causes the introduction of heavy metals such as lead, mercury and copper into the water systems. Furthermore, aluminium ions become soluble at a pH of 4.2 and are highly toxic, particularly to fish as they thicken the mucous layer over the gills and cause suffocation. Aluminium also reacts with other essential ions such as phosphates,

resulting in their precipitation and loss from the system. In lakes, phytoplankton is lost at a pH of 5.8, whilst fish disappear at a pH of 4.5. In Norway, fish began to disappear from the lakes in the 1920's and currently the southern lakes are entirely dead and more than 2000 lakes are without trout. In the northeastern United States and eastern Canada tens of thousands of lakes are dying as a result of acid rain.

Deforestation: What acid rain is achieving in industrialized countries, deforestation is achieving in the tropics. With more than half the world's population living in the tropics, the serious problems of space provision, food supply and the provision of household fuel will have to be overcome if this is still possible at this stage. Many people in the tropics are engaged in shifting agriculture, which entail the clearing of an area of forest, its use for agriculture, and then moving on once the soil has been deprived of its nutrients. Vast areas of forests are slashed and burnt, and in other areas the timber is indiscriminately cut and sold to developed countries. One and a half billion people depend on firewood as their main source of fuel, and particularly in Africa, the destruction of natural forests for fuel is leading to widespread erosion and desertification.

It is estimated that cutting destroys some 160,000 square kilometres of forest annually, with an equal area being lost to shifting agriculture. At this rate, the total destruction of the forests will be complete in 25 to 30 years. In Sudan alone, some 150 million cubic metres of wood are used for firewood per year. The dismantling of tropical forests leaves permanent damage, in view of the delicate nature of the ecosystems involved. Rainforest soils are generally poor, since the soil minerals have been trapped in the lush growth of the forests. If these trees are cut and removed or burnt, a large proportion of these minerals are lost to the area and regeneration of the forest is virtually impossible. With less than 5% of the world's rainforests receiving any form of protection, the devastation will leave a legacy of loss to the world.

Destruction of the world's rainforests not only removes

one of the world's prime consumers of CO₂, which could retard the greenhouse effect, but also leads to an unprecedented destruction of biodiversity. It is estimated that 3.5 million species of organisms exist on earth, 2.5 million of them are as yet unfound and 95% of them live in rain forests. Some estimate that at least 100 species go extinct every day. "It's as though the nations of the world decided to burn their libraries without bothering to see what was in them," says University of Pennsylvania biologist Daniel Jansen.⁴⁸

Desertification: Overcultivation, overgrazing, and the destruction of vegetation due to human need have led to widespread desertification. Wells and boreholes are sunk to provide water for cattle, and this leads to further destruction through trampling. Water resources are dwindling rapidly in areas affected by desertification. In the past, Lake Chad had an area equivalent to the Caspian Sea (350,000 km²). By 1963, it had shrunk to an area of 35,000 km² and currently has an area of less than 20,000 km². The world's sixth largest sea, the Aral Sea, is shrinking so rapidly that it probably won't exist in 20 years time. Worldwide, the rate of desertification is estimated to be 6 x 10⁶ hectares of land per year which represents an area about the size of Ireland. It does not take much imagination to see that this trend cannot long continue before the now densely populated areas subjected to desertification will face a toll of human misery unprecedented in history.

Pollution: Pollution of the world's oceans and fresh water resources is so widespread that whole ecosystems are collapsing. Waste disposal by industry and agricultural runoff have wreaked widespread havoc. Fertilizers used in agriculture are rapidly leached from the soils and end up in rivers, dams, lakes, and eventually the oceans. The increase of nutrients is called eutrophication and causes an increase in photosynthetic organisms and leads to algal blooms. At night, photosynthetic organisms use up oxygen reserves in the water and this can lead to large scale death of aquatic life including algae and plants. Not only

fertilizers, but pesticides, herbicides and industrial toxins, including heavy metals also impact on ecosystems. These toxins become concentrated as they pass through the food chain and some have a direct effect on living organisms. The concentrating process as toxins accumulate up the food chain is called **biological magnification** and is responsible for widespread decimation of animal life on earth. Moreover, humans who harvest numerous species from the top of the food chain (particularly marine species) are very prone to biological magnification. The extent of biological magnification of a toxin such as DDT is well documented. The concentrating potential of the food chain can result in several million fold increases in organismic toxic levels as illustrated in the following example.

Animals accumulate toxins particularly in their fatty tissues, and when called upon to utilize these fat reserves, these toxins are released into the bloodstream and can lead to various diseases and death. It has now been firmly established that the deaths of hundreds of thousands of marine mammals such as dolphins and seals can be largely attributed to a lowered immune capacity owing to the immune system being compromised by the presence of accumulated toxins. It has been found that even the paint used on the hulls of boats and ships can add sufficient toxins to the oceans to cause widespread death of marine life. The paint contains tributyl tin (TBT), which prevents barnacles from sticking to the hull of vessels. The substance has been banned for use on small vessels but is still widely used on large vessels. TBT is probably the most potent toxin deliberately introduced into the sea.

DDT and its Breakdown Products DDE and DDD

Water	0.000005	
Phyto- and zooplankton	0.04	PRODUCERS & CONSUMERS
Silverside minnow	0.23	HERBIVORES&PLANKTIVORES
Sheephead Minnow	0.94	
Pickrel (fish)	1.33	
Needlefish	2.07	CARNIVORES
Heron	3.57	
Tern	3.91	
Herring gull	6.00	SCAVENGER
Fish Hawk	13.8	
Merganser (duck)	22.8	TOP CARNIVORES
Cormorant	26.4	

The toxin has a very potent effect, and even a few nanograms in water can cause abnormal development such as female dog whelks developing male organs. However, the immunosuppression capabilities of the toxin could be one of the factors contributing to the widespread death of dolphins and other marine life. It was found that marine mammals concentrate TBT in their tissues in concentrations of up to 10 parts per million.⁴⁹

There are numerous substances found in the oceans which are wreaking havoc with marine life and directly impact on humans. Already in 1953, cats and birds on the island of Minimata in Japan got the ‘staggers’ and died. Then humans developed headaches, ataxia, fatigue, fetal deformities and mental abnormalities. Some 15,000 people were affected and at least 3500 died. A government investigation showed that the culprit was mercury salts that had been dumped in the river and had accumulated in the sediments of Minimata Bay. There the salts had become methylated and converted to methyl mercury, a highly toxic organic compound. Once this compound had found its way into the food chain, it was responsible for the symptoms in humans who consumed the tuna.

The disposal of highly toxic waste has always been a major headache for industry and governments. Much of this waste is stored in drums and buried in deep wells or discarded mineshafts. Some of

it is incinerated and a fair proportion is dumped in the sea. Even if the toxins are dumped in barrels, sooner or later mankind has to reap the legacy of this indiscriminate dumping. After the Second World War, tons of chemical weaponry was dumped in the oceans, and in the North Sea, mustard gas is now leaking from these eroded containers and affecting marine life.

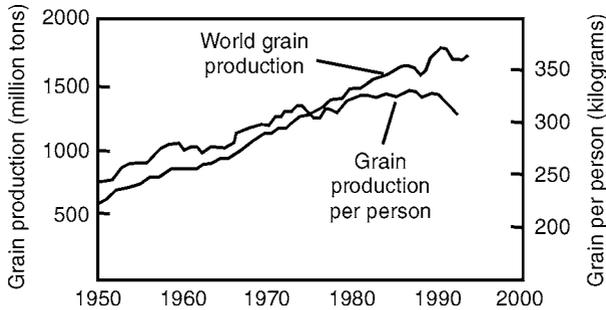
In the Mediterranean, more than 500 million tons of sewage alone pours into the water. An article in *New Scientist* states that: "Attempts to save the grossly polluted Mediterranean seem as doomed as the sea itself." Sewage is only one of the many pollutants that are destroying this partly enclosed sea. Each year 120,000 tons of marine oils, 60,000 tons of detergents, 100 tons of mercury, 3800 tons of lead, 1 million tons of crude oil and 3600 tons of phosphates enter this sea. Thousand of marine mammals have died and are dying from this pollution. A further problem is that certain weeds such as *Caulepra toxifolia* flourish under these conditions and could cause the total collapse of ecosystems in the area. In 1985, the Mediterranean nations set themselves cleanup goals which were to be achieved by 1995, but none of these goals have been achieved.⁵⁰ The fresh water resources of the world are equally polluted. On the first of November 1986, the Rhine River, which flows from the Alps to the North Sea, almost died. The problem started in Switzerland where a fire had started in a warehouse belonging to the giant chemical company, Sandoz. By the time the blaze had been contained, 30 tons of mercury and pesticides had washed into the Rhine. Soon thereafter, for hundreds of kilometres, the water was blanketed with dead fish, and even the plants started to die. The river became a river of death and not one drop was fit for use. Only direct and targeted intervention by the industrialized European nations prevented this disaster from permanently destroying the delicate ecosystem of this river, and today the Rhine has largely recovered from the almost death blow. This type of drama is however, repeated all over the world, and in many cases, the governments concerned do not have the resources to deal with the crises as was the case with the River

Rhine.

In the former East Block countries, the fresh water systems are so polluted, that whole river and lake systems have become sterile. It is not only the surface waters that have become affected, but the seepage into the underground water systems has affected these vast reserves as well. The indiscriminate dumping of toxic waste has left its legacy worldwide. From the industrial landfills in Germany's industrial areas to the choked sewage drains in Calcutta, the dumping has reached uncontrollable levels. In Hong Kong alone, the 49,000 factories dump 1000 tons of plastic within 400 square miles of dumps per day whilst mines and smelters in former East block countries are pumping industrial sludge directly into river systems. To give an idea of the extent of the problem, it is informative to note that in Western Germany alone, up to 50,000 landfills which threaten underground water supplies have been declared potentially dangerous. Of late, the rich countries of the world are ridding themselves of their toxic waste by exporting it to poorer countries, and in this way, the whole planet has become a target for hazardous chemical pollution.

The Water and Food Problem

The problems of food production and the utilization of water go hand in hand. There is simply not enough water to dispose of all the industrial and other pollutants that today's huge population produces daily. The world's fresh water reserves are being over-exploited, and in spite of improvements in technology, the amount of water fit for human consumption and agriculture is rapidly diminished. The world food production is increasing, but in spite of this trend, the production is falling behind the world's population growth as can be seen in the case of grain (Figure 6.4)



More people can be fed from plants than can be fed from animals, and it is therefore not surprising that some 70% of the world's population subsists on a largely vegetarian diet, particularly in Asian countries and certain areas of Africa. The water and energy (particularly fossil fuel energy) required for the production of food for human consumption rises dramatically if animal products are substituted for plant products. For each calorie of food that appears on our tables, it has been estimated that it requires 9 calories of energy to put it there. Only half a calorie was used to produce the food on the farm and the rest is used to process, package, store, distribute and cook the food. Grains and other seed products are relatively easy to store, but animal products tend to spoil and require sophisticated storage and processing systems. In figure 6.5 the amount of energy required to produce plant and animal food products is presented, and in Figure 6.6 the volume of water required to produce this food is indicated.⁵²

The state of our planet and the future for mankind do indeed look bleak. The warnings from the scientific community have become louder and more urgent as we enter the twenty-first century. Mankind seems to be running out of time, and even where solutions are at hand, natural disasters and the sheer volume of other equally pressing problems renders us impotent to deal with all these issues simultaneously. We are caught in an exponential spiral. For those who believe in divine revelation, there is, however, hope. God predicted this turn of events and He did not leave us orphans. His promise is

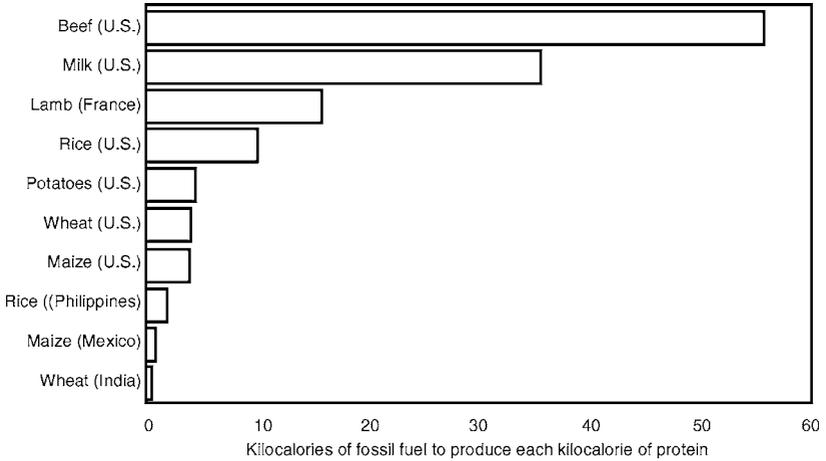


Figure 6.5 - Fossil fuel energy required to produce certain agricultural products.

