

## Are we designs or occurrences? Should science and government prejudge the question?

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“I look with confidence to the future, to young and rising naturalists, who will be able to view both sides of the question with impartiality.”

Charles Darwin

The National Academy of Science (NAS) and the American Association for the Advancement of Science (AAAS) have developed science education standards as models for the country. They recognize that our understanding of natural phenomena is key to many fundamental personal, cultural, social and civic decisions. To that end they seek to develop a “scientifically literate society” that can explain natural phenomena and employ that understanding in all of those areas.<sup>1</sup> We are to develop habits of mind that will allow us all to move in the same direction.<sup>2</sup> We are to become a scientifically literate society where “scientific information and scientific ways of thinking” will influence “informed decision making” in practically all areas of one’s life.<sup>3</sup> Of course, these areas include religion, government, ethics and morality.

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<sup>1</sup> “The *National Science Education Standards* are designed to guide our nation toward a scientifically literate society. Founded in exemplary practice and research, the *Standards* describe a vision of ***the scientifically literate person*** and present criteria for science education that will allow that vision to become reality..... ***Americans are confronted increasingly with questions in their lives that require scientific information and scientific ways of thinking for informed decision making.*** “The Goals of the National Science Education Standards are “to educate students who are able to.....use ***appropriate scientific*** processes and ***principles in making personal decisions***” [National Science Education Standards, Chapter 1 – Introduction – Goals for School Science, <http://books.nap.edu/html/nses/html/index.html> (1995, National Academy of Sciences)]

“SCIENTIFIC LITERACY. Scientific literacy is the knowledge and understanding of scientific concepts and processes **required for personal decision making, participation in civic and cultural affairs**, and economic productivity. It also includes specific types of abilities. In the *National Science Education Standards* , the content standards define scientific literacy. Scientific literacy means that a person can ask, find, or determine answers to questions derived from curiosity about everyday experiences. ***It means that a person has the ability to describe, explain, and predict natural phenomena.*** [National Science Education Standards, Chapter 2 – Principles and Definitions, <http://books.nap.edu/html/nses/html/index.html> (1995, National Academy of Sciences)]

<sup>2</sup> See note 58 and accompanying text.

<sup>3</sup> See Notes 1 and 2. The idea is to develop habits of mind in the early years about “how the natural and designed worlds work,” so that this knowledge can be applied as an adult: “Scientific literacy has different degrees and forms; it expands and deepens over a lifetime, not just during the years in school. ***But the attitudes and values established toward science in the early years will shape a person's development of scientific literacy as an adult.*** Scientific literacy implies that a person can identify scientific issues underlying national and local decisions and ***express positions that are scientifically and technologically informed.*** [National Science Education Standards, Chapter 2 - Principles and Definitions, <http://books.nap.edu/html/nses/html/index.html> (1995, National Academy of Sciences)]

It is true that our understanding of natural phenomena is key to these decisions. But where does the “informed decision making” start? What is the foundational question that starts the decision tree? Both the NAS and the AAAS implicitly recognize the key issue as one of design.<sup>4</sup> Are we designs or occurrences? The answer to this question starts the cascade of mutually exclusive alternatives. If we decide we are designed and made – created – for a purpose, our decisions about religion, government and ethics will lead in one direction. However, if we believe we are merely occurrences, then we will be led in a completely different direction.

### How does one differentiate between a design and an occurrence?

A design is a pattern of events arranged *with intent* for a purpose.<sup>5</sup> Something that is “designed and made” is created. A creation is the end product of a design – an intention. Intention derives only from a mind. Minds process information, decide upon ends and then adapt means to achieve those predetermined ends. A design reflects a choice made by a mind to affect the future in a particular way. The preceding sentence reflects numerous choices made by a mind for a purpose. The sentence is a design and has been designed. A mind operates in three time perspectives - the past, present and future.

The opposite of a design is an occurrence. An occurrence is something that just *happens* without intention. One recalls the plea of the accused: “*I didn’t know the gun was loaded!*” Ergo, I did not intend his death. It was an occurrence for which I am not responsible. Today the sun is out, yesterday we had a hard rain and the river changed course. These are occurrences ultimately driven only by chemical and physical laws and chance. Natural occurrences result from a combination of random events that occur within pre-existing boundary conditions. Lacking a mind, natural occurrences have no concept of the future and do not occur for a purpose in the future.<sup>6</sup> A river does not chose today where it will go tomorrow.

