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CREATION RESEARCH SOCIETY QUARTERLY

Toppling the Timescale
Part II: Unearthing the Cornerstone

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Abstract

Creationists have addressed uniformitarianism, evolution, and deep time as foundation blocks of the geological timescale, but have failed to assess its cornerstone. That key principle is the assumption that elements of the rock record represent global correlative synchronous time periods. It is an assumption that dates to the earliest days of modern stratigraphy, but one of questionable value in diluvial geology. Our increasing knowledge of the rock record; of its local variations in tectonic, hydraulic, sedimentary, and diagenetic environments makes it unlikely that globally correlative synchronous time periods can be readily and practically identified in the rocks.

Introduction

Archaeologists patiently sift through layer after layer in search of the foundations of ancient ruins. Investigating long-lived paradigms requires the same persistence; the original ideas are usually obscured by layers of accreted concepts. Such is the geologic timescale. It appears at first glance to be a simple chronology of Earth's history. It can be displayed on one page. However, creationists need to dig deep to its hidden foundations. These are assumptions outside science, like uniformitarianism, evolution, and deep time (Whitcomb and Morris, 1961; Woodmorappe, 1999; Reed and Oard, 2006). But there is one assumption—the "cornerstone" if you will—that deserves extra scrutiny, if for no other reason than that it has been ignored by both uniformitarian and diluvialist scientists for centuries.

This key to the geologic timescale (and modern stratigraphy) is the assumption that rock units can be ordered by reference to concentric layers of synchronous time that are globally correlative. In other words, every rock in the crust can be theoretically assigned a particular age and then correlated with other rocks anywhere on the planet solely on the basis of that age. It is the purpose of this paper to expose that assumption and discuss its past impact and future value for stratigraphy.

The Cornerstone: Global Correlative Synchronous Time

At first glance this idea seems unworthy of intellectual effort; it is too simple. But a little reflection demonstrates that the timescale cannot possibly be true without it. Rocks do not come labeled in the field, and so the fundamental challenge of stratigraphy has always been to correlate the bits and pieces of the crust exposed in outcrop, mines, or wells or measured by acoustic, magnetic, or gravitational properties.

Early stratigraphers acted locally, but thought globally. How could a particular rock unit be correlated to others everywhere on Earth? Today we realize that it cannot be done by lithology, fossils, unconformities, or any other (as yet) known physical property. The pioneers apparently also understood that direct correlation was impossible. It could only be done indirectly—and they chose time as the filter to derive meaning from the jumble of strata.

Since then, there has never been a serious challenge to this decision, probably because every stratigrapher, from creationist to strict uniformitarian, have all agreed on one thing—that the rock record represents history in some fashion. From that conclusion, everyone has made the leap that since rocks are a historical "record," then a

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Accepted for publication April 25, 2007