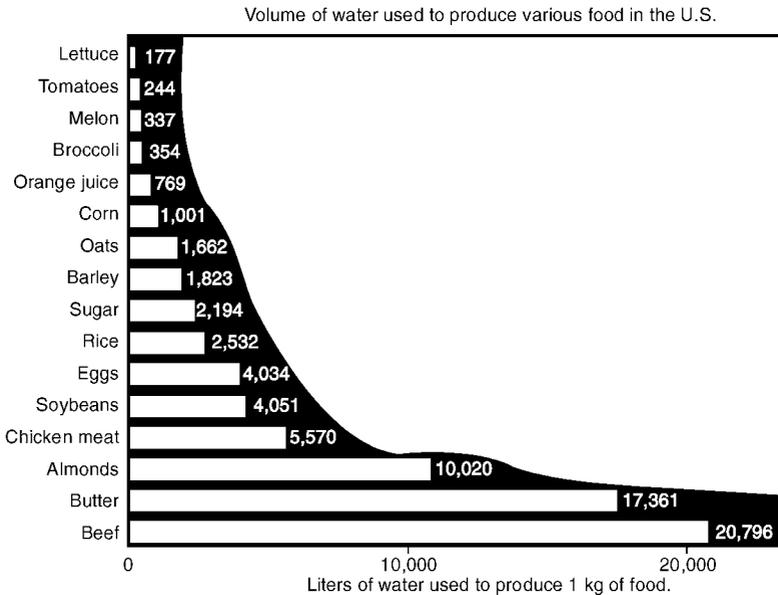


Figure 6.6 - The volume of water required to produce certain foods

one of redemption in Christ and an earth made new. Restored to its former glory, the earth will become the home of the redeemed, and there will be no more death, nor crying, nor disease.

And I saw a new heaven and a new earth: for the first heaven and the first earth were passed away; and there was no more sea. And I, John, saw the holy city, new Jerusalem, coming down from God out of heaven, prepared as a bride adorned for her husband. And I heard a great voice out of heaven saying, Behold, the tabernacle of God was with men, and He will dwell with them, and they shall be His people and God Himself shall be with them, and be their God. And God shall wipe away all tears from their eyes; and there shall be no more death, neither sorrow, nor crying, neither shall there be any more pain: for the former things are passed away. And He that sat upon the throne said, Behold, I make all things new. And he said unto me, Write: for these words are true and faithful. *Revelation 21:1-5*

REFERENCES

- ¹. Charles Darwin, *The Autobiography of Charles Darwin and Selected letters* (New York: Dover Publications, 1958): 249.
- ². Charles Darwin, "The essay of 1844," in *Darwin for Today: The Essence of his Works* (New York: The Viking Press, 1963): 222.
- ³. D. L. Lindsay and E. H. Grell, "Genetic Variations of *Drosophila Melanogaster*," Carnegie Institution of Washington, No. 627 (1967).
- ⁴. Michael Behe, *Darwin's Black Box* (New York: The Free Press, 1996).
- ⁵. Charles Darwin, *The Origin of Species*, (New York: Heritage Press, 1963).

6. Richard Dawkins, "The Eye in a Twinkling," *Nature* 368 (1994): 690-691.
<http://spot.colorado.edu/~cleland/articles/Dawkins.pdf>
7. George C. Williams, *Natural Selection: Domains, Levels, and Challenges* (New York: Oxford University Press, 1992): 73.
8. Steve Jones, *Almost Like a Whale: The Origin of Species Updated*, (London: Doubleday, 1999).
9. R. W. Young, "The Renewal of Rod and Cone Outer Segments in the Rhesus Monkey," *Journal of Cell Biology* 49(2) (1971): 303-318.
10. Michael F. Land, "Animal Eyes with Mirror Optics," *Scientific American* 239(6) (1978): 88-89
11. M. Chown, "I Spy with my Lobster Eye," *New Scientist* 150(2025) (1996): 20.
12. "How Dolphins Hear Without Ears," *New Scientist* 164(2218) (1999-2000): 17.
13. Andrew C. Mason, Michael L. Oshinsky, and Ron R. Hoy, "Hyperacute Directional Hearing in a Microscate Auditory System," *Nature* 410(6829) (2001): 686-690.
http://hoylelab.cornell.edu/hoy/mason_oshinsky_hoy2001.pdf
14. Peter M. Narins, "In a Fly's Ear," *Nature* 410(6829) (2001): 644-645.
15. *Daily Telegraph* (London, May 26, 1995): 5.
16. Gerald T. Keusch, "Ecology of the Intestinal Tract," *Natural History* 83(9) (1974): 70-77.
17. *Nature Australia* (1999-2000): 5.
18. Gerald Wheeler, "The Cruelty of Nature," *Origins* 2(1) (1975): 32-41.
<http://www.grisda.org/origins/02032.pdf>

19. Jonathan Weiner, *The Beak of the Finch* (London: Jonathan Cape Random House, 1994): 17.
20. "Islands of the Vampire Birds," *ABC TV* (ABC Natural History, Australia, October 13, 1999).
21. Lyudmila Trut, "Early Canid Domestication: The Farm Fox Experiment," *American Scientist* 87 (1999): 160-169.
<http://www.americanscientist.org/issues/issue.aspx?id=813&y=0&no=&content=true&page=3&css=print>
22. Labbish Chao, "Piranha and New DNA Evidence," *Bio-Ama-zonia Conservation* ><http://www.angelfire.com/biz/piranha038/dna.html>>, April 28, 2000.
23. Labbish Chao, "Sub-Family Serrasalminae," *Bio-Ama-zonia Conservation* ><http://www.angelfire.com/biz/piranha038/pg2.html>>, April 27, 2000.
24. S. A. Miller and J. P. Harley, *Zoology*. 3rd edition (Boston: WCB/McGraw-Hill, 1996): 654.
25. David I. Macht, "An Experimental Pharmacological Appreciation of Leviticus XI and Deuteronomy XIV," *Bulletin of the History of Medicine*, 27(5) (1953): 444-450.
26. Glen Blix, "Unclean or Unhealthy: A Look at the Levitical Prohibition." (Unpublished document written by Prof. Glen Blix, Associate Professor, Health Promotion and Education, School of Public Health, Loma Linda University).
27. David I. Macht, "An Experimental Pharmacological Appreciation of Leviticus XI and Deuteronomy XIV," *Bulletin of the History of Medicine*, 27(5) (1953): 444-450.
28. Glen Blix, "Unclean or Unhealthy: A Look at the Levitical Prohibition." (Unpublished document written by Prof. Glen Blix, Associate

Professor, Health Promotion and Education, School of Public Health, Loma Linda University).

29. David I. Macht, "An Experimental Pharmacological Appreciation of Leviticus XI and Deuteronomy XIV," *Bulletin of the History of Medicine*, 27(5) (1953): 444-450.

30. Glen Blix, "Unclean or Unhealthy: A Look at the Levitical Prohibition." (Unpublished document written by Prof. Glen Blix, Associate Professor, Health Promotion and Education, School of Public Health, Loma Linda University).

31. David I. Macht, "An Experimental Pharmacological Appreciation of Leviticus XI and Deuteronomy XIV," *Bulletin of the History of Medicine*, 27(5) (1953): 444-450.

32. Glen Blix, "Unclean or Unhealthy: A Look at the Levitical Prohibition." (Unpublished document written by Prof. Glen Blix, Associate Professor, Health Promotion and Education, School of Public Health, Loma Linda University).

33. Ibid.

34. Theodore H. Gaster, *The Holy and the Profane: Evolution of Jewish Folkways* (William Morrow and Co. Inc, 1955).

35. Glen Blix, "Unclean or Unhealthy: A Look at the Levitical Prohibition." (Unpublished document written by Prof. Glen Blix, Associate Professor, Health Promotion and Education, School of Public Health, Loma Linda University).

36. A. Cerami et al., "Glucose and Aging," *Scientific American* 256 (1987): 90-96.

37. T. H. Maugh, "Hazards: Browning Foods May Carry Harmful Toxins" (*Los Angeles Times*, June 10, 1996).

- ³⁸ Alfred J. Kolatch, *The Jewish Book of Why* (New York: Jonathan David Publishers Limited, 1981).
- ³⁹ Walter J. Veith, *Diet and Health: Scientific Perspectives* (Stuttgart: Medpharm Publishers, 1998).
- ⁴⁰ *New Scientist* (February 4, 1995): 29.
- ⁴¹ *Time Magazine* (January 2, 1989).
- ⁴² *New Scientist* (September 28, 1996): 5.
- ⁴³ Ibid.
- ⁴⁴ Ibid.
- ⁴⁵ Bernice Wvethrich, "El Niño Goes Critical," *New Scientist* 145(1963) (1992): 32-35.
- ⁴⁶ *New Scientist* (March 16, 1996).
- ⁴⁷ *New Scientist* (September 28, 1996).
- ⁴⁸ *Time Magazine* (January 2, 1989).
- ⁴⁹ *New Scientist* (September 28, 1996).
- ⁵⁰ *New Scientist* (February 4, 1995).
- ⁵¹ Ibid.
- ⁵² K. Arms and P. S. Camp, *Biology* (Philadelphia: Saunders College Publishing, 1995).

Bibliography

P. H. Raven and G. B. Johnson, *Biology*. 4th edition (Wm. C Brown Publishers, 1996).

New Scientist (January 13, 1996).

WRITTEN IN STONE

Archaeology and the Bible

The Genesis account of origins has led to much controversy in the course of history. There have always been those who took the Bible at its word and those who would question its claims. The Genesis account of origins has, in particular, been a bone of contention, and even from within church circles this battle has taken its toll. Darwin himself was a member of the clergy, but even long before Darwin, the churches could not find unanimity on the issue of origins. Many regarded the Biblical account of origins as allegorical or poetic and would not allow for a literal interpretation. The doctrines of **Higher criticism**, started by the theologians Richard Simon and Dr. Alexander Geddes in 1678, ripped the heart out of the Scriptures and called into question the plainest teachings on origins and history. The so-called higher critics questioned the historic references and the creation account in the writings of Moses and relegated these to the realms of mythology. This, of course, had a ripple effect on perceptions regarding the validity of the Scriptures, since if Moses was not historically correct, then every further reference by subsequent prophets and even by Jesus Himself, to

these writings must then also be mythologized. The result was that faith in the validity of the Scriptures was undermined, and a literal interpretation of these events was not only questioned, but also often ridiculed. Questioning the writings of Moses sets a dangerous precedent, since where does one draw the line in the invalidation of what is written. As Jesus Himself said,

If you believed Moses you would believe Me, for he wrote about Me. But since you do not believe what he wrote, how are you going to believe what I say? *John 5:46,47 NKJV*

Today, most churches, including the Vatican, have given their blessing to the naturalistic origin of life and even *Time Magazine* carried a caption which read: "Vatican Thinking Evolves... The Pope gives his blessing to natural selection though man's soul remains beyond science's reach." Even more astounding was the statement made by the Jesuit, Consolmagno, who in an interview with the magazine *Elm Street* in 1999 in their lead article "*And Heaven and Nature Sing*," responded to the question: "Aren't you guys all creationists?" by stating that creationism is "a 19th-century Protestant heresy. The ancient Church fathers knew better than to interpret the Bible that way." The pendulum has surely swung the other way. In Protestant circles, as well this trend is very pronounced, and a new wave, termed the 'New Reformation', is sweeping the ranks whereby the Biblical accounts are placed on a par with ancient mythologies. This is not only true for the creation account, but also for the teachings regarding Jesus Christ Himself. The virgin birth, the death and the resurrection, and the centrality of Christ with regard to salvation are mythologized and placed on a level with ancient Gnostic teachings embracing Babylonian and Egyptian cult figures.

In spite of the swing of the pendulum of faith in the veracity of the Scriptures, it cannot be denied that the Bible has greatly influenced the minds of men. It has been loved and hated, criticized

and revered. Indeed, millions have suffered torturous deaths rather than to deny its teachings. Equally as many millions have refused to believe it! There have also been numerous attempts to destroy the Scripture off the face of the earth. In the Dark Ages, Bibles were banned. It was considered a mortal sin to study its pages, and people were put to death for the crime of possessing a Bible. The printing presses of Gutenberg were destroyed because they might put the Scriptures in the hands of common man. All these attempts, and all the wars fought in the name of religion could, however, not eradicate the Word. The Historical Critical Method of Biblical interpretation not only threw doubt on the Genesis accounts, but the actual existence of the famous Bible characters such as Abraham, Moses and Daniel has also been doubted, and many of the prophetic writings were attributed to obscure scribes and scholars of much later periods. It was argued that the amazing prophecies in the Bible could not have been written by the proposed authors, since then they would have had the capacity to foretell the future, and so the writings had to have a later origin, and must have been written after the events foretold.

In spite of these attacks on the Bible, it has consistently stood the test of time, and as the science of archaeology blossomed after the discovery of the Rosetta stone, so the tablets of stone have come out in support of the words of Scripture. The historical characters of the Bible that were previously scoffed at were found inscribed in tablets of stone, and proved to be historical figures. Even the most improbable events described in Scripture find support in the numerous discoveries made at ancient archaeological sites. The Bible invites man to test it.

Despise not prophesyings. Prove all things; hold fast to that which is good. *1 Thessalonians 5:20, 21*

The Bible challenges us to examine its pages and to either prove or disprove their claims. God claims to be the *only One* able to foretell the future. Through the prophet Isaiah, He says,

Produce your cause, saith the Lord, bring forth your strong reasons ... shew us what shall happen... declare us things to come. Shew the things that are to come hereafter, that we may know that ye are gods ... *Isaiah 41:21-23*

I am God, and there is none like Me, declaring the end from the beginning! *Isaiah 46:9,10*

For this test, the Bible lays down some very specific guidelines.

