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A CRITIQUE OF CURRENT ANTI-CREATIONIST ARGUMENTS AND CREATIONIST RESPONSES, FROM A BIBLICAL PERSPECTIVE

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A critique of current anti-creationist arguments and creationist responses , from a biblical perspective

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The controversy over intelligent design, creation and evolution has a long history, beginning before Charles Darwin (Ruse 2004). In recent years the conflict has been heating up, and the number of publications on both sides of the debate has increased. An important stimulus for all this recent activity is the legal war over what will be taught in public school science classes (Pennock 2003). I will not speak more about political matters of science teaching in public schools, but will focus on the scientific and philosophical issues behind the choice between naturalistic origins and biological origins by divine creation.

PHILOSOPHY OF SCIENCE

The modern scientific method uses the philosophical approach called *methodological naturalism* (Scott 2004). A related view is *philosophical* (or *metaphysical*) *naturalism*, the idea that there is no god and no supernatural forces, and the entire universe is the result of material causes, the laws of physics and chemistry. Methodological naturalism, on the other hand, does not make any claim about whether or not God exists or whether there is such a thing as the supernatural. Methodological naturalism (MN) is simply a practical rule, the most important rule in the contemporary definition of science. The rule is that science does not ever invoke the supernatural in its explanations, but attempts to see how far it can explain phenomena in the universe by strictly physical and material causes (Scott 2004). In most of science this rule works well and the "game" of science defined by this rule has resulted in unprecedented scientific progress. Even creationists can agree with MN much of the time. It appears that God has set up an exquisite set of "laws of nature" which He uses to govern the universe with His continuing sustaining power, and these reliable, unchanging laws allow us to discover how the universe and life functions, and how life changes and adapts to changing conditions.

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But the controversy begins when we deal with the origins of life and of the universe. Some creationists suggest dividing science into *operation science* and *origins science*. Operation science is the study of the *functioning* of the physical and biological universe, the study of regularly-occurring processes. Origins science is the study of singular, unique events, primarily the *origin* of the universe and of the initial life forms. In this scheme operation science uses the concept of MN, while origins science is allowed to postulate and evaluate supernatural explanations.

Mainline science does not accept origins science as science, but expects that all of science will use the philosophy of MN. When creationists object to the philosophy of naturalism, anti-creationists often respond that science uses MN, not philosophical naturalism, and MN makes no claims about the existence or non-existence of God (Pennock 2004). Ideally that may be true, but in practice the boundary between the two types of naturalism becomes blurred, because scientists do not allow consideration of the supernatural to influence scientific thinking, even in origins. MN may seem neutral and open-minded, since it ideally does not make any claims about the existence of God or the supernatural. However, many scientists who use this approach are, in practice, adamantly opposed to consideration of any form of creationism or intelligent design. The ultimate result, in practice, is that MN and philosophical naturalism have essentially the same effect on the faith/science discussion.

We will examine current arguments and tactics being used against creationism and intelligent design and the responses of those who doubt the adequacy of naturalism. How convincing are these arguments, and how solid are the responses to the arguments? This paper is not a comprehensive literature review, but samples a number of what I consider to be the best quality recent books and articles and other material on this topic, to provide an overview of the controversy. Intelligent design (ID) will occupy a significant part of our discussion, because of its prominence in the current debate over origins. Intelligent design does not specify who the designer is, and doesn't require the biblical Designer, but ID, along with creationism, isn't compatible with the usual applications of MN in the origins discussion.

My goal is to be fair to all parties, and recognize weak or strong arguments, no matter who uses them, or whether or not I agree with the author's conclusions. We don't

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need to be afraid of data or of careful thinking. We may struggle in our attempts to understand and respond to some interpretations of evidence, but in the end truth will stand on its own.

INTELLIGENT DESIGN

The biblical concept of creation has generally included belief that the universe is the result of intelligent design. However, in the last two decades the term "intelligent design" is commonly used for a specific movement developed by a group of highly educated scientists and philosophers. The movement began in the 1980's (Thaxton et al. 1984; Denton 1985) but was brought to public attention by publications of Phillip Johnson, a law professor in the University of California. The first of these was *Darwin on Trial* (1991), followed by other books (Johnson 1995, 1997, 2000).

The intelligent design movement does not concern itself with the age of the earth, flood geology, or evolutionary history, but focuses on how life originated - reasons for believing that life is the result of intelligent design, rather than any materialistic process. In other words ID is not a comprehensive view of origins or of the relationship between faith and science. Individual ID proponents may express their personal views of such things, but ID ideally addresses just one point: the existence of life requires intelligent design of some type. This is the only aspect of ID that we will consider. This view has been developed in books written by leaders of the movement (Behe 1996; Dembski 1998, 1999, 2002, 2004, 2006; Dembski and Kushiner 2001; Wells 2000). Another book edited by Dembski and Ruse (2004) contains chapters for and against ID. Philosophy professor Del Ratzsch (2001) has written a book evaluating the scientific legitimacy of intelligent design, from the perspective of the philosophy of science. He concluded that there is no compelling basis for excluding intelligent design from being explored within the scientific context.

However, the scientific community has been very critical of intelligent design (ID). We will examine a sampling of the criticisms of ID. A general scientific conclusion is that the Darwinian mechanism of chance (chance mutations) and necessity (natural selection preserving the biological variations that favor survival) are sufficient to explain the biological world, and thus design "as a fundamental principle disappears" (Young and Edis 2004). But whether chance and necessity can explain the origin and the

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diversity of life is a very big question – THE question under discussion here. We will keep coming back to this question in our discussion.

ID and religion

There are different views on the relationship between ID and religion. Some say that the success of Darwinism undermines all spiritual explanation of nature, while others argue that Darwinism is still compatible with liberal religion. The only theologians and philosophers favoring ID are those who share more conservative religious views (Edis 2004a).

Edis (2004a) concludes that ID is not excluded from science on a philosophical basis, but that ID is not taken seriously because it is not scientifically successful, while science under MN has been very successful, and chance and necessity are adequate explanations for nature. However, I suggest that although MN has been a very successful approach in most areas of science, the success of MN in explaining the origin of life and the origin of significant new biological structures (megaevolution) has yet to be demonstrated. We will need to consider more information before reaching a conclusion on the relative scientific merits of ID and MN.

Irreducible complexity

Michael Behe (1996) argues that irreducible complexity is evidence for intelligent design. A system (generally a "molecular machine" or a physiological system) is irreducibly complex if it contains at least three or more parts that are critical to its functioning, and it can't work unless all critical parts are present at once. A system that is truly irreducibly complex couldn't arise by evolution, because evolution can only produce a complex system by adding to its complexity one small step at a time. Meanwhile the system must be functioning during the entire process, or natural selection will be likely to eliminate it. Behe argues that some biological systems are irreducibly complex, and can't evolve because all critical parts would have to appear at the same time (Behe 1996).

Behe uses a mousetrap as an analogy, an example of a mechanism that doesn't work if one part is missing, and thus could not evolve, even if it were alive. Some have responded by figuring out ways to modify a mousetrap so it can have fewer parts and still

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work, at least theoretically (Young 2004). I don't know if anyone has tried to catch mice with these modified traps.

Behe presents the bacterial flagellum as an example of an irreducibly complex system. The flagellum is a slender tail-like structure, with a motor that appears, with electron microscopy, amazingly like an electric motor. The flagellum is rotated by the motor and acts like a propeller to move the bacterium along. A sensory system detects the chemical environment around the bacterium, and stimulates the flagellum to rotate one way to go forward, or rotate the other way to reverse direction. Many protein molecules, of specific structure, compose the flagellum and its motor. It appears that a number of these must be there, all at once, for the flagellum to function at all. If so, how could it evolve step by step? This same argument has been applied by ID proponents to the eye, the blood clotting system, and other biochemical systems.

Challenges to irreducible complexity

Some authors have challenged Behe's interpretation of the flagellum (e.g. Miller 1999, 2004; Ussery 2004; Musgrave 2004). They point out that there can be quite a bit of variation in the sequence of amino acids in the flagellum proteins, and that the structure of the flagellum varies in different types of bacteria. Some flagella are simpler in structure than those that Behe describes. This, they argue, shows that the flagellum can start out simple, and evolve more complexity, step by step.

The above authors also emphasize another line of evidence and reasoning. There is much similarity between parts of a flagellum and other bacterial components. One type of motility utilizes a long flagellum-like structure that doesn't turn like a propeller, but repeatedly attaches to a surface and pulls the organism along. These are also structurally very similar to hollow flagellum-like secretory organs which secrete protein solutions through their hollow tubes, in some cases to attack the cell walls of host organisms. It is then argued that the individual parts of a bacterial flagellum evolved for some other function, like secretion, and the complex flagella that Behe discussed evolved by co-opting parts from these other systems, and combining them in new ways to evolve a flagellum with a new function. According to this hypothesis, the problem posed by irreducible complexity is solved by indirect evolution of a flagellum. It is indirect

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because the parts are evolved, step by step, for other functions, and only then are they combined to make a flagellum. This evolution of parts for one function, followed by co-opting of such parts for a new function has been called *exaptation* (Gould and Vrba 1982).

This same logic is often used in explaining the evolution of other biological systems. Many proteins are composed of sub-units, or domains, and each domain may be used in other proteins. This observation has suggested the theory that various protein domains can evolve, each in response to some selective force, for a particular function, and then these domains can combine in different ways to make many types of proteins. In this way mutation and natural selection may generate relatively simple domains, which can combine to form proteins with whole new levels of complexity and diverse, novel functions.

In the ways described above, it is proposed, it would not be so difficult to evolve complex systems and organisms, by evolving simple components and combining them in new ways to make new complex structures. Miller (2004) maintains that the existence of simpler systems consisting of components of the flagellum indicates the collapse of Behe's concept of irreducible complexity as an argument for design.

This proposal may sound good, but those "simple" protein domains and co-opted parts are not necessarily so simple. Their origin still needs an explanation. The ability of the "simple" components to re-organize into such complex, functional systems also requires an explanation.

Behe (2004) points out that finding, for example, subunits of a flagellum that are functional without being part of the most complex flagellum does not argue against the validity of irreducible complexity. Many of these subunits are likely to have an irreducibly complex core, and this needs an explanation. Behe (2004) describes some additional challenges for the origin of a complex structure like a flagellum, that go beyond the structure of the flagellum itself. It has an intricate control system, and an elegant assembly process. Also, if parts of other systems are to be co-opted to become combined into a flagellum the parts can't necessarily just be popped together – they must be adjusted so that they will fit together. These factors multiply the challenge of making a complex structure without a designer.

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A recent paper in *Science* (Bridgham et al. 2006) is claimed to exemplify studies that "solidly refute all parts of the intelligent design argument (Adami 2006). The research started with a protein that had the ability to strongly interact with three steroid hormones, and then modified it to make it resemble their interpretation of what the ancestral hormone must have been like. This modification involved two amino acid changes in the protein. It still interacted with the steroids, but more weakly. It was then argued that they had reproduced the evolutionary sequence that led to the protein complex. Behe's unpublished response is that 1) the system Bridgham et al. studied was not even close to being irreducibly complex, 2) the simple change in two amino acids was easily within the range of variation consistent with ID, 3) nothing new was produced, but they only weakened the ability of the protein to bind to several molecules, and 4) this was the "lamest attempt yet . . . to deflect the problem that irreducible complexity poses for Darwinism."

This entire Darwinian process for generating complexity needs one important component to make it viable - a mechanism, a biochemical process capable of making the needed transitions from one level of complexity to another by purely material causes. Is such a process known? We will begin the answer in the next section, and return to it at several points in this paper.

Behe (2004) analyzes suggestions that a mousetrap is not irreducibly complex. Others have suggested ways in which individual parts of a mousetrap could function as a simpler mousetrap, which could evolve into a more complex mousetrap. The problem is that the "simpler moustraps" must be intelligently adjusted before they can become parts of a complex trap. At some steps additional parts (e.g. staples) must be added in a precise way before two simple traps could be combined. There seems to be too much requirement of intelligent action or chance for this to be a viable example of the Darwinian process.

Self-organization – can it explain the origin of biological complexity?

Shanks and Karsai (2004) tackle the origin of complexity by pointing out that complexity and organization exist on all scales - in the shape of galaxies, hurricanes and snowflakes, and in molecules and organisms. They propose that this complex

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organization is best explained by processes of self-organization, rather than as intelligent design by a supernatural being. The same argument is also presented in Shanks and Joplin (1999).

They describe how, if the necessary components (atoms, molecules, organisms, etc.) are present, and there is energy exchange with the environment, self-organization can occur. An example is the interaction of air and water molecules and heat, in the proper context, to organize itself into the complex spiral patterns of a hurricane.

Do these arguments demonstrate the superiority of MN over ID, as explanations of the origin of biological systems and organisms, as the anti-ID writers maintain? Actually there are at least two classes of phenomena used in explanations of origins. The first class includes snowflakes, and the shape of hurricanes and galaxies. These are purely physical phenomena, governed by laws of physics. As water freezes under the right conditions it makes the intricate, organized shapes in a snowflake. A snowflake is very complex, it exhibits contingency (it could be in some different shape), and someone without knowledge of chemistry and physics could think of the symmetry and shape of a snowflake as a type of specification requiring intelligent design. However, science knows much about chemistry and physics, and it is evident that there are physical reasons for the design features common to all snowflakes (Edis 2004b).

According to Dembski the nature of the complexity in living things is unique, "capturing the notion that there is something in life that is different from the intricacy of a snowflake." But Edis (2004b) doesn't accept Dembski's logic, that there are fundamental problems with the comparison of snowflakes and biological design. On this point Dembski is right and Edis is missing something significant. Living things require biological information (the sequences in proteins and DNA) for their existence and their design, while snowflakes have no such information. The shape of a snowflake is evidently determined by chance and necessity – necessity in the form of basic laws of physics controlling the crystallization process in freezing water, and chance that allows the specific snowflake to vary randomly. Within the necessity of the physical laws governing the general hexagonal shape of snowflakes, there is no limit or function to the intricate details of crystal pattern – they can vary at random, with no specificity.

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As a hillside erodes from the runoff of rainwater, the water flow and erosion occur within limits determined by gravity. Within those limits there are details that can vary in a random pattern. This is comparable to the shape of a snowflake – there is no information involved. It is truly chance and necessity. The same seems to apply to the shape of hurricanes and galaxies. The nature of biological information, the other class of phenomena pertinent to issues of origins, is fundamentally different from the forces controlling the formation of a snowflake.

In contrast to a snowflake, the sequence of amino acids or of nucleotides (ie. biological information) is not governed by the laws of chemistry and physics, but is the result of some other process. Is chance and necessity adequate for the job, or is ID required? So far in this discussion we have not arrived at an answer to that question, but we will get to it. Edis's discussion of snowflakes, hurricanes, etc, misses the point entirely because he doesn't recognize the uniqueness of biological systems.

One other example of self-organization is the Belousov-Zhabotinski (BZ) reaction. In this chemical reaction several chemicals (an organic substrate, an acid, bromate ions, and transition metal ions) are placed in a beaker, and the system self-organizes to perform a repeating cycle of reactions, with a sequence of associated color changes repeated in each cycle. It has been argued that the BZ reaction involves organized, irreducible complexity without the need for any intelligent designer. This reasoning goes on to suggest that these reactions illustrate how life could arise by self-organization (Shanks and Joplin 1999; Shanks and Karsai 2004).

But there seem to be some problems with this conclusion. Are BZ reactions really illustrations of irreducible complexity "without any help from intelligent designers?" What about the chemists who understand the principles of chemical reactions and use this knowledge to put the right chemicals in a beaker? So far I am not aware of any natural occurrences of BZ reactions, without intelligent intervention by chemists, but even if they do occur, there is still another problem. Like the shape of snowflakes, these reactions are controlled by basic natural laws and do not involve anything comparable to biological information, whose origin would have to be explained by something apart from laws of physics and chemistry. Another criticism is that the BZ reactions do not require very specific chemicals, as long as there is an organic molecule

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that can be oxidized, the right category of metal ions, etc. (Behe 2000). BZ reactions also do not produce anything durable, like biological information.

Behe (2000) suggests that even though the chemicals needed in a BZ reaction are not specific enough to qualify as irreducible complexity as exemplified in biological systems, BZ reactions are comparable to the self-organizing properties in, e.g., a tornado. Behe gives the blood clotting cascade as a better example of irreducible complexity, because at least some of the proteins involved require a very specific structure in order to work. The simple chemistry of BZ reactions is not comparable to the sophisticated biochemical machinery in living cells. He also points out that even though mathematical models of the chemical behavior of BZ reactions and biological systems may be similar, the underlying chemistry is very different – one does not explain the other, and definitely does not explain the origin of biological systems.

Redundancy

Shanks and Joplin (1999) argue that there is redundancy in biochemical systems that negates Behe's irreducible complexity concept. For example they discuss the chemistry of glycolysis, part of the process that produces useable energy within cells. If Behe's mousetrap model was correct, then using some laboratory procedure to knock out one enzyme from the glycolysis pathway should stop the whole system. However that doesn't happen. There is redundancy in the system, so if one enzyme is taken out another enzyme performs the task and the process goes on. This redundant complexity exists, they say, because of gene duplication. A gene that produces an enzyme becomes duplicated by a mutation. One of the duplicated genes carries on its usual function, and the duplicate mutates until it is co-opted to produce a new enzyme with a novel function. The new enzyme may not be as efficient, but evolution presumable can improve its efficiency. This redundancy means there are multiple routes to accomplish a biochemical task. If one route fails, another takes over. This shows, they say, that Behe's simple mousetrap illustration of irreducible complexity is not a correct description of biochemical reality in living organisms.

Behe (2000) responds that some biochemical systems are redundant, but some are not redundant. He describes, e.g., some proteins in the blood clotting system that are not

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redundant. If they are missing it is lethal. There are some additional, pertinent issues that Behe didn't discuss. If there is as much redundancy as Shanks and Joplin claim, then the biochemical systems are actually more complex and thus more of a challenge to evolve, than if they weren't redundant. The redundancy provides a safety net in case of mutational damage to part of the system, but if there was no intelligent design, all of that complexity had to evolve. And if the biochemical pathway evolved, it isn't likely that it was redundant from the beginning, but went through a non-redundant step. In addition, the assertion that novel features evolved through gene duplication involves an assumption that we will discuss below.

Some biochemists also point out (Boskovic personal communication) that the presumed redundancy in, e.g., blood clotting, is not really redundant. The alternate pathways are not optional, but form a network of reactions which assures the right response in various circumstances.

Social wasps and "intelligent action"

Social wasps build complex nests composed of hexagonal cells packed tightly together. Such a structure seems to require sophisticated cognitive ability to produce. But research has shown that nest-building by wasps is not the unfolding of an intelligent plan, and there is no wasp supervisor who manages the building. Rather each wasp follows several simple rules, and applies the rules in response to the conditions it encounters at each step in the building process. Thus without any mental blueprints or supervised planning a complex structure emerges as a by-product of application of the simple rules. There is no requirement of "intelligent design from outside the system," and the "orderly, complex structures emerge as the consequence of the operation of blind, unintelligent, natural mechanisms operating in response to" the local nest-construction environment (Shanks and Karsai 2004).

Their conclusion seems to overlook some important concepts. It took some scientists a lot of intelligent research to figure out the "simple" rules, which aren't so simple after all, and their results are indirect. The constructive result of an individual move by a wasp only becomes evident as it fits into the overall context of many additional moves by many wasps. If wasps evolved, those rules had to be determined and

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programmed into the wasps' brains somehow. Is random mutation and natural selection up to the task? We can't demonstrate that it isn't, but these authors are also only exercising faith in their chosen philosophical framework, just as ID advocates are doing if they choose to believe that God is the designer. Their claim that no "intelligent design from outside the system" is needed to supply the wasps with the necessary nest-building rules is simply a statement of their faith, with no supporting evidence.

Biological information

It is often just assumed that since chance and necessity are sufficient for some types of complexity in nature (e.g. snowflakes, crystals, and hurricanes), they are sufficient for biological origins. But arguments against ID will have to deal with the origin of biological information, and whether chance and necessity are sufficient for the job. None of the anti-ID arguments we have discussed so far have dealt with this issue, and thus they are largely irrelevant.

A protein, e.g. a hemoblobin molecule, consists of a sequence of amino acids joined together in a chain. A protein is not a repetition of a simple sequence, as in a crystal (e.g. ALV ALV ALV ALV ALV), but is complex and non-repetitious. It is also specified, which means the amino acids in at least part of the molecule must occur in a specific sequence for the molecule to be functional. This complex, specified sequence of amino acids is information, like the sequence of letters on this page. William Dembski calls this complex, specified information (CSI) (Dembski 1999), and argues that proteins and the information in books (CSI) are too complex to arise by chance, without intelligent input. The same concept applies to nucleic acids, DNA and RNA. I suggest that the origin of this biological information (CSI) in proteins and nucleic acids is perhaps the single most significant challenge for any naturalistic theory of biological origins.

God-of-the gaps: has the gap been filled?

The ID claim that some organs or biochemical systems are too complex to evolve is often called a god-of-the-gaps argument; since we can't imagine how they can evolve (the gap in our knowledge), they must require a designer. It is claimed that we know enough about how complex features evolved to make ID unnecessary (the gap has been

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filled). A classic case is the eye. The vertebrate eye is amazing in its complexity, but is it irreducibly complex? Young (2004) says no. In the animal kingdom there are a great variety of eyes, including simple light-sensitive spots, and various simple eyes that provide different levels of visual ability. Young and authors he references claim that these eyes can be arranged in a sequence illustrating convincingly how eyes evolved, and eliminating the need for a designer for the origin of eyes.

The origin of flight in birds is another example of the same concept (Gishlick 2004). It is hard to imagine how the power of flight in birds could evolve – "what good is half a wing?" The counter argument given here is a comparison of forelimb structure in the dinosaurs presumed to be bird ancestors. These bipedal predatory dinosaurs can be arranged in a sequence showing changes in the wrist allowing movement of the forelimb in prey-catching maneuvers that were, it is proposed, later exapted for the purpose of flight. Add to this the apparent existence of feathers in some dinosaurs (presumably for insulation) (Martin 2001, p. 249; Norell et al. 2002), and it is claimed that we now understand the origin of flight, which is first seen in the fossil bird *Archeopteryx.* However, there is of course a huge gap, not represented by fossils, between the non-flying dinosaurs and the flying *Archeopteryx*, and this gap includes all the steps in the presumed evolution of flight from a non-flying but perhaps feathered dinosaur. This example, the proposed evolution of eyes, and many other cases share a significant problem, which we will now address.

Word pictures as explanation

Word pictures of how a complex structure could evolve often sound quite convincing. But is reality as simple as the word pictures make it sound? Is there good reason to believe that the evolution of the eye, or bird flight, or a flagellum is convincingly demonstrated by these word pictures of proposed evolutionary steps, axaptations, and recombinations of protein domains? It is often implied that the evolutionary scenarios presented are adequate to eliminate the need for ID (e.g. Young and Edis 2004).

But theoretical descriptions of how a set of evolutionary steps can evolve new structures depend on the *assumption* that this process will actually happen, or has

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happened. Word pictures, or just-so stories, as they are sometimes called, make evolution of novelty sound easy, but they don't deal with the fundamental biochemical problem of how new biological information arises. Young (2004) describes the use of a genetic algorithm to show how the all the types of eyes can evolve, and then says that the existence of a variety of eyes provides hard evidence to support this claim. He states that "If the genetic algorithm can generate complexity, then so can evolution by natural selection." I don't doubt that such an algorithm models some aspects of evolution. But it does not demonstrate that the correct mutations will in fact appear when needed, providing the raw material for natural selection to successfully invent the next more complicated type of eye. It is also far from obvious that each intermediate step from one type of structure to another will have some improved survival value, and would be selected, rather than rejected, by natural selection. We will still return to this crucial issue later, but there are a few other items to deal with first.

The explanatory filter – a logical tool for identifying ID

Dembski (1999, 2002) has described an explanatory filter, to identify design and distinguish it from features that could result from chance. He claims that the logic used in his filter is essentially the same as archeologists or forensic scientists, e.g., would use to determine if some feature resulted from intelligence. The filter involves three logical steps: 1) contingency - could the feature exist in some other form than it has? 2) complexity – is the feature complex enough (by a rigorous quantitative standard) to require design? 3) specification – does it match some specific known pattern (e.g. if it is a protein, does it work)?

Gary Hurd (2004) compares the explanatory filter with the logical procedures used in archeology and forensic science and concludes that the explanatory filter does not match what an archeologist or forensic scientist does. Some of his criticisms miss the point of the filter. For example the filter could probably not distinguish whether certain events were suicide, murder, or divine retribution, because all three of those explanations are the result of intelligent action. Most of Hurd's examples are of this same type. However, he seems to make a valid point that archeologists and forensic scientists don't use Dembski's filter in their work. Perhaps the filter is best described as a type of logic

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underlying some of the actual procedures used in archeology and forensics, but they don't use the filter as such. Also it appears that much of the work in those fields involves distinguishing between different types of intelligent action, which is outside of the filter's role.

Algorithms and weasels

Mark Perakh (2004) challenges Dembski's use of certain algorithms in his arguments that complexity cannot be purchased without intelligence. These are detailed analyses, and it would be instructive to see Dembski's response to Perakh. There isn't any special reason to think that either the ID proponents or the opponents of ID have all the answers. There will no doubt be an ongoing discussion over the details.

One of Perakh's criticisms of Dembski, however, is clearly wrong. Perakh objects to Dembski's conclusion that an algorithm used by Richard Dawkins (1986) is fallacious. Dawkins enters a sentence (METHINKS IT IS LIKE A WEASEL) into a computer simulation, scrambles the letters, and then allows the simulation to recreate the sentence through random changes in the sequence of letters and a selection process to choose between the previous letter sequence and the mutated sequence. By this process his simulation of mutation and natural selection fairly quickly reaches the original sentence. Dembski doesn't accept this as a legitimate simulation of evolution. Perakh vehemently insists that Dembski is only criticizing minor issues in Dawkins' simulation, and that the simulation is indeed a good example of evolution. This is where Perakh is wrong.

The problem with Dawkins' simulation is that the computer compares each mutated letter sequence with the "target," which is the actual sentence METHINKS IT IS LIKE A WEASEL. If the mutated sequence is closer to the target, the computer chooses the new letter sequence. The problem here is that the actual biological evolution process *does not know what the "target" is*; it does not know what features will be needed in the future. Natural selection can only choose between an existing feature and a mutated alternative on the basis of their selective value at that moment in time. It can only determine which color moth will be more camouflaged *today*. It cannot look into the future to see what the evolution process is aiming for - what color the moths will need to be a few years from now. This is not a creationist criticism, but is a fundamental concept

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in the theory of evolution. Dawkins' simulation does not model Darwinian evolution, but illustrates only one point – it shows that mutation and natural selection can work effectively if there is intelligent guidance of the process. It illustrates nothing beyond this, and Perakh did not understand that. Dembski was not criticizing a minor problem; Dawkins' simulation contains a very major flaw. I am amazed that Dawkins published this simulation in the first place, and that knowledgeable scientists still refer to it favorably.

ID and publishing

It is often claimed by critics of ID that creationists don't publish in peer-reviewed journals, revealing that their ideas about ID are not really science. Stephen Meyer did publish an article making the case for ID in a local peer-reviewed journal, the Proceedings of the Biological Society of Washington (Meyer 2004), with the title The origin of biological information and the higher taxonomic categories. His article discussed various scientific difficulties in evolution by natural selection, and in explaining the origin of many phyla in the Cambrian explosion. Most scientists continue to use MN to seek answers to these challenges, but Meyer suggests that the evidence points to design of living things.

The Biological Society of Washington was severely scolded by the scientific community for publishing this article (Giles 2004; Helgen 2004; Ligon and Lovern 2004; Terry 2004), and the society published a statement repudiating the Meyer paper and its ID concept and describing irregularities in the editorial process that allowed the paper to be published. The article was peer-reviewed, but it is claimed that the editor, an ID sympathizer, didn't utilize all the other quality control processes of the journal.

The Meyer article was a thoughtful presentation of the topic, but none of the responses I have seen responded to the arguments in the paper. They only argued that it was not legitimate for such a paper (not in accord with MN)` to be published in a scientific journal.

Conclusion on ID

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Neither the proponents nor the opponents of ID have so far produced arguments that are convincing to the other side. This is partly because of the complexity of the biochemical phenomena they are arguing about. I expect that both sides will continue to hone their arguments. But there is one major difference. ID recognizes and focuses on the real issue – the origin of biological information, while their critics generally skirt this issue and base their criticisms of ID on peripheral issues. They rely on the assumption that the biological information will evolve when needed, using word pictures to support their arguments. In reality, the argument can probably never be resolved as long as the philosophical differences between the two groups exist. The concepts of ID could never be accepted, no matter how true they may be, as long as there is a commitment to MN.

It is claimed that ID is being rejected as unscientific, not only because of philosophy, but because it hasn't been successful in generating new, publishable scientific research. This is, so far, largely true. Creationists who make definite claims about history that can be compared with the historical evidence – the geological record and biological history, have an easier time using their world view in defining hypotheses that are testable with scientific procedures (Brand 1997, 2006). ID does not make those geological or biological claims about history and thus has not generated truly testable hypotheses.

However, ID does ask legitimate questions about the nature of the search for truth. Since MN is not a scientific claim, but is a philosophy, to reject ID because it is a violation of MN is a philosophical or religious choice, not a scientific choice. Even if ID doesn't succeed in initiating testable hypotheses, the claims of ID still could be true. For science to try to keep ID from being discussed may be just as unproductive as it was for the church in Galileo's day to try to prevent open discussion of the heliocentric universe theory. A valid intellectual goal of ID is to put naturalism out on the table for open discussion, and it has made considerable progress toward this goal, although it is vigorously opposed by many prominent scientists.

ORIGIN OF LIFE

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We have discussed ID, which deals with a theory of what is necessary for life to begin. Now we will turn to study of the *conditions* that could favor the origin of life process, if it is possible for life to arise spontaneously.

BZ reactions could be considered a suitable analogue for the origin of biological information if the necessary components were mixed in a beaker and a living system, or parts of a living system spontaneously arose, as the cycling reactions arise in a BZ reaction. Something like this does occur in Miller-Urey type experiments (Miller 1953; Miller and Urey 1959). The appropriate elements are mixed together in an apparatus simulating the presumed atmosphere on the primitive earth, and amino acids and other biological molecules spontaneously form. This demonstrates that the formation of amino acids and nucleotides can form by a "self-organizing" process, at least partly analogous to what happens in a BZ reaction. But these are only the "bricks" that must then be arranged in the proper sequence to form proteins and DNA/RNA, the biological information molecules. The "self-organization" of life cannot be claimed until the amino acids and nucleotides are arranged in the correct sequences to form biologically functioning macromolecules (i.e. biological information) and biochemical machines to form a cell. So far that has not been demonstrated in any experiments.

A likely response to this statement is that we should not expect such a clear-cut result in the short time we have to work on it. That may be so, but it remains true that acceptance of the hypothesis that life arose by a naturalistic process can only be accepted on faith. A person who accepts MN will likely think it is worthwhile continuing the scientific search for the naturalistic mechanism of the origin of life. One who believes the origin of life is impossible without a Designer should not condemn origin of life study as bad science, but he/she is likely to think that their scientific effort is better utilized on a different topic, because origin of life research, for biochemical reasons, is a dead-end road.

Many references on the origin of life report studies on what conditions might be most favorable for forming early components of life, and what components seem most likely to have been the starting place for life (e.g. did life begin as RNA? Were alkaline springs in the ocean critical to the process?) (e.g. Bada 2004; Hazen 2005; Russell 2006). They typically don't deal with the crucial unanswered question of how the appropriate

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biological information could have originated in those molecules. Bradley (2004) reviews several attempts to explain how life evolved, and concludes that they all must fall back on chance to produce the necessary biological information.

Natural selection could not help assemble the initial functioning biological information, because natural selection could not function at all until there was a living, reproducing organism. Only when there are living organisms can there be variation in individual characteristics and different likelihoods of survival and reproduction, and a genetic system to preserve the characters of those favored by natural selection. Consequently, before the first living things existed the only mechanism for assembling a set of functioning proteins and nucleic acids appears to be chance. Richard Dawkins, speaking of the origin of life (1986, p. 141), summarized it nicely: "What is the largest single event of sheer naked coincidence, sheer unadulterated miraculous luck, that we are allowed to get away with in our theories, and still say that we have a satisfactory explanation of life?" That may seem satisfying to some, but is it worthy of being called science?

MICROEVOLUTION AND SPECIATION: evolution not requiring any new gene complexes or new structures

Now we will move beyond ID, and discuss some broader aspects of origins. Since the development of the neo-Darwinian synthesis, a large body of evidence has accumulated in support of the reality of microevolution and speciation (e.g. Gould 2002; Coyne and Orr 2004; Ridley 2004; Futuyma 2005; Brand 1997, 2006). Creationists generally accept the reality of these processes. Some anti-creationists imply that creationists arbitrarily pick and choose the ideas they like, when they accept microevolution but doubt megaevolution. But does the scientific method include the expectation that we accept all parts of scientific theories, or is it better if we analyze them carefully, and favor those parts of the theory that are well supported by evidence while questioning parts not so well supported? Creationists learn from accumulating evidence, just as others do, and have concluded that the evidence for megaevolution doesn't measure up to the same standards as the evidence for microevolution (Brand 1997, 2006).

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The processes involved in microevolution and speciation don't arbitrarily stop at the development of a new species. It appears that the same evolutionary process can generate sufficient change to result in an organism different enough to at least be called a new genus. The difference between micro and macroevolution (evolution above the species level, or including speciation), as usually defined, is not meaningful here. The relevant issue is the origin of significant new features. The evolution of new species or genera doesn't usually require the evolution of any new physiological systems, new anatomical structures, or new complexes of structural genes and their supporting regulatory genes. When a new organism exhibits a new body plan with new structures, systems and genes, such a level of change is megaevolution (see Brand 1997, 2006). We will now turn to discussion of this presumed large-scale evolution.

MEGAEVOLUTION: the presumed evolution of new gene complexes, new structures, or new body plans

It is often claimed that if the small changes (microevolution) occur, the same process, given enough time, will produce the larger changes in body plans. But evolving a new body plan is very different from microevolution and speciation. Microevolution involves variation in the alleles of existing genes, but does not seem to require significant new biological information in the form of new complexes of structural and regulatory genes and their resulting proteins. By the term significant I am making a difference between producing variations of an existing protein, e.g. hemoglobin (microevolution), and the production of a whole new complex of genes and proteins - for example the complicated system needed to evolve live birth in mammals.

The hypothesis that the small changes observed in microevolution will extrapolate into production of the large changes needed for megaevolution is an assumption. In the evolution literature it is generally assumed that there is no difference in the process of microevolution and the process of megaevolution; the small changes will naturally add up to the largest evolutionary changes. There are two primary lines of evidence often considered as demonstration that this is more than an assumption. One of these is homology – the homologies that are used to develop phylogenetic hypotheses. All mammals, reptiles and amphibians have front limb skeletons with a scapula, humerus and

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ulna, carpals, metacarpals and phalanges. These skeletal similarities are homologies. If two groups of animals have homologous features, they are interpreted as evidence that these features evolved from a common ancestor. The Mesozoic bird *Archeopteryx* has certain homologies in bone structure with dinosaurs, and this is considered to be evidence that they evolved from common ancestors (Ostrom 1994; Gishlick 2004). But of course if life was created, some homologous features could have resulted from common design, by a Designer who designs in an organized, systematic way, using the sophisticated genetic mechanism which He invented. In this view of biology, it would take careful study to differentiate between "homologies" that resulted from common design, and true evolutionary homologies that resulted from evolution within created groups. Many scientists may not like this division between created features and features resulting from natural processes. But the real question isn't whether we like it – the question is "what is truth?" Perhaps new developments in molecular biology can make it likely that we can actually test hypotheses of common descent vs. independent origin of various groups of organisms.

The other primary evidence relative to megaevolution is the fossil record. It can be claimed that the sequence of animals and plants in the fossil record, with distinct differences in types of fossils present at successive levels in the record, demonstrates that megaevolution has produced the entire living world. Bacteria appear first as fossils, then invertebrates, then fish, amphibians, reptiles, and mammals and birds in order. This seems conclusive, unless we are willing to at least consider the possibility that life has a Designer. If we allow that option then we need to consider more than one possible explanation for the sequence of fossils. Depending on how we understand Scripture, there are several ways that the Creator could have interacted with the living world as reflected in the fossil record. Such an interaction could have introduced the different life forms, created separately, all at one time or at different times.

Whether or not homologies and the fossil record demonstrate the reality of megaevolution is a philosophical concept. The philosophy of MN requires that the body plans which appear in the fossil record arrived on earth by way of megaevolution, but if the option of creation is allowed, then megaevolution is not demonstrated by the fossil record or by study of homologies. Some other, independent line of evidence is needed to

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convince us that megaevolution produced the body plans. What is needed is genetic evidence that mutation and natural selection can produce the significant new biological information needed to generate a new body plan.

One place to look for such evidence is in textbooks on evolution. Two high quality evolution texts are by Ridley (2004) and Futuyma (2005), and I searched these books and categorized the information contained therein, in several categories. The categories are: microevolution and speciation, patterns in the fossil record, phylogeny (pathways of evolution, but not genetic evidence for megaevolution) and genetic evidence for megaevolution – processes involved in producing new gene complexes and new structures that did not exist before.

In both of these books there is little evidence that could be interpreted as supporting the genetic process of megaevolution, and such evidence generally involves the duplication of genes. The theory of gene duplication proposes that mutation would make one or more duplicate copies of a gene. The original gene would continue to provide its same function, while subsequent mutation and selection modifies the duplicate genes until they perform a different function. Essentially all new genes are expected to arise through some version of this process.

Examples of gene families, that include variations of a gene, include the ribonuclease gene family in primates, and the globin gene family. The latter contains several slightly different hemoglobins. Each of these gene families is presumed to have resulted from gene duplication and evolution. However, an alternate hypothesis is that the different genes and proteins in each family were always present. Even if some of these are the result of gene duplication and mutation, they represent only microevolution and are not evidence for the evolution of distinctly different genes as needed in megaevolution. The counter-argument will no doubt be that given enough time completely different genes will evolve. But this is an untested hypothesis. The process depends on the needed mutations occurring at the right time, and not mutating again in a non-constructive direction before the other necessary positive mutations occur. There is no proof or disproof of this hypothesis, but I suggest that it is too unlikely to be taken seriously, as the source of the overwhelming complexity seen in the living world.

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Futuyma (2005) also discusses new gene origin by exon shuffling, producing new combinations of protein domains. This process could be part of the original created mechanism for generating genetic variation. If life was not created, there would be definite limits to how much genetic novelty could arise through this process, until new domains evolved by gene duplication and mutation. Thus exon shuffling as a source of the new genes needed for megaevolution is subject to the same constraints discussed above for gene duplication.

The other line of evidence that new genes can evolve comes from observed modern events like evolution of insect resistance to pesticides, bacterial resistance to antibiotics, or appearance of new enzymes in bacterial cultures. Spetner (1998), in his book *Not by Chance*, analyzes the molecular details in these phenomena. He found that no point mutation known at that time added any new genetic information. For example, a bacterium that developed resistance to streptomycin did so because a mutation changed the ribosome protein where the streptomycin attaches, making the protein less specific, which means loss of genetic information, not gain of information. This loss of specificity has side effects, making the ribosome less efficient. Thus resistance to a deadly drug was "bought" at the price of a less effective ribosome. This type of change cannot produce the new genetic information needed for megaevolution. Other examples of known mutations followed the same principle.

Barry Hall (1982, 1988) studied changes in a strain of bacteria that some others have interpreted as evolution of a new enzyme. He prepared a strain of bacteria with a mutation that destroyed its ability to break down lactose. Then two other mutations occurred and a new enzyme appeared that could utilize lactose. However, these two mutations appeared in many cultures within a few days, which indicates that it was not a new enzyme, but just the activation of an already existing gene and its enzyme, whenever the conditions were right (Spetner 1998; Behe 2001).

Spetner's analysis points to the conclusion that there is no evidence that random mutations can produce truly new genetic information. If this is true, then there is no known genetic mechanism to produce megaevolutionary change. Perhaps new research will modify this conclusion some, but that remains to be seen. Also, for megaevolution to be a viable process to generate the diversity of life on earth there needs to be more than

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a slight possibility of evolving new genetic information. There would need to be a reliable process to generate a rich input of new information on a regular basis. So far the evidence for this has not been forthcoming. This is the critical question that has arisen several times in this essay. Many of the anti-creation arguments we have reviewed fall flat unless MN can produce evidence supporting the evolution of biological information.

An objection likely to arise is that books like the texts by Ridley and Futuyma are full of evidence for megaevolution. They do contain a mountain of impressive evidence and theory that seems to support the origin of all life forms by megaevolution. However, on closer inspection I conclude that virtually all of their explanation for the origin of truly novel biological features and new body plans is dependent on the assumption that the needed biological information will appear when needed in the process of megaevolution. Evidence that can be explained by common designer or by common ancestor, they consistently interpret in a naturalistic framework. It sounds convincing at first but does not have the potential to test between origin by evolution or creation by a highly intelligent super-scientist type of designer. The same applies to the explanations by many other authors (Scott 2004; Valentine 2004).

Of course none of this disproves the theory of megaevolution, because it can be claimed that we just don't know enough yet to understand how it works. We can't deny that argument, since all of us, no matter what our view on origins, must exercise considerable faith in our beliefs or theories. A Bible-believing creationist has faith in creation in spite of many unanswered questions, especially in areas like geology and radiometric dating. A non-creationist view requires strong faith that a naturalistic theory will someday answer the unknowns as to how genetic information and molecular complexity arose. Personally, I predict that in future centuries, when we know much more about molecular biology, we will see the theory of life arising without intelligent design as an area of great naiveté in 20th century scientific thinking.

Pennock (2004) claims that Darwinian evolution tells us that God is not necessary, and Weber and Depew (2004) say Darwin showed that "natural selection *could* account for the empirical claim of a common descent for all living beings." Those claims may be seriously premature.

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CRITICISMS BASED ON MISUNDERSTANDING OF CREATIONIST VIEWS

Pennock (1999) discusses the evolution of languages, and suggests that this implies biological evolution as well. He argues that since languages have evolved, we must give up the biblical story of the creation of languages at the Tower of Babel, and if we accept the evolution of languages we should also accept biological evolution. The problem here is that he doesn't consider the possibility of created language groups, with subsequent evolution of the languages within these created groups. Similarly he doesn't seem to understand that creationists accept both microevolution and some evolution above the species level, and that this is not the same process as the evolution of new body plans.

There are many superficial statements in Pennock's book, many of which could have been avoided if he understood how informed creationists think. He thinks he has refuted the arguments of creationism, but for a creationist who accepts microevolution, speciation, some evolution above the species level, and language evolution within created language groups, this book has little of substance to offer. It is at its core one long and often shallow philosophical argument that naturalism is the only acceptable philosophy in science, and science is the only way to know truth.

Kenneth Miller (1999) writes well, and I appreciate that he is looking for a way to support belief in God and in the Bible, without letting science push him into an atheistic mode of thinking. He is knowledgeable about some very real difficulties that creationist views must deal with, and in some cases do not at this time have answers to. Radiometric dating is an example of this.

His writing, however, exhibits a problem common among critics of creationism (and among critics of evolution!). He has little understanding of what biologically educated creationists believe, and consequently he sometimes uses arguments that are false or meaningless.

Miller, for example (p. 95-100, 172, 215, and other pages), claims that creationists do not accept any evolution, even of species (p. 215-218, and p. 262, e.g.), and that creationists don't think that the world around us is governed by the laws of chemistry and physics, and that creationists think that God must directly intervene in the blooming of a flower! On p. 109-111 he discusses a perfectly good example of experimentally induced

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microevolutionary changes, and claims that these microevolutionary processes are "scorned by critics of evolution." There undoubtedly are some creationists who think like that, but I do not know of any biologically educated creationists who believe the way Miller claims they do. He has fun making creationists look foolish, but for something that we do not believe. By doing so he only makes himself look uninformed. In some places where he critiques the doctrinal consequences of what he thinks is creationism he reveals how little he understands of the belief system of thoughtful, conservative Christians, and ridicules something that is just a straw man that he himself has set up.

When evaluating a line of evidence, and seeking for the most valid explanation, it is important to try to think of a wide range of possible hypotheses for its explanation. This can help us to avoid the mistake of jumping from one extreme to another, and missing valid possibilities that may lie between those extremes. If Miller had done that, perhaps he could have avoided some logical blunders. When considering the explanation for the universe, there are at least three types of hypotheses that should be considered (a number of others could be added, but this will illustrate my point):

Hypothesis A. God created all species of organism as they are; no change occurs; God directly manipulates nature on a daily basis. (one who accepts this hypothesis rejects everything that supports any aspect of evolution)

Hypothesis B. God invented the laws of nature, and created the universe and a few initial types of organisms, with a genetic system capable of adaptation to new or changing environments. He made all of that so that the whole system will continue to function and adapt under the management of His comprehensive set of natural laws.

Hypothesis C. God began the universe, and then left it alone (or some variation of this - including Miller's position).

In many places throughout his book Miller makes the logical error of rejecting hypothesis A and then jumping directly to C (a black/white, either/or type of thinking) without considering that there could be other options in between, like Hypothesis B or some variation of it. If his book is to have any meaning to informed Christians, he will have to respond to some intermediate position, like B, and show why he thinks it doesn't work. As it is, he appears to be ignorant that ideas like hypothesis B exist.

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Miller does not honestly discuss or even admit difficulties for his theory, and sometimes claims quite directly that there are no problems for his theory. He glosses over the question of the origin of life, leaving the impression that naturalism can readily explain it, and never discusses the severe scientific problems that confront origins of life theories. Also, he does not discuss the Cambrian explosion at all, or even explain what the evidence is like at this crucial point in the fossil record.

WEBSITES

There are a variety of anticreationist web sites. Talk Origins (http://www.talkorigins.org) is perhaps the most comprehensive and representative of the thinking of informed evolutionary scientists. I will not deal with any of these websites, for lack of space in this essay.

STRATEGIES

Probably the main reason for the vitriolic battle over creation and ID is the political controversy over what will be taught in public school science classes. If it wasn't for this, most scientists would probably be content to ignore creationists and the ID movement. After the Scopes trial in Tennessee in 1925 there was very little evolution included in science textbooks until the 1950's (Scott 2004). At that time high school science texts began to include significant presentations of evolution. Since then, encouraged by the plurality of the population in the United States who want creation to be taught along with evolution, various creationist groups have been seeking ways to include at least some recognition of creationism in public school science classes. Various strategies have been used in the past – trying to make creationism look scientific, declaring that evolution is a religion, seeking equal time, and more recently simply using the political process to put creationists on local school boards to rewrite the educational standards (Pennock 1999; Scott 2004).

This is an ongoing, escalating political battle, and ID, rather than creationism, is seeking entrance into public schools. So far the courts have not allowed creationist concepts or ID into public education, but the battle continues and many scientists fear they will lose the contest.

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Those who oppose ID have made dramatic statements of the danger of ID or any version of creationism. It is claimed that if ID or any form of creation is included in science education it will shut down science, medicine, and modern technology. Pennock (1999, p. 294) says that "without the binding assumption of uninterruptible natural law there would be absolute chaos in the scientific worldview." There have also been many statements in the internet discussion group Paleonet, predicting, e.g, that creationists, who "do not believe in rational thought" are "the largest threat to science in the United States" and "would plunge the world into a new dark age." These dire predictions seem wildly unrealistic and fanatical. Most of modern science, outside of direct study of earth and biological history, would be unaffected even if there were some changes in beliefs about origins. There are many scientists who believe in a Creator who regularly publish excellent scientific papers in peer-reviewed journals, and there is no reason to think there would be any substantial change in science if more scientists believed in creation.

The biggest challenge in this public education debate is how to help students learn the truth, and learn how to think for themselves instead of being shielded from discussion of controversial issues.

We have discussed books and articles that at least attempt to answer the viewpoints of ID or creationists. Other scientists advocate a different approach – "We have to treat the ID movement as a joke. Laugh then off, wave away their arguments as nonsense and waffle. . . Treat them as irrelevant. We have to make it look to the general public like we don't see them as a threat (Paleonet)."

SCIENCE AND RELIGION

A number of books have proposed that the origin of all life forms by evolution is compatible with religion; that one can be a Christian and also believe that humans and the rest of the living world are the result of evolution. This is not a new concept, but the prominence of that position in recent years is illustrated by the number of books advocating some kind of accommodation or at least thoughtful understanding between religion and science, with MN-governed science being the final standard for truth about origins (e.g. Van Till et al. 1988; Barbour 1990, 1997, 2000; Murphy 1990, 2002; Peococke 1993; Polkinghorne 1994, 1996, 1998, 2000; Miller 1999; Ruse 2001, 2005;

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Williams 2001; Peters and Bennett 2002; Peters and Hewlett 2003; see also Brand 2004). Haught (2004) claims that many religionists have lost opportunities for theological growth because they don't follow the example of other religious thinkers in making evolution the backbone of their understanding of god and of the world.

But is it really true that 500 million years of evolution is compatible with biblical Christianity? This is a much bigger issue than we can deal with here, except to highlight a few basic points.

Miller (1999), in the book *Finding Darwin's God*, claims that such things as weaknesses in our backbones, optical errors in our eyes, plagues, and parasites demonstrate, if there was a designer, that the designer is incompetent. He claims that this is a logical contradiction for the advocates of design, but it actually shows that Miller does not understand how design advocates actually think. Haught (2004) expresses similar thoughts. He concludes that the waste, suffering and struggle are incompatible with a personal, benevolent creator God. These authors do not understand the concept of a good creation followed by sin and evil and mutational decay. Whether they would agree with the design concept is another issue entirely, but it is unfortunate that they did not become knowledgeable on the views of those they are criticizing, so that their criticisms would be meaningful.

We can propose any theological solutions we want to, unless we accept Scripture as an inspired source that gives us a reliable account of what God is like, and how He deals with the fallen human race. Then our interpretations must make sense of conditions on earth for humans and the whole biological realm, and the nature of God.

The sources listed typically do not take the Bible as an authoritative guide, but allow current scientific interpretations to set the stage, and then fit God into the picture. The result is often a vague concept of God that has little substance (e.g. Miller 1999), or a God who does not and cannot prevent evil, but uses the randomness of evolution to generate all life forms and then suffers with us in our distress by hanging on the cross (Polkinghorne 1994, p. 49; 2004). Some others have trouble accepting these theological views, typically because they have trouble reconciling a good God with the pain, disease, death, and suffering on earth through a half billion years of divinely guided evolution. This is a common objection to religion among naturalistic scientists. It also leads those

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who accept Scripture as an authoritative book, to reject theistic evolution and related concepts. Although the conclusions of ID and creationists don't demonstrate the existence of God, they open the door to that possibility. We can not, by human reasoning find God and determine what He is like. Scripture gives the added information to reveal the Designer to us.

The best answer to the dilemma of a good God who allows suffering seems to be the theme of the Great Controversy. In this view, God creates a biosphere that is very good. Then the enemy, Satan, who naively wishes to become as great as God, beguiles the first humans into unwittingly giving him access to their world, to influence them however he can. By the same token Satan deceptively gains their permission, without their realizing it, to use his power to modify and degrade the physical and biological features of their earthly environment, in his effort to discredit God and spoil His initially good creation. This is the source of the evil in our world. Evil is not a punishment for sin, but is the natural result of sin, in the same way that death from jumping off a cliff is not a punishment, but is the natural result of that action.

I suggest that these changes in the environment and in living things have lead to the randomness of mutations and subsequent natural selection that have produced the vicious, competitive side of nature. The initially coherent and effective genetic system, designed to sustain a healthy and harmonious network of life forms, and foster adaptations to changing conditions, now includes changes that introduce pain and suffering into the creation. God is still a good God, but allows the conflict to go on until it is clear to all that God's way is truly better than Satan's way.

At the end of Miller's book (1999), where he directly addresses what Darwin's god is, his answer seemed to have little substance to it, and I was left wondering why he thought Darwin's god was worthy of my interest. Miller repeatedly claims that his theory of origins is not a problem for belief in a good God, but nowhere does he discuss or admit the very real, specific, theological problems that his theory faces. For example, on p. 243 he talks about the genius of his god, but it could be argued that his god is cruel, and doesn't tell us the truth about origins.

CONCLUSION

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Shallit and Elsberry (2004) make an amazing statement – "Dembski thinks intelligence has a magical power that permits it to do something that would be impossible through natural causes alone." I respond that if intelligence confers no advantage, why do we invest energy in science and technology? Why haven't we just waited for natural causes to heat our houses, cure diseases, and provide the conveniences that enhance our lives? Of course Shallit and Elsberry are referring specifically to the origins process, but my response still stands. The inventive power of intelligence can accomplish unimaginably more than unaided natural causes, and I believe the existence of living beings is evidence of that inventive power. The authors I have cited have not provided evidence to contradict that conclusion, as long as we are willing to consider naturalistic theories of origin as hypotheses to be tested, rather than fiat truth.

The debate over origins gets more complicated all the time, and is not likely to end any time soon. ID proponents like Behe and Dembski have presented interesting challenges to naturalism, but their detractors suggest many detailed reasons why ID concepts like irreducible complexity or complex specified information are not problems for the evolution process. The ID side then presents answers to these arguments, but it doesn't seem that either side is able to definitively settle the argument. They are arguing about complex things, and hypotheses of presumed events from the past that can't be tested. It is very hard to find "silver bullet" arguments on these issues!

Ultimately it remains a philosophical argument. For those scientists who accept MN as part of the definition of science, no argument for ID or other creation concepts, no matter how accurate, will be satisfactory. For them, accepting the possibility of a supernatural explanation for any event or phenomenon means throwing in the towel and stopping the scientific search for answers in that topic.

And in some cases that is correct, because if life was created, there is nothing for science to study about life's origin. Or if several or many groups of organisms were separately created in the beginning, science will not be able to discover a complete phylogenetic tree for living things. But in the first example (origin of life) knowing that life began by creation could prevent much pointless research on abiogenesis (naturalistic origin of life) and redirect that scientific effort to some other, more productive area. In the second case (phylogeny), knowing that various groups of organisms began as separate

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creations with microevolution and speciation within each group would not need to prevent research. Attempting to discover the limits to evolutionary change and the boundaries of the created groups could perhaps be as challenging and fruitful a research area as attempting to determine the most likely phylogeny for all organisms.

On the other hand, many persons are more interested in seeking the truth about our origin and destiny, than in choosing ideas simply because they generate new scientific hypotheses. And for those who reject MN, or are willing to at least consider some form of creation, the most sophisticated biological arguments against creation or ID, will probably not be convincing, for a couple of reasons. First of all, most anti-creation arguments are based on the prior acceptance of MN. Second, most substantial anti-creation and anti-ID arguments are actually attempts to show that plausible theories for evolution and the origin of life, without a creator, can be proposed, rather than an even-handed evaluation of creation vs. naturalistic origins. And third, some of us actually believe that God knows more than we do about the history of life, geology, and geophysics, and has taken the trouble to communicate with us plainly in Genesis 1-11.

And those who accept MN as part of the definition of science will reject arguments for creation because that idea is ruled out, *by definition*, by MN.

It is probably not possible to scientifically refute the hypothesis that the first life forms were invented and put together by a designer. It also appears that science has not produced convincing evidence in support of the most critical issue for origin by naturalistic processes – the origin of biological information without intelligent input. Pennock (1999, p. 292) says that since an all-powerful god can do anything, "supernatural hypotheses remain immune from disconfirmation." That may be true, but for many scientists the concept of naturalism is also immune, by choice, from disconfirmation, and too much dependence on naturalism and deep time to solve any theoretical problem can lead to careless reasoning. A number of anti-creation or anti-ID arguments cited in this paper are evidence for this careless reasoning.

The cause of all the heated controversy, the thorny issue of what should be taught in public schools, is quite dependent on what definition is accepted for science, and at present MN is at the center of that definition.

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Some of us creationists wish primarily for one thing – that science be an open-minded search for truth, and not a game defined by any one philosophical position on intelligence or materialism. Individual scientists may prefer one or the other philosophy, but if scientists with different views can talk to each other, with respect rather than condescension, and even work together, we can make progress in our understanding of both scientific issues and religious perspectives.

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