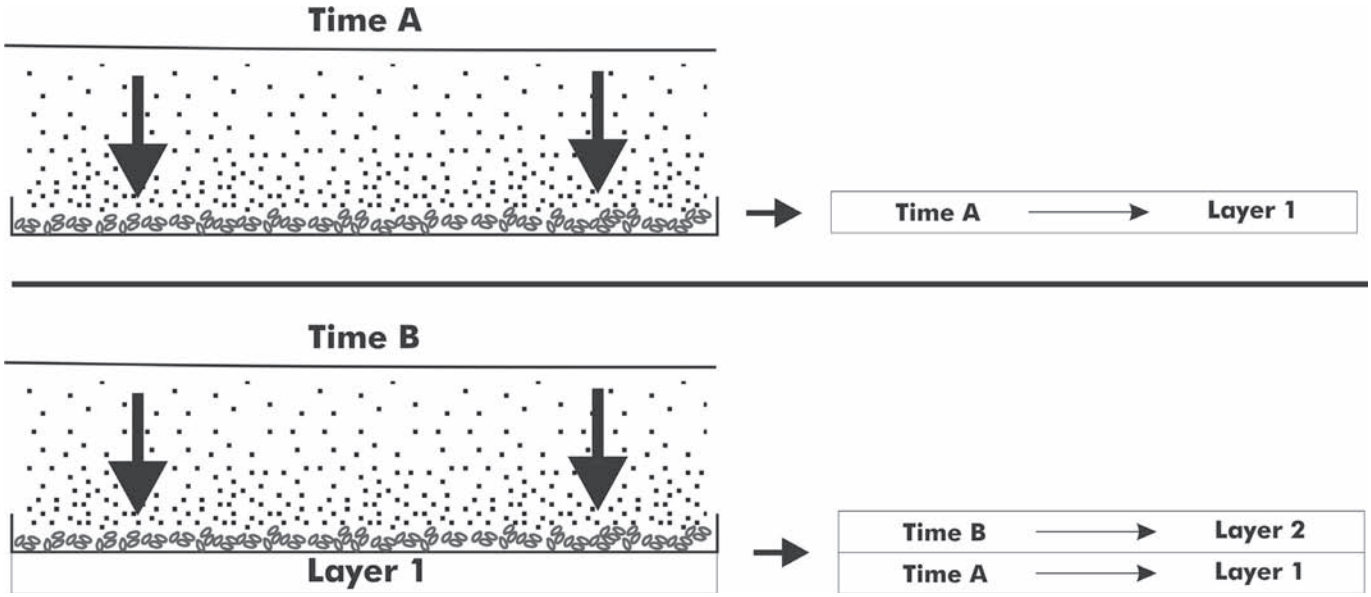

Figure 1. Steno's model of stratigraphic layering. Vertical settling causes the deposition of Layer 1 during Time A. After Layer 1 hardens, the process repeats, forming Layer 2 during Time B. The process continues, over and over, until the sedimentary record is complete—distorted only by erosion and deformation. This concept underlies the modern geologic column.

chronology of layers—like the sequential pages of a book—is not only possible, but necessary. Ergo, the layers are the chronology. Every stratigrapher since Steno has agreed, resulting in the "onion model"—even though rock units are irregular, *stratigraphic* units measure time like the layers of an onion—regular, concentric, and the same everywhere.

In addition to the questionable logic of this arrangement, the effects of scale have been largely ignored and visible sedimentary bedding on the outcrop scale has almost certainly reinforced the idea that strata parallel time, even after exceptions have been demonstrated in the field and the laboratory (Julian et al., 1993; Berthault, 1994). Why has this model been so persistent if problems exist? A quick historical review shows how the assumption was first made and more importantly, how it then quickly vanished below the radar screen.

Origin and Development of the Assumption

Like other axioms of stratigraphy, this assumption can be traced back to Steno. His well-known principal of superposition and his less well-known axioms of "lateral continuity" and "original horizontality" form the framework for the "onion model" that many take for granted today. He believed that sedimentary rocks formed as horizontal layers, which represented discrete periods of time (Figure 1). The logic flowed from that point. Time is a universal constant; its passage is uniform. Thus if time can be correlated to rocks (i.e., today's time-rock units), the succession of strata (absent erosion and non-deposition) would be uniform and could be correlated globally.

> The goal of constructing a single sequence that would have worldwide validity had in fact been present implicitly in much earlier [before the 1830s] descriptions of strata; the general working assumption—it hardly merited the status of a theory—was that there was indeed such a universal sequence to be found (Rudwick, 1985, p. 533, brackets added).

However, if this relationship between rocks and time is not absolute, then modern stratigraphy and its timescale must be reevaluated from the ground up.

Once this theoretical basis was promulgated, early stratigraphers faced several hurdles to implement it. The first was data—too much and too little at the same time. Outcrops, pits, and mine shafts revealed local successions of rock units that were commonly named without consideration for their lateral continuity (or lack of it). The plethora of both rock units and nomenclature demanded simplification. But simplification required systematic information. William Smith [1769–1839] paved the way, gathering and ordering the rock record of England. Using Steno's axioms,

he developed a vertical order of strata that he assumed reflected a historical succession, demonstrating that strata from various locales could be ordered by a single vertical template—a timescale.

But there remained a problem. Observed rock units seldom corresponded to cartoon-like layers. So to apply the template of time, stratigraphers needed a key—some non-repeating inherent property that would allow unambiguous labels for sparse or disrupted strata. European stratigraphers first tried lithology, and their initial timescale—*Primary-Secondary-Tertiary*—was based on changes from one rock type to another. By the end of the eighteenth century, geologists realized that lithostratigraphy could not unambiguously define time units. Facies changes, unconformities, diachronism, problems of scale, and the ability of any given lithology to occur in strata of widely varying ages all demanded another approach. Rock units all ended eventually, and the geologists needed to correlate beyond England. Rather than reexamine their assumptions, they kept searching for a "clock." Smith and Cuvier fanned their hope by emphasizing correlation based on lithology combined with fossil assemblages, but by then the direction of stratigraphy was caught up in the raging conflict over history itself. Stratigraphy became a weapon in the fight between Enlightenment secularism and Christianity. As a result, the attempt to order the rock record became an attempt to use the rock record to overthrow the biblical version of ancient history.

In the early 1800s, stratigraphy became a battleground among uniformitarians, old-earth catastrophists, and scriptural geologists. Determined to overthrow the Bible, uniformitarians won, and deep time became a dogma to defend, not a tool of science. The crowning achievement of the uniformitarians was the establishment of a "prehistory" that ripped the majority of Earth's past away from Genesis and made it accessible only to the worldview of naturalism, masked by the new science of geology. As the length of prehistory increased, the relevance of the Bible decreased.

But Ussher had shown that the Bible presented a well-developed chronology as the skeleton of history. Consciously or unconsciously, geologists raced to develop an equally sophisticated system. They did this in two steps. First, they set about to order rock units into a global historical sequence (chronostratigraphy). Second, they assigned absolute dates to those units, creating a global historical chronology. Both steps required the assumption of global correlative synchronous time. Thus, the axiom of global correlative synchronous time periods had become necessary to much more than extended correlation—that assumption became the cornerstone of the emerging uniformitarian worldview.

Two nineteenth-century developments pushed the timescale to its modern form (Figure 2). The first—an ever-expanding chronology—emphasized time boundaries over physical rock properties, and Lyell lived to see the template achieve its modern form. Also, deep time conveniently blurred inconsistencies in correlation. Relationships (mainly diachronous) that might have proven significant puzzles in a short time frame became nothing more than background noise in deep time—especially when the emphasis was so heavily weighted towards driving "golden spikes" to define exact time boundaries.

The second development, the theory of evolution, provided stratigraphers with the reliable chronometer they so desperately sought—index fossils. The irreversible progression of life became the one true clock of stratigraphy—geologists were convinced that evolution's arrow of time would finally order strata globally. Chronostratigraphy was assured, even in areas where physical correlation was impossible. This was because one no longer had to relate physical rock units, only the evolutionary stage of their fossil contents. Ironically, this signaled the end of the search for an empirical key to the rock record—evolutionary successions cannot be observed. Stratigraphers had their solution, but it required a sleight of hand substitution. One could "date" rocks "empirically" by index fossils, but only if the unobserved evolutionary stages were real. The resulting circular argument that fossils "prove" evolution has ironically given modern creationists a potent argument against evolution. To this day, most stratigraphers (who are specialists) believe their work is empirical. Once they find a particular fossil or suite of fossils, they can plug the formation into the "empirically-established" timescale and correlate it across the planet.

The leap from correlating rocks to correlating time periods was a brilliant (though flawed) conceptual shortcut. It provided the means to evade empirical problems created by limited observation, incomplete sections, facies changes, unconformities, deformation, and problems of scale. It relieved geologists of having to perform time-consuming, backbreaking inductive evaluations of every locale. Although the column is presented as an *inductive* culmination of decades of observation, in retrospect, it always has been a *deductive* template—as demonstrated by the failure to use field research to assess its primary (and now sacrosanct) axiom—global correlative synchronous time. Instead, the timescale imprints itself on the local stratigraphy of any new area—assigning ages, unconformities, and correlations. If the template is correct, its shortcuts are beneficial. But what if it is not?