When the word of the prophet shall come to pass, then shall the prophet be known, that the Lord hath truly sent him. *Jeremiah 28:9*

... if the thing follow not, nor come to pass, that is the thing which the Lord hath not spoken.
Deuteronomy 18:22

More than 50% of the Bible is in the form of prophecy, most of which has been fulfilled. This alone should be overwhelming evidence for the authenticity of the Bible, and should encourage us to trust the yet unfulfilled prophecies (incidentally, it cannot be denied that these are written before the events which are yet to unfold). Nevertheless, a study of the past will enable us to make informed judgments as to the Scriptural authenticity, and can strengthen us to believe in the future. Beside the prophetic writings, the Scriptures contain substantial historical accounts, many of which were questioned by the critics, but which have found vindication in the sands of time as unearthed by archaeologists of the past century and a half. Of course, the Bible's main task is to introduce the author of life and the path to salvation. Knowledge of science and history cannot save one, but the steady unfolding of prophecy and the unearthing of the historic record can strengthen one's faith in the Bible as the Word of God. The

well-known archaeologist, Professor Nelson Glueck was once asked if any discovery had been made that contradicted the Bible. His answer may come as a surprise to some:

No, not one! It may be stated categorically that no archaeological discovery has ever controverted a Biblical reference. Scores of archaeological findings have been made which confirm in clear outline or in exact detail historical statements in the Bible..... The archaeologist today is correcting much of what the historian said – but the archaeologist has never had to correct anything the Bible has said about these ancient cities.

Another famous archaeologist, Professor W.F. Albright, said:

During these 15 years, my initially rather skeptical attitude towards the accuracy of Israelite historical tradition has suffered repeated jolts, as discovery after discovery confirmed the historicity of the details which might reasonably have been considered legendary Thanks to modern research we now recognize its (i.e. the Bible's) substantial historicity. The narratives of the patriarchs, of Moses and the Exodus, the conquest of Canaan ... have all been confirmed and illustrated to an extent that I should have thought impossible 40 years ago.¹

Since it is unbelief in the Genesis account of origins which has led many to doubt the veracity of the remainder of the Scriptures, it may be useful to briefly outline some of the amazing discoveries which archaeologists have made which underscore the authenticity of the Biblical accounts. Since the Biblical prophecies and historic accounts are the foundation pillars upon which the authenticity of

the Bible must be measured, and since it is these very pillars that are questioned by the critics, a brief study of these may throw some light on the question of the trustworthiness of the Scriptures.

The Bible and History

The Rosetta Stone: For many centuries, the history of ancient civilizations lay buried under sands of time and even the information that was available could not be deciphered because the ancient languages and writings were not understood. In Egypt, the inscriptions were veiled in mystery because the art of reading the hieroglyphics had been lost. However, this situation was dramatically changed when Napoleon invaded Egypt in 1798. Shortly afterwards in 1799, one of his scientists discovered a flat stone with three different languages on it at a place called Rosetta (its modern name is Rashid). After careful investigation they discovered that it carried an identical message in three different languages. At the bottom was Greek, in the middle Demotic (Egyptian phonetic) and on top hieroglyphics. Deciphering the ancient writing was a major task and it took a man by the name of Jean Francois Champollion 22 years to complete this task. It is thus only for the last 100 years that the mysteries of ancient civilizations are being unfolded. Today, it is possible to not only read hieroglyphics, but also the ancient cuneiform writings. Astoundingly, the ancient relics have succeeded in silencing many of the Biblical critics and the harmony between Scripture and archaeological findings has shed new light upon these ancient records.

The Ebla Tablets: Prior to the advent of modern archaeology, knowledge of the ancient civilizations was fragmentary and the only records of kings, kingdoms and wars were those preserved in ancient manuscripts and in many cases the only records were those, which were recorded in the Bible. The Biblical record was often brushed aside as unreliable and other sources of information were advanced as authentic,

particularly if the records were in conflict with each other. It was also argued that the Bible was written by unknown scribes and that much of the information had been lost or changed over time.

Prior to modern archaeological endeavors, names of certain kingdoms, cities and patriarchs were known only from the Scriptures, names such as Sodom and Gomorrah, numerous Bible places, and names of kings and records of their wars, defeats and victories. Bible critics had a field day with these Biblical records until some major archaeological discoveries shook the world and vindicated the Bible at every turn. Pet theories had to be laid aside as the names of these hitherto unknown characters were found inscribed in stone. A major discovery was made as recently as 1964, when the ancient records of the kingdom of Ebla were discovered at Tel Mardikh near the present city of Idleb in Syria.

Excavation were carried out at Tel Mardikh by a team of archaeologists headed by Prof. Paul Mathia of the University of Rome, which resulted in the one of the most significant discoveries in modern Archaeology. The so-called Ebla tablets (the official records of the kingdom of Ebla) were discovered and date from 2300-2400 BC. These records are recorded on over 14,000 clay tablets and contain records of Sodom and Gomorrah, previously only known from the Bible records. Moreover, regarding these cities and the circumstances surrounding their destruction, archaeologists made a tremendous breakthrough when they excavated and identified the cave where they believed Lot lived after he fled from the destruction of these cities. Moreover, the sites of ancient Sodom and Gomorrah, called Bab ed Dhra and Nuweira have also been identified.

Besides references to Sodom and Gomorrah, the Ebla tablets list numerous Bible places, the names of Esau, Abraham, Israel, Sinai and Jerusalem. The name of Ebla is also recorded on the temple walls at Karnak in the Valley of the Kings and it is known that it was destroyed twice, once by Sargon I in 2300 BC and then by the Hittites in 1000 BC. Incidentally, before the science of archaeology unearthed numerous records and artifacts from the Hittite Kingdom,

even its very existence was doubted, since the only record of this once mighty kingdom that even dominated Egypt for a while was to be found in the pages of Scripture.

The Dead Sea Scrolls: One of the most amazing discoveries of our time must be the discovery of the Dead Sea Scrolls in the Qumran caves. The scrolls were written by the Essenes who lived there in the time of Christ, and some believe that they had an influence on John the Baptist and even Jesus himself. However, this is highly unlikely, since Gnostic elements formed part of their belief systems and besides the canonical writings the Dead Sea Scrolls also include many apocryphal writings. The Dead Sea scrolls are largely kept in the museums of the world, with the bulk of the scrolls being housed in Israel at the Rockefeller and Shrine of the Book Museums but some significant portions are also housed in the Archaeological Museum of Jordan, which is built on the citadel in Amman where the ancient Ammon Rabba, the once Ammonite capital where Uriah the Hittite died, stood.

Qumran lies northwest of the Dead Sea between Jericho and 'Ain Geddi, and the ruins of the town itself have been excavated in order to throw light on the community involved with the scrolls. The Essenes were a Jewish sect tainted with Gnosticism and Hellenism who wanted to bring forth the Messiah and who practiced scrupulous ritual purity. The sect probably never had more than some 4000 members and was spread over the former province of Syro-Palestine but they preferred to live in isolated communities. They formed secret societies within towns, the best known of these being the community of Damascus. The Essenes were wiped out during the period of Roman repression at the time of the Jewish revolt in 69-70 AD.

The discovery of the scrolls at Qumran was made as late as 1947, when Támireh Bedouin found jars containing scrolls in the caves and clefts of the cliff face at Qumran. This discovery was extremely fortuitous and was made when a young Bedouin by the name of Mohammed adh-Dhib lost a sheep and threw stones into the caves

in order to see if it had perchance strayed into one of these recesses. One of the stones broke the clay jar in which scrolls were contained and the sound of breaking pottery attracted his attention.

Eleven caves yielded ten complete scrolls in the form of rectangles of kidskin sewn together and rolled up. The pottery jars in which they were stored were long and narrow and were specifically made for the purpose of storage of the scrolls. Beside the complete scrolls, 600 further manuscripts have been found in 50 broken jars, but most of these were badly damaged by decay, rats and insects. However, thousands (more than 100 000) of small fragments were salvaged and are still being pieced together.

The scrolls are a veritable library and were written in Hebrew, Aramaic and Greek. Portions of every book in the Old Testament, with the exception of the book of Esther have been found. Also found were the records of the Essenes and the eschatological texts titled “Conduct of the war waged by the Sons of Light against the Sons of Darkness”, the “Rule” and the “Hymns”. Some copper scrolls (up to 2.4 meters long) were also found engraved with Aramaic ‘square’ script giving details of treasure troves hidden in Palestine. However all attempts to find these so-called treasures have failed to date. Moreover, some believe that the copper scrolls do not form part of the original scrolls but date from a later period coinciding with the second Jewish revolt in 135 AD.

It was thought by some that these 2000-year-old manuscripts would show that the Bible had changed significantly over time and that its reliability was therefore questionable. The discovery of the complete Isaiah scroll showed, however, that the scrolls contents was exactly the same as the present book of Isaiah in the Bible. Moreover, the fragments of the scrolls of the book of Daniel show that the great prophecies of Daniel could not have been written after the events, and also the dialect of the Aramaic used in these scrolls dates from the Persian period and authentically dates the writing of the Daniel scrolls (part of which were written in Hebrew and parts in Aramaic) to the Persian period. This totally eliminates the critic’s

arguments that these books date from a later period.

Chronology of nations: The critics often doubt Biblical chronology, but even ancient secular writers support the Scriptural chronology. One such example relates to the founding of the original Babylon which Biblical chronology dates to a time period after the division of the earth in the time of Peleg.

The Hebrew word for earth which is used in this text is ‘*erets*’, which can also mean nation. In other words, it could be interpreted as the division into nations at the tower of Babel event after the flood, and the date is to be sought in the time of Peleg around 2247 BC. This date is not a date which Biblical critics would accept; however, when Alexander the Great defeated Darius at Gaugmela near Arbela, he also entered Babylon. Writings covering 1013 years of astronomical observation were handed to him by the Chaldeans which they claimed dated from the founding of Babylon. This would place the founding of Babylon in 2234 BC which is exactly in line with the Biblical chronology. This was documented by De Caelo, by Simplicius, a Latin writer in the 6th century AD, and Porphyry (who was an anti-Christian Greek philosopher, c. 234-305 AD) supports the same date.²

Constantinus Manasses, a Byzantine chronicler, wrote that the Egyptian state lasted 1663 years. Counting back from the conquest of Egypt in 526 BC by Cambyses, king of Persia, this would give a date for the founding of Egypt of 2188 BC, 60 years after the birth of Peleg. The origin of the Greek nation is given by Eusebius of Caesarea to be 2089 BC, when the king of the city of Sicyon began to reign some 160 years after Peleg. These secular dates confirm the veracity of the Biblical chronology and also place Babylon first, followed by Egypt and then Greece, exactly as it is described in the Bible. Moreover, since the dawn of Archaeology, researchers have drastically reduced the chronologies of these ancient cultures, as more and more information is unearthed. Kings that in the past were placed in chronological sequence by secular historians have now been found to have been co-rulers (father and sons controlling various

provinces) and the times allocated to these various dynasties have thus had to be reduced, bringing them more and more into line with the Biblical chronology.

Egypt

The Bible stories concerning the relationship of God's people with Egypt have been subject to much ridicule. Higher critics regarded such stories as the account of Joseph who became second in command in all of Egypt, and the Exodus, as belonging to the realms of mythology. The stones of archaeology were silent witnesses to the dramas of the past, and it was only after 1799, when the Rosetta stone was discovered that the ancient records could be deciphered. Concerning the story of Joseph, it is known that the Semitic Hyksos overthrew the Egyptian dynasties from the year 1780 BC to 1545 BC, a period of just over a quarter of a century. During this time, it would have been possible for a Semite to reach the position of prestige occupied by Joseph. In recent times, frescoes have been found in Egyptian tombs depicting fat and thin cows, and inscriptions have been found referring to seven lean and seven opulent years, making this Biblical story more than just a myth. The inscriptions found at the first cataract of the Nile, which support the story of Joseph, read:

I collected corn... I was watchful in times of sowing. And when famine arose lasting many years, I distributed corn. ... The Nile has not overflowed for a period of seven years...Herbage fails... The storehouses were built... All that was in them has been consumed.³

The Exodus and the Eighteenth Dynasty: One of the most exciting stories in Scripture, however, concerns that of the exodus. The

exodus must have caused a major upheaval in Egypt, yet the records (other than the Biblical one) are strangely silent as to these events. Moreover, there is considerable controversy as to the date of the exodus. The Bible texts requiring a date in the middle of the 15th century BC and archaeological data suggesting a much later date in the 13th century. Raamses II is often associated with the exodus because of Biblical references to the building of the City of Raamses (also spelt Rameses) by the Israelites, but these references do not seem to refer to the city located at Tanis, and the Bible also does not employ the name Raamses with the same chronological specificity employed in Egyptian texts. None of the other circumstances regarding the exodus seem to apply to the Raamses period either. One of the most detailed accounts of the Biblical chronology and the events surrounding the exodus are to be found in an article written by Prof. William Shea in the International Standard Bible Encyclopedia, revised edition. This article also provides substantive evidence for associating the exodus with the Eighteenth Dynasty of the earlier 15th century.⁴

The main Biblical evidence for the 15th century date is the text which is found in 1 Kings, where the date of the exodus is given with reference to Solomon's reign. In this text, even the month is given, and given that Solomon reigned from 971-931 BC, this would date the exodus *ca.* 1450.

And it came to pass in the four hundred and eightieth year after the children of Israel were come out of the land of Egypt, in the fourth year of Solomon's reign over Israel, in the month Zif, which [is] the second month, that he began to build the house of the Lord. *1 Kings 6:1*

The correlation of the Egyptian data with this date must also be based on sound criteria, and in the case of the eighteenth Dynasty, this is indeed the case. The dates and chronology of this

dynasty have been established by using Sothic cycle dates, new moon dates and the highest-numbered regnal years for each of the kings of this period.⁵ In the light of the fact that Egyptian records of defeats and embarrassments are largely lacking from their writings, the deciphering of events can be likened to a detective story, and the true history has to be gleaned from what is written between the lines.

