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CHAPTER 1 *Defining the Rock Record within the Context of Biblical History*

Introduction

Earth's geologic history can be constructed from rocks, fossils, radioactive isotopes, ice layers, and other geological features. The manner in which that history is assembled is based on a belief system or world view. In the past, the history conveyed in Genesis was the Western world's foundation for human origins and earth history. Belief in the biblical account focused on the global Flood and individuals who supported this world view were identified as "catastrophists." However, the movement of the Christian Church away from a literal interpretation of the Genesis account, particularly under the influence of the Enlightenment, served to erode confidence in the scriptural record (Laudan 1987). Questions regarding origins could only be answered by a purely naturalistic interpretation — one in which God is omitted. Within this world view of naturalism,[1] the earth's geologic past is defined using natural processes operating in similar settings under processes and rates that we observe today. This concept, that "the present is the key to the past," is known as uniformitarianism. Its icon is the geologic time scale (Figure 1-1). This world view of earth history uses the purported evolution of life and the decay of radioactive isotopes to assign an age to rocks consistent with the geologic time scale.

Can we use the various theories developed in naturalism and framed by their time scale to define a biblical account of earth history? How can we understand earth's geologic history from a biblical perspective when the Bible was not written for that purpose? What should we use in defining a Bible-based geologic history? The simple answer to

these questions is that we start from the history that Scripture conveys and work toward understanding its geologic expression in the rocks. Instead of using the conceptualized uniformitarian geological time scale, *we emphasize the biblical account and construct an outline of earth history drawn from the* ***actual rock record***. This book seeks to lay a foundation for this method. Field examples will show how the scriptural account of earth history presents the most reasonable explanation for the rock record. Two similar Bible-based time scales will also present the framework from which we can define our geologic studies. But first, we must review the uniformitarian time scale based in naturalism to understand its developmental history.

The Development of the Uniformitarian Geologic Time Scale

The Enlightenment was a time when many leading thinkers began to reject the Bible. One of their primary targets was its historical reliability, and the new science of geology gave them the perfect weapon. Earth history fell to the philosophies of naturalism and uniformitarianism, which were widely accepted long before they were formalized in 1795 with the publication of James Hutton's *Theory of the Earth* (Adams 1938; Albritton 1986; Gohau 1990; Greene 1982). While catastrophists did represent some of the greatest minds of that period, they were a minority in the battle to define earth history. In fact, it was the catastrophists[2] who produced the first geological maps (i.e., Cuvier and Brongniart's

UNIFORMITARIAN GEOLOGICAL TIME SCALE

Eon	Era	Period	Age (Ma)
Phanerozoic	Cenozoic	Neogene	23.03
		Paleogene	65.5
	Mesozoic	Cretaceous	145.5
		Jurassic	199.6
		Triassic	251.0
	Paleozoic	Permian	299.0
		Carboniferous	359.2
		Devonian	416.0
		Silurian	443.7
		Ordovician	488.3
		Cambrian	542.0
Proterozoic			2500
Archean			~4550

Figure 1-1. The uniformitarian geologic time scale presents 4.55 billion years of radiometric and evolutionary history. It is assembled from a global patchwork of "type sections" (i.e., rock layers deemed representative for that particular interval of uniformitarian time). The lower 84 percent of the time scale contains little evidence of life and is age-dated solely from radiometric methods. Only in the last 542 million years do the fossilized remains of former life forms become abundant in the rocks where time can be measured by evolution. Not to scale and modified from Gradstein and others, 2004.

final version of their map of the Paris region in 1811, followed by William Smith's map of England, Wales, and portions of Scotland in 1815). However, this work was quickly assimilated into the naturalist world view. In succeeding years, British geologists developed the framework for the modern uniformitarian time scale, which quickly became the standard for ordering and mapping new field data around the world (Rudwick 1985a, 1985b; Secord 1986).

The history and development of the geological sciences can be traced back to the 17th century, when scientists became interested in the lithologic (sediment composition and color) and paleontologic (fossilized organic life forms) content of the sedimentary rock layers. Their analysis of these geologic materials provided no obvious means of determining an appropriate age based solely on the contents or characteristics of the rocks and fossils. However, as field studies of the various sedimentary layers progressed, vertical relationships among the sedimentary layers were noted. Nicolas Steno, a Danish physician working in Tuscany, deduced that the relative age of stratified sediments could be determined using the "law of superposition."[3] Later, certain types of fossilized plants and animals were found in what is interpreted to be a specific succession of changing environments and this led to another concept identified as the "law of faunal succession." This biostratigraphic division of the sediments (based on changes in fossilized plants and animals) was later used to support Darwin's concept of an evolutionary progression of life through time. In turn, evolution provided a "clock" by which geologists could date rock layers.

But even in the turbulent 1800s, not all Bible-believing geologists accepted uniformitarianism (see Mortenson 1997, 2003, 2004). Unfortunately, the geologic work of these Bible-believing Christians failed to develop a scriptural alternative to the geological time scale that could command the same popularity and provide a framework for field research. The momentum of naturalism was too great, and its broad acceptance marginalized these men. As a result, uniformitarianism has dominated the geological sciences (Mortenson 2006). Today, the uniformitarian geologic time scale commands the geological sciences and is the only widely accepted view of earth history (Figure 1-1) (Cohee and others 1978; Berggren and others 1995; Gradstein and others 2004; Harland and others 1990; North American Commission on Stratigraphic Nomenclature 2005; Salvador 1994; Snelling,1985).

If the time scale is the child of uniformitarianism and if uniformitarianism is a part of the world view of naturalism, then Christians cannot simply concede the geological sciences. Fortunately, recent decades have seen a resurgence in biblical creationism and Flood geology following the publication of *The Genesis Flood* (Whitcomb and Morris 1961). A part of that effort has been a critique of the time scale, and several serious flaws have been identified and discussed (see Reed 2001; Reed and Froede 2003; Reed and Oard 2006).

More Gaps Than Record

It must be understood that the uniformitarian geologic time scale is a conceptual framework. In very few places do uniformitarian geologists find a stratigraphic section containing most of the major eras of the time scale fitted together. Even then, much of the rock record is missing — periods of tens of millions of years might be represented by only a few thin layers. Often there are many time gaps present (Figure 1-2). A prominent uniformitarian geologist, the late Derek Ager, recognized and noted this perplexing situation over his many years of studying the rock record (1993a). Therefore, it is important to note that the rock layers at any one location on earth are very incomplete time records.

Incomplete history is a tremendous problem for followers of naturalism, because in rejecting

God and the Bible, they are forced to an empirical (i.e., scientifically testable) path to knowledge. No data means no knowledge. Thus, the absence of so much of their historical record means that their confidence in their knowledge of history must also be deficient. Even claiming that their knowledge is based in "science" cannot hide that logic.

Regardless of what can be learned from the rocks, nothing can be understood from the gaps. No matter how geologists might seek to fill those gaps by inference, speculation, and extrapolation, it can never be anything more. Thus, the time scale provides an attractive abstract of their historical narrative, but in many instances it lacks real substance.

Natural History and Science

The incomplete nature of uniformitarian history points to an even more serious problem regarding the differences between natural history and science. History is the study of unique past events. Science is the study of present-day observable processes, relying on repeated observations under

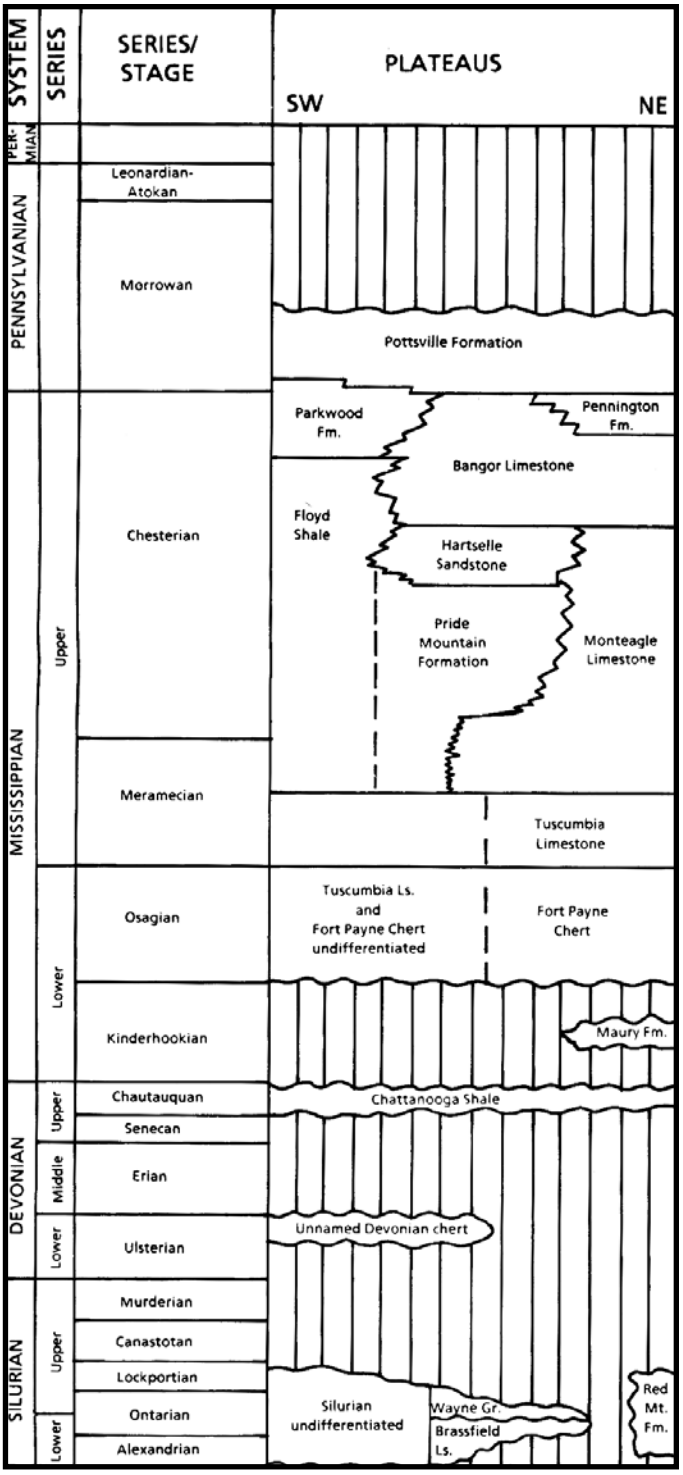

Figure 1-2. There is a dramatic difference between the conceptual time scale and the physical rock record. In most cases, rocks do not represent the entire section of time in which they are defined. Geologists have recognized this discrepancy for many years and have resolved it through the construction of stratigraphic correlation charts. This particular chart is from the plateau region of Alabama (Raymond and others 1988). It reveals both the rocks that are present (assuming long ages for deposition) and the missing time/rock record, represented by vertical lines. This chart does not span the entire stratigraphic section for the Alabama plateau, but shows that much of the area's history consists of no rock record of time. The "youngest" rocks exposed in the area are from the Pottsville Formation, with a time gap of approximately 316 million years between its upper surface and the present. Instead of getting bogged down in the uniformitarian morass, we should focus our investigative efforts on understanding the actual rock record, and interpret it within the framework of the Bible.

controlled circumstances. Thus, natural history is first and foremost *history* and should not be confused with science. However, naturalists attempt to expand science into the domain of history because they equate science and truth. They speak of earth's past with great confidence, even though they have no means of testing and verifying their stories. Their history is an *interpretation* of the rock record within the framework of uniformitarianism. As Christians, we observe the same rocks, sediments, and fossils, but we would interpret these geologic materials within the constraints of the biblical time scale. While we should use scientific methodology to help us develop and define models of historic geology, we need to realize that natural history (where not directly observed) is based on interpretation.

For example, finding a sand deposit exposed at an outcrop would allow us to scientifically test the physical properties and characteristics of the individual sand grains. We can drop the grains into either moving air or water and document how they are deposited. This is experimental science as we can test ideas and observe the results. However, when we move back to the exposed outcrop of sand and speculate how it was formed, we move from the realm of science to historic interpretation. Science might tell us that the sediments were transported by water, but it is our world view that tells us whether this was a rolling river millions of years ago or the Genesis flood in the recent past. Ultimately, the interpretation of the entire rock record will depend upon the world view of the individual and their preconceived ideas — not science (Figure 1-3).

Developing a Creationist Time Scale

The uniformitarian view of earth history never advertised its connection to naturalism, and because it was thought to be merely "scientific," it gained favor inside the Church. Many church leaders sought compromise with the new popular ideas being presented in geology (see discussions in Morris 1985 and Taylor 1991). Unfortunately, this trend usually occurred as the biblical record was conceded. Christians were hoodwinked for decades by the false dilemma of "religion versus science." Those not intimidated into silence were led into error by the "science" they were taught in school, never realizing the philosophical conflicts beneath the surface.

Even some young-earth creation scientists have attempted to synthesize the uniformitarian time scale and a young-earth Flood framework (e.g., Austin 1994; Coffin and Brown 1983; Hedtke 1971; Holt 1996; Morris 1996; Northrup 1986, 1990a, 1990b; Oard 2006; Rugg 1990; Scheven 1990; Silvestru 2006; Snelling 1997; Snelling and others 1996; Tyler 2006; Tyler and Coffin 2006). In addition to the philosophical problems, none of these proposals has proven consistent in application outside of a very local area. The root of the problem lies in this: uniformitarianism was established precisely to rid history of the Genesis flood. How then can its time scale be integrated with the Bible? Where could the Flood fit within the various eras, periods, epochs, and stages? Several creationists have also attempted to set Flood boundaries within the uniformitarian geologic time scale[4] (Figure 1-4) (e.g., Anonymous 1995; Austin 1994; Austin and Wise 1994; Garner 1996a, 1996b; Garton 1996; Robinson 1996; Tyler 1996, 2006). However, in each case, they are left with the problem of requiring multiple large-scale post-Flood events never mentioned in the Bible. In many instances, hemisphere-to-global-scale tectonic, sedimentary, and extinction events would be necessary to explain the remaining Paleozoic, Mesozoic, or Cenozoic overburden created during the post-Flood period. Although these creationists all reject the long ages of the time scale, they believe that they can use its linear framework to define a Flood-based stratigraphy (Snelling and others 1996; Snelling 1997). Unfortunately, they

Figure 1-3. Exposed along this escarpment are cross-bedded quartz sands and invertebrate shell layers that reflect deposition by water. These geologic materials could be collected and carried into the laboratory with the sedimentary bedding reproduced in a flowing water tank. This is experimental and reproducible *science*. The sand/shell outcrop could then be *interpreted* within a uniformitarian perspective as having formed within a number of different former aqueous environments operating over hundreds to thousands of years, potentially even longer based on historic changes in the former sea level position. Notice how we moved from the scientific aspect of the deposit (i.e., sand and shells deposited in flowing water — based on experimentation) to the interpretive (uniformitarian historical narrative). The history of this exposure does not equate to science — but it is easy to confuse the two concepts. This confusion occurs at almost every rock outcrop where the actual conditions of deposition were not observed, and assumptions are made within a specific world view. In reality, this exposure containing cross-bedded sands and shell layers formed in a matter of minutes with the entire exposed section forming in just a few hours (Froede 2006a). We know this because these sedimentary materials were added to the beach during recent renourishment activities. Water-transported and deposited sediments compose this man-made rock record. From this small outcrop, we can imagine how this process would have occurred on a global scale, depositing in places thousands of feet of antediluvian sediments over a brief period of time. Scale is divided into six-inch (15-cm) units.

