ARTICLE

NATURALISM: ITS ROLE IN SCIENCE

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ABSTRACT

The philosophy of Naturalism dominates scientific thinking, for reasons that can be understood from review of the history of scientific thought. This article evaluates the nature and implications of Naturalism when several components are examined separately. Philosophical Naturalism rejects the possibility that God exists. It is clearly a philosophy, cannot be tested by science, and will not be discussed further in this paper. Methodological Naturalism (MN) is simply a method for doing science that does not accept any supernatural explanations. It seems, on the surface, to be harmless and a necessary part of the scientific method. However, since modern scientists working in areas of experimental, observational science do not seem to puzzle over whether they should invoke the supernatural in their explanations, it seems difficult to claim that MN is necessary in this part of science. However, in the study of history (geological or biological history, e.g.) it is important to decide what to do with MN. This article claims that when we can examine evidence for certain historical events, they are legitimate subjects for science, even if science cannot examine all the possible causes for those events. An example would be evidence for very rapid and extensive geological processes that may suggest a (divinely initiated) global flood as the cause.

Naturalism, the worldview[1] in science that explains everything in terms of material, law-bound processes known to us, will not accept any miraculous or supernatural explanations. The history of that concept in recent centuries provides clues to help us understand it. There was a time when great scientists, like Isaac Newton, believed their scientific work was guided by an understanding of the Creator and His work. But today Naturalism is the ruling paradigm in science. Why did this change? Some features of the historical context help to explain why the change occurred.

In centuries past there were many phenomena in nature with no evidence-based explanations available. This lack of explanations applied to many functions in our bodies, like what makes the blood flow, or how the universe operates. It was common in those early times to invoke miracles or mystical processes as explanations for these challenging physical or

biological features. For example, before the heart was adequately understood it was thought that some mystical force moved the blood through the body. Even Newton suggested that God at times adjusted the orbits of the planets.

As knowledge advanced during recent centuries it was discovered that more and more of these puzzling features could be explained by natural physical and chemical laws, without reference to the supernatural. William Harvey's research showed that the heart is a pump that moves the blood through the body. When this gap in our biological knowledge was filled, it became evident that the blood flows by a mechanism that can be understood. The direct, miraculous action of God or the spirits was replaced by a law-bound process.

As more discoveries of this type occurred, the "god-of-the-gaps" was no longer needed to fill the gaps in our knowledge. Many scientists moved away from Newton's theistic worldview. They thought their discoveries had pushed the supernatural farther and farther away, and in time they replaced it with purely law-bound, naturalistic explanations. It seemed to them, at the time, that God was no longer needed to make the universe work. With hindsight we can now think more deeply about Naturalism, what its role in science is today, and what effect it has on scientific conclusions. In this article I will seek to understand Naturalism and the reason for its existence, and I will suggest that it needs a reevaluation. Alvin Plantinga suggests that Christians should, in their thinking about science, make use of all that we know as Christians.[2] Is there a way that we can appropriately do that?

In centuries past, as those facile supernatural or mystical explanations were finally removed from our thinking, it resulted in increased incentive to search for natural, law-bound, evidence-based explanations. The increasing dominance of naturalistic scientific thinking was associated with the modern era of impressive progress in science. The success of this new mindset, at the time, appeared to eliminate the need for any miraculous actions anytime in the history of the universe. If there was a God, His role in the universe was in question. There developed a growing optimism that science could explain everything by ordinary physical laws and by naturalistic, materialistic processes. It is the thesis of this article that the shift to Naturalism has not received sufficient critical analysis. Has the change has gone too far, and missed some limiting factors along the way? Why would I suggest this? Didn't I just say that Naturalism coincided with a growth in scientific progress? Yes it did, in some ways, but that is not the whole story.

The change away from supernatural explanations occurred in a cultural context that helps to explain the timing and the manner of the change. At the same time that science was moving toward its modern era, attitudes toward authority of various kinds were changing. There was a growing weariness

of autocratic, authoritarian abuses of power by both church and state. For centuries the state and the cultural caste system prevented much of the population from experiencing freedom of thought and action. The Christian church in its Middle Ages form had demanded adherence to its belief system and power structure, often with the support and power of the state.The result of "heretical" thinking could be, and very often was, death. The people were ready for a change; ready to reject the dominating authority of both church and government.[3] As part of this urge for freedom the scholarly world was ready to move away from the Bible as a source of authority, with its stories of miraculous events. Methodological Naturalism (MN) became the expected foundation for scientific thinking.

CRITICAL ANALYSIS OF WORLDVIEW CONCEPTS

Some may think I am questioning Naturalism as a definition of science because it keeps creation from being taught in schools. In this article I will not discuss the contentious political question of what should be taught in public schools. My purpose is different from that; my only interest is to consider how naturalistic philosophy affects research and discovery in science.

As we seek to understand Naturalism and its role in science it will be helpful to break down Naturalism into its logical components and analyze them individually. Another example of this analytical process can be seen in historical analysis of Charles Lyell's concept of geological uniformitarianism. Before and during the time of Lyell, in the 17th to early 19th centuries, it was common for geologists to explain geological features as the result of rapid, catastrophic processes. Lyell differed with these catastrophists, and his geological theory expected that geological explanations would follow the principle of uniformitarianism; no catastrophes were allowed; ancient geological events must be explained, if possible, by processes observable today.[4] Lyell was a lawyer, and his convincing logic resulted in eliminating catastrophic processes from geological thought for a century.[5]

But trouble was brewing. The rigid hold of uniformitarianism in geology was finally weakened by the geological work of independent-thinking J Harlen Bretz, in the Channeled Scablands of Washington State.[6] Bretz saw that the evidence required catastrophic erosional process to explain the Scablands. The rigid hold of Lyell's uniformitarian principle resulted in very persistently strident objections to Bretz's interpretations. After several decades of conflict it became evident that the objections were assumption-based (uniformitarianism), not evidence-based. It was finally clear that Bretz was right and Lyell was wrong.

Careful analysis of Lyell's concept of uniformitarianism revealed that it actually contained several separate principles, some of which are still

valid and some are not. I will summarize Stephen Gould's analysis of these principles.[7] He identified four concepts in Lyell's use of uniformitarianism. The following list gives each of Lyell's geological principles, and an evaluation of them.

1. Uniformity of law: this is a part of science in general, and not unique to geology. It is still accepted that natural law is indeed uniform. Water never flowed uphill in the past.
2. Uniformity of geological processes: the present is the key to the past. The application of this means we do not invent unique processes if modern processes can explain the observations. But this is only partly valid; it is now known that in some ways the geological past was very different from what we observe today.[8]
3. Uniformity of rates of processes: geological processes have always been slow and gradual. There have not been any catastrophic geological events. This is now known to be false.[9]
4. Uniformity of conditions: conditions on earth have always been the same. This is not true. Conditions when the Cambrian sediments were being deposited, e.g., were quite different from conditions today. For example, our existing continents were largely covered with shallow seas during the Cambrian.

ANALYSIS OF NATURALISM

It is also helpful to divide Naturalism into its components and consider each one individually. It could be that all components are equally beneficial to science, but on the other hand some components may be strong assets to science, some may not be helpful at all, or perhaps none of it is helpful.

Our first step will be to distinguish between two forms of Naturalism:

(1) Philosophical (metaphysical or ontological) Naturalism (PN), and

(2) Methodological Naturalism (MN).

Philosophical Naturalism (PN) includes the rejection of any belief in the existence of God. There can be no supernaturalism because there is no divine being to perform these miraculous actions. In contrast, Methodological Naturalism (MN) makes no claims as to the existence or non-existence of god (or God).[10]

What set of experiments could be done to demonstrate that no god exists? Until a set of conclusive experiments can be done, science cannot properly make any claims of whether any god exists. What if God exists, but does not do anything that alters the effects of physical laws in ways that we can observe today? How could science perceive such a God's existence? The

existence or non-existence of god is not a concept that can be analyzed by science. If someone chooses to believe God does or doesn't exist, that is their personal business, but, as things stand at this time, scientific research can't tell us if He exists. Most Christians believe that God has revealed Himself to us, and if this claim could be *scientifically* examined, that would open the possibility that philosophical naturalism could be tested by science. Until such tests can be done, PN remains clearly as philosophy, not science.

MN, on the other hand, only claims that naturalism is a practical approach to doing science; science only uses natural, material explanations, because that is all that science can study. Theists and others can agree on part of that; we have no way of investigating *how* supernatural actions could happen. Consequently, science will only accept explanations that depend on the operation of known laws of physics and chemistry. But this still leaves us with an ambiguity. MN, as it is commonly used, goes a step farther and denies that any miracles that could affect things that science studies – *have ever* happened in the past. Although it may not be stated that way in print, that is one effect of the way Naturalism is applied in practice. Is that a claim (no supernatural actions have ever happened) that the scientific method can test? That is an issue that we will discuss later. In any case, if we are going to logically question the validity of the principle of MN, we must have good reasons for doing so.

To summarize, MN can be argued to be, in principle, consistent with current scientific practice. In contrast I find it necessary to conclude that PN is philosophy, not science. From here on I will discuss only MN.

METHODOLOGICAL NATURALISM

MN may sound reasonable, and for many decades has been almost universally accepted as a primary rule that must be followed in the practice of science, because it is the accepted definition of science, or because it is thought to be the only method that works.[11] But it will not damage science to look more closely at MN and its actual influence on the practice of science. In fact, if we are not willing to continue applying critical thinking to the concept of Naturalism we must answer the question "why are we not willing?"

Methodological Naturalism (MN) in two aspects of science

To examine how MN is used in science we will consider how it functions in two different types of scientific pursuits:

1. Experimental/observational study of ongoing processes – what happens in the laboratory today.
2. Study of history – events in biological and geological origins and history.

Experimental science

It is routinely claimed that science can only function if we follow the principle of MN.[12] Is this really true? Is it true in principle, and also in a practical way? The first category above includes use of experiments and carefully designed observations to study processes we can observe. These may be, e.g., studies of chemistry in a laboratory, or perhaps study of physiological processes in lab animals. Since these involve processes that occur right now, in front of our eyes, we can do the experiments over and over again, to verify the reliability of our findings. Then we seek to explain our data, in reference to what is known about chemistry or physiology. In our interpretations of daily, *ongoing* processes which are evidently governed by physical or chemical laws we all recognize that it is essential to base our explanations on the evidence, if our interpretations are to be valid. We cannot use supernatural explanations for our observations of *ongoing, law-bound* processes, even if we believe in a miracle-working God.

Naturalistic thinking (MN) is portrayed as essential for the success of science, in order to keep supernatural explanations out of science. But let me ask some questions of you readers. If you are a scientist doing these experimental studies, are you tempted to use supernatural explanations? Do you have to remind yourself not to do that? Do you know of any active scientist who is tempted to think that God is tinkering with the chemicals in his/her experiments, or a physiologist who is tempted to think that their routine observations have a supernatural cause? If the answers to these questions are no, then what is the practical role of MN today in experimental science? Is it needed at all?

I suggest that over the last couple of centuries we have learned that ongoing, observable daily processes in nature reliably follow the laws of chemistry and physics. Even scientists who actively believe in an all-powerful God realize that however God manages the universe, He doesn't normally do so by tinkering with the routine law-bound operations of nature. That principle has been taught to us by the accumulated experience of science. It is apparent that God has established a set of laws by which He manages the ongoing daily processes in nature, and He doesn't normally alter those. Our scientific findings have revealed that God must be a mathematically oriented super scientist type, using His laws to run the universe. He is not a capricious magician who tinkers with the daily processes we study in our experiments.

If we recognize the predictability of physical and chemical laws that govern the subjects of our experiments, how does that affect the common claim that MN is necessary for the successful functioning of science? It does not seem that any scientist engaged in experimental study of natural processes finds it necessary to ponder whether they should use supernatural

explanations for their research findings. Recognition of the reliability of physical/chemical law is an adequate guide. If this is so, then what is the practical role of MN in experimental/observational research? Does it have any essential role at all? It seems to be irrelevant, a relic of history, a lesson we needed to learn, but that lesson now has made MN obsolete and unnecessary in this part of science. That doesn't mean that the concept of MN will damage experimental study of ongoing processes, but MN just isn't necessary.

Some nagging questions

Several questions remain. What if there are claims that, for example, a person dying of cancer was supernaturally healed? How does science deal with this? If it could be demonstrated that the person was full of cancer one day, and the cancer was absent the next day, the physicians would need to decide what to do with these observations. However, even if the healing was real, it would be a unique event, and tells us nothing about normal disease processes. Whether the healing was real or just a phony claim, it would have no potential to help us in a scientific study to understand how to cure cancer. I do not personally know any theistic medical scientist who does not recognize this difference between normal, natural processes that science can study and purported miraculous healings. Thus, even if miraculous healings occur, they don't alter the nature of experimental science.

Are there any other exceptions that require us to consider if we still need MN? One other that is likely to be suggested is the claim of Intelligent Design (ID). ID claims evidence requiring the action of an intelligent agent in biological origins, but makes no claims of whether this agent uses supernatural processes.[13] However, since the supernatural could be a part of the proposed process, we must consider how this relates to MN. The relevant issue here is that ID does not propose supernatural involvement in *ongoing* processes of nature that we can study in a laboratory. What ID addresses is history, the *origin* of complex biological features, not how they function. We will come back to that in the next section.

A comparison can help to explain why I am saying that it is not necessary to invoke MN in experimental science. I could make a rule for myself that today I will not shoot anyone. That rule is certainly a good practice to follow, and it could be important for a person with a damaged mind to be reminded of that every day. However, for a person with a normal, healthy respect for the value of a human life that rule will be quite superfluous, for the same reasons I am claiming that MN is superfluous.

To summarize this discussion, for scientists either working in mainline science or as a scientifically educated creationist researcher in the study of the

daily operations of nature, MN is no longer needed. It is a relic of history, and we have learned not to use supernatural explanations for the daily, ongoing processes in nature. Our recognition of the consistent operation of natural law in processes we study in the laboratory is an adequate guide, and MN is superfluous or even misleading.

You may respond – why are you concerned about this? In experimental research MN may not be necessary, but nothing will be hurt if we follow it. Isn't that true? Yes, I think that is *partly* true, but the question is more complex, and an adequate answer will only come after additional factors are considered.

ORIGINS: THE STUDY OF HISTORY

In the study of history and origins there are some issues that differ significantly from experimental research of ongoing processes.[14] *In the study of history the decision of what to do with Naturalism is not so straightforward.* As we ponder questions about history there is a need to consider, for example, whether the processes that govern the *functioning* of a living cell are also adequate to explain the *origin* of living cells, or if an intelligent agent is needed for their origin.

Can science answer questions like this with evidence-based work? If so, what would be required to do so? How could science determine empirically that intelligence is not needed for the origin of life? That seems like an important issue, because if we can't depend on evidence-based work, how can it be science? If science is going to be objective it must be willing to ask any question, and be willing to consider any answer. That doesn't mean we will *accept* any answer, but if we are not willing to *consider* any answer, without excluding it *a priori* then some factor outside of scientific observations is in control. In practice no scientist will spend time thinking of all the (sometimes unreasonable) answers that could be suggested for a scientific question. However, if pressed for an explanation, can we give evidence-based reasons for excluding a possible answer? How well does the evidence support excluding that answer (e.g., origin by intelligence) from consideration? That may not be easy to settle, because there will be arguments about the evidence, and the meaning of the evidence, but it is still an important principle to not *arbitrarily* exclude a possible answer. And there may be some historical questions that science won't be able to answer, for practical reasons – we were not there to observe.

On the other hand, if someone, perhaps with a preference for MN, chooses to spend his/her career examining the possible natural processes that could initiate the origin of life, I would be the last person to discourage him/her from doing so. Science has a bright future if all scientists have the

freedom to think for themselves, within the worldview they choose, as long as they practice quality scientific work. In spite of my doubts about the validity of MN I will not condemn anyone from pursuing origin of life research, but I won't choose to practice that line of research because my worldview does not recommend such research as the most productive use of my time.

There may be some who are too convinced of the absolute necessity of Naturalism to see anyone question it, and I will not object to that. But for those who are confident that truth will withstand critical thinking and questioning, we will explore if and how science can work even if Naturalism is not taken as an absolute. I am recognizing that experimental science should not use supernatural explanations, and yet I also am objecting to the use of MN. Is this a contradiction? After discussion of one foundational issue, we will answer that question and propose such a scientific procedure that does not try to study the supernatural, but also does not depend on MN as it is usually practiced.

Events and ultimate causes

In study of the past, there are questions about whether or not certain events happened. I am using the term *event* as something that has happened, or is claimed to have happened. For the purpose of our discussion it could be a single event (such as the burial of a particular set of fossils) or a series of events (the sequence of processes in the origin of life). This discussion is dealing only with history, not with events that can be observed in our experimental or observational study of ongoing processes that we can observe today. As we study historical events we are likely to also encounter a deeper question: a question that addresses the *cause* of an event. We will first discuss what I am calling *events*.

Science seeks to understand events and their causes, but our ability to understand causes may be very different from evaluating the reality of events. Science can commonly determine if an event happened, even if we can't study the ultimate cause. Did General George Custer attack an overwhelming force of Native Americans because he had presidential ambitions? The cause of that disaster was an "intelligent" cause – hatched in the mind of Custer. Since it was initiated by an "intelligent" decision, does that mean science can't study the battle and its outcome? Although there has been much advance in understanding the brain, we can't fully comprehend the mind of Custer. But that doesn't keep us from looking at the evidence and testing whether the event, the Battle of the Little Bighorn, happened. We can also study the secondary causes of the actual deaths.

In other historical studies, in geological and biological history, science can ask whether an event happened, whether or not we can understand the

ultimate cause. We seek to understand what events occurred in history and what suggested events did not occur. We also wish to understand the causes of these events, if they are amenable to the methods of science. It is valuable to know if there really was a mass extinction of life forms at the end of the Cretaceous, even if there has been much uncertainty about the cause of that event. That event can be evaluated by study of the evidence left behind, even if we cannot observe and be absolutely sure of its cause.

We can study some potential causes with the methods of science, but some others can only be acknowledged as possibilities that cannot, at least at this time, be studied by science. As we study the events and sequences of events in past history, and their causes, it seems that unknown or even possibly untestable causes should not be rejected as false by assumption alone. Open-ended evaluation seems more worthy of the name science.

I suggest that the same concepts should be applied to more controversial issues in study of the history of the earth and the history of life. How did life begin? Did life begin through a sequence of essentially random encounters of molecules over time? Or was it because of an intelligent cause,[15] maybe even an intelligent plan by a supernatural cause? Many readers will immediately respond – wait a minute, don't you know that is exactly what Naturalism rejects?! Yes I do know, but that concept is exactly what I am seeking to evaluate.

Why should any of us care about this? Why am I going though all the trouble to analyze Naturalism? An analogy will help to explain.

Picture a soldier in wartime in some desolate landscape who becomes separated from his company. He becomes good at avoiding discovery by the enemy and this skill serves him very well in preserving his life. When the war ends he is not aware of the change in circumstances and he keeps on using his skill at avoiding detection while hoping to find his companions. He continues this determined strategy for a considerable time, while his life becomes more difficult. His skillful strategy seemed to work in one situation, but it fails him at a time when he needs a different strategy if he is going to survive. There is a story like this from World War II. Some well-entrenched strategies may seem to work for awhile but they spill over into a different situation and lead to trouble.

The key application of this analogy is that following MN in experimental science can seem neutral, but that philosophy is likely to spill over into the study of origins, resulting in the rejection of any biblical insights in biological or geological history (e.g., creation or a global flood), whether or not that is the right strategy.

We can all agree that science has no way to explore a supernatural process. That is beyond the range of scientific study. But science can still examine evidence to determine if an *event* happened – even the event of the beginning

of life on earth. Is the evidence compatible with life's origin occurring by strictly natural causes? Or does the rapidly accumulating biochemical evidence make that too unlikely to be worth serious consideration? Do we wish to know the answers to questions like that, without basing the answer on an assumption irrespective of the nature of the evidence? If not, why not?

If science is objective and open minded it can explore that question and at least evaluate the probabilities for different postulated events of life's beginning. That is, it can do so if not blocked by a thought stopper – the rigid application of MN that refuses to allow that question (was life designed?) to be asked. Why should science be controlled by dogma – including the dogmatic use of MN? If science doesn't yet have an evidence-based answer to how life began, can we be candid enough to say that? Some do have the candor to say that, and they are worthy of our respect.[16]

A research procedure

Any worldview can introduce a bias into research, but our task is to define an approach to research that does not bring with it a bias against Naturalism or a bias against an interventionist view.[17] It simply seeks to allow scientists with various worldviews to ask questions and suggest hypotheses to be tested by the methods of science. If we succeed in this plan, then we can show that arguments against use of interventionist (creationist) worldviews in scientific study are not valid.

Our research plan may begin with observations from science, including field or laboratory observations, or observations from published literature in science. These observations, along with our worldview, may prompt new questions about the phenomena under study. The new questions could arise from any source (science, philosophy, religion) but they must be questions that can be addressed with the methods of science (as illustrated in the example below). After learning from the scientific literature what is already known about the topic, a research plan can be defined with clear methods of data collection and analysis, and the (science) research can begin.

An example will help to explain this concept. The Miocene/Pliocene Pisco Formation in the coastal plain of Peru is a thick succession of layers of sediment. These sediments contain a rich assemblage of fossil marine vertebrates, including a large number of whales. A high percentage of these are very well preserved, articulated skeletons, with the bones undamaged by invertebrate scavengers. Many of the whales even have their baleen food-filtering apparatus (keratin, not bone) preserved and in its normal position in the mouth.[18]

In modern environments such good preservation of a whale would require burial within weeks or months at most. However, the Pisco sediments that entombed the whales were interpreted as accumulating on the sea

floor at rates of only a few centimeters per thousand years – far too slow to preserve the whales. Geologists and paleontologists who had studied the Pisco whales during at least 20 years either had not noticed this glaring inconsistency or had not taken it seriously enough to seek an answer and discuss it in published scientific papers.

Along with other earth scientists, I studied the Pisco Formation and we quickly noticed the contrast between assumed sediment accumulation rates and the rapid burial necessary to preserve complete whales. Why did we notice it? In contrast to previous researchers, we approached the research from a worldview that did not assume long ages of time for the geological record. We began with an open question, "how long did it take for these sediments and fossils to be deposited here?" Our thinking was not controlled by uniformitarian assumptions, but it allowed the option of a short time period for the Pisco (consequently also questioning the accuracy of radiometric dates). Our hypothesis proposed a much more rapid process than the chronology based on MN would allow (since much time is thought to be needed for the inferred evolutionary changes in some of the vertebrate fossils in the Pisco). Our goal was to test that hypothesis in the part of the Pisco that we studied, not to force our data into our hypothesis whether or not it fits. If we are seeking truth (as science should) we will not be satisfied with any effort to force the data into a preconceived idea.

The evidence from the whales and the diatomaceous deposits did support rapid burial of the whales and rapid accumulation of the sediments that entombed them.[19] So what did this research accomplish? Which of these options are correct descriptions of our work?

1. We proved the biblical flood – NO. The word proof should not be used here; and the Pisco is only one rock formation out of many.
2. We showed the entire Pisco Formation formed very rapidly – NO.[20] We did not eliminate the possibility that some parts of the Pisco formed more slowly.
3. We disproved MN – NO. We simply didn't use it.
4. We used different research methods from other scientists – NO. Our data collection and analysis used standard research procedures.
5. Our hypothesis was scientifically productive; it led to discovery and understanding of evidence that others had not recognized – YES.
6. This research is compatible with the proposal that questions and hypotheses not utilizing the principle of MN can be scientifically successful - YES.
7. The evidence supports our hypothesis of rapid burial - YES.

8. We tried to study a miracle – NO; we studied a sequence of depositional *events*, not their ultimate *cause*. Rather than trying to study any miracle, we simply allowed our worldview to open up our thinking to a broader range of options. Could the rapid deposition burying the whales be part of a larger process initiated by intelligent action? It could be, but the scientific process could not evaluate that.

In our research and interpretation of data are we entirely unbiased? No, we are human like everyone else. But we do have a couple of advantages over many others. One advantage becomes evident when reading the abundant anti-creationist literature, which clearly reveals that those who write that material know little or nothing about how a scientifically educated creationist thinks.[21] They only understand their own worldview. However, those of us interventionists who are deeply involved in research and publication are very familiar with our own point of view and also with the mainline scientific research literature and theories in our field. Thus we are constantly comparing and thinking of how we can test between specific concepts from these different worldviews. The other advantage is that since we don't constrict our thinking to MN-based interpretations, we are more likely to notice features that can appear, from a mainline MN mindset, to be just oddities with no significance, like well-preserved whales in slowly forming sediments. When we pay attention to them, some turn out to be very significant. In this and other research, keeping our thinking free from the artificial restrictions (presuppositions) of MN opened our eyes to see things that others had not seen. This convinces us that MN as it is used today is mostly a detriment to science, not an asset.

Interpreting published data

The principles illustrated in the example above also apply to how an interventionist worldview may evaluate evidence from the published literature. For example, consider the numerous cases of preserved biomolecules like proteins or DNA in ancient fossils.[22] These same biomolecules in the modern world have short half lives of hundreds or thousands of years. However, the chronology based on MN requires, and radiometric dating provides, ages for the fossil biomolecules of many millions of years. The short half lives of biomolecules and the radiometric dates are two conflicting lines of evidence, and the conflict needs an explanation.

The conflict between these two lines of evidence indicates there is something that we don't yet understand. Are the fossil biomolecules very ancient, in violation of their half lives observed today? Or are the accepted dates wrong, and the fossils are actually quite young? Which interpretation is correct? MN allows only one of those interpretations – the fossils must

be very ancient, but we don't understand how they lasted so long. MN does not allow consideration of both possibilities – it does not allow an open minded search for scientific truth. As Plantinga says, "A Christian therefore has a certain freedom denied her naturalist counterpart: she can follow the evidence where it leads."[23]

Of course if the fossils were formed within the last few thousand years (too short a time for the evolution process), that points ultimately to miraculous actions in regard to the short time span, and science can't examine the nature of that cause. The question here is, do we want to know what is truth about the *events*, even if we can't verify their ultimate cause? Or do we allow an assumption or presupposition, MN, to dictate what is truth about the events?

Science can't study miraculous causes, so many persons consider the idea of miracles to be science-stoppers. But miraculous causes like Intelligent Design and creation of life or the initiation of a global flood catastrophe could have happened. If they did, will it improve our science if we pretend they did not happen? Do we want to know true answers, even if they don't fit our preferred philosophy? If the evidence indicates that a materialistic, naturalistic origin of life is not a realistic possibility, will our science be better if we ignore the evidence and insist that an explanation consistent with MN is the only acceptable explanation? Do theory and assumptions trump evidence, as would be the case if we refuse to even consider the postulate that life may not have arisen by a naturalistic process?

I conclude that the only constructive thing MN has to offer is to remind us that science can't study *how* miracles happen. It is not valid for MN to deny that some miracles could have happened in the course of origins. In some cases the evidence (which we can study) may tell us that *events* have occurred that point back to the likelihood of miraculous or at least intelligent *causes* (and science can't study how those happen). Science has a definite limitation in that it cannot determine if miracles have happened in the past, and it also cannot determine if they did not happen. It seems wiser for scientists to recognize this limitation than to deny it. There will always be qualified, careful scientists who follow the principles of MN, and some who do not. The difference is philosophical, not scientific, and I predict that those who favor interventionism, not MN, will ultimately be more successful. That may seem to be a rash prediction, but as time goes on, we will see.

CONCLUSIONS

A Christian who engages in science should be able to devise hypotheses making use of the information we as Christians have. Methodological Naturalism does not allow that to happen.[24] There is one factor that all,

those who accept MN and those who do not accept it, can agree on: science cannot examine *how* purported miracles happen. We can't know the process involved in such things. So what is the difference between MN and a worldview that rejects MN? The difference, for both sides of that divide, is a religious difference. Science can't test either of these hypotheses: 1) A miracle-working god has been active in the history of origins, or 2) No miracle-working god has been active in history. The choice between these hypotheses is a philosophical or religious choice, not a scientific choice. If there is a miracle-working god, and MN declares that he is not allowed to ever have done any miracles, will that change history? Not likely. We can see that modern processes reliably follow the laws of chemistry and physics, but what about beginnings?

There once was a time when MN was needed, to teach us not to rely on mystical explanations of daily operations of nature. We have learned that lesson, so the only constructive thing MN does now is to remind us that no human can understand *how* miracles happen. MN has no ability to tell us *whether* miracles have occurred in connection with origins, nor does it have a right to dictate that to us. If a miracle did occur in the past, science can't study the miracle, but it can study any evidence that it may have left behind in regard to events that may have resulted from the miracle.

It doesn't seem that this distinction between the results of events in history (resulting from secondary causes), which can be studied, and the ultimate causes of such events, which may not be amenable to our research, has been clearly recognized in previous discussion of MN. If this factor is put on the table it can have an influence in opening up the discussion of geological and biological history and origins.

Just as it is not appropriate to assume there have been no miracles in history, we should also not *assume* that miracles have affected our research site. But our research will be more objective if we are aware of, and open to, the possibility of an earth history different from the history required by MN. In other words we seek for our research and conclusions to be evidence-based, not assumption-based.

Some evidence seems to support long ages for earth history, but other evidence says the opposite. When two lines of diligently studied evidence point in opposite directions, this does not necessarily mean that someone is doing careless or biased science. Maybe they are, or maybe they aren't. The contradiction is quite likely telling us there is something still to be discovered that can bring clarity and consistency to our understanding of the subject under study. I predict that this clarity will be enhanced if we are not limited in our thinking by MN.

In conclusion I must return to what is probably the biggest question about the issues in this article. Why is it so important to challenge the use of MN, especially in experimental science? I have stated that MN is not beneficial to science, but also that "science has no way to explore a supernatural process." Is that an outright contradiction? Is it saying that MN is bad but we can't get along without it? The answer to those questions describes the essential reason for this article. MN is a problem in the modern scientific world because it is a deeply held philosophy with implications that inevitably go way beyond any valid basic application. If it were only applied to experimental science it could be fairly harmless. But the most serious problem with MN is that it inevitably spills over deeply into discussions of history, where in practice it tries to dictate answers that science cannot provide.

Scientific research, for example, *cannot* demonstrate that life originated by naturalistic processes. Yet MN dictates that only naturalistic processes can be considered. That is science overstepping its legitimate bounds, and that always seems to happen when MN, as a philosophical position, is used. Instead, it is better to simply recognize that using supernatural explanations in experimental science is not helpful, and if miraculous events have happened *in history* science can't tell us how the supernatural works, and leave it at that. Beyond that our explanations should be based on the available or accessible evidence, not controlled by philosophical assumptions like MN. Genuine science must be fully evidence-based, not assumption-based.

ENDNOTES

1. A worldview is a set of assumptions that provide a framework for answering the significant questions about life and our universe; is there a God, where did we come from, where are we going, etc. These assumptions also influence how we understand the scientific process.
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5. Gould SJ. 1984. Lyell's vision and rhetoric. In: Berggren WA, Van Couvering JA (eds). *Catastrophes and Earth History: The New Uniformitarianism*. Princeton, NJ: Princeton University Press.
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11. (a) Miller KB. 2009. The Misguided Attack on Methodological Naturalism. In: Schneiderman JL, Allmon WD (eds), *For the Rock Record*, p 117-140. Berkeley, CA: University of California Press. (b) Pennock 1999, p 191-206 (see Endnote 9). (c) Pennock RT. 2009. Can't philosophers tell the difference between science and religion? Demarcation revisited. In: Pennock RT, Ruse M (eds), *But is it Science?* (updated edition). Amherst, NY: Prometheus Books, p 546-565.
12. (a) Miller 2009 (see Endnote 10a). (b) Pennock 1999, p 191-206 (see Endnote 9).
13. (a) Behe MJ. 1996. *Darwin's Black Box*. New York: The Free Press. (b) Behe MJ. 2007. *The Edge of Evolution*. New York: Free Press. (c) Meyer SC. 2009. *Signature in the Cell.* New York: HarperOne.
14. Thaxton CB, Bradley WL, Olsen RL. 1984. *The Mystery of Life's Origin: Reassessing Current Theories*. New York: Philosophical Library.
15. Meyer 2009 (see Endnote 12c).
16. (a) Shapiro J. 2011. *Evolution: A View From the 21st Century*. Upper Saddle River, NJ: FT Press, p 125. (b) Meyer 2009 (see Endnote 12c).
17. Interventionism is a worldview that accepts the possibility of intervention in history by intelligent beings, divine or otherwise.
18 . (a) Esperante-Caamano R, Brand LR, Chadwick A, Poma O. 2002. Taphonomy of Fossil Whales in the Diatomaceous Sediments of the Miocene/Pliocene Pisco Formation, Peru. In: De Renzi M, Alonso M, Belinchon M, Penalver E, Montoya P, Marquez-Aliaga A (eds), *Current Topics on Taphonomy and Fossilization* (International Conference Taphos 2002. 3rd Meeting on Taphonomy and Fossilization, Valencia, Spain, 2002), p 337-343. (b) Esperante R, Brand L, Nick K, Poma O, Urbina M. 2008. Exceptional occurrence of fossil baleen in shallow marine sediments of the Neogene Pisco Formation, Southern Peru. *Palaeogeography, Palaeoclimatology, Palaeoecology* 257:344-360.
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23. Plantinga 1997 (see Endnote 2).
24, Ibid.