Creationists question the timescale because they reject evolution, deep time, and uniformitarianism. But they have not yet delved deeply enough. Toppling the timescale requires that its cornerstone be uprooted. *If the assumption that rock units represent globally correlative synchronous time periods is not correct, then neither is the timescale.*

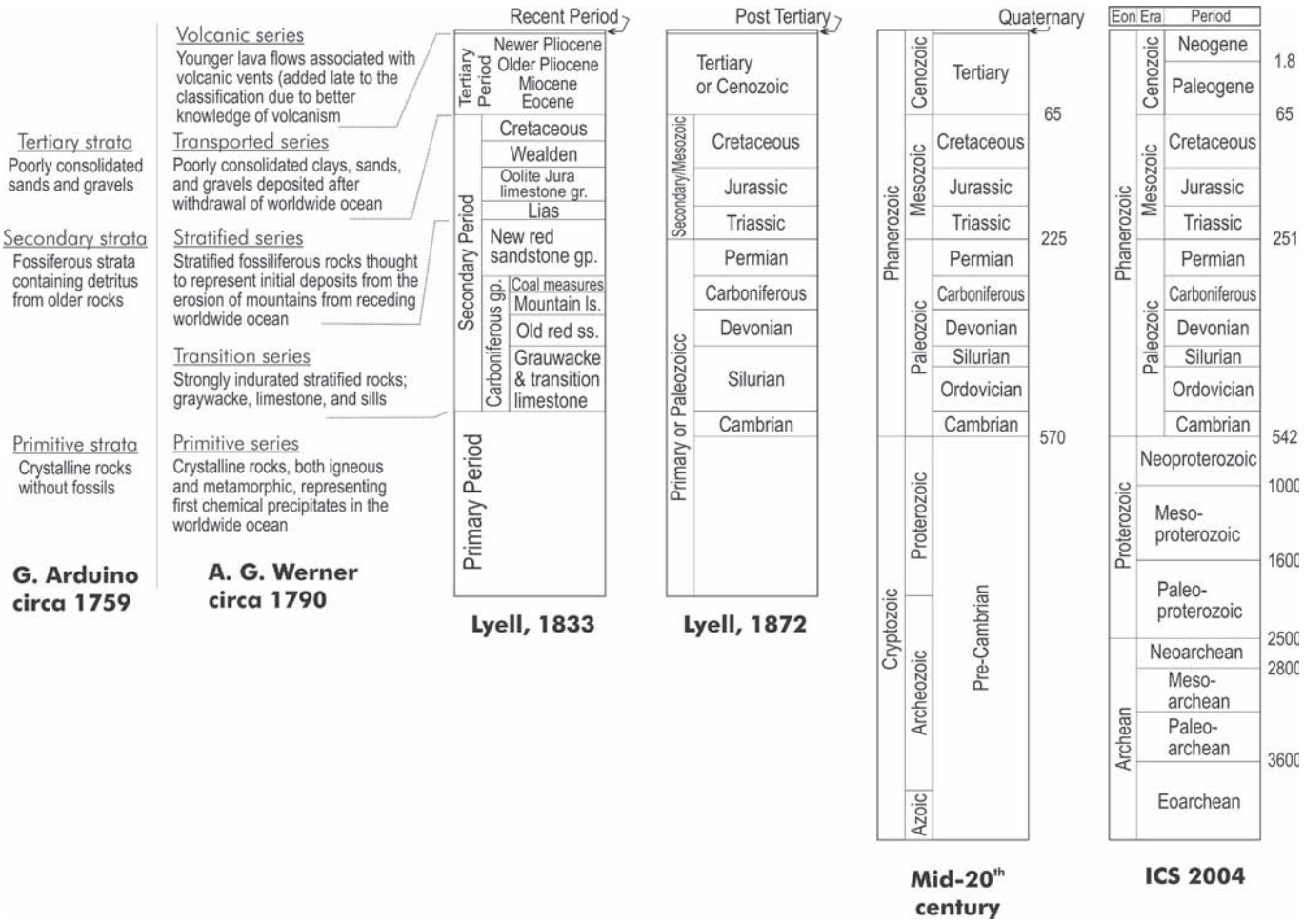

Figure 2. Development of geologic column from eighteenth to twenty-first century. Note transition from a vertical succession of *rock* units to a vertical succession of *time* units during nineteenth century. Modified from Gradstein et al. (2004).

In that case, geologists—like centuries of Ptolemaic astronomers—have been seriously misinterpreting their observations.

Cracks in the Cornerstone

Any challenge to any long-accepted and unrecognized assumption will generate significant misunderstanding. So we must be clear about what is not being challenged. First, at given scales, rock units certainly can be identified and correlated. Second, the succession of particular rock units at a given scale most likely represents the passage of time. The primary error lies in the unwarranted extrapolation of *local* observation to *global* scale. Like Plato's forms, we see the imperfect reality in an outcrop and intuit an ethereal, ideal column. This extrapolation is dual—across space (e.g., from Britain to Bangladesh) and from space to time (e.g., rock unit A = time unit A). Even in the initial "Primary-Secondary-Tertiary" framework, these leaps were beginning to be made.

But the reasoning is circular. If the timescale (as a template) is used to decipher a given outcrop, it is invalid to then say that the same outcrop "proves" the timescale. One of the greatest barriers to fruitful discussion is that stratigraphers continue to assume that they can jump from physical rock to abstract time and be doing something empirical. When the timescale is questioned, they point to the physical rock—"This is Jurassic!"—in response. If someone is impertinent enough to point out that that particular rock unit ends a few miles away, they respond by noting that the Jurassic time period was global. Like evolution and index fossils, the argument is circular. However, as long as everyone assumes the validity of globally correlative synchronous time periods, that circularity vanishes in the intellectual fog of a shared assumption.

Modern research has increasingly demonstrated that physical rock units are not regular concentric global layers. They are usually found filling sedimen-

tary basins, and though some of the basins are quite large, they are by no means global. There is no doubt that in particular locations and particular scales, strata occur in vertical successions that represent some passage of time. However, time is not the only factor; time is not necessarily the most important factor; and the leap from rock units to globally correlative time intervals is a leap far out of the empirical realm. There are three reasons why the assumption should be questioned by diluvialists.

A Presuppositional Error

Errors can be divided into three categories: (1) empirical, (2) logical, and (3) presuppositional. Faulty observation may be corrected by additional examination. Faulty reasoning may be corrected by critical evaluation. However, presuppositional errors tend to be both pervasive and resistant to correction. The axiom of globally correlative synchronous time as a template for stratigraphic interpretation is ubiquitous yet never discussed, much less critically evaluated. It finds support among parties as diverse as creationists and uniformitarians. When everyone believes the same tenet, it becomes virtually immune from critical evaluation. For example, all of Tycho Brahe's careful astronomical observations were directed to an incorrect conclusion, simply because he started with the assumption of geocentrism… yet Brahe was no less exacting and careful a scientist than any modern stratigrapher!

Increasing Knowledge of the Rocks

Pioneers of stratigraphy up to the late nineteenth century might be excused for envisioning a "layer-cake" model of Earth's crust. After all, Smith showed that much of England's rock record was a vertical succession of strata. Nothing could have been more obvious than connecting the outcrops and equating the resulting layers with a historical succession. However, the explosion of empirical data and sophisticated investigative tools leaves modern geologists with less excuse; the three dimensional complexity in both geometry and composition of rock bodies is well documented over most of the continents and even to an extent in the ocean basins. And the resulting picture looks less and less like the textbook cartoon. No informed geologist believes that *rock* units are global regular concentric layers; they understand that deposition often has a stronger lateral component than a vertical one. So why do they cling to the assumption that the best interpretive template is that of globally correlative synchronous time?

Instead of reexamining the premise of time-rock equivalence, geologists have always preferred to deal with "problems" in the rock record by multiplying inexact criteria to set time-stratigraphic boundaries. When lithology did not work, they tried fossil assemblages. When those proved inexact, they developed the concept of index fossils. Because index fossils are not foolproof, modern stratigraphers supplement them with isotopic dates, magnetic polarity zones, or chemical markers that supposedly reflect astronomical cycles—each with its own set of shortcomings. They assume that a plethora of inexact methods will provide exact answers, apparently not realizing that the only way for this approach to work is if the answer is known in advance! Rather than question whether the inability to derive exact chronometers for the rock record indicates a problem with the assumptions, the uniformitarian obsession with deep time armors the foundation from such inquiry. After all, the mania about time boundaries prevented a serious investigation into sedimentary depositional systems until the latter half of the twentieth century. And yet, there is clearly a problem. Increasing skepticism about evolution renders the "fossil clock" obsolete and the multitude of other methods cannot mask their individual empirical failures.

Therefore, the horns of today's stratigraphic dilemma are clear: some locations show well-ordered strata in a clear vertical sequence extending over large areas, while others show inexplicable transitions that render correlation almost impossible. Structural and tectonic boundaries, province changes, facies shifts, differential preservation, and the transition from continental to marine all hinder correlation. But stratigraphers insist on pigeonholing rocks into the same old eras, periods, or stages. It may preserve their history from the chaos of ignorance, but the axiom of interpreting via globally correlative synchronous time periods has put a straitjacket on the rock record. What is worse: not knowing, or being sure of what is wrong?

In addition to increasing empirical complexity, experiments (Berthault, 1994) demonstrated the superiority of a hydraulic emphasis as opposed to temporal. Steno apparently failed to recognize that hydraulic variables could create the appearance of superposition without its reality (Figure 3) by the simultaneous formation of multiple sedimentary horizons. Both diluvialists and neocatastrophists are beginning to apply this knowledge in the field, but neither seems to have reached the point of using that knowledge to question the cornerstone. Perhaps this is due to the fact that a hydraulic approach emphasizes local analysis, while the timescale focuses on universal extrapolation.

Scale

One of the fundamental principles of science is the profound effect of scale. No one denies that changes in scale dramatically shift our perspective, but no one seems to apply that insight to the timescale. Early columns were based on local observations and extrapolated over growing distances. Today's template was set firmly in place with virtually no empirical knowledge of geology outside of Western Europe, and with much of that detail coming from Britain. Since stratigraphy was grounded in the transposition

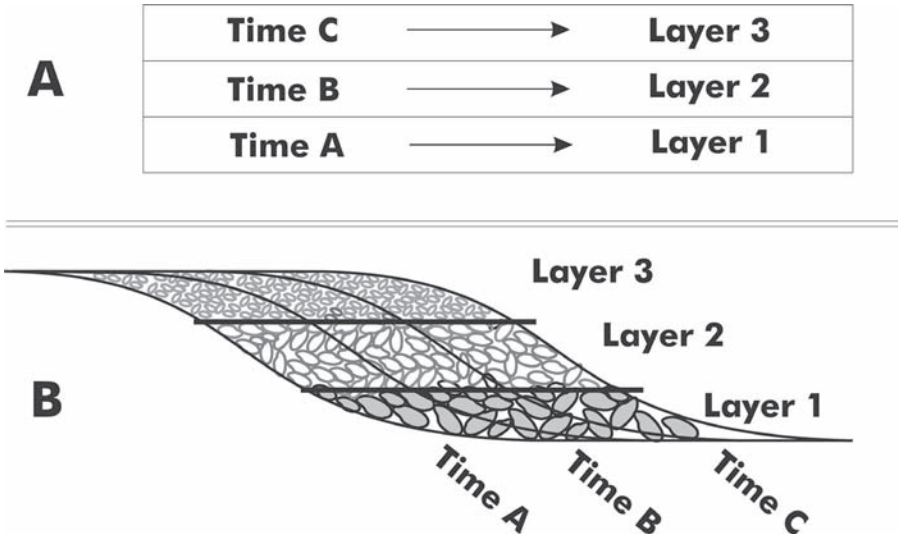

Figure 3. In contrast to the conventional assumption that the rock record was formed by horizontal layering (A), experiments have demonstrated that sedimentary layers and time lines are not parallel (B) when formed by progradation in a moving current. Needless to say, deposition in a Flood model would be heavily weighted to moving currents. Modified from Berthault (1994).

of rock units to time units, geologists "knew" what to expect as they explored elsewhere.

Summary

Stratigraphy rests on the cornerstone of global correlative synchronous time as the template for interpretation. With hardly a thought, empirical rock units are transposed into conceptual time units, and the resulting 4.6 billion-year "prehistory" has hijacked true history. This foundation must be reexamined. It has many inherent weaknesses. Rock units are scale-dependent features, and our increasing knowledge of depositional processes de-emphasizes time at the expense of hydraulics. No one "chronometer" is exact and modern stratigraphers keep switching between methods—fossil zones, astronomical cycles, magnetic polarity chrons, etc.—to mask those weaknesses. Yet no one has bothered to question the one big assumption. Furthermore, the management of the timescale is given into the hands of an elite priesthood, while most geologists turn their energies to tectonic, depositional, and diagenetic histories of local units. Although phenomena are local, interpretation is still presumed to be global. Poor assumptions are retained and their weaknesses are masked by a continuous supply of new methods.

Global Correlative Synchronous Time and Diluvial Geology

The modern resurgence of diluvial geology has challenged the absolute timescale of the geologic column. However, in many cases the critique stops there (e.g., Snelling et al., 1996). Few seem to appreciate that the Genesis Flood, properly understood, challenges the core of the system—the cornerstone of global correlative time "layers." For although the Flood account in Genesis includes a chronology that can be read into Earth's geology (i.e., onset, transgression, highstand, recession, end), there is no guarantee that this chronology will manifest itself globally in similar predictable physical features of rock units. Deposition of rock units in hours or days rather than millions of years; local variations in erosion, tectonism, volcanism, and sedimentation; and even variations in topography (Figure 4) all call for a different approach. The Flood shatters the illusion that time is the key to stratigraphy, focusing attention instead on the effects of widely varying tectonic and hydraulic energy levels on depositional environments.

But even for Flood geologists, it is hard to make such an abrupt shift in stratigraphic paradigms. We have all been heavily influenced by the education, training, and research contexts of our age. Worse, the fact that the offending presupposition has remained hidden so deeply for so long makes it difficult to evaluate the consequences of replacing it. All young-earth geologists reject the geochronology of the timescale, but many seem loath to abandon its global chronostratigraphy (e.g., Tyler and Coffin, 2006). It will be even more difficult to abandon the assumption that makes that chronostratigraphy possible. But at a minimum, we must engage in a critical evaluation of this questionable stratigraphic axiom.

If the rock record cannot be arranged into tidy time periods, then how should we reorder the resulting empirical morass? First, it is worth pointing out that much work has already been done—to the extent that description and environmental/hydraulic interpretation have occurred. Interpretation must begin with a renewed emphasis on empirical stratigraphy (Reed, 2005; Reed et al., 2006). Modern tools and techniques now make it feasible to describe and assess the three-dimensional geometry of many rock bodies. Being able to show rock units in relationship (both laterally and vertically) to each other should be a primary goal of any stratigrapher. Geometry may provide clues to the

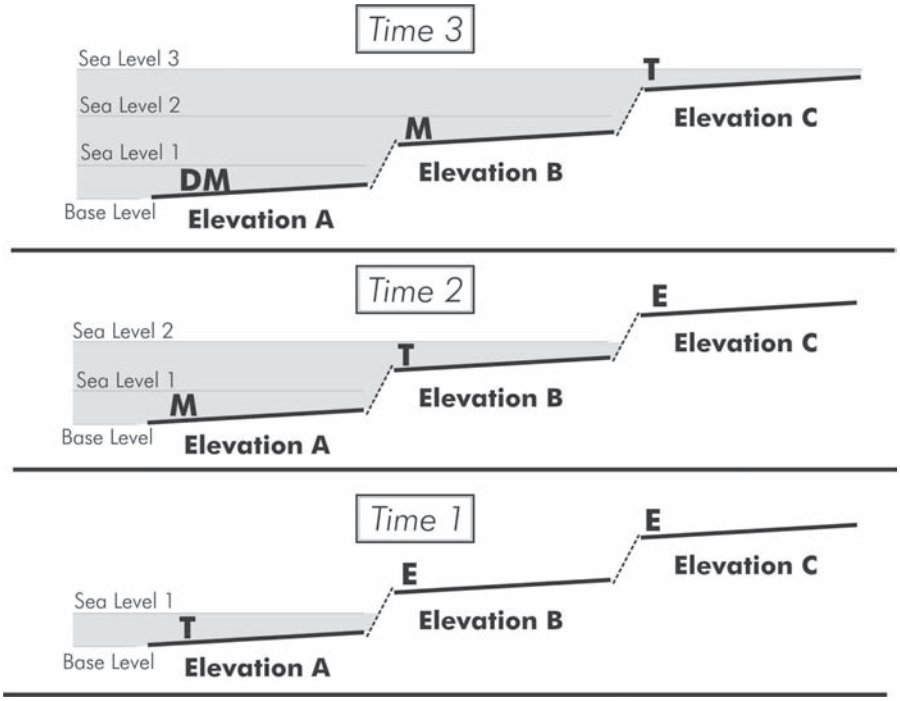

Figure 4. During the Flood, water would have moved laterally across continental landmasses, and the position of those waters with respect to base level would have depended on topographic variation. Since depositional environments would have been determined in part by water depth and energy, any topographic variation would have created differences in geological regimes based on *position*, not *time*, as seen in this hypothetical transgression. Note that abrupt breaks in elevation represent shortening of lateral distances. At Time 1, erosion (E) occurs at higher elevations (B and C), while transgressive deposits (T) cover Elevation A. At Time 2, erosion is restricted to Elevation C, while transgressive deposits move to (B) and marine deposits (M) cover the transgressive deposits at Elevation A. At Time 3, all levels are submerged. Transgressive deposits finally cover Elevation C at the same time that deep marine deposits (DM) are deposited at A. Thus, the large erosional surface and the resulting sedimentary units, T, M, and DM are *not* synchronous. Most modern stratigraphers would correlate the depositional units (T, M, DM) and the erosional hiatus as each representing a discrete synchronous period of time. The scale of the Flood would cause this diachronous relationship in even large-scale sedimentary units.

original depositional conditions. Was the substrate flat or tilted, rough or smooth, stable or tectonically active? What was base level? Steno may have envisioned a simple setting of particles settling into successive layers on an ideal level substrate, but the rock record and the biblical account of the Flood demand a more complex and comprehensive view.

Conclusion

The bulwark of anti-biblical history is the geological timescale—one of the most powerful constructs of our age. Its power rises from the appearance of multiple overlapping independent methods (biostratigraphy, isotopic dating, astronomical cycles, etc.) and voluminous supporting data. But appearances are deceiving. The whole edifice rests upon a questionable cornerstone—the reality of global correlative synchronous time—that has remained unexamined far too long. When viewed from the perspective of the Genesis Flood, this assumption appears to distort the real message of the rock record by focusing on time rather than geologic process. In the clearing away of the detritus of uniformitarianism, let us ensure that we replace its stratigraphic cornerstone with a foundation built on biblical truth.

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Book Review

The Genesis of Germs

by Allen Gillen

Master Books, Green Forest, AR, 2007, 192 pages, $15.00.

This helpful work provides a foundation for creation writing and thinking on the subject of disease, a fruitful area of study for creationist scholars. Author Gillen, professor of biology at Liberty University, explores the biological and biblical basis for disease in a manner that is informative and understandable to the average reader, while providing details that will interest the most well informed students of pathology.

Gillen begins by exploring the microbial world in this well-illustrated book. He explains that most microbes are helpful, or at least not harmful, to larger organisms, introducing Joseph Francis's creation concept of microbes as a "substrate" for macroscopic life to exist. Diseases are not part of the original creation but appear to be the result of harmful mutations and other changes since the Fall that have turned symbiotic microbes and free-living microorganisms into disease-inducing parasites. Still, most microbes retain most or all of their original functions, helping maintain the ecosystem and supplying humans and other life with necessary nutrients.

Interwoven throughout the book are interesting case studies in the history of disease research, with an emphasis on antievolutionary scientists such as Sir Ernest Chain, the Nobel-winning penicillin researcher. Biblical references to diseases are also covered, including a concluding section on the coming plagues associated with the book of Revelation.

One interesting topic discussed is the past optimism that disease could be conquered, contrasted with the current reality that numerous new diseases are appearing among mankind. The rapid development of new diseases supports the conclusion of John Woodmorappe (1996) that disease could have developed almost entirely after the Flood cataclysm. Noah did not have to harbor all known modern diseases aboard the ark!

One area that could have been more strongly developed is the thesis that antibiotic resistance and similar phenomena are not the result of innovative mutations, as evolutionists commonly allege. Instead, cases of resistance appear to be either preexisting or due to neutral, iterative variations, or the fluke side effect of degenerative mutations. Gillen does provide references that touch on this subject, but the penetrating analysis of Lee Spetner (1997) and the various reports of Carl Wieland (1994, 1998) on this subject are overlooked.

The book includes an appendix on bacterial genetics, a multiple choice question section for each chapter, a glossary, and an index.

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