Geology as science and Geology and the Bible

We have already discussed somewhat the nature of science and that the goals of science are never to “prove” anything, but to seek to establish the validity of ideas about the natural world with experimental data, the so-called “weight of evidence.” Some may find this view of science different than they had supposed science to be. Nevertheless, the nature of science is such that scientists should hold every idea as tentative forever. Many examples could be cited of well-established ideas in science that have fallen ingloriously by the wayside as science moved on. In spite of this we have reaped great rewards from the activities of science and the consequent advances in technology.

Nowhere is this subjective and tentative aspect of science more essential to keep in mind than in the earth sciences – geology and paleontology. In normative science, experimental effects can be associated with causes through the manipulation of conditions of the experiment. Repetition permits probabilities to be assigned that give a sense of the strength of the association, and give confidence to the conclusions of the investigator. The sharing of information permits other investigators to repeat the results with a critical mindset, lending a sense of objectivity to the enterprise. This works well in physics, chemistry and biology under a wide spectrum of circumstances, so long as observation, experimentation and repetition are possible. In geology and paleontology, especially in the historical aspects of these disciplines, only observation is directly possible. You cannot, for example deliberately recreate the proposed catastrophic ending of the Cretaceous with an asteroid impact to see what effects may have caused the demise of the dinosaurs. So you have to do the best you can through circumstantial evidence, inference and storytelling. As an illustration consider the case of a fossil site with an abundance of bones in a small area. [example of bonebed]

This necessary short circuiting of the mechanisms of science, means that the historical sciences are going to be very much paradigm driven and are going to depend far more on the bias of the investigator than is true in the sciences where direct experimentation is possible (although bias also plays a role here). Sometimes we do have catastrophes that may give us insights into past geological events [Mt. St. Helens] and sometimes these insights can be very revealing [Yellowstone fossil forests]. But these occasions are rare, fortunately. So bear in mind that although geology and paleontology are legitimate fields of science, there are important differences that we must take into account. And it is precisely these fields that we are considering when we look at an alternative view of earth history.

Before we do that, we should consider one additional aspect of the playing field: Naturalism. Naturalism is a philosophical construct that dictates to its adherents that they must view the world as being independent of any power that might set observational or empirical limits on the scientist. Thus adherents of naturalism arbitrarily exclude the possibility that there is a power outside of them that may be relevant to the results or conclusions of their experiments. That is, they decide that there cannot be a “higher power” or God whom they might have to consider when they are drawing conclusions about the natural world. This is convenient because it eliminates a potential source of complication to their work. In a sense some form of naturalism is necessary in order to do meaningful science, and a subset of naturalism, called “methodological naturalism” is used by all scientists, even those who do not exclude the possibility of God. Methodological naturalism means the scientist will approach his or her work as if there were no outside influence over which the investigator had no control. Since it does not appear that God acts capriciously, MN is a useful construct.

Naturalism, on the other hand, has the trappings of a religion. Its adherents are arbitrary, are profoundly disturbed by the prospects of being wrong, and are violently opposed to any threat from outside their comfortable domain. Their belief system is not based on evidence, but on a faith commitment to the premise that there is no God. Richard Dawkins is a good example of a cleric of naturalism, although there are many others. Naturalism enjoys wide acceptance in the geological and paleontological sciences.

So what advantages do those of us who accept the Biblical version of origins enjoy? I will give some examples, all having to do with time that seems to us to be very much shorter than that required by the standard radiometrically based model

Stratigraphy

Layers of rock result from the consolidation and lithification of sediment. In the standard (radiometrically constrained) model, sediment accumulates, is subjected to bioturbation, to erosion, reworking, and finally to burial by subsequent depositional events. It can then become deeply buried, lithified and then uplifted where it can be subjected again to erosion, etc. These processes are considered to take place on a very long timescale. Estimates of depositional rates for ancient rocks vary widely from less than 1 cm per thousand years to up to exceptionally, hundreds of cm per thousand years, but often about 20 cm per thousand years. This would suggest that a given layer of sediment a few centimeters thick would be exposed to erosion and bioturbation for a long, long time. Yet when we look at the rock layers we see little evidence for the passage of time. In most cases there is no evidence for the passage of time between layers. In fact the existence of bedding features preserved in the rocks cries out for some explanation within a very much attenuated timeframe.

Sedimentary rates themselves require some explanation as they generally appear to be off by a factor of 1000 or more over ordinary processes today. Modern depositional rates appear to be of the order of 7-10 cm per year. Rates calculated for ancient rocks based upon the radiometric time scale are consistently about 1000 fold slower than ordinary processes are depositing sediment today.

Rates of erosion. Current rates of erosion as measured by a number of different criteria indicate that if radiometric time is correct, there should have been sufficient time since the beginning of the phanerozoic (the time of metazoan life) to have eroded the entire continent of North America down to sea level many times over. Had this happened we would have no fossil record to contemplate. The existence of a complete geologic column in many places around the world gives testimony to the need to reconsider the meaning of radiometric time.

Depositional hiatus. Numerous examples could be cited for the existence of planar surfaces that would have been exposed for millions of radiometric years. Yet they show no evidence of erosion. As an example we are studying the contact with the Middle Triassic Moenkopi and the Lower Jurassic Shinarump. This contact represents a hiatus of 15 million radiometric years, during which no sedimentation is apparent. The upper surface of the Moenkopi mud remained an unconsolidated water saturated flat surface with no evidence of erosion, in southern Utah, and elsewhere.

Evidence for deep water. The processes of deposition require time. How much time depends at least to some extent on the water depth. The deeper the water the easier it is to deposit material in a hurry. In the Grand Canyon, we have demonstrated deposition of the Tapeats Sandstone in deep water. This does not mean that it was deposited during the flood, just that it could not have been deposited in 30 million years in shallow water, and it could have been deposited quickly. In the case mentioned previously, the unconsolidated Moenkopi mud was followed by deposition of the Shinarump conglomerate, a coarse pebble conglomerate. Although the Shinarump is described as a fluvial (river) deposit, emplaced over millions of years, it is extremely widespread covering many thousands of square miles of the Southwest. Had this occurred as described, it should have deeply eroded the unconsolidated mud surface upon which it was deposited. In fact we see evidence that the Shinarump was emplaced rapidly in deep water.

Origin of Life. Without doubt, the present scientific endeavors focused on understanding the origin of life on this planet in naturalistic terms constitute one of the greatest frustrations in science. The studies have been particularly frustrating because as time has lapsed, and the database has expanded, the objective of understanding the origin of life in naturalistic terms has become increasingly elusive. This is opposite of the expected outcome. For example, it has recently come to light that the progenitor(s) of all modern forms of life contain the same complement of enzymes for producing energy in an oxygenating environment. It was formerly believed that the first living organisms arose in an anaerobic environment and that the ability to utilize oxygen arose much later. This and many other recent observations make even more remote the possibility for a period of earth history when oxygen was absent or rare. It is virtually certain that the required precursors for life could not have arisen in the presence of free oxygen. This is an area of science particularly ripe for some fresh insights. See this NASA lecture for a recent update on the state of Origin of Life research.

Cambrian Explosion. Within Lower Cambrian strata (the first layers of rock containing the remains of complex multicellular animals), representatives of nearly all of the modern phyla of living organisms are found. This phenomenon is so marked and unexpected in the naturalistic evolutionary paradigm that it has been widely referred to as the "Cambrian Explosion." Various authors have used adjectives such as "riotous diversification" or "sudden and abrupt appearance" to describe the state of biological diversity found in these rocks. Other authors have gone to great lengths to deny the significance or the explosive nature of the Cambrian record, having no ready explanation for the phenomenon. The explosion is real. The underlying Precambrian rocks are often similar rock types, such as sandstone or shale, but are devoid of multicellular animal fossils. This dramatic change cannot be accommodated in any naturalistic model, because it involves not only the appearance of multitudes of life forms representing nearly every modern phylum, but more pointedly, it involves the appearance of virtually all of the molecular biological complexity present in modern forms. Contemporary evolutionary models are unable to account for the origin of this diversity and information without invoking principles outside of the domain of science. Naturalistic evolutionists repeatedly acknowledge this condition, without offering a viable alternative. Here, perhaps more than in any other area in geology, there is a pressing need for innovative research and creative suggestions.

Origin of other life forms. When lesser taxonomic categories (class, order, family, genus) down to the species level make their appearance, wherever that may be in the fossil record, these forms nearly always appear suddenly, without the transitional intermediate forms required and predicted by the evolutionary paradigm. In Darwin's day and beyond, these so-called "gaps" were inferred to be due to inadequacy of our knowledge of the fossil record. One hundred and fifty years later this argument can no longer be offered as an explanation for the scarcity of intermediates. Some groups can be interpreted as intermediate forms, such as the early whales with back limbs, the Triassic fossils with mammal and reptile characteristics, etc. However, these exceptions do not change the overall pattern of lack of intermediates between forms.

Paleontologists who knew the fossil record and its inadequacies well proposed the theory of Punctuated Equilibrium as an alternative to gradualistic evolution of species. The theory acknowledges and seeks to capitalize on two features of the fossil record: the absence of intermediate or bridging fossils between species (i.e. they appear 'suddenly'), and the seeming stasis of species once they make their appearance (i.e. once they appear, they don't change). Although the theory is good at describing what is seen in the fossil record, it offers no legitimate explanation for the observations. There is a critical need for a coherent theory that will not only describe what is observed, but will yield logical and consistent explanations for the data.

Creation-Evolution controversy. There can be no doubt that geologists and especially paleontologists, are concerned about origins. The possibility that some theory other than naturalistic evolution may be the correct explanation for the origin and development of life on the earth is a matter of serious concern to geoscientists, who may have built careers around naturalistic evolutionary assumptions. Generally, these scientists have been able to deflect the impact of creationists, who have tended to be poorly informed about paleontology and geology. There is much concern, some of it legitimate, among professional geologists and paleontologists that creationists might negatively influence the already inadequate science education of our youth. More recently, a small number of well-informed and well-trained active scientists who are creationists have completed professional training in the disciplines of geology or paleontology. These creationists are not so easily dismissed, but their numbers at present are so small that they are more a curiosity than a threat to the current model of origins. The debate over origins will continue to generate great interest and controversy until a new theory is developed that better accommodates the data of science, particularly with respect to biological organisms.

Areas where Christian perspective makes a difference in earth sciences.

Scripture as a primary source of inspiration. Since the 'Enlightenment', Scripture has repeatedly been subordinated to science when conflicts have arisen between the ideas of science and those of religion. The scientist declares the world to be billions of years old, and the theologian adjusts his or her interpretation of Genesis. The scientist declares there was never a global catastrophic flood, and the theologian again adjusts Genesis. The scientist declares man to be a product of mindless evolution, arisen by tooth and claw, and again the theologian adjusts the interpretation of scripture to accommodate. There is no conflict between science and Scripture, so long as the theologians can continue to adjust the interpretations to keep up with the science. Is this what God had in mind when He communicated with man through His Word? Unless we hold to a high view of inspiration, we are left with nothing but chaff. Stephen Gould recently expressed his perspective by proclaiming that religion and science occupy separate and independent domains that do not overlap. He used the term "non-overlapping magisteria," inferring that both have domains of understanding in which they properly have dominion, but these domains are mutually exclusive. Religion has nothing to say about science, and science has nothing to say about religion. But in seeking to build his case, Gould demonstrates its weakness when he calls upon religion to do all of the accommodating to the teachings of science. We must recognize and appreciate the unity of Truth and the importance of revealed truth to our understanding of the world. The integrity of Scripture, which believers acknowledge as the revealed will of God, must not be surrendered in seeking harmony with natural science or any other subject.

An openness to new ideas. Each individual develops a basis for his or her philosophy by accepting as 'givens' certain premises about the world and existence. The basis for these premises for the Christian is, among other things, the Word of God. For the secularist the basis may lie in some other authority. While one cannot begin without premises, we can be careful and thoughtful about the premises we accept. The Christian, no less than the secularist, must continue to test and review these fundamental beliefs from time to time, and should constantly seek to enlarge that domain. There is great danger in feeling that one has encompassed all Truth. It is one of life's paradoxes that those who believe they have arrived at Truth, lose all chance for obtaining it, for it is in the continued pursuit of Truth that new possibilities are encountered and a philosophical base is broadened and strengthened. The Christian, with a strong commitment to this pursuit, should, even more than the naturalist or secularist, seek to maintain a mind open to new possibilities and explanations of the natural world that might be unthinkable to the secularist. Our philosophy determines to a large degree what questions we can ask. The Christian community asks different questions than the secular community, and as a result may go in directions the secular community would not. In the case of the history of the earth, the Christian has freedom to explore possibilities that the secularist cannot see, as a result of insights gained in the exploration of God's Word. This should be seen and exploited as a great advantage.

A fundamental belief in the Creatorship of God. Regardless of how one may choose to read Genesis, a belief in God as the Creator is fundamental to the Judeo-Christian worldview. Scripture distinctly and repeatedly associates the Creatorship of God with His worship. The reason we worship God is because He created us and we are indebted to Him for our existence. False gods were false because they could not create, and because they claimed that ability without substance. Isaiah 44 (14-21) is a polemic against this. The connection between God's Creatorship and His worship is emphasized in many places in Scripture (cf. Rev 4:11, Romans 1:20-25, Eph 3:9,14). To disallow God as Creator is to disallow God. More importantly to the scientific enterprise, God as Creator and Designer is the most viable and rational explanation for the origin of life and for the origin of information in living organisms. It is good science and good sense to work within this framework.

Honesty and integrity. The Christian geoscientist will bring honesty and integrity to his or her work. This is not an option for the Christian. This includes honesty in financial matters, both personal and corporate, and integrity in dealing with danger, dishonesty or potentially hazardous situations in the workplace. Furthermore, the Christian scientist will deal honestly with data, and will give careful consideration to possible alternative explanations and theories, realizing that one's paradigm can and does affect the conclusions one reaches. The science done by Christian geoscientists will be of the highest quality and integrity.

Stewardship of the earth. Christians are stewards of the earth and have responsibility for caring for it. Unfortunately we have too often been accused of malfeasance in this regard, and often with cause. The Christian geoscientist will have in mind the preservation of the resources of the earth and will pursue policies of conservation, in the best sense of the word.

Areas of particular concern to the Christian Earth Scientist.

Naturalism. Naturalism is a philosophical/religious system proposing that everything that exists can be explained in natural terms (as opposed to supernatural terms) without the intervention or need for intervention of a supernatural being. Methodological naturalism is an adoption of naturalistic principles, with or without fully subscribing to naturalism, for the purpose of carrying out scientific investigations. Science has often been characterized as a naturalistic enterprise, an activity that uses the tools of methodological naturalism exclusively. Because of the unparalleled success of science in western society, the prevalent methodology of naturalism has achieved great status. Naturalism has not, however been confined to science. Theologians have seemed almost eager to embrace the methods and philosophy of naturalism, without regard to the consequences. If all of Scripture can be explained without recourse to Divine intervention, then what significance do Scriptures have? The results of embracing naturalism have been devastating to the Church, weakening understanding of the nature and meaning of inspiration. If the books of the Bible are not a revelation of the intervention and involvement of God in the affairs of men, but are merely man's feeble efforts to create a deity, Christianity is a farce. Many have no awareness of how dangerous or pervasive naturalism is in the Church.

Naturalism is an intentionally atheistic philosophy antithetical to the fundamental values of Christianity and it has no business whatsoever in the Church. The application of the principles of naturalism to our understanding of Scripture leaves us without a clue to the answers of the really important questions in life: Where did we come from? Why are we here? Where are we going?

Because of the success of methodological naturalism in solving scientific problems, its weaknesses have largely been overlooked. Science claims to be an open-ended search for Truth. But if Truth lies outside the realm of naturalistic explanations, science can never reach Truth so long as the only methodology is naturalistic. For some this is irrelevant because they have made naturalism the end of science. But for those fair-minded individuals for whom Truth is more important than a strict adherence to naturalism, science should be defined with breadth to accommodate other possibilities. Methodological naturalism cannot hope to provide answers to some problems, particularly in science dealing with origins. Presently there is no satisfactory explanation for the origin of life, or for the origin of the information content of organisms, within the realm of methodological naturalism. This makes it necessary for naturalists to bend logic in an effort to accommodate data that cannot be explained within the tenets of naturalism. Adhering exclusively to methodological naturalism also stifles inquiry by prohibiting investigation not only of those areas where science cannot adequately explain observations, but also in areas in which the Scriptures suggest God has intervened in man's affairs.

Naturalistic evolution. The application of the principles of naturalism to the fossil record leaves only one reading possible: All organisms alive on the earth today or preserved as fossils, are the result of the impersonal, mindless, amoral process of evolution. There was no Creator, no Information Provider, no Designer, only chance and time. This view has, in various permutations, made its way into the Church, again with perilous consequences. It is inevitably accompanied by a loss in confidence in Scripture and a more or less impersonal view of God. The crafters and promoters of the naturalistic views recognize full well the significance of their position: Whether there is or is not a Divine Being, one was not necessary for the origin or development of life. Within the Church, purely naturalistic evolution may be palliated with theism, or some other form of non-random evolution, but this position is a compromise that will ultimately lead to a less personal view of God.

A proscribed view of earth history. Geologists tend to have a very proscribed view of earth history. Certain perspectives are allowed, but many others are disallowed. Christians within the community who might like to explore new ideas such as the concept of Intelligent Design within the geologic record, or the possibility of a global catastrophe, are discouraged from doing so. As a consequence, geoscientists who are Christians can themselves be intolerant of new ideas, perhaps because they feel vulnerable or have a desire to conform. Christian geoscientists tend not to like to discuss their Christianity with colleagues, except on a spiritual level. A sharp separation sometimes exists between geologists and their Christian faith. Christian colleagues in geology have confessed that they deal with the conflicts by doing their geology during the week and their religion on Sunday. Thus possible alternatives to the conventional views are sometimes not given careful consideration, even by Christians. This lack of openness is regrettable.

The "Yahoo" problem. Perhaps at the other extreme, but fully as dangerous as the inroads of naturalism in the church, are the uses of unsupported assertions by well-meaning, enthusiastic, but uninformed Christians who make extravagant claims "disproving" conventional theories of geology and paleontology. Gould has referred to such individuals as "Yahoos". These individuals and their claims constitute one of the most problematic concerns for the professional geologist, and are a large factor in discouraging many geologists and other scientists from taking a closer look at Christianity. Claims of "giant fossil men", "dinosaur and human tracks", "out of order fossils" and many other unsupported assertions are a positive hindrance to the exploration of alternatives to conventional views, and are responsible for the loss of faith and discouragement of many. It is the responsibility of Christians to prevent outrageous and unsubstantiated claims from being used in "support" of Christianity. Our search for Truth is not helped by assertions, however sincere, that are false or pretentious.