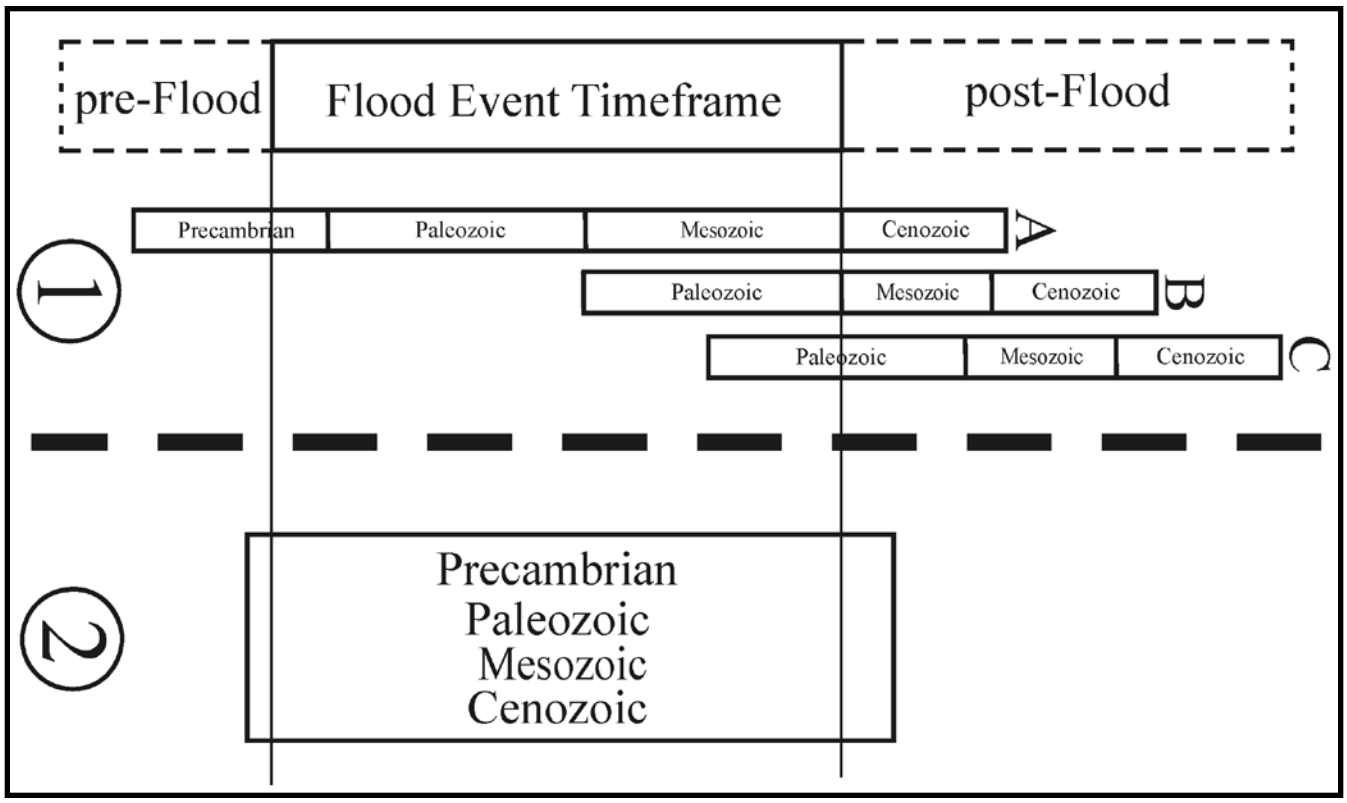

Figure 1-4. Some creationists have attempted to unify the uniformitarian geologic time scale and biblical history, while others propose to define the rocks solely from the biblical perspective. These two different concepts are presented here: 1) The linear progression of time conveyed by the uniformitarian time scale welded to the Flood event. Several Flood/post-Flood boundaries (A, B, C) have been correlated to the uniformitarian geologic time scale, but none successfully extend outside of the local area in which they are defined. 2) This is an alternative approach that does not support the idea that the uniformitarian geologic time scale is linear and which provides the flexibility necessary to define the physical rock record within a biblical framework. Since almost all of the earth's crustal rocks were either formed or altered by the global flood of Genesis, we would expect that the majority of the uniformitarian geologic time scale would occur within the Flood Event Timeframe in no particular order.

fail to understand that the time scale is a conceptual framework rather than an empirical reality (Froede 1997a; Reed and Froede 2003; Reed and others 2006b). To date, all attempts to integrate the Bible and uniformitarian geology end up sacrificing the biblical account in favor of natural history.

But the problems with these attempts are also empirical. A study conducted several years ago tested these boundaries against actual sediments infilling the northern Gulf of Mexico basin (Froede and Reed 1999). This basin has been extensively investigated for oil and gas deposits found within the subsurface. The stratigraphy of the area has been well defined within the uniformitarian geologic time scale. The creationist investigation assessed potential end-of-Flood boundaries at the time scale's Paleozoic/Mesozoic and Mesozoic/Cenozoic contacts, and near the top of the Cenozoic (see Figure 1-5). Our results suggest that the volume and nature of the sediments above even the "youngest" uniformitarian boundary would require many large-scale sedimentary events and/or special geological

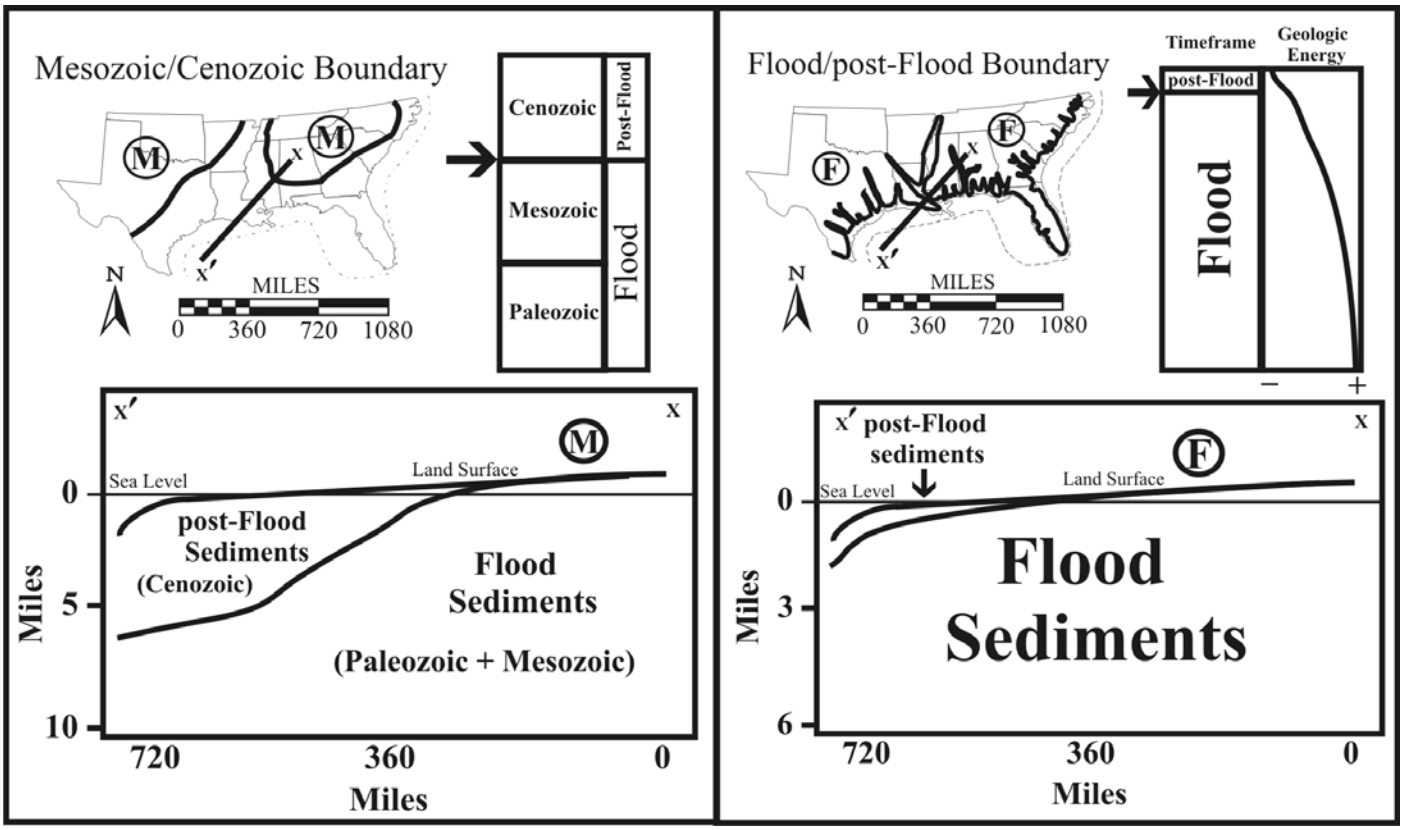

Figure 1-5. The northern Gulf of Mexico basin provides a well-defined geological setting in which to test the possible unification of the uniformitarian geologic time scale and biblical record. In our analysis, emphasis was placed on determining if a Flood/post-Flood boundary could be correlated to the Paleozoic/Mesozoic, Mesozoic/Cenozoic, or a late Cenozoic (i.e., Pliocene/Pleistocene) boundary (for additional information see Froede and Reed 1999). Two different boundaries are presented in this diagram: 1) the Mesozoic/Cenozoic-Flood/post-Flood boundary, and 2) a biblical interpretation outside the bounds of the uniformitarian time scale (modified from Froede and Reed 1999, Figure 4 and Figure 6). Regarding the possible Mesozoic/Cenozoic (K/T) boundary — note the tremendous volume of sediments that would have been eroded from the continent, transported laterally off the Gulf of Mexico coastal plain and deposited out into the basin within a *post-Flood* setting. Is this a reasonable expectation from biblical history? While the Bible does not provide us with much geological information, is this interpretation consistent with the biblical narrative? Should we expect such large-scale geologic activity following the Flood? We believe that this interpretation is unreasonable, and to accept the K/T boundary as the Flood/post-Flood boundary for this location requires greater geological activity than what might be expected in the post-Flood world. We need to redefine basin-filling strata within the constraints of biblical history, and in doing this, we believe that the best approach is to completely ignore the uniformitarian geologic time scale. Our focus should be consistent with the scriptural account and within reasonable and expected levels of geologic activity.

conditions *after the Flood*. Since none of the proposed boundaries were successful, we concluded that any attempt to define the Flood through application of the uniformitarian time scale would fail. Rather than continuing to seek conformity to the uniformitarian framework, we need to shift our emphasis toward the biblical record and define earth history accordingly (Figure 1-6) (see Froede 1997a; Reed and Froede 2003; Reed and others 2006a, 2006b; Woodmorappe 1981).*

What Is the Rock Record?

This leads us to another important conclusion: the rock record and the uniformitarian time scale are not one and the same. The time scale is a template constructed from a patchwork of stratigraphic-type sections scattered across the globe. Naturalists assert that these rock/sediment sections represent specific locations where the strata have accurately recorded a specific period of earth history. Compiling these individual type sections into a single vertical rock column then purportedly reflects earth's 3.8-billion-year history.[5] Counter to this perspective, Christians can be confident that the Bible provides

*Note: In this book, the capitalized, one-word term "Timeframe" is used by the author to denote his concept of a biblical geological time scale, defining specific geologic time intervals as opposed to other secular designations. The five divisions therein are also capitalized in this book: Present Age, Ice Age, Flood Event, Antediluvian, and Creation Week.

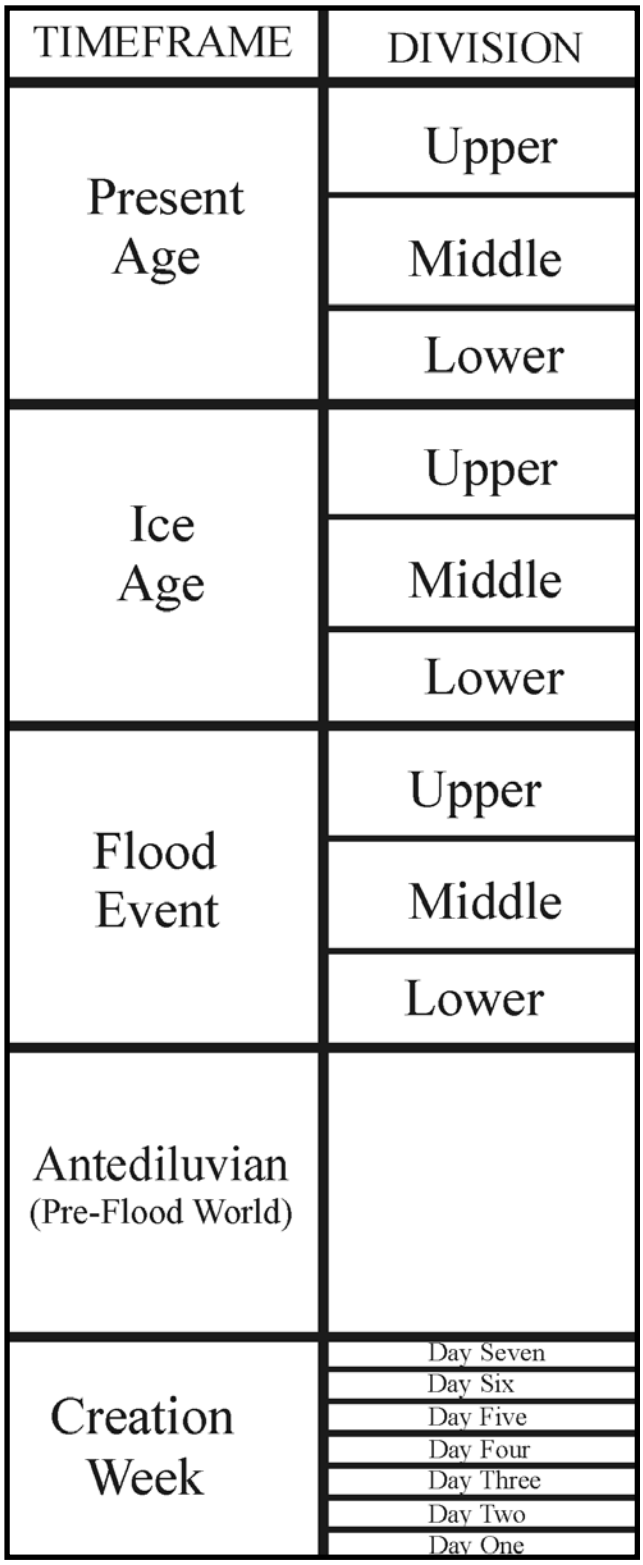

Figure 1-6. This biblical geological time scale (Froede 1995b) defines specific geologic time intervals and provides a broad framework for testing models about geologic history. Though flexible with regard to the interpretation of the rock record, the overarching biblical framework is consistent (Reed 2001; Reed and Froede 1997). Varying levels of geologic activity are believed to be reflected within the site-specific rock record and this information can be interpreted to reflect the various "time frames" in which the materials were formed or deposited based on Scripture.

us with the only accurate account of earth history. From it we learn that the rock record is certainly not billions of years old, but no more than 10,000 years old and probably closer to 6,000 years old.

Many young-earth creationist geoscientists are beginning to understand that the uniformitarian time scale has no place in a biblical outline of earth history (Froede 1995b; Reed and Froede 2003; Reed and Oard 2006; Reed and others 1996, 2006b; Walker 1994; Woodmorappe 1981). Focusing on the actual three-dimensional rock record frees the investigator from the philosophical straightjacket of uniformitarianism and allows for an objective analysis of the physical data (Reed 2005). This new perspective facilitates a young-earth creationist to interpret the rocks based on changes in geologic energy (e.g., hydraulic, sedimentary, tectonic, thermal, and climatic) before, during, and following the Flood.

Navajo Sandstone

For example, the Navajo Sandstone is a large layer of sandstone that extends across portions of four southwestern states in the United States. It is a mappable unit identified by its lithology and stratigraphic position, and as such, it conforms to the definition of a "formation" (North American Commission on Stratigraphic Nomenclature 2005). Uniformitarian scientists consider this massive sandstone as being all of the same age. That is probably not true. From a creationist perspective, the Navajo Sandstone was formed during the Flood Event Timeframe, prograding outward from an unknown source — possibly the uplifted and submerged Appalachian Mountains (Froede 2004a). Experimental laboratory work conducted and reported by Julien, Lan, and Berthault (1993) and Berthault (1994) suggests that massive horizontal sheets of sand — like the Navajo Sandstone — should not be considered a lithologic unit of equal age. The hydrodynamic transport, sorting, and settling of sediments across the submerged North American continent during the Flood would create prograding horizontal deposits of similar lithologic composition that are actually not of

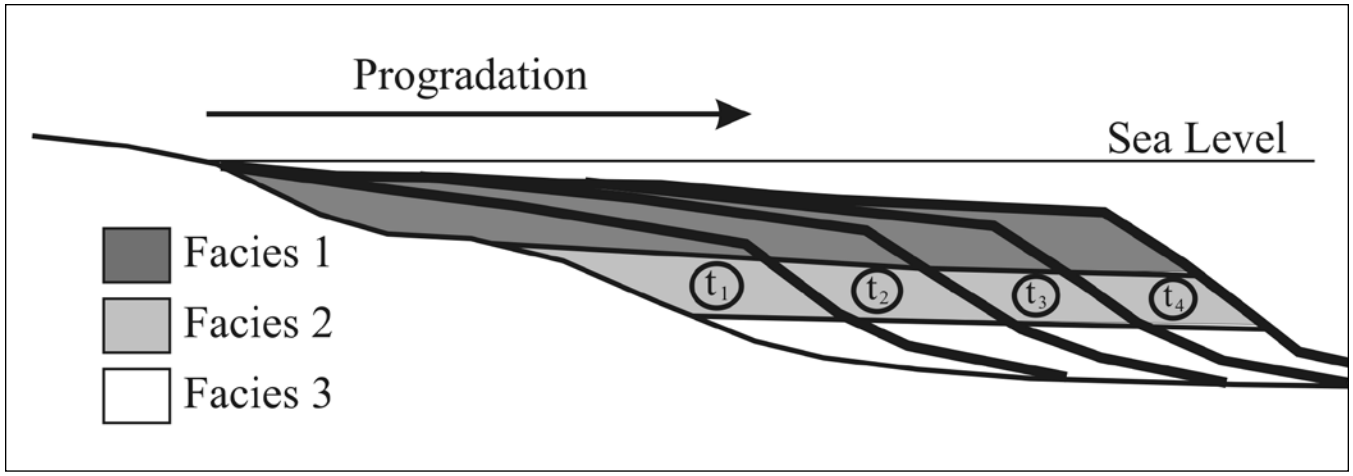

Figure 1-7. Laboratory work by Julien, Lan, and Berthault (1993) has demonstrated that lithologically similar sediments can develop one on top of another as materials are added to the front of a prograding delta. This is reflected in the horizontal "facies." The Navajo Sandstone is a horizontal sheet of quartz sand that is consistent with this view. However, time is actually defined by the slope of the prograding surface and the diagonal stack of varying materials — represented by t_1, t_2, t_3, and t_4. From this perspective, the Navajo Sandstone "facies" should *not* be considered of equal age. This approach to understanding stratigraphic relationships between sedimentary layers has great relevance to the Flood model. Many of these revolutionary ideas have been incorporated into the new field of sequence stratigraphy (modified from Berthault 1994, Figure 1).

equal chronological age (Figure 1- 7) (see Berthault 2002, 2004; Julien, Lan, and Berthault 1993). This new concept of prograding sedimentation and time serves to redefine massive lithologic units like the Navajo Sandstone and it challenges several uniformitarian geologic principles (e.g., law of faunal assemblages, law of faunal succession, law of original continuity, law of horizontality, law of superposition), suggesting that these concepts may be less useful to creationists. Flood geology requires innovative thinking, focusing on field data rather than simply repeating uniformitarian interpretations. The Flood demands a different perspective for most of the rock record that is consistent with waterborne transport and deposition occurring over a brief time.

As a result, we should focus on sedimentary features reflecting changes in the hydraulic conditions because that better characterizes Flood-related processes than do slowly changing paleoenvironments. This is illustrated by Figure 1-8, which shows different ways of interpreting sediments formed by a prograding delta. The sediment source area is to the left and sediments are being transported to the right. Box A reflects the simplistic "layer cake" approach to interpreting the stratigraphic record. The numbers on the right of the drawing reflect the layering sequence and lateral spread of strata of equal ages. This approach is consistent with many uniformitarian stratigraphic laws (e.g., original continuity, horizontality, superposition, faunal assemblages, faunal succession) and assumes that the age of the strata decreases with each new layer of sediment. Box B is derived from the tenets of sequence stratigraphy,[6] a new approach based on *Walther's law* in defining stratigraphy reflective of changes in sea level position. While many of its principles hold great promise for creationist studies, its inherent assumptions remain uniformitarian.

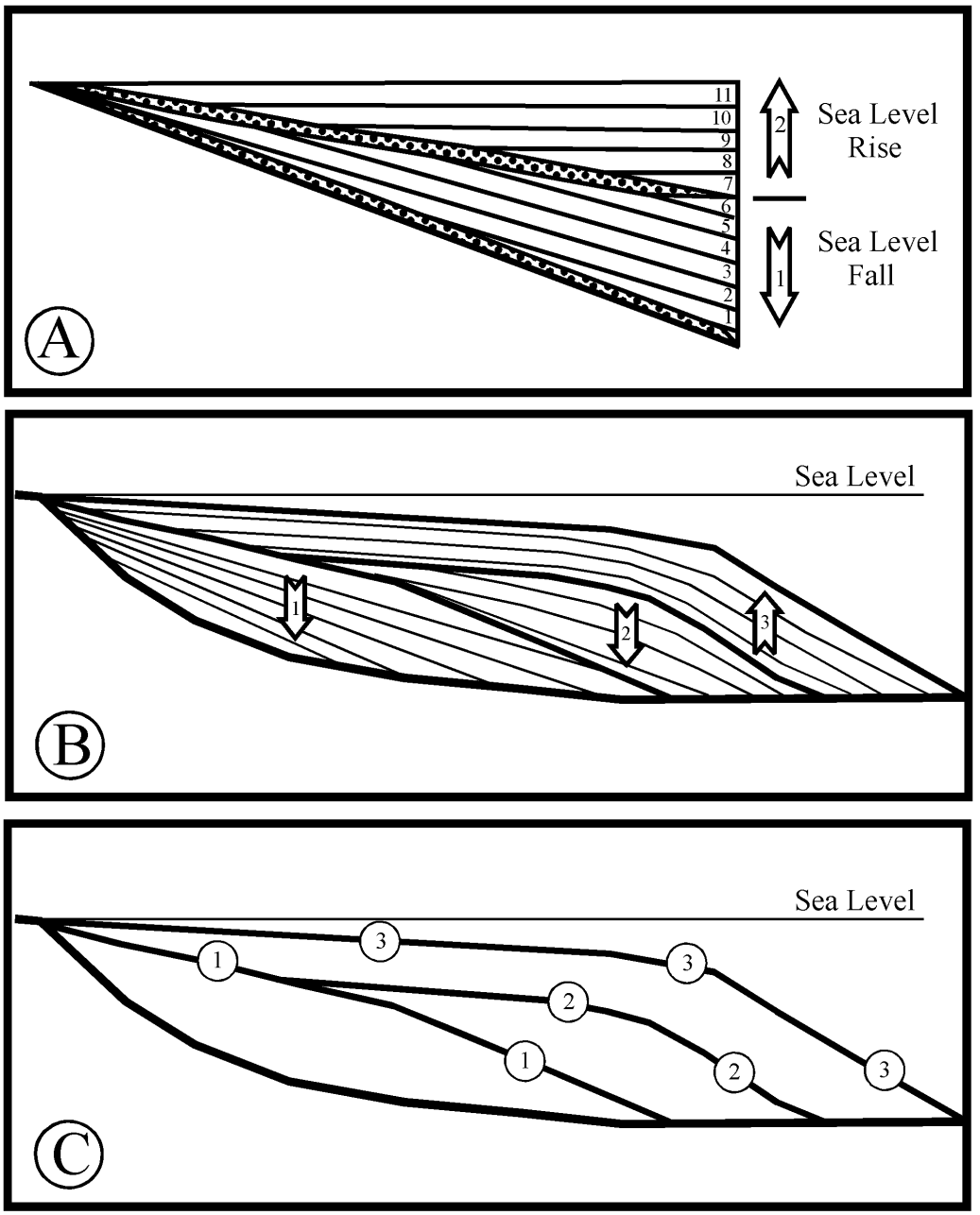

Figure 1-8. Three different ways of understanding the development of a stratigraphic sequence. Boxes A and B emphasize uniformitarian envisioned changes in sea level position while box C focuses on Flood conditions. Box A represents an outdated layer cake model. The sedimentary layers are age-dated from the bottom (oldest) to the top (youngest). A sandstone layer marks the base and top of the sea level fall series and only occurs along the base of the sea level rise series (modified from Grabau 1960, Figure 151).

This concept of stratigraphy has been largely discarded due to geophysical work at many of the large sedimentary basins around the world. Box B represents new ideas from sequence stratigraphy. This conceptual approach emphasizes defining sedimentary units grouped into parasequence sets, sequences, and unconformity-bounded system tracts. Sea level changes affect the construction of these sedimentary packages. The arrows indicate sea level conditions during the deposition of that group of sediments and the numbering refers to the progression of development bounded by unconformities (the heavier line). Box C represents a modified sequence stratigraphic approach to Flood geology. Areas of greatest interest probably occur along unconformity boundaries, which imply changing geologic conditions during the course of the Flood. Creationists would tend to focus attention on the sedimentary changes marked by the unconformity boundaries. The numbering refers to the age progression of the unconformities. See text for further information.

Young-earth creationists can use this conceptual approach, but must remain aware of its limitations within the biblical framework (Froede 1994a, 1998a; Klevberg 1999, 2000). Box C reflects a creationist adaptation of sequence stratigraphy. Our emphasis would be on the unconformity boundaries, which reflect changes in geologic energy instead of sea level changes over purportedly long periods of time. These boundaries might reflect differences in sediment source areas, floodwater conditions, and even tectonism. They would probably not be correlative outside of their depositional basin. This approach would place less emphasis on individual parasequence sets and sequences and more on systems tracts. Less value would be placed upon paleontological content or the lithology of the strata. Changes in organic materials and sediment would not be used to assign age, but would point to possible hydrologic and sorting conditions or possible source areas. Although this example is a delta, other flood settings would be interpreted using similar principles.

This emphasizes the distinction between our focus on the rock record and the uniformitarian time scale. Most of the sedimentary strata thought by uniformitarian geoscientists to have been deposited over hundreds of millions of years were in fact laid down in the Flood Event Timeframe (see Figure 1-4, Number 2). Rock units defined by uniformitarian scientists as an orderly march from the Precambrian to the Cenozoic, in reality, were deposited at the same time or even out of order. Every created kind[7] has existed on earth from the creation week, and we would not expect the rock record to show evolutionary order. Rather, the formation of most of the *rock record* would be the end product of Flood-derived erosion, transport, and deposition reflective of changes in hydraulic energy, tectonics, sediment type, and accommodation space (other factors apply but only these are listed). The arbitrary divisions within the uniformitarian geologic time scale, based on changes reflected by fossilized organic life or radioactive daughters, are meaningless within our understanding of earth history. As a result, it should be easy to understand why the uniformitarian geologic time scale, with its linear arrow of time derived in support of the purported evolution of life, cannot be welded to the biblical account of earth history (see further discussion in Froede and Reed 1999; Reed and Froede 2003; Reed and others 2006a, 2006b; Reed and Oard 2006).

A Biblical Approach to Defining Earth History

The Bible provides only an outline of geologic history because it was not written as a geologic textbook. However, it is an excellent textbook of ancient history, the only one carrying God's stamp of truth. Thus, the sparse geologic-related information that it does provide is absolutely reliable, and several Bible-believing geoscientists have proposed geologic chronologies based on the biblical record.

In the mid-1990s, two biblical geologic time scales were proposed (Walker 1994; Froede 1995b). In 1996, several of us published a chart of geologic energy versus time based on the Genesis account (Reed and others 1996). Since these conceptual models follow the biblical account, they are a good starting point for geological investigations. All of these ideas focus on the actual rock record rather than trying to find accommodation with uniformitarian assumptions or methods.

The Walker Time Scale

In 1994, Dr. Tasman Walker, an Australian engineer and geologist, published what is certainly the most detailed Bible-based geological time scale to date (Figure 1-9). According to Walker (2005), the time scale is divided into four parts identified from the biblical record. The creation event lasted six days and the Flood event about one year. The 1,700-year

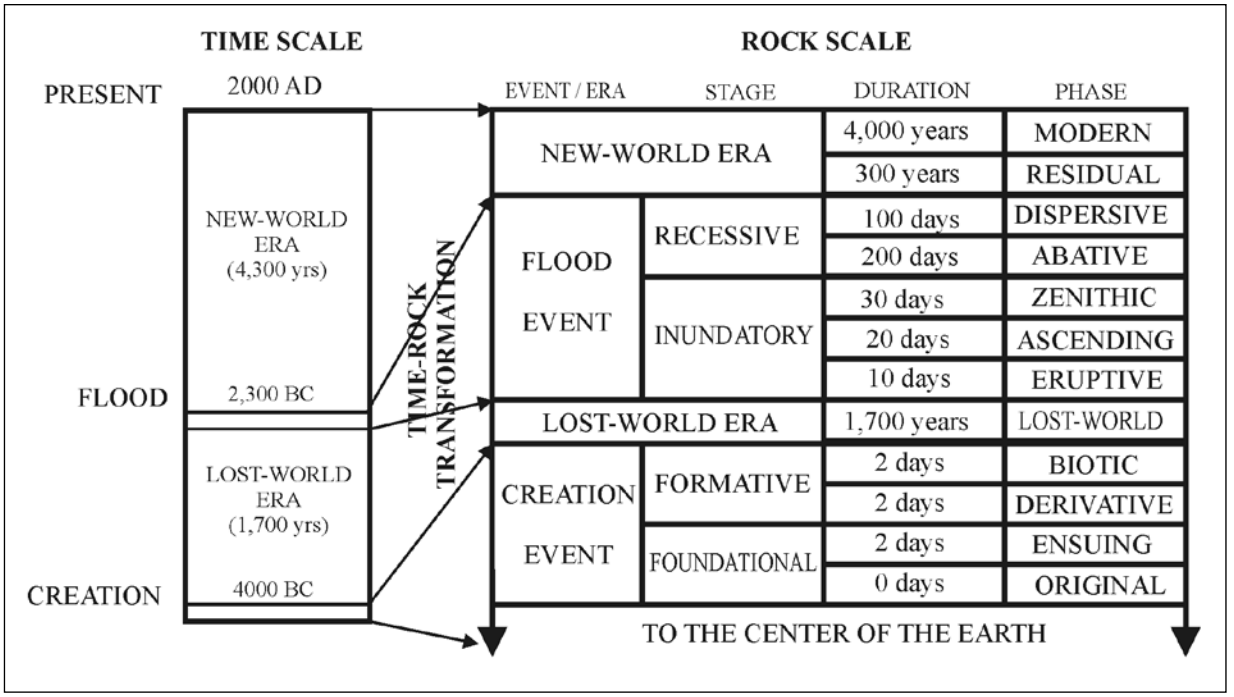

Figure 1-9. The Walker biblical geological time scale (1994) is composed of two parts, a rock- scale on the right and a time scale on the left. Most geologic activity occurred during the creation event and the Flood event. Although not explicit, the rock-scale also defines time intervals in light of changing geologic energy. This time scale is divided into great detail based on expected hydraulic conditions that occurred and are recorded in the rock record during the course of the Flood.

period between the creation event and the Flood event is called the Lost-World Era, while the 4,300-year-period from the Flood event to the present time is called the New-World Era.

The term "event" corresponds to a significant happening that occurred within a short period of time, whereas the term "era" is for a much longer period of time. These terms reflect the variation in geologic intensity for different times in the past because most geological activity happened during the short events, rather than the longer eras. The time duration of this time scale runs parallel with the events based on the biblical chronology developed by Ussher (1658).[8]

The rock-scale is correlated to the time scale via the time-rock transformation. Older rocks underlie the younger in the same manner in which they occur on earth. The lengths of the rock-scale units conceptually correspond to the quantity of rock material found on earth today and stand in marked contrast to the length of the units of the time scale.

This concept of time-rock correlation is fundamental to this biblical geologic time scale and reflects the non-uniform effect of historical events on the geology of earth. Emphasis is placed on the geologically significant processes and not time. The correlation between these two columns is indicated by arrows. Although the creation and Flood events occurred quickly and were of rather short duration, they were responsible for almost all the sedimentary rocks and a considerable volume of basement rocks present on earth today. The two long eras that make up virtually the entire time scale column did not contribute significantly to the development of the rock-scale column. Because these eras have such

little impact on the rock-scale, the exact dates for the creation and the Flood, within reason, are not critical to the model.

Walker has successfully applied his geologic time scale to sites in New Zealand (Walker 2001) and Australia (Walker 1996a, 1996b). This time scale has also been used to define strata for several locations in the United States (Klevberg 2005; Klevberg and Oard 2005; Oard and others 2005; Spencer and Oard 2004).

The Froede Time Scale

My own concept for a Bible-based geological time scale (Figure 1-6) was developed in 1993/1994 and published in 1995 by the Creation Research Society (Froede 1995b). Earth history is divided into five geologic time periods: 1) Creation Week Timeframe, 2) Antediluvian Timeframe, 3) Flood Event Timeframe, 4) post-Flood Timeframe, and 5) Present Age Timeframe. It is presumed that the post-Flood Timeframe would be *geologically* dominated by the post-Flood ice age. Therefore, the entire post-Flood interval is identified as the Ice Age Timeframe. The term "Timeframe" is used because it has no uniformitarian geologic connotations. This time scale is not as finely divided as Walker's because present knowledge is not sufficient to support such specificity. Several sites across the southern United States have been investigated and correlated to this time scale (Akridge 2000; Akridge and Froede 2005; Akridge and Williams 2001, 2005; Froede 1997d, 2005a; Froede and others 1998a, 1998b, 1998c; Froede and Williams 1999).

Several questions emerge when dividing earth's geologic history with the Bible. Some of these issues may be resolved through further study and some may never be known:

1. The first question involves the magnitude of the geological processes that occurred during the six days of the creation week. For example, the withdrawal of water from the land surface (on day 3) implies considerable geologic activity (e.g., erosion, transport, deposition, tectonism, and possibly even volcanism). However, if present laws of nature were not in effect, then the resulting earth materials would be created in place and only exhibit the appearance of having been developed by real geologic processes. Perhaps future investigation can resolve this question if Creation Week Timeframe sediments and strata can be identified in the rock record. However, the differences between strata formed by actual geologic activity and strata created *in situ* with the same features could prove to be unresolvable.
2. We can only speculate about geologic processes and paleoenvironmental settings during the Antediluvian Timeframe because we do not know precisely what the conditions were like during this interval of time. Many ideas have been put forth (e.g., no rain, no glaciers or ice sheets, no high mountains, one continental land mass, more uniform lower-energy geologic processes), but these are, at best, educated guesses. The eventual identification of one or more antediluvian environments and possibly *in situ* fossils might help in accurately determining the geologic setting and climatic conditions during this interval of earth history.
3. Did the "breaking of the fountains of the deep" have a terrestrial or extraterrestrial cause? Some individuals invoke the breaking of earth's crust by terrestrial forces (e.g., Austin and others 1994; Brown 2001; Horstemeyer and Baumgardner 2003), while others have suggested that the breakup might have been initiated by meteoric impact (e.g., Auldaney 1992, 1994; Faulkner 1999; Fischer 1994; Froede 2002a;

Froede and Brelsford 1998; Froede and DeYoung 1996; Parks 1990; Spencer 1994; Unfred 1984). The answer to this question has important connotations for understanding the likely condition of earth's crust, beginning with and extending throughout the Flood Event Timeframe.

4. The majority of the rock record was created by the global Flood and has yet to be specifically correlated to a biblical geologic time scale. Only a few areas have been investigated using this approach. A lot of work is waiting for anyone interested in undertaking this challenge. I believe that presently, the smallest interval of time that can be discerned from the rock record is at the "Division" level (Figure 1-6). Further research should result in the creation of additional smaller subdivisions of geologic time.

5. The geologic time interval identified as the Flood Event Timeframe extended longer than the year-long Flood documented in Genesis. The withdrawal rate of Flood water from each of the continents has yet to be determined. It is not likely that Flood water withdrew from every continent on earth at the same rate to expose all of them at the same time. There is geological evidence to support the idea that Flood water remained on portions of some of the continents well after the year-long event recorded in Scripture. Evidence in support of this proposal occurs as fossilized *in situ* invertebrate communities are found in life position along the southern end of the former North American epeiric seaway (Froede 1995a) and across various portions of the United States Gulf Coastal Plain (Froede 1997c). Additional evidence comes from exposed reef corals that are tens of feet above present-day sea level in areas such as the Florida Keys (Froede 1999, 2006b). Many questions still remain regarding the duration and range of the multiple global sea level changes that would have occurred throughout the Ice Age Timeframe as a function of tectonism, isostasy, and polar ice sheet glacial expansion and contraction. These eustatic changes could also create problems in determining where Flood-created marine deposits terminate and where overlying marine strata age-dated to the Ice Age Timeframe might begin. A combination of geological and archaeological evidences could prove useful in defining the termination of the Ice Age Timeframe (see Rucker and Froede 1998).

6. Finally, only with the establishment of a somewhat stable modern climate and a general reduction/cessation of large-scale tectonism can we ascertain which deposits represent the Present Age Timeframe. During this time, sea level position would moderate with alpine glacial advances and retreats (see Karlén and others 1995) and measured differences would only deviate from the present eustatic level within tens of feet (several meters) (see Fairbridge 1961, 1976). Most continental volcanic eruptions would be subaerial. Resulting ash deposits would reflect wind patterns consistent with our modern weather patterns. Lava flows would follow the land surface that we observe today. The creeks, streams, and rivers initiated following the withdrawal of Flood water and developed within the varying atmospheric conditions during the Ice Age Timeframe would begin to reach equilibrium with the land surface. The world's coastlines would also begin to move toward equilibrium, as sea level would stabilize

within a general tidal range. For most locations, the proper determination of this stratigraphic boundary will probably occur near the top of the rock record due to the expected reduction in geologic energy and climatic stability for most settings. The resulting layers of Present Age Timeframe sediments and fossils should correspond to a more uniform environment similar to our modern geological settings.

The Reed, Froede, and Bennett Geologic Energy Curve

In 1994/1995, I met several times with two colleagues to discuss the role that geologic energy played in biblical history. We quickly realized that, from a geologic perspective, the Flood interval would have experienced the greatest levels of geologic energy necessary for building the rock record through sedimentary, tectonic, thermal, and hydraulic processes (Figure 1-10). Our ideas were published in the *Creation Research Society Quarterly* (Reed and others 1996). The energy curve is less specific in its divisions of geologic time when compared to the two earlier proposals, but it remains a very important tool for understanding the expected magnitude of geologic forces in operation over the course of biblical history. It has been applied to the geologic history of the North American Midcontinent Rift (Reed 2000), as well as other locations (Reed 2001, 2002, 2004). This curve provides a conceptual means of translating global geological activity to the rock record.

Choosing a Biblical Geologic Time Scale

The Walker and Froede geologic time scales can be used to define the rock record in accordance with Scripture. Other geological models are possible and beneficial as long as they are constrained by the literal biblical record. Conceptual ideas (i.e., models) are important tools for earth history research. However, they must be validated by field results. Creation geoscientists must test their ideas and report their findings to support their theories. This work must begin at the outcrop and proceed toward understanding the stratigraphy and sedimentology of the site, area, or region. Every attempt should be made to examine the entire stratigraphic column (surface outcrops, subsurface cores, and well logs) within an area of investigation. This is necessary to accurately determine the physical properties of the rocks in question. This knowledge can then help in determining the creationist time frame in which they originally formed. Some areas may contain a rock record that spans one or more biblical geologic time frames. The investigator should also pursue related literature resources, both secular and creationist. With this detailed information, the researcher must then discern between the physical rock record and uniformitarian interpretation. All that remains is the interpretation of the rock record within the biblical framework. This is how the biblical outline of earth history should be developed.

Conclusions

The world view of naturalism and its component of uniformitarianism have given us a distorted view of history encapsulated by the uniformitarian geologic time scale: a construct that has no place within the biblical account of earth history (Froede 1997a; Reed 2001; Reed and Froede 1997, 2003; Reed and others 2006b). We do *not* need to waste further time and effort attempting to unify these mutually exclusive concepts. This planet is six to ten thousand years old, not 4.55 billion. All life was created in six days, and not over the course of billions of years.

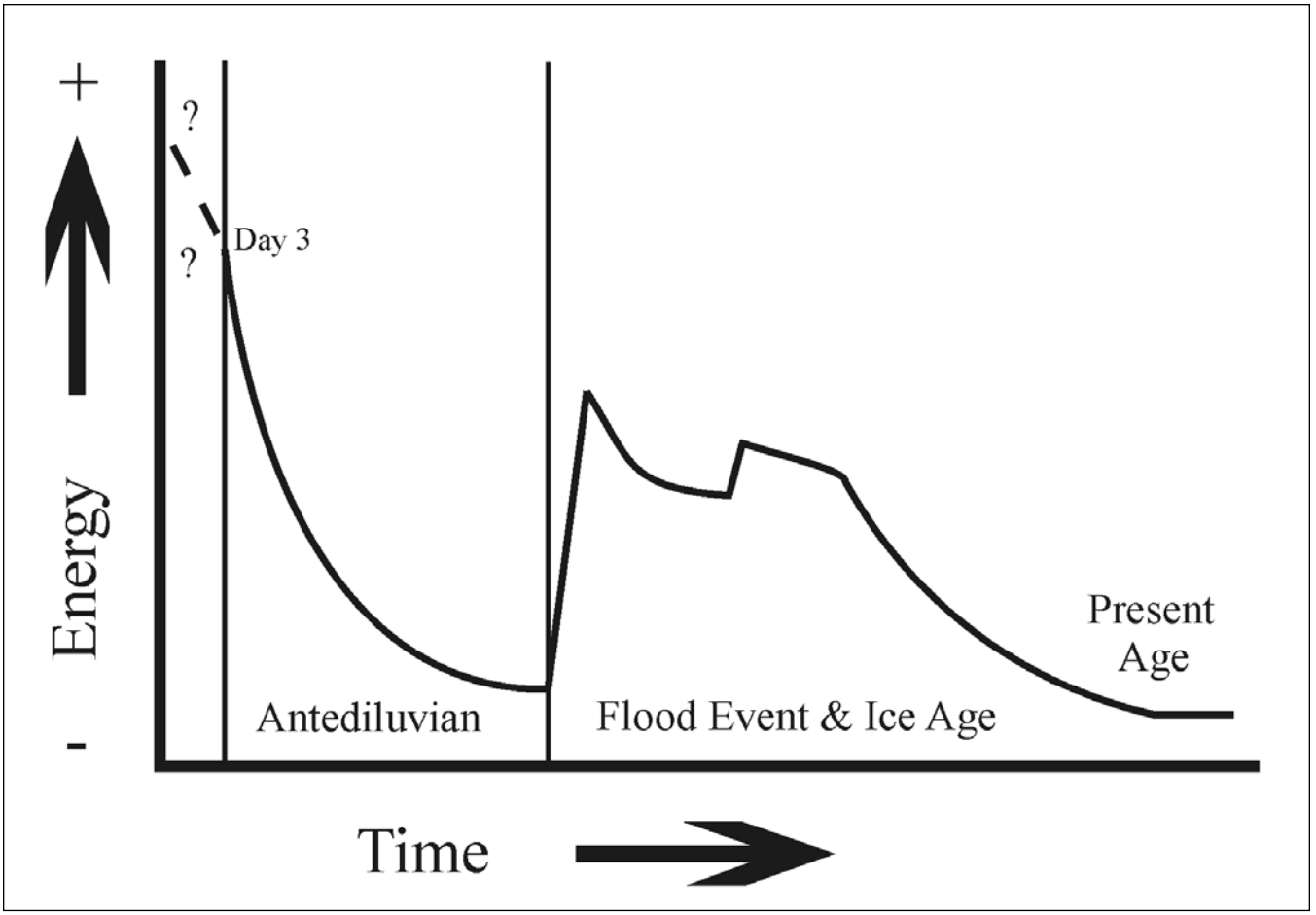

Figure 1-10. Another tool for investigating Flood strata is a geologic energy curve (Reed and others 1996). It can also be used to help define geologic conditions expected during the course of earth history, and corresponding changes in energy levels (modified from Reed and others 1996).

Most of the rock record was deposited in a year-long Flood, and not over billions of years. Any effort to join these two different accounts of earth history will only come from sacrificing one world view for the other.

Our approach to defining the geologic time scale along biblical lines would not recognize the time-rock gaps noted by uniformitarian scientists. Our interpretation of the stratigraphic record for any particular area would expect it to be relatively complete unless erosional features suggested otherwise. Any changes in sedimentary composition and content in the vertical stacking of the rock layers might easily reflect hydraulic conditions during transport or possibly changes in the sediment source areas, rather than slow accumulations over eons. Additionally, our historical interpretation of the rock record would be drawn from the framework provided by Scripture. We have no common ground with either naturalism or uniformitarianism.

Young-earth creationists should start with the scriptural account and apply it to the rock record by focusing on geologic energy levels of widely varying magnitudes and the effect that this has had on rocks, sediment, and fossils.[9] Interpreting the rock record within any one of the Bible-based time scales reviewed in this chapter should enable

us to better define and understand earth's geological history. This new approach will provide the creationist geoscientist the freedom to conduct research away from the confines of the uniformitarian geologic time scale and eliminate the confusion that occurs when the two world views are mixed together. It is time to get started in defining the rock record within the biblical framework of earth history.

Endnotes

1. Naturalism is also referred to as materialism, secularism, secular humanism, and evolution (see Reed 2001).
2. While identified as "catastrophists," many of these individuals were compromising biblical truth to try to keep pace with the new science, abandoning the biblical chronology and the uniqueness of Noah's flood.
3. The *law of superposition* states that younger strata will be found on top of older strata unless disrupted by later events. This geologic term along with many others is defined in the glossary.
4. Three different Flood/post-Flood boundaries have been proposed within the uniformitarian geologic time scale (Figure 1-4, Numbers 1A, 1B, and 1C). In order for any one of them to succeed as a definitive boundary, they must correlate between the uniformitarian column and biblical history at every appropriate uniformitarian boundary location on earth. All of them fail in their application to strata filling the northern Gulf of Mexico basin (a test case). Therefore, they should all be rejected. The uniformitarian column has no place in the scriptural account of earth history. Rather, an alternative approach is proposed (Figure 1-4, Number 2) based on our expectations within the Flood framework of earth history. We should abandon the linear arrow of uniformitarian time and redefine the physical rock record consistent with the biblical narrative.
5. Earth is reportedly 4.55 billion years old based on the age-dating of meteoric materials which are assumed to be of the same age as the earth. However, the oldest rocks on earth have been age-dated to approximately 3.8 billion years.
6. Emphasis has moved away from many of the old assumptions and laws of stratigraphy toward understanding the depositional setting in which these sedimentary units build parasequence sets, sequences, and eventually system tracts (see Emery and Myers 1996; Catuneanu 2006). The individual system tracts in this sequence (with a stable sea level position) generally conform to a sigmoidal curve (i.e., a clinoform).
7. The Genesis "kinds" are not the same as Linnaean species. After the Flood, new "species" might have appeared as the basic kinds migrated outward to fill the post-Flood earth.
8. Archbishop James Ussher is widely ridiculed for his biblical chronology, yet it is one of the greatest works of scholarship ever published.
9. What is proposed here is not new. Rather, this conceptual framework follows what others such as Gish (1995), Morris (1985), Whitcomb (1988), Whitcomb and Morris (1961), and Woodmorappe (1993) have already recognized. These gentlemen have stated that fossil-containing strata and radiometric dating, as defined within the framework of the uniformitarian geologic time scale, do not define *time* from a biblical perspective.

Checking Your Understanding

1. Read Genesis, chapter one.
   A. What days within the creation week suggest geological activity?
   B. How does this account of earth differ from the uniformitarian account?
   C. Is there a way to reconcile the two accounts, working from Genesis, chapter one?
2. If we cannot unify the biblical account with naturalism, then which version should we trust? Why?
3. Explain the differences between a world view, history, and science? How does one affect the other?
4. How do we know if our world view is consistent with scientific principles? Does it have to be?
5. What is the difference between the physical rock record and the uniformitarian geologic time scale?
6. Can we interpret the actual rock record outside of the framework of the uniformitarian geologic time scale?
7. How can we age-date earth's rocks, sediments, and fossils from a biblical perspective?