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<sup>4</sup> The National Education Standards, published by the National Academy of Science divide all objects into two categories: “natural and designed.” Natural objects just occur, while designed objects have been made by humans for a purpose. [National Science Education Standards, Chapter 6 – Science Content Standards – Content Standards K-4 – Science and Technology., <http://books.nap.edu/html/nses/html/index.html> (1995, National Academy of Sciences)]. Thus, an appropriate scientific way of thinking starts with the ultimate question having already been answered. Natural phenomena, like humans, are not designed. They are occurrences. The distinction is recognized, and then decided before any critical analysis has begun. The AAAS Benchmarks follow the same paradigm as indicated in the discussion associated with Note 58. where the world is divided into the “natural and designed world.” This approach prejudices the question and is the subject of this article.

<sup>5</sup> “Designed” as an adjective means “done, performed, or made with *purpose and intent* often despite an appearance of being accidental, spontaneous or natural ..... *syn* see DELIBERATE.” *Webster’s Third New International Dictionary of the English Language, Unabridged*, (1993).

<sup>6</sup> This is explained by an evolutionary biologist in a college level book on that subject: “It cannot be sufficiently emphasized that before Darwin, both philosophers and people in general answered ‘Why?’ questions by citing purpose. *Only an intelligent mind, one with the capacity for forethought, can have purpose.* \*\*\*\*\* The entire tradition of philosophical explanation by the purposes of things, with its theological foundation, was made completely superfluous by Darwin’s theory of natural selection. The adaptations of organisms-long cited as the most conspicuous evidence of intelligent design in the universe-could now be explained by purely mechanistic causes. **For evolutionary biologists, the flower of a violet has a function, but not a purpose.** ... The profound, and deeply unsettling, implication of this purely mechanical, material explanation for the existence and characteristics of diverse organisms is that we need not invoke, nor can we find any evidence for, any design, goal, or purpose anywhere in the natural

Of course logic suggests that the laws, matter and energy themselves may have been ordered by a mind for a purpose, in which case all events may be intended in this sense. However, if a mind uses a random process like law and chance alone, without subsequent intervention to change an outcome for a future purpose, the results of that process will be an occurrence and not a design. For example, what would happen if I were to close my eyes now, raise my hands above this key board and then let my fingers fly uncontrollably to create a random sequence of characters? Here is the product of that exercise: [usg p[w [y]n qb4n[w;n tvq yq . Let's highlight this sequence, call it the "Random Sequence," and put it in the middle of the page where we can look at it:

[usg p[w [y]n qb4n[w;n tvq yq

Although my mind intended to produce a random sequence, it did not intend the Random Sequence. It did not intend the specific characters in the sequence or the positioning of those characters. I did not intend that "[ would first appear, nor did I next intend the "u" and then the "s." Although "us" has a defined meaning in the English language, I did not intend to convey that meaning when we started the exercise. Let's suppose the above random sequence was much longer and I were to use an algorithm to search the longer pattern to cull out sequences that are recognized words in the English language. Suppose, by chance the next recognizable word that appears after "us" is the sequence "mint." The algorithm would first cull out "us" and then "mint," in that sequence to form two sequences that look like the phrase: "us mint." We now have a sequence that in our common understanding is meaningful: "us mint." That is where coins are made. However, even though "us mint" may appear to be a design - the reflection of intention - the desire of a mind to convey that meaning, that would not actually be the case. The pattern reflected in the sequence would merely be an occurrence that gives an *illusion of design* - of having been intended by a mind for a purpose. When I started the exercise I did not intend for "us mint" to come up. The sequence "us mint" may appear to have an inherent purpose to those who do not know how the sequence was generated, but in truth it does not, even though the sequence resulted from the activity of a mind.

Some argue that an evolutionary process like the foregoing could have been used to front-load the universe with information so that it would all unfold in a way that would somehow accommodate our existence. This is a deistic notion of a designer who pushes a button and lets everything unfold without intervention. However, as Stephen J. Gould and Kenneth Miller point out, such a process will necessarily produce unintended, purposeless and unpredictable results because the process is inherently random and therefore unpredictable.<sup>7</sup> One cannot look at the forty different body plans that arose suddenly in the Cambrian Explosion and predict which would meet evolutionary success. If the clock was rewound and the very same button was

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world, except in human behavior.. Douglas J. Futuyma, *Evolutionary Biology, Third Edition*, p. 10 (Sinauer Associates, Inc. 1998)

<sup>7</sup> Kenneth R. Miller, *Finding Darwin's God: A Scientist's Search for Common Ground Between God and Evolution*, 211-12 (Harper Collins, 1999): "The observation that Gould finds so remarkable follows naturally from the cause-and-effect links that extend upward from quantum physics through chemistry and biochemistry into the undirected input of variation into living, genetic systems. Gould may not have recognized the physical roots of his observations, but they are nonetheless there for all to see. The natural history of evolution is unrepeatable because the [random] nature of matter made it unpredictable in the first place. Wind that tape back, and it will surely come out differently next time around, not just for the Burgess shale, but for every important event in the evolutionary history of life."

pushed again, a different outcome would arise and we would not be here. This is because natural “selection” is driven by both hypothesized random mutations and random environmental pressures. Hence, just as I did not intend “us mint” when I pushed the buttons to start a random process, a deistic push of a button in the first instance could not logically intend our occurrence, assuming its use of a mechanism driven only by law and chance.