According to the Biblical chronology, Moses was born in 1530 BC, and this date would place his birth in time when Tutmoses I reigned, since he ruled from 1532 to 1508 BC. Tutmoses I was the third pharaoh of the eighteenth dynasty, the first being Amoses (the moon is born) 1570 to 1553 BC, followed by Amenhotep (Amun is pleased) 1553 to 1532 BC, who was the father of Tutmoses I. The pharaoh who must have issued the decree that all the sons born to the Israelites were to be thrown into the river, but that girls were permitted to live (*Exodus 1:22*), must thus have been Tutmoses I. Aaron, the brother of Moses was born in 1533 BC, just prior to the reign of Tutmoses I, and he had thus escaped the vicious decree. Tutmoses I fits the bill very well for a pharaoh who would have issued such a harsh decree. Prior to this pharaoh's time, the 18th Dynasty had defeated the Hyksos and it was only in the time of Tutmoses I that the kingdom really became established, and he enlarged the kingdom until it encompassed the territory stretching from the Euphrates to the Fifth Cataract of the Nile. His character also fits that of the pharaoh of the death decree, since he was known for his harshness, and he even hung the head of his executed Nubian enemy from the bow of his barge. The hieroglyphic records also confirm that Tutmoses I was the first pharaoh to introduce Semitic slave labor. Moreover, he had a daughter named Hatshepsut who would later play a prominent role, even becoming pharaoh herself. This very daughter could thus have been the princess that found the baby Moses in the basket floating on the Nile, and she could also have been instrumental in persuading her father not only to save Moses but also to rescind his death decree on the Hebrew baby boys. In *Exodus*, we read about the pharaoh that subjected

the Israelites to slave labor and also proclaimed the death decree regarding the sons born to the Israelites.

And Joseph died, and all his brethren, and all that generation. And the children of Israel were fruitful, and increased abundantly, and multiplied, and waxed exceeding mighty; and the land was filled with them. Now there arose up a new king over Egypt, which knew not Joseph. And he said unto his people, Behold, the people of the children of Israel *are* more and mightier than we: Come on, let us deal wisely with them; lest they multiply, and it come to pass, that, when there falleth out any war, they join also unto our enemies, and fight against us, and *so* get them up out of the land. Therefore they did set over them taskmasters to afflict them with their burdens. And they built for Pharaoh treasure cities, Pithom and Raamses. *Exodus 1:6-11*

Then Pharaoh gave this order to all his people: Every boy that is born, you must throw into the river, but let every girl live. *Exodus 1:22 NKJV*

If Moses became the adopted stepson of Hatshepsut, then he would have been trained in all the wisdom of the Egyptians and theoretically he could also have been in line for the throne, which is suggested in the Bible and also in the writings of Josephus.

And Moses was learned in all the wisdom of the Egyptians, and was mighty in words and in deeds. *Acts 7:22*

By faith Moses, when he was come to years, refused to be called the son of Pharaoh's daughter;

Choosing rather to suffer affliction with the people of God, than to enjoy the pleasures of sin for a season. *Hebrews 11:24,25*

The pharaoh succeeding Tutmoses I could thus theoretically have been Moses, but he refused the throne as suggested in *Hebrews 11:24*. The reason for his refusal can be sought in his religion, since he was nursed by his real mother. He was also trained in the Hebrew religion, but to become pharaoh he would have had to adopt the Egyptian polytheistic religion, which he refused, preferring to suffer affliction with his own people. This could explain why Tutmoses II, who was the husband of Hatshepsut, became the next pharaoh. But he died after just four years on the throne. Hatshepsut herself ruled as pharaoh from 1504-1482 BC, and as co-regent she had Tutmoses III (an extramarital son of her husband Tutmoses II), who also commenced his rule at the same time as Hatshepsut. Tutmoses III ruled from 1504-1450 BC, and the date of his death coincides exactly with that of the Exodus. This situation makes for an interesting scenario, since the two co rulers seem to have been in conflict with each other. Tutmoses III began to assert himself in the latter part of Hatshepsut's reign, and in 1488 BC, the last reference to Senmut, Hatshepsut's prime minister is recorded. He could have been deposed to give Tutmoses III full control of the throne. Tutmoses III eventually became the most powerful pharaoh of all time and he was also called the Napoleon of Egypt.

In 1488 BC, after 16 years of co-rulership, not only was the prime minister of Hatshepsut deposed of, but also all official documentation concerning Hatshepsut herself ceased. Why? Is it possible that she was ostracized for sympathizing with the Israelites, or could she even have changed her religious views and leaned towards monotheism? Hatshepsut was a powerful ruler, and she was not deposed in 1488 BC, but six years later in 1482 BC, she and all her officials were finally murdered.

In ancient times, regents were also considered gods, and

kingship and religion worked in unison with each other. The pagan priesthood had a powerful and influential position in the courts of kings, and a change of religion would have met with great opposition. Tutmoses III was not only pharaoh, but he was a powerful religious figure as well. Under Tutmoses III, the Guidebook to the Netherworld, the so-called Amduat, which presents the Egyptian view of the underworld, was formulated, and it first appears in his royal tomb.⁶ This guidebook can be likened to the “Egyptian Bible”, and it is still a much-revered document in occult circles today. Is it possible that this pharaoh, who is considered to be the father of occultism, could have been the very pharaoh that was to clash with the monotheistic religion of the Hebrews?

During her reign, Hatshepsut was a creative builder and she erected many temples throughout Egypt. She was also known for establishing trade links with distant countries. Her mortuary temple, Deir el Bahri, also reveals some interesting secrets. In this temple and at Karnak, the reliefs of Hatshepsut have been chiseled out of the walls, as if the memory of her was to be obliterated from history. Some murals of her still exist, but these date from earlier periods where she was still associated with the Egyptian deities. One such mural shows her drinking milk from the holy cow Hathor.

The Bible states that Moses fled Egypt because he feared the wrath of pharaoh after he killed an Egyptian overseer.

And when he was full forty years old, it came into his heart to visit his brethren the children of Israel. And seeing one *of them* suffer wrong, he defended *him*, and avenged him that was oppressed, and smote the Egyptian: For he supposed his brethren would have understood how that God by his hand would deliver them: but they understood not.

Acts 7:23-25

According to Biblical chronology, Moses fled Egypt forty years

after his birth in 1490 BC (Remember, we have to calculate backwards, as we are dealing with the time before Christ). *Exodus 2:15* tells us about pharaoh's reaction:

When pharaoh heard of this [the killing of an Egyptian], he tried to kill Moses, but Moses fled from pharaoh, and went to live in Midian. *Exodus 2:15*

Now, from which pharaoh did he flee, since there were two ruling at that time? The obvious conclusion would be that he fled from the wrath of Tutmoses III. The escape of Moses could further have fomented the hatred that this pharaoh felt for Hatshepsut, but it took two more years for him to depose her and a further six before she was finally eradicated. Hatshepsut thus died whilst Moses was in exile in Midian. It was here in Midian of Sinai that the Lord revealed Himself to Moses. Moses heard about the death of Hatshepsut while he was in exile, and her death is recorded in his writings.

And it came to pass in process of time, that the king of Egypt died: and the children of Israel sighed by reason of the bondage, and they cried, and their cry came up unto God by reason of the bondage. *Exodus 2:23*

The death of Hatshepsut must have removed the last vestige of protection that the people of Israel had and their burdens of bondage must have been increased greatly under the rule of Tutmoses III who was now the sole regent. Moses had great compassion for his people, as is evident from the beautiful Psalm which he wrote during his exile.

Return, O Lord, how long? and let it repent thee concerning thy servants. O satisfy us early with thy mercy; that we may rejoice and be glad all our days.

Make us glad according to the days *wherein* thou hast afflicted us, *and* the years *wherein* we have seen evil. Let thy work appear unto thy servants, and thy glory unto their children. And let the beauty of the Lord our God be upon us: and establish thou the work of our hands upon us; yea, the work of our hands establish thou it. *Psalm 90:13-17*

The Bible records how pharaoh suppressed the children of Israel in the most cruel fashion. It is no wonder that Moses feared this pharaoh who was also responsible for the assassination of his stepmother Hatshepsut, and it is understandable that he was reluctant to return to Egypt and to face his former enemy who was now the sole regent in Egypt. Since this pharaoh was also the father of the Egyptian religious writings concerning the underworld and militarily speaking the most powerful of all the pharaoh's that had ruled in Egypt, he would suit the bill perfectly with regard to a clash between truth and error. Also the clash between the priesthood of Egypt and the God of Israel would make sense, since it would represent a clash between sorcery and faith.

It was thus in the year 1450 BC that God told Moses to go back to Egypt and tell Tutmoses III: "Let my people go!", but Tutmoses III replied haughtily.

...Who is the Lord, that I should obey him and let Israel go? I do not know the Lord and I will not let Israel go. *Exodus 5:2*

God's answer to this stubborn refusal was to send the plagues in order to humble him and to lead the Egyptians to repentance. He also demonstrated His superiority over the Egyptian deities. For instance, they worshipped the Nile and called it Hapi and Iru, but their Nile god was turned into blood. They also worshipped insects, such as the dung beetle as manifestations of god (a form of pantheism), but during the

third and fourth plagues insects were turned against them. They worshipped cattle such as cows (a system still practiced in eastern religions today), but during the fifth plague these beasts all died. In the final plague, all the first born of Egypt died, their own cruelty was turned against them and they were at the receiving end of the same decrees that pharaoh's had dared to utter. However, God being a compassionate God, provided a way out and any Egyptian that sought refuge amongst the children of Israel could be saved from this destruction just as the children of Israel were spared. The children of Israel themselves were subject the same requirements, and they were also only spared from the plague if they painted the blood of the Passover lamb on the doorposts of their dwellings. Only those were saved on that fateful day who had placed themselves under the protection of the blood of the Passover lamb.

The greatest miracle of antiquity took place when God led His two million redeemed slaves through the waters of the Red Sea. The Bible also gives us the exact date when the Israelites celebrated their first Passover. It was the 14th day of the Abib, later called Nisan, which corresponds with the month of March. Three days later they passed through the Red sea. This brings us to March 17, 1450 BC.

The date of the death of Tutmoses III is exactly in line with the recorded date of the exodus in 1450 BC. According to the chronology in *1 Kings 6:1*, the exodus, as we have seen, took place on the 17th of March 1450 BC. The Bible tells us that the pharaoh then ruling (Tutmoses III) followed the Israelites through the Red Sea, and that he was killed in the process and this date can be verified independently by the Egyptian writings.

Breasted, the famous Egyptologist, studied the biography of Tutmoses III written by Amenemhab who wrote:

Lo, the king completes his lifetime of many years,
splendid in valour, in might and triumph: from
year 1 to 54.

Calculating from 1504 to 1450, a reign of 54 years, brings us precisely to the date of the Exodus. Amenemhab also mentions the month and the day of his death:

The last day of the third month of the second season...He mounted to heaven, he joined the sun: the divine limbs mingled with him who begat him.

According to Breasted, this translates to the 17th of March 1450 BC. There are no references to his mode of death in the Egyptian writings, but none need to be expected, since this would be contrary to Egyptian propaganda, which could not admit to such misfortune, particularly since, in the theology of kingship, the pharaoh was regarded as a god, the incarnation of Horus. If this pharaoh died in the Red Sea, together with his entire army, then it is possible that his body was not recovered, but there is a mummy in the Cairo Museum which bears his name. This mummy of Tutmoses III in the Cairo museum was, however, examined by two Egyptologists, Harris and Weeks in 1973 and found to be a mummy of a young man in his forties, whereas Tutmoses III must have been much older.⁷

Egyptians had a way of disguising their embarrassments. This pharaoh was probably never recovered from the Red Sea, and to hide this fact from posterity, a fake mummy was put in his place. To further support this argument, there is more circumstantial evidence that can be gleaned from the eighteenth dynasty. The next pharaoh after Tutmoses III was his son Amenothep II who previously was co-ruler together with his father. The record tells us that he became co-ruler of Egypt with his father in 1453 BC, and was crowned as the sole ruler of Egypt in June 1450 BC. Now if his father died in March 1450, why did he only take over the reigns in June of that year? The reason is that he was not in Egypt at the time of the exodus, but he was suppressing a revolt in Syro-Palestine with the bulk of the Egyptian army and only returned to Egypt in June of 1450 BC. Upon his return, he apparently defaced many Egyptian monuments and this act needs an explanation. The Bible tells

us that all the first-born in Egypt died in the last plague. On returning to Egypt, he would thus have found not only the Israelites gone, but also he would have found his father dead, and his first-born son killed in the plague, and this could explain his anger. On his arrival at Memphis he was so bitter that he decapitated a few Semitic prisoners of war (Amenemhab records the beheading of seven kings of Tikshi) from Syro-Palestine and displayed their heads on the walls of Karnack. Moreover, he probably made an example of these captives in order to discourage any further revolts, particularly since all the Israelites had defied the Egyptian authority and had also left Egypt.

The fact that Amenhotep II was on a campaign in Syro-Palestine could also explain why Moses confronted Tutmoses III in the Delta region and not in the capital city of the kings which is in the south of Egypt. Tutmoses III probably accompanied his son to the north of Egypt and sent him on the campaign whilst he stayed in the delta region to await his return. Moreover, the revolt in Syro-Palestine could be one of the reasons why he refused to let the Israelites go. Also, the location and circumstances concerned has impact on the route of the exodus, which took the long route rather than the direct road to Canaan. In *Exodus 13:17* a possible reason (beside the lessons of trust that had to learnt on the way) for the chosen route is given.

And it came to pass, when Pharaoh had let the people go, that God led them not *[through]* the way of the land of the Philistines, although that *was* near; for God said, Lest peradventure the people repent when they see war, and they return to Egypt: But God led the people about, *[through]* the way of the wilderness of the Red sea: and the children of Israel went up harnessed out of the land of Egypt.
Exodus 13:17-18

What war is this text talking about? The most likely explanation is that they would have faced Amenhotep II with his army

who was returning south, had they ventured along the shorter route. God thus led His people on a detour through the Sinai Desert to the Promised Land in order to avoid a bloody confrontation. Also very unusual is the Egyptian text which is associated with the end of this pharaoh's reign where he expresses his hatred for the Semites as well as referring to magicians, which could reflect the contest between the magicians of Egypt and Moses.⁸

The next pharaoh to rule Egypt was Tutmoses IV, who was the second born son of Amenhotep II. According to succession rights, the first-born and heir apparent should have become pharaoh. To explain this apparent anomaly, there is an inscription on the Stela between the legs of the Sphinx (The Sphinx represented the Egyptian god Harmachis), which tells the story of how the second-born son became pharaoh in the place of the first-born. Apparently, Tutmoses IV was resting between the legs of the Sphinx after returning from a hunting expedition, when he heard a voice telling him to clear the sand from between the legs of the Sphinx, and the Sphinx would see to it that he, rather than the first-born, would be pharaoh. This is an unlikely story, and a further demonstration of attempts to cloud the issue, so that the embarrassment of the tenth plague should not be made public to the descendants.

The Amarna Period: Events as dramatic as the exodus and the awesome demonstration of the power of God in the outpouring of the ten plagues must have left their mark in Egypt. There could be no denying that the God of Israel was superior in power to all the gods of Egypt that had been humiliated during this contest. One wonders why the record is so silent regarding the impact of these events; or is there hidden between the lines of recorded Egyptian history any indication of a change of heart in that once mighty nation? Yes there is; monotheistic worship did not die with the death of Hatshepsut, but during the Amarna Period of the eighteenth dynasty, monotheism again surfaced in Egypt. The pharaoh after Tutmoses IV was Amenhotep III, the son of Tutmoses IV. We will

never know the full extent of what happened in the minds of these pharaohs, but Tutmoses IV had witnessed the entire contest and had ascended the throne because his brother had died in the plague. These issues must have left their mark on that family, because there is to be found a dramatic shift in the religion of Egypt during the reign of his son Amenhotep III.

Amenhotep III left Karnack and built his palace on the western side of the Nile. The biography of this pharaoh shows that he began to move away from the worship of Amun as the most prominent god in the Egyptian pantheon of gods, and that from this time period the name of “Aten”, the symbol of the unseen Creator God, became more prominent. During the reign of his son, Amenhotep IV (the name still contains the reference to the god Amun as the controlling god in his life), the religion of Egypt shifted from the worship of Amun to that of Aten. Atenism was the worship of the one Creator God. The symbol of the sun and its rays was used to describe Aten’s care for mankind. The sun was not worshipped in Atenism, but served merely as a symbol. Amenhotep IV, however, changed his name to Akhenaten, which implies a change of religion, in that Amun was no longer his god but Aten. His wife was the famous Nefertiti, which means ‘maiden of joy’.

Not only did he change his name, but also he moved away from Thebes where all the Egyptian gods were worshipped and built a new capital and a new center of worship to the north called Akhetaten which today is called Tel-el-Amarna. This site is most interesting, since it was here where the Amarna tablets with their cuneiform inscriptions were found which contained pleas for help from the kings of Palestine to come and rescue them from the invading Habiru (Hebrews), a further vindication of the truthfulness of the Scriptural historic records. Akhetaten, which means the Horizon of Aten, thus became the new capital where monotheism replaced the Egyptian pantheon of gods. But again this shift produced strife, and history shows that this new religious emphasis was eradicated by force. Just as in the case of Hatshepsut, Akhenaten and his

wife were murdered and archaeologists are only recently piecing this history together. Akhenaten left an astounding legacy behind and one scholar by the name of Lionel Casson says he was the sole pharaoh in Egypt's history to boast the distinction of an intellectual. Under his influence, Egyptian culture experienced a period of realism. Statues of this pharaoh and his family were no longer depicted as larger than life, but portrayed him with all his defects, and his wife and children were also portrayed in a loving bonding relationship with the pharaoh.

Akhenaten's theology was in conflict with the traditional Egyptian belief and he broke away from all the old traditions. Whilst all the previous pharaohs built their tombs on the western side of the Nile, Akhenaten built his tomb on the eastern side. Archaeologists also excavated a beautiful hymn, which he wrote concerning the Creator and His creation. What is so amazing about this hymn is the fact that 17 lines correspond perfectly with 17 lines of Psalm 104, a psalm written by Moses in honor of the Creator God and this strongly suggests that his sympathies lay with the God of Israel. Moreover, Akhenaten introduced a new word in Egypt called Maat, which means 'truth', and in all the murals of him and his family he chose to display the beauty of family relationships rather than material achievements. In one engraving, Akhenaten and his wife are shown hugging and kissing the first three of his six daughters, Meritaten, Meketaten and Ankesenpaten. All the names also end in 'Aten' in honor of his God, but after the murder of Akhenaten and his wife Nefertiti, the names of his children revert to Amun, which again implies a reversal to the old form of religion.

One of Akhenaten's daughters, Ankensenpaaten, was engaged to a young man by the name of Tutankaten. Upon the death of Akhenaten, Tutankaten was to become the next pharaoh. However, his change of name to Tutankamun indicates that his continued reign was subject to the change of his religion. The greatest archaeological finds concern this pharaoh and tell the story of a splendid reign of short duration. The question one might ask is whether it was

worth giving up the truth for the sake of earthly glory. The defacing of the statues associated with the reign of Akhenaten again demonstrates the hatred and rivalry between idolatry and the worship of the Creator God.

Tutankaten, which means 'in the living image of Aten', changed his name to Tutankamun, which means 'in the living image of Amun', but the history of his short reign is still poorly understood and some scholars believe he was also murdered. His famous tomb was discovered in the Valley of the Kings on November 25, 1922 when Howard Carter and Lord Carnarvon were the first to gaze upon the most incredible burial treasures ever discovered. Most of these treasures are today housed in the Cairo Museum. What is really astounding is that there are two royal thrones amongst these treasures, which tell the story of a change of religion and heart. One of these portrays Egyptian polytheism, and the other is his famous monotheistic throne, which still reflects the symbols of Atenism. At this stage he was still called Tutankaten, meaning 'in the living image of Aten', and his wife, the daughter of Akhenaten and Nefertiti, was still called Ankensenpaaten before her name also changed to Ankensenamun.

The story of the 18th Dynasty is a vivid reminder of the conflict between truth and error. The veracity of the Bible may be doubted by some, but the history recorded in its pages is verified by what archaeologists have been able to glean from the stones of time.

The Fall of Jericho

The fall of Jericho is another of those amazing Bible stories, which are so often greeted with incredulity. According to the Scriptural record the walls of Jericho came tumbling down without human intervention. After excavations carried out in the 1950s, the British archaeologist Kathleen Kenyon concluded:

It is a sad fact that the town walls of the late Bronze

Age, within which falls the period of Jericho, therefore, has thrown no light on the walls of Jericho of which the destruction is so vividly described in the Book of Joshua.^{9,10}

In spite of this conclusion, the evidence that has been mounting suggests that conclusions of Kenyon were premature. Firstly, her date was not in line with Biblical chronology and it appears that the destruction took place around 1400 BC.¹¹ The tell (mound containing the remains of ancient cities) contains evidence that Jericho had tremendous walls, just as Moses had told the children of Israel the walls of the enemies would be (*Deuteronomy 9:1*). Excavations show that the walls of Jericho consisted of a retaining wall some four to five meters high and on top of that there was a further wall built of mud brick approximately two meters thick and up to eight meters high. A similar wall was situated at the crest of the embankment 14 meters above the base of the first wall. These were formidable walls, and according to the records of the German archaeological teams, the population of Jericho lived not only within the inner walls, but also lived on the embankment between the inner and the outer wall.¹² The city also had a spring and according to *Joshua 3:15*, the harvest had been gathered, so the people of Jericho were well equipped to handle a siege.

The work of Kenyon was concentrated on the west end of the city where she reported piles of bricks reaching nearly the top of the lower wall, and these probably came from the top wall. The bricks are thus evidence of a fallen city wall. Again, according to the Bible, Rahab's house formed part of the wall and it was promised that this house would be spared (*Joshua 2:12-21; 6:17, 22-23*) and that she and her family would be spared. Now it is interesting, that the German excavation team of 1907-1909 found that a short stretch of the wall on the northern side did not fall as did the rest, and that a portion was still standing to a height of over two meters, and what is more, there were houses built up against the wall.¹³ Excavations have thus shown that the Israelites could have entered the city after the collapse of the inner wall and brick outer wall which then formed

a natural ramp against the outer retaining wall. The invaders then climbed up and over the ramp into the city.

So the people shouted when [the priests] blew with the trumpets: and it came to pass, when the people heard the sound of the trumpet, and the people shouted with a great shout, that the wall fell down flat, so that the people went up into the city, every man straight before him, and they took the city.
Joshua 6:20

According to *Joshua 6:24*, the Israelites then burned the city and archaeology has verified this fact as well. Excavations that have been carried out on the east side of the city show an extensive layer of ash and debris approximately one meter thick. Kenyon writes:

The destruction was complete. Walls and floors blackened or reddened by fire, and every room was filled with fallen brick, timbers, and household utensils; in most rooms the fallen debris was burnt, but the collapse of the walls of the eastern rooms seems to have taken place before they were affected by the fire.¹⁴

Moreover, many storage jars full of grain were found in the ruins, which is most unusual, as this would have been considered plunder by any invading army. Not only does this confirm the Bible statements regarding the harvest, but also confirms that plunder was not taken, according to the command of Joshua. These extraordinary findings once again confirm the veracity of the Bible by proving that a heavily fortified city with an abundance of food and water fell suddenly to the invading Israelites, and that the city was burnt without being plundered exactly as described in the Bible.

The Bible and Prophecy

The science of archaeology is not only confirming historic data, but also the ancient Biblical prophecies regarding the kingdoms and cities of antiquity have been shown to be absolutely accurate. The trustworthiness of all the fulfilled prophecies in the Bible underscores the trustworthiness of the prophecies that need yet to be fulfilled, and provides a foundation upon which to build one's faith. Some of the ancient prophecies are amazing, and yet they have been fulfilled to the letter. In fact, one is filled with a sense of awe when tracing the events foretold in the annals of history. Let us briefly look at three ancient prophecies to demonstrate this point, those regarding Babylon, Tyre, and Petra.

Babylon: In 689 BC, the Assyrian king Sennacherib ruthlessly destroyed Babylon, but the Assyrian empire eventually came to an end when Nabopolassar, along with his son Nebuchadnezzar and Cyaxares, the Median ruler of Ecbatana defeated them. It was Nebuchadnezzar (Nabu-kudurri-ussur) who had the dream described in Daniel 2, and he was to become one of the most powerful rulers of antiquity, but for 2600 years virtually all the knowledge about this man was obtained from the Bible and the writings of Josephus. In 1956, however, the Babylonian Chronicle was discovered describing the events of the first 11 years of his reign. In 605 BC, he defeated the Egyptians and the rest of the Assyrian army at Carchemish on the upper Euphrates River. He then conquered the rest of Syro-Palestine, and Jerusalem surrendered to him in 605 BC in which year he also took the Jewish hostages, including Daniel and his three friends, to Babylon. Jerusalem was, however, rebellious, and Nebuchadnezzar punished it again in 596 BC, and on this occasion he took the prophet Ezekiel along with 10,000 citizens as well as the king captive to Babylon and in 586 BC Jerusalem was finally destroyed after a siege of two years.

The dream described in Daniel 2, which brought Nebuchad-

nezzar face to face with the omnipotence of God, and Babylon had every opportunity to acquaint itself with the Creator God, but eventually they rejected the light that they had been privileged to receive. According to the Scriptures, Nebuchadnezzar himself finally did accept that God controlled the destiny of nations, but initially he challenged the prophecy that the head of gold (the kingdom of Babylon) would be replaced by another kingdom. In defiance of the prophecy, he built an image that was made of gold from head to foot in 593 BC. A further reason for enforcing the worship of his image can be gleaned from a clay tablet that was translated and published in 1956. It tells of a serious mutiny that erupted in Nebuchadnezzar's army in December 594 BC and states: "He slew many of his own army. His own hand captured his enemy". His decision to summon the officials to the dedication of his image could have been triggered by this revolt. One also wonders how he felt when Daniel's three friends refused to bow down to the image that the king had erected and were thrown into the fiery furnace at his command only to be protected by the one that looked like the 'Son of God'.

He answered and said, Lo, I see four men loose, walking in the midst of the fire, and they have no hurt; and the form of the fourth is like the Son of God. *Daniel 3:25*

No wonder he was induced to proclaim:

[Then] Nebuchadnezzar spake, and said, Blessed [be] the God of Shadrach, Meshach, and Abednego, who hath sent his angel, and delivered his servants that trusted in him, and have changed the king's word, and yielded their bodies, that they might not serve nor worship any god, except their own God. *Daniel 3:28*

The Bible also tells the story of Nebuchadnezzar's insanity when he ate straw like an ox, and critics of the Scriptures had a field day with these verses. However, the symptoms of his disease as described in the Bible are consistent with those of the disease called boanthropy, the ox-syndrome. Now it is fascinating that a clay tablet has been found which is now housed in the British Museum and which supports the Biblical claims. It was translated in 1975 and says that "his life appeared of no value to him He does not love son and daughter ... Family and clan do not exist." The Bible is an amazing book and contains untold treasures for those who seek. The happy ending to the story of the life of Nebuchadnezzar is that the Bible states that the king personally accepted God. However, the same cannot be said for Babylon as a whole, since it stubbornly refused to acknowledge the God of the Hebrews in spite of all the manifestations of His power and majesty.

The name Babylon is derived from BAB-ILU – The portal of the gods, and in a sense it thus portrays a means of access to the gods that is contrary to Gods' prescribed plan of salvation. Access is granted through the system and not by faith in Jesus Christ. It is a system where salvation by works replaces salvation by faith. To add to the confusion (which is also implied in the name Babylon), the Babylonians believed in a pantheon of gods thus providing more than one intercessor, which also makes the ministry of Jesus of non-effect. Two hundred years ago, scholars doubted whether Babylon ever existed, and the only record could be found in the Bible. Higher critics used the story of Babylon, and what they called its "non-historic kings", to disseminate Scripture. However, in 1898, Babylon was suddenly discovered and excavations started.

We know today that it was one of the first cities in the world, and indeed, founded by Nimrod, great-grandson of Noah (*Genesis 10:10,11*). Archaeologists have found his name on many inscriptions and tablets, while a massive stone head of Nimrod has been excavated near Calah on the Tigris River. The Bible tells the story of the tower of Babel and how the language of mankind was

confused there. Archaeologists have found that the inhabitants of ancient Mesopotamia had a popular habit of building towers (zig-gurats), and almost every city of importance had at least one. The temple Tower of Babylon was the highest and largest of all, being 91 meters high and built in seven stages. At one site, the foundations and a few steps of the stairway may still be seen at what is now considered to be the most probable location of the Tower of Babel. Moreover, it is interesting to note that, according to the Scriptures, the tower was built of brick and asphalt (*Gen. 11:3, Hebrew*), and this is the very building material found in the buildings of Babylon.

For 1400 years, the city of Babylon grew in importance and, in 626 BC, it became the capital of the Babylonian empire. In the time of Nebuchadnezzar II, it reached its peak, and was the wonder of the ancient world! It was 18 kilometers in circumference, with 26-metre wide double walls towering 62 meters high. It was a magnificent sight, the external brickwork of buildings being glazed and of different colors. The outer walls were yellow, the gates were blue, the palaces were rose-red and the temples were white with golden domes. Reliefs of bulls, dragons and lions decorated many walls and gates and the famous Hanging Gardens, which Nebuchadnezzar had built especially for his wife Amuheia from Ecbatana, was one of the Seven Wonders of the World. The city was also regarded as the greatest religious center of the world, and the area called the Esagila had 53 temples, 955 small sanctuaries, and 384 street altars. The temple tower of Etemenanki rose to a height of 300 meters and was the most famous temple in the East.

We know today that ancient Babylon was a center of advanced science, art, culture, and industry. Then appeared upon the scene the Hebrew prophets Isaiah and Jeremiah who predicted her utter destruction.

And Babylon, the glory of kingdoms, the beauty
of the Chaldees' excellency shall be as when God
overthrew Sodom and Gomorrah. *Isaiah 13:19*

And Babylon shall become heaps, a dwelling-place for dragons, and astonishment, and a hissing, without an inhabitant, desolate forever. *Jeremiah 51:37,26*

These amazing prophecies are all the more astounding because of the location of Babylon - at the very center of economic trade routes of that time. Destruction of a city might have been plausible, but that it would never be rebuilt to be inhabited again seemed far-fetched. This prophetic claim should be easily challenged, and indeed has been over the ages. Yet the prophecy stands to this very day. A further point is that Babylon was extremely wealthy, but the prophet Jeremiah predicted that these treasures would be robbed, and that all who robbed her would be satisfied (*Jeremiah 50:10*). To read her history is to read the fulfillment of the prophecy. Cyrus the Median took mammoth treasures, Xerxes the Persian took huge quantities of gold, Alexander the Great of Greece plundered what was left, fulfilling these prophecies to the letter. The City would thus face total destruction, would never be inhabited and would be totally plundered. In harmony with this prophecy Sir George Rawlinson wrote of the: "absolute loss of inhabitants" and he goes on to say:

Babylon soon became, and has for ages been, an absolute desert ... Captain Mignan was accompanied by six Arabs completely armed, but he could not induce them to remain towards night, from apprehension of evil spirits. It is impossible to eradicate this idea from the minds of these people.¹⁵

The explorer Henry Layard wrote:

Shapeless heaps of rubbish cover for many an acre the face of the land ... a naked and hideous waste. Owls ... start from the scanty thickets, and the foul jackal skulks through the furrows."¹⁶

Babylon was never again inhabited, just as the Bible predicted, and the archaeological findings that were made in its ruins testify to the validity of the Scriptures.

Tyre: The city of Tyre was located in Phoenicia and was the wealthiest and most powerful coastal city of antiquity. Tyre was located on the mainland, but about one kilometre off the mainland there used to be an island that the Phoenicians also used as a harbour. Tyre was the maritime equivalent of Babylon. It was a major city, and Carthage, a rival of Rome, was only a colony of Tyre. The Greek name, Phoenicia, is related to one of its principal exports, a purple-coloured material called Phoinix, meaning purple or crimson. The people who lived here called themselves Kena'ani hence they were Canaanites. Cuneiform records reveal that the Phoenicians called Tyre-Ushu, the Greeks however called it Palaityros. The earliest reference to Tyre in contemporary historical sources is to be found in the Tell el-Amarna tablets of the 14th century BC, which contain letters written by Milki, the governor of Tyre, to pharaoh Akhenaten of Egypt.

Tyre has an amazing history which stands as a memorial to Biblical prophecy. The prophet Ezekiel wrote a powerful reprimand against this city and predicted an unusual end to its glory. The city was well known for its idolatry and licentious worship, which included the offering of human sacrifices to their gods, of which Baal was the principal deity. They also worshipped the patron goddess of sexual love, called Ashtoreth. These deities were also worshipped by the other nations of antiquity, but under different names. Ashtoreth, for example, was named Aphrodite by the Greeks and the Babylonians called her Ishtar from whence the present day feast of Easter is derived. The Phoenicians also sacrificed to the god Moloch, a cruel deity who required that human sacrifices were to be burned alive in order to appease him.

In his lament against Tyre, the prophet Ezekiel uses the cruel king of Tyre as a type of Satan and his kingdom. In typology, there

is enacted an object lesson of a greater reality. For example, the Hebrew sacrificial system required the sacrifice of a lamb (the type of the greater reality), which in turn represented the Messiah who would come to die in the place of the repentant sinner (the Messiah is the greater reality, the antitype, to which the lamb points). In the prophecy of Ezekiel, the literal ruler of Tyre becomes a type or example of the antitypical ruler of this world, who is Satan.

While Tyre was at the height of her power and wealth and prestige, the prophet Ezekiel wrote this startling prophecy from Babylon in the year 592 BC.

And they shall destroy the walls of Tyrus, and break down her towers: I will also scrape her dust from her, and make her like the top of a rock. It shall be [*a place for*] the spreading of nets in the midst of the sea: for I have spoken [*it*], saith the Lord God: and it shall become a spoil to the nations. ... And they shall make a spoil of thy riches, and make a prey of thy merchandise: and they shall break down thy walls, and destroy thy pleasant houses: and they shall lay thy stones and thy timber and thy dust in the midst of the water. ... And I will make thee like the top of a rock: thou shalt be [*a place*] to spread nets upon; thou shalt be built no more: for I the Lord have spoken [*it*], saith the Lord God.

Ezekiel 26:4,5, 12,14

The prediction of destruction of Tyre could have been plausible in the sense that all the cities of antiquity were eventually destroyed by wars or natural disasters, but the prophecy that Tyre would be thrown into the midst of the sea, and its former location be scraped like the top of a rock seemed more than implausible. Considering the wealth and power of the Phoenicians, it is not surprising that they ignored the prophecy, yet these prophecies were

fulfilled to the letter. Ancient sites, such as Baalbek, in the vicinity of Tyre reveal that the buildings and particularly the temples of the Phoenicians were impressive and even colossal, and from this, one can deduce that Tyre, the principle city, must have been even more impressive. The probability of any power succeeding to scrape the city as clean as the top of a rock and to throw the entire city into the sea seemed ridiculous. How was this prophecy of the destruction of Tyre fulfilled?

The clay tablets discovered at ancient Babylon tell us that Nebuchadnezzar of Babylon besieged the city in 583 BC, but the siege lasted some 13 years before he could destroy the city. The inhabitants of Tyre, however, escaped to the nearby 140-acre island and built a new city on the island. Nebuchadnezzar then fulfilled only the first part of the prophecy by rendering the city to ruins. The prophet Daniel, who was a contemporary of the prophet Ezekiel, predicted that the Medo-Persians would overthrow Babylon. This happened in 539 BC, but the ruins of ancient Tyre still lay on the original mainland site for two and-a-half centuries, as a mute contradiction of the Bible.

When Alexander the Great conquered the Medo-Persian Empire in three successive battles, the first of which were the battles of Granicus in 334 BC and at Issus in 333 BC. The speed of his conquests so intimidated the other regions that they surrendered to his army before he even engaged them. The new island city of Tyre, however, resisted his advances. Frustrated by their efforts, Alexander ordered his troops to build a causeway to the island by throwing the ancient ruins of mainland Tyre into the midst of the sea, and using the dust to create a way for his troops, thus fulfilling the prophecy that Tyre would be thrown into the midst of the sea. The historian Meyer writes:

Alexander the Great, after a most memorable siege captured the city of Tyre, and reduced it to ruins in BC 332. She never recovered from the blow. The

larger part of the site of the once great city is now bare as the top of a rock; a place where the few fishermen who still frequent the spot spread their nets to dry.¹⁷

The scraped rocks and sunken causeway of ancient Tyre declare with emphasis to this generation that the Bible is more than just an ordinary book!

Petra: Petra is the Greek word for ‘rock’. In the heart of Mount Seir, halfway between the Dead Sea and the Gulf of Aqaba, there is a trapezoidal valley surrounded on all sides by very steep rocky cliffs, with a few narrow gorges leading inside. In this valley, the city of Petra was built. Its Bible name was ‘Sela’. The earliest inhabitants of this area were the Horites, or Hurrians. Later, Esau, the brother of Jacob, settled in the territory south of the Dead Sea, and his descendants, the Edomites, gradually replaced the Hurrians. The Edomites lived here when Israel came from Egypt during the Exodus about 1445 BC.

About 400 BC, the Arabian Nabataeans drove out the Edomites. These people made Petra their capital and controlled the most important trade routes between the East and the West. Caravans passing through this territory had to pay taxes to the Nabataeans, who in this way became very wealthy enabling them to build beautiful palaces, temples, theatres and tombs hewn out of solid rock in their capital city. In later centuries, caravans followed other routes between the Orient and Europe. Traffic through Nabataean territory dried up, Petra became deserted and forgotten, and for centuries it was a legendary city, and all the references in Scripture were considered by higher critics to be figments of the imagination. Once more they ridiculed and claimed the nonexistence of Petra as proof for the unreliability of Scripture. However, in the year 1812, Burckhardt, disguised as an Arabian sheik, discovered the lost city and when he published his report, it seemed almost unbelievable that such a

picturesque place could have existed just 161 kilometres south of Jerusalem without being known. Yet the city was still occupied in the time of Christ, since Hulda, the daughter of king Aretas who lived here during the time of Christ is the woman who was married to Herod Antipas who divorced her in order to marry Herodias, his brother Phillip's wife.

Because of the unstable Middle Eastern political situation, visits to Petra were made virtually impossible, and only in recent years has this ancient city become readily accessible to tourists. Biblical descriptions of Petra speak of lofty places, and the confidence of its inhabitants. Yet the prophets Obadiah and Jeremiah predicted that the city would lose its power and become uninhabited.

The vision of Obadiah. Thus saith the Lord God concerning Edom; We have heard a rumour from the Lord, and an ambassador is sent among the heathen, Arise ye, and let us rise up against her in battle. Behold, I have made thee small among the heathen: thou art greatly despised. The pride of thine heart hath deceived thee, thou that dwellest in the clefts of the rock, whose habitation [*is*] high; that saith in his heart, Who shall bring me down to the ground? Though thou exalt [*thyself*] as the eagle, and though thou set thy nest among the stars, thence will I bring thee down, saith the Lord. *Obadiah 1-4*

Thy terribleness hath deceived thee, [*and*] the pride of thine heart, O thou that dwellest in the clefts of the rock, that holdest the height of the hill: though thou shouldest make thy nest as high as the eagle, I will bring thee down from thence, saith the Lord. Also Edom shall be a desolation: every one that goeth by it shall be astonished, and shall hiss at all the plagues thereof. As in the overthrow of Sodom

and Gomorrah and the neighbour [*cities*] thereof, saith the Lord, no man shall abide there, neither shall a son of man dwell in it. *Jeremiah 49:16-18*

Petra, a city hewn out of solid rock, is one of the most magnificent ancient cities in the world today, yet it is uninhabited. As one enters through the narrow 1.2 kilometer gorge that the Arabs call, Es Siq, the first view that confronts one is that of the beautiful temple, carved out of solid rock, called El Khazneh Farun. The urn on top of this temple was thought to contain some of the treasures of Egypt, but no evidence to this effect has been found. Petra boasts a beautiful amphitheater which seats 5000 people and just above the top seats there are tombs hewn out of the rock, because the Edomites believed that they could witness the theatre events after their death. Petra is built along two deep valleys, called Wadi Farasa and Wadi Thugra with magnificent dwellings, places of worship and tombs hewn out of the sheer sides of the rock-faces lining these valleys. There were also ruins of buildings in the wider sections of the valleys that were constructed in the normal way, including homes and temples such as the temple to Isis.

Why did God predict the demise of the inhabitants of Petra? For the answer, one must look into the rituals and practices of these people. The main place of worship, the Jabel-Aibb'Atuf, is the best-preserved high place in all the Bible lands. The object of worship here was not God, but the sun, and as part of their worship they offered human sacrifices! Close by, two obelisks may be seen which were sun pillars of fertility. The two at Petra represent the gods of Dushara and el Uzza. Regarding such pillars, God told the Israelites that they had to "destroy their sacred pillars" when they come to Canaan. (*Exodus 23:24*), the reason being that they represented the beams of light of pagan sun worship and were phallic symbols which were connected to the fertility rites of these systems of worship. An integral part of these rites was the offering of human sacrifices, which also included the sacrifice of young virgins in order

to appease the sun god and to ensure future fertility. At Petra, the hill of sacrifice is called Um el Bayyarah, and ruins dating back to the time of the Edomites, descendants of Esau, have been excavated on the summit.

Contrary to the Biblical claims, some propose that only animal sacrifices were offered at such high places, but archaeology has revealed remains of numerous human sacrifices associated with sacred pillars on high places such as found Gezer in Israel. Just below the cultic pillars at Gezer, archaeologists discovered several caves filled with ash and bones of men, women, children and infants that had been sacrificed. It was because of these and other abominable practices that God instructed Israel on their entry into Canaan after the exodus, to destroy the 'high places' of the heathen. Because of the pagan vices and immoral rites practiced there, the finger of prophecy forecast the downfall and entire destruction of cities like Petra.

Egypt shall be a desolation, and Edom shall be a desolate wilderness, for the violence [*against*] the children of Judah, because they have shed innocent blood in their land. But Judah shall dwell for ever, and Jerusalem from generation to generation.

Joel 3:19-20

And say unto it, Thus saith the Lord God; Behold, O mount Seir, I [*am*] against thee, and I will stretch out mine hand against thee, and I will make thee most desolate. I will lay thy cities waste, and thou shalt be desolate, and thou shalt know that I [*am*] the Lord. *Ezekiel 35:3,4*

From the top of Jaball-Madbah, looking across the valley, a white stone is visible which, according to tradition, is the site where Aaron the high priest of Israel is buried. In a sense, two

religious systems meet here at Petra, the one relying on eternal life through one's fertility and sacrifices of one's own merits, and the other relying on the blood of the lamb. The story of Petra bears a deep spiritual meaning which can serve as an object lesson for us today. Petra represents the rock of self-reliance, hewn out by human hands, to create dwellings of safety. The Edomites were the descendants of Esau, the brother of Jacob, who chose rather to sell his birthright than to inherit the blessing of his father. In type, Esau thus represents those who would rather forego the blessings of eternal life and rely on their own merits than to submit to the sanctifying power of God. In a literal sense, Esau and Jacob then represent the Edomites and Israelites. But in a spiritual sense they represent the saved and the lost. In *Genesis 25:34* we read that "Esau despised his birthright," which means that he rejected the spiritual responsibilities of the birthright.

Jacob, on the other hand, was himself no angel, since he deceived his father by claiming to be Esau in order to receive the blessings of the birthright which was reserved for Esau, the first-born. Jacob thus represents sinful man with his deceptive nature. Jacob, however felt remorse for his sin, and at Bethel, God gave Jacob a dream after he fled from the wrath of Esau. The dream recorded in *Genesis 28:12* provided a solution for his problem, but the solution lay outside himself and his own self-reliance.

And he dreamed, and behold a ladder set up on the earth, and the top of it reached to heaven: and behold the angels of God ascending and descending on it. *Genesis 28:12*

The ladder, of course, is a symbol of Christ as we read in the New Testament:

And he saith unto him, Verily, verily, I say unto you, Hereafter ye shall see heaven open, and the angels

of God ascending and descending upon the Son
of man. *John 1:51*

His own merits could not bridge the gulf between sin and righteousness, but God provided a way out. By repentance and dependence on the merits of Christ all sinners can be reconciled with God. Just as Jacob wrestled with the angel one evening at the Jabok River just before returning to his homeland to face Esau, so we have to wrestle with our sinful nature, and it is only by clinging to Christ as Jacob clung to the angel that we can find peace. After this event, Jacob's name was changed to Israel because he had struggled with God and found forgiveness. Jacob fell upon the rock and was broken; his salvation lay in the Rock of Ages. The rocks of Petra represent the rock of self-reliance and those who choose this rock will eventually be crushed. No human sacrifice will suffice to eradicate sin or change the heart:

But if we walk in the light, as he is in the light, we
have fellowship one with another, and the blood
of Jesus Christ his Son cleanseth us from all sin.
1 John 1:7

Standing on Petra's high place with the colorful ruins of the city below, one can hear the voice of its desolate silence declaring that God's prophetic word never fails!

REFERENCES

- ¹ William Foxwell Albright, *History, Archaeology and Christian Humanism* (New York: McGraw-Hill Book Company, 1964).
- ² Larry Pierce, "In the Days of Peleg," *Creation* (22)(1) (1999): 46-49.
<http://www.answersingenesis.org/articles/cm/v22/n1/peleg>
- ³ *Archeology and the Bible*: 305-306.
- ⁴ William H. Shea, "Exodus, Date of the," *International Standard Bible Encyclopedia*. Revised edition (Grand Rapids, Eerdmans, 1982): 230-238.
- ⁵ Ibid.
- ⁶ D. Kessler, "The Political History of the Eighteenth to Twentieth Dynasties," in *Egypt: World of the Pharaohs*. Eds. R. Schulz and M. Seidel (Köln: Könenmann Publishers, 2004): 144.
- ⁷ James E. Harris and Kent R. Weeks, *X-Raying the Pharaohs* (Charles Scribner's Sons, 1978).
- ⁸ Alan H. Gardiner, *Egypt of the Pharaohs* (New York: Oxford University Press, 1966).
- ⁹ K. M. Kenyon, *Digging up Jericho* (London: Ernest Benn, 1957): 261-62.
- ¹⁰ Bryant Wood, "The Walls of Jericho," *Creation* 21(2)(1999): 36-40.
- ¹¹ B. G. Wood, "Did the Israelites Conquer Jericho?" *Biblical Archaeology Review* 16(2) (1990): 44-58.

13. Ibid.
14. Bryant Wood, "The Walls of Jericho," *Creation* 21(2) (1999): 36-40.
15. Sir George Rawlinson, *Travels*: 235.
16. Sir Austen Henry Layard, *Discoveries Among the Ruins of Ninevah and Babylon* (New York, Harper & Brothers, 1871).
17. Ernst Meyer, *Ancient History*: 121.

STONES THAT SPEAK

Ancient writings



Figure 8.1a) The famous Rosetta stone in the British Museum. This stone was found in 1799 during the Napoleon archaeological expedition to Egypt. Jean Francois Champollion took 22 years to decipher the hieroglyphics, and by September 14, 1822 he could read the names of pharaohs. He also discovered that the Coptic language of

Christian Egypt was an adaptation of the Greek alphabet and was a form of the language of ancient Egypt. This set the stage for the deciphering of the ancient writings. Egyptian words were written with a mixture of sound and picture signs and by the



death of Champollion in 1832, the groundwork for understanding the Egyptian language had been laid. **(8.1b - 8.1d)** Excavation site at Tel Mardick where the Ebla tablets were found containing the official records of the kingdom of Ebla. These tablets **(8.1d)** are now largely housed in the museum at Idlib, Syria and contain the names of ancient Bible places and names of Biblical personalities previously only known from the Bible. Since the deciphering of



ancient cuneiform writings, these once silent stones are now confirming the veracity of the Bible in our age. **(8.1e-8.1f)** The Dead Sea Scrolls. One of the original jars in which the scrolls were housed



and a fragment of one of the scrolls currently housed in the museum at Citadel Ammon Rabba in Jordan.

The 18th Dynasty of Egypt and the Exodus

Hatshepsut

Figure 8.2a) Obelisks of Tutmoses I (the father of Hatshepsut) and Hatshepsut at Karnak, the temple of Amun-Re. Tutmoses I had these two obelisks erected and originally they probably had gilded tips.

(8.2b & 8.2c) The Temple of Hatshepsut at Deir el-Bahri with the staircase of Ammun-Re. Hatshepsut chose this site for her funeral temple which was called



8.2c



Djeser-Djese-ru (the Holy of Holies).

8.2d) The site alongside the temple where the university stood where Moses in all likelihood received his education.

8.2d



8.2e



8.2e) The temple at Deir el-Bahri shows many features of Egyptian sun worship. Here, the facade of the entrance hall is fronted by a row of pillars depicting the god Osiris.

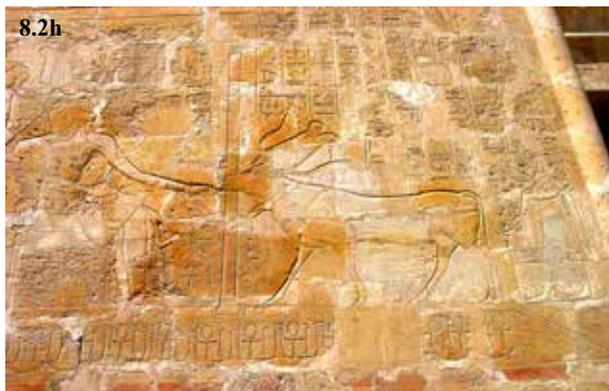


8.2f-8.2i) shows the images of Hathor worship at the chapel of Hathor on the south of the temple. The pillar (**8.2f**) shows the face of the goddess Hathor and in **8.2g**, **8.2h** & **8.2i)** the goddess is depicted as the divine cow. In **8.2g)** the solar disc can be seen between the horns of Hathor, in **8.2h)** Hathor is being fed and in **8.2i)**



Hatshepsut is seen drinking from the udder of Hathor.

After having eliminated Hatshepsut, Tutmoses III started a



8.2i



82j





program to eradicate the memory of Hatshepsut. He had the statues of Hatshepsut destroyed both at Deir el-Bahri and at Karnak and he had her images defaced. It is interesting, however, that reliefs of her where she is engaged in pagan rituals were preserved, such as the image of her drinking from the cult images of Hathor. This is an indication that posterity was to



forget aspects of Hatshepsut other than her pagan roots. In **8.2j** & **8.2k** the images of Hatshepsut were chiseled out of the wall at Deir el-Bahri and Karnak respectively. In **8.2l**, can be seen one of the few busts of Hatshepsut that survived the destruction and which is now housed in the Egyptian Museum, Berlin.

Tutmoses III

Figure 8.3a) Bust of Tutmoses III who ruled from 1504 – 1450 BC. According to the Biblical chronology of the exodus, this is the pharaoh that ruled when the children of Israel were delivered.



8.3b) The tomb of Tutmoses III in the Valley of the Kings. The tomb contains descriptions from the book of the afterworld, which is attributed to this pharaoh. Within the tomb there is also a chamber with two columns and the burial chamber is cartouche shaped and also has two columns. Two columns are also a feature of modern day occultic practices.





8.3c) The mummy of Tutmoses III is housed in the Cairo Museum, but it has been branded a fake since the mummy is of a much younger man than was the pharaoh when he died.

8.3d & 8.3e) Images of pagan deities such

as the scarab beetle, the goat form of Amun, the cow Hathor and serpents. According to the Scriptures, the pharaoh of the exodus challenged God and in one incident his magicians





were able to turn their staffs into serpents. The Tomb of Tutmoses III contains numerous images of serpents and the serpent, as staff is also a very common design on the tomb walls. **(8.3f & 8.3g)** Pharaoh seated with serpent standing in front of him and a priest of Horus (the eagle head is a depiction of Horus) throwing a staff with a further image of the serpent



serpent staffs. These murals show an amazing similarity to the story recorded in the Scriptures.



well in his kingdom. This is a typical example of selective reporting, because this is the pharaoh that, upon his return from Syro-Palestine, found his kingdom almost

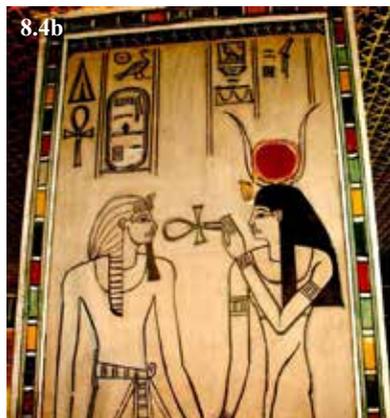
standing before him as well as images of worshipping the deity by bowing down toward the serpent.

8.3h & 8.3i) show priests representing other deities (such as Amun) also with



Amenhotep II and his son Tutmoses IV

Figure 8.4a) Statue of Amenhotep II at Karnak where the inscription states that all is



annihilated by the plagues, his father and first-born son dead and the Israelite slaves gone. He also vented his anger on the captives of his campaigns by beheading them and displaying their heads on his barge. **8.4b)** Mural on the wall of the tomb of Amenhotep II showing the goddess Hathor holding out the ankh, the symbol of life, to the pharaoh. **8.4c & 8.4d)** The stela between the legs of the sphinx, telling the story how the next



pharaoh (Tutmoses IV) became pharaoh instead of his first-born brother. This is a further example of distorted reporting, since the Bible says that the first-born died in the 10th plague, but the stela reports that

the king was rewarded for removing the sand that had accumulated between the legs of the sphinx by becoming the next pharaoh instead of his first-born brother.





Amenhotep III

Figure 8.5a) Quartzite head of Amenhotep III wearing the red crown of Lower Egypt British Museum London. The style of the sculpture shows leanings towards realism as portrayed during the Amarna period at the end of the 18th Dynasty. **8.5b)** These two large statues (20 meters tall) of Amenhotep III are known as the colossi of Memnon and were placed in the sun court of his mortuary temple. An earthquake in 27



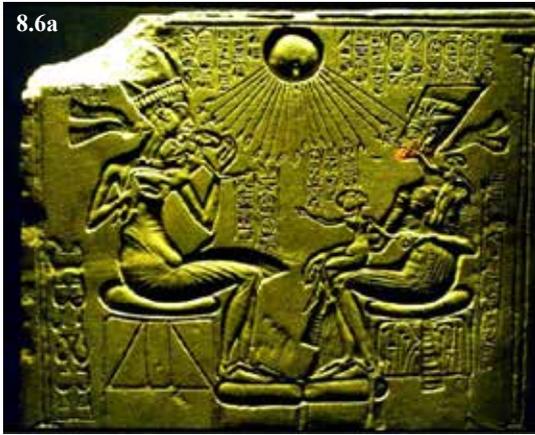
BC caused one of them to crack and when the wind blew through the crack a mournful sound was made which became known as the ‘cry of lament’. After the statue was restored in AD 199, the sound ceased.

8.5c) The statue is still similar to the art form prior to the Amarna Period, since prior to this period, the wives and consorts of the pharaohs were assigned minor positions on such statues.

8.5d) Destroyed mural of Amenhotep III.

During the latter half of his reign, Amenhotep III experienced a shift in religious emphasis, which was taken further by his son Amenhotep IV who later changed his name to Akhenaten, thus showing a break in the worship of Amun and a switch toward monotheism and to the worship of the one creator God. In both the cases of Amenhotep III and Akhenaten, their statues and murals were also largely defaced or destroyed as in the case of Hatshepsut. It appears as if a switch in religion was not readily tolerated.

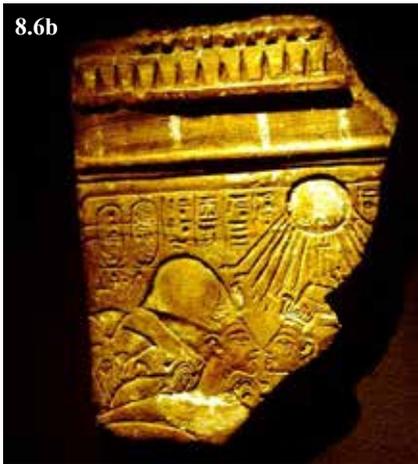




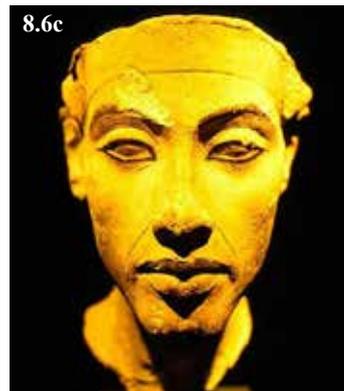
Amenhotep IV (Akhenaten) and his Family

Figure 8.6a & 8.6b) Akhenaten - Depicted with his wife Nefertiti and their first three children, and the pharaoh

kissing his wife. Egyptian art was transformed during the Amarna Period and Akhenaten had himself portrayed as he was, complete with potbelly. Also the relationship between the pharaoh and his family is displayed as a loving relationship with the wife, depicted as an equal by



his side and the children being cuddled by the couple. Under Atenism, the sun was not worshipped, but served as a symbol of the creator God. (8.6c-8.6e) Akhenaten and his wife Nefertiti (8.6d, Egyptian Museum, Berlin). While sculptors were busy on the second bust of



8.6d



Nefertiti (8.6d), she and her husband, Akhenaten were brutally murdered. The worship of the creator God was short lived, and during the next generation of pharaohs there is a reversal to Amun worship. Akhenaten broke so completely with the old religion that

he even built a new capital and, unlike previous pharaohs, he built their tombs on the western side of the Nile. They were put to death because they dared to believe in Maat, the Egyptian name for truth.

8.6e



Tutankhamun and his wife Ankensenamun

Figure 8.7a & 8.7b) Royal throne of Tutankhamun (Tutankaten) still depicting the worship of Aten, here shown with Ankensenpaaten.

8.7a



The Genesis Conflict

There were other thrones found with the treasures of Tutankhamun including a polytheistic throne and an ecclesiastical throne (8.7c). Before their death, the third



eldest daughter of Akhenaten and Nefertiti, Ankensenpaaten, married Tutankaten. In this relief the wife touches her husband.



Tutankaten, which means 'in the living image of Aten', changed his name to Tutankamun, which means 'in the living image of Amun'. He thus forsook the worship of Aten for the worship of Amun, but he only reigned for a short time and then suddenly died. Some scholars believe he was also murdered. His wife's name was also changed to Ankensenamun, which means she also changed her religion. Here at Luxor, the couple is depicted as Tutankhamun and Ankensenamun (8.7d).

Additional Treasures of Tutankhamun (Cairo Museum)

Figure 8.8a) Head of Tutankhamun.



8.8b) Lid of Tutankhamun's ivory chest which still depicts Amarna art and was therefore probably made while he was still Tutankhaten and his queen was still Ankensenpaaten.



8.8c

8.8c) The golden mask of Tutankhamun.

8.8d) The coffin.



8.8d



8.8e

8.8e) The canopic shrine which contained the king's vital organs. The four protective goddesses are Isis, Nephthys, Selket and Neith. Normally, the internal organs were placed under the protection of four divinities known as the sons of Horus (Imsety, Hapy, Duamutef and Quebehsenuf).

8.8e



8.8f

8.8f) The god Anubis. **8.8g)** Statue of the young Tutankhamun



8.8g



8.8h

8.8h) A model of the boat on which Tutankhamun's mummy was transported across the Nile to his final resting place in the Valley of the Kings.

8.8i) Some of the gods in the Egyptian pantheon that were to protect the king. Depicted here are the earth-god Geb, the goddess Nephthys, the 'sun-god' Aten, Ihi (son of Hathor), the god Mamu, the goddess Isis and the god Khepri.



8.8j) The lid of the canopic chest that housed the internal organs of the king

8.8k) the jars which contained the king's viscera.



8.81) One of the king's chariots.



Petra (the siq)

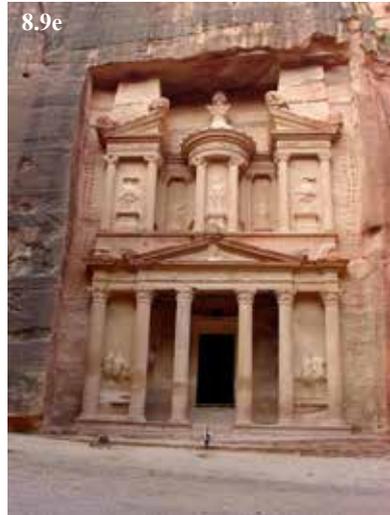
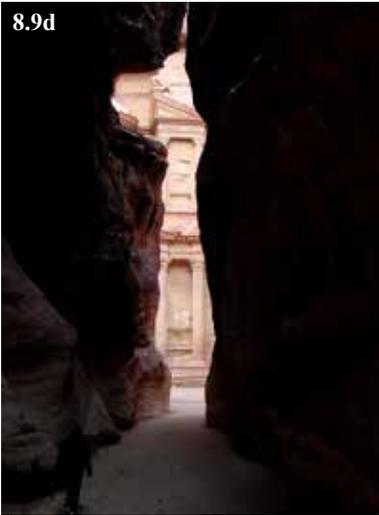
Figure 8.9a) The 1.2 kilometer Es Siq is the narrow entrance to the rock city of Petra, the capital of the Edomites, built in what the Bible calls the Seir Mountains. The siq widens in places and originally the rock face was decorated with murals and prayer shrines.



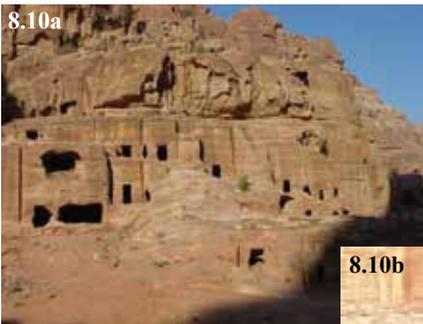


8.9b & 8.9c) The remnant of a sculpture of a man leading a camel and a prayer shrine which would originally have contained an image of one of the deities. The narrow siq ends at Al-Khazna Farun, a mausoleum (templetomb) built in the 1st century BC. This magnificent





temple shrine is the very first building one sees as one nears the end of the siq (8.9d). The temple is hewn out of solid rock (8.9e) and according to folklore the urn on top was believed to contain Egyptian treasures but this has never been confirmed.



Petra the City

Figure 8.10 The street of Facades contains highly decorated Nabataean tombs

(8.10a), which were carved for the wealthy residents of the city. Prime location for a tomb was above the amphitheatre (8.10b & 8.10c);



8.10c



8.10d) the lion's fountain;



8.10e



10e) the soldier's tomb;

8.10f



8.10f) a Bedouin rides on her donkey past the tombs of Petra;

8.10g



8.10g) the ruins of the Temple of Isis which was built from clay bricks and was not carved out of the rock;

8.10h



8.10h) this magnificent temple, reminiscent of the Al-Khazna temple, is according to legend the place where Miriam the sister of Moses was buried.

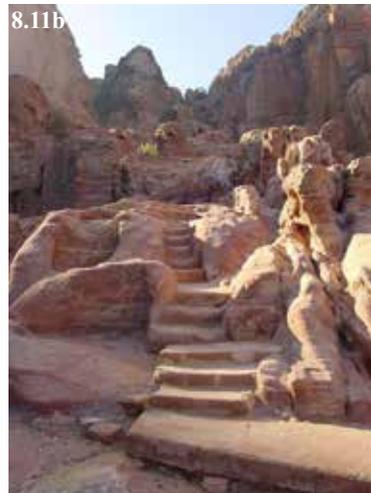
Petra - the Sacrificial High Place



Figure 8.11a) The sacrificial high place, Jabal Madbah, at Petra and the steps

8.11b) leading up to the sacrificial high place. Whenever two obelisks **8.11c)**

such as these were present (similar high places with cultic pillars were also found at Gezer in Israel where human sacrificial



remains were excavated), sacrifices, including human sacrifices, were offered to the sun god. These two represent the gods

of Dushara and el Uzza. God told the Israelites that they had to “destroy their sacred pillars” when they came into Canaan (*Exodus 23:24*).



8.11d-8.11f) The place of sacrifice showing the slab where the victim lay



8.11d) together with the ritual sacrificial area. In the background is a high mountain with a tiny white marker stone, which according to tradition marks the grave of Aaron, the High Priest of Israel and the

brother of Moses. **8.11e)** the area where the body was washed and prepared. Animal sacrifices were routinely sacrificed and in this area the carcass was prepared.

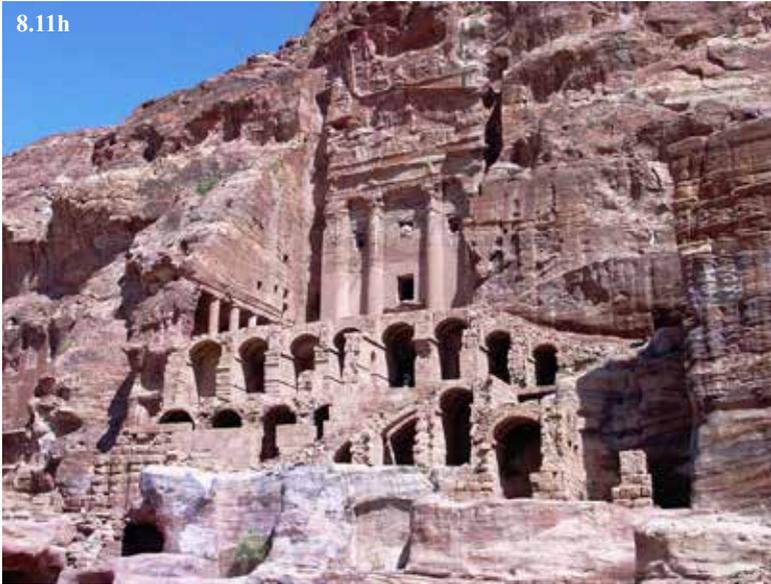
8.11f) The sun disk into which the heart was placed after the sacrifice.



The blood from the heart would trickle down the groove into the sacred pool and the wrath of the sun god would be appeased.



8.11g) The sacred pool for ritual washing. Before and after the offering of sacrifices, the priests washed their hand in these pools.



8.11h) One of the temple complexes at Petra where worship took place. The Irony of Petra is that here the two systems of religion meet, represented by the priests of Israel and Esau. Also interesting is that both the graves of Miriam and Aaron are at Petra. The High Priest of Israel stood as a type of Christ who through His own sacrifice (represented by the sacrificial lamb) would take away the sins of the world, whilst Esau, the father of the Edomites, spurned his birthright and sought salvation in his own way.

NOTES:

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