Designs have a future perspective, occurrences do not. Designs reflect purpose, occurrences do not. Michael Ruse, a philosopher of science, discusses this issue in his new book *Darwin and Design: Does evolution have a purpose?*<sup>8</sup> The apparent design of nature is a problem for a materialistic view of science. In this view nothing is actually designed. Everything just occurs, only from law and chance. We are all occurrences. The difficulty is that this conclusion, which may work in physics and chemistry, is very counter intuitive in biology. Biological systems like eyes and ears have a future perspective, a function, and look designed. Hence many biologists use design terminology in describing them. According to Michael Ruse, that terminology is merely metaphorical because we “know” the systems are not designed. His problem is whether it is appropriate to use the metaphor or whether it should be discarded, because, in his view it may be misleading to call something designed, when it really isn’t.

If we conclude that something is a design and not just an occurrence, then logic leads us to two important conclusions: (a) the thing has an inherent purpose and (b) that at some time in the past a mind existed to create it for that purpose. If on the other hand, we deem the thing to be an occurrence, then it has no inherent purpose. Also, we cannot use it to infer the prior existence of a mind. Of course, if all natural phenomena are occurrences, then none have a purpose and there is nothing we can observe in the natural world that would support belief in the existence of a mind other than our own and those of animals and other entities that our minds control.

Those who believe that life is an occurrence are materialists. Those who believe that life reflects design are teleologists. A teleologist is one step removed from a theist. A materialist is one step removed from an atheist. If we are teleologists our views about religion, government and ethics will likely be very different from those of materialists. So, should science and government lead us to be materialists or teleologists, or should they simply fully inform us so that we may make our own “informed decision” about the matter?

### **What’s at Stake?**

Before addressing the question of how one may reach an “informed decision” about whether we are designs or occurrences, it would help to see what’s at stake. Why is the distinction between designs and occurrences so important to our views about religion, government, ethics and morality?

**Respecting intentions.** The idea of purpose is exceedingly important. Purpose reflects the intention of another mind. We intuitively respect the intentions of other minds. The Random Sequence reflects on its own no meaning and is therefore irrelevant. However, suppose I place a note next to my wife’s coffee cup that says “I love you!” Messages that reflect intention have a power much different than the force of gravity, the electromagnetic force, and the weak and strong nuclear forces. Indeed, even in science information is becoming recognized as far more

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<sup>8</sup> Michael Ruse, *Darwin and Design: Does evolution have a purpose?* p. 279 (Harvard, 2003)

important than the raw material of physical and chemical forces.<sup>9</sup>

Intention not only generates information that is useful, but generates an intuitive reluctance to violate it. If a father expects his daughter home by dark, she will worry about coming home late. Intentions are respected even in the absence of their author. Suppose a land developer plans to build a ten million dollar mansion on the top of a hill overlooking a picturesque lake and valley. When we arrive at the site we find an assemblage of stones that look very much like the arrangement at Stonehenge. If everyone agrees that the assemblage was a prehistoric memorial to a fallen hero - a design made for a purpose - then we begin to worry about violating that purpose by tearing it down to make way for a different purpose. However, if everyone, after an exhaustive search, concludes that the stones only appear prehistoric and are in truth natural “occurrences” that have no purpose, then we can bring in the dozers without qualm and shove the stones aside that are otherwise blocking our progress. When we decide something is designed, we dramatically change the entire decision making process.

In the case of Stonehenge we are contemplating a foreign designer who has no present relationship to us and who no longer exists. But what if *we* really are designed? We are then contemplating a designer that has a very direct relationship with us – our very existence is the product of that intention. Furthermore, what if the mind that designed and made us is still hanging around somewhere inside or outside our universe watching our every move to see whether or not we fulfil the purpose for which life was created? In any case, perhaps we should make a wise and “informed” decision about whether we are or are not designed. If we wrongly conclude that we are not designed, then we may very well fail to achieve the very purpose for which we were created. We may offend the reason for our very existence and effectively waste each day of our life that is not devoted to that purpose.

**Religion.** Whether we are designs or occurrences will obviously affect our views about religion. The idea that we have been *designed and made* – created – *for a purpose* is central to all traditional theistic religions, such as Christianity, Judaism, Islam and Hinduism. With knowledge that life has an inherent purpose, we visit places of worship of these religions to learn the nature of that purpose. Theistic beliefs all flow from an initial conclusion that He even exists and has acted with specific intent to create life for a purpose. If we are merely occurrences, then the scriptures of all of the theistic religions are fundamentally flawed. “[A]ny one who believes in Him must believe that He *exists* and that he rewards those who earnestly seek Him.”<sup>10</sup>

The Apostle Paul explains that man has no excuse for non-belief because we can look at

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<sup>9</sup> “Ask anybody what the physical world is made of, and you are likely to be told ‘matter and energy.’ Yet if we have learned anything from engineering, biology and physics, information is just as crucial an ingredient. The robot or the automobile factory is supplied with metal and plastic but can make nothing useful without copious instructions telling it which part to weld to what and so on. A ribosome in a cell in your body is supplied with amino acid building blocks and is powered by energy released by the conversion of ATP to ADP, but it can synthesize no proteins without the information brought to it from the DNA in the cell’s nucleus. ....Indeed, a current trend, initiated by John A. Wheeler of Princeton University, is to regard the physical world as made of information, with energy and matter as incidentals. This viewpoint invites a new look at venerable questions....” [Jacob D. Bekenstein, *Information in the Holographic Universe*, p. 59 (*Scientific American*, Vol 289, No. 2, Sept 2003)]

<sup>10</sup> Hebrews 11:6, New International Version, Disciples Study Bible, p. 1,584 (Holoman Bible Publishers, 1988)

what has been made, and from that observation infer not only the existence of God, but something about His very nature and character:

“...<sup>19</sup>since what may be known about God is plain to them, because God has made it plain to them. <sup>20</sup>For since the creation of the world God’s invisible qualities – his eternal power and divine nature – have been clearly seen, ***being understood from what has been made, so that men are without excuse.***”[Romans 1:19-20] [The commentary for this verse states: “Atheists have no excuse. ***Open minded attention to the nature of creation*** makes the existence of God evident.”]<sup>11</sup>

If Paul is wrong, and what appears to him as having been designed and made, is merely an occurrence, then man not only has an excuse, but he has grounds for becoming an intellectually fulfilled atheist. As explained by Richard Dawkins, “Darwin made it possible to be an intellectually fulfilled atheist.”<sup>12</sup>

Anecdotally, one is reminded of Darrell Lambert, a Boy Scout. He was recently asked to leave scouting because of his atheistic beliefs. Where did he get them? From “studying evolution in the ninth grade.”<sup>13</sup>

Kenneth Miller, an ardent materialist who claims to be a theist, discusses the logical consequences of a materialistic view that denies inherent purpose in life:

“As Wise makes clear, he believes that the real danger of evolutionary biology to Christianity is not at all what most scientists might suspect. It is not that evolution’s version of natural history threatens to unseat the central Biblical myths of unitary creation and the Flood. Rather, ***it is the chilling prospect that evolution might succeed in convincing humanity of the fundamental***

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<sup>11</sup> New International Version, Disciples Study Bible, Romans 1: 19-20, p. 1,417 (Holoman Bible Publishers, 1988). A recent article in *Discover* shows how anthropologists use the same evidence used by the Apostle Paul to infer the existence and nature of a Divine mind, to infer the prior existence and nature of human minds: “Scientists don’t yet know how that modern mind came into existence. The question is particularly hard to answer because they can’t get into the brain of *H. ergaster* or any of our ancestors. Instead they have to infer what those ancient minds were like ***by looking at the things they made***....Klein ...has offered a ***controversial theory***: The modern mind is the result of a rapid genetic change.” Carl Zimmer, *Great Mysteries of Human Evolution*, p. 40 (*Discover*, September 2003) The theory of rapid change is “controversial” because it allows little time for a gradual evolutionary process to operate. Sudden change is the kind of evidence that supports design theory because it tends to rule out chance as a likely explanation for the change.

<sup>12</sup> Richard Dawkins, *The Blind Watchmaker: Why The Evidence of Evolution Reveals A Universe Without Design*” p. 6, (W.W. Norton & Company, 1996). “But what Hume did was criticize the logic of using apparent design in nature as positive evidence for the existence of God. He did not offer any alternative explanation for apparent design, but left the question open. An atheist before Darwin could have said, following Hume: ‘I have no explanation for complex biological design. All I know is that God isn’t a good explanation, so we must wait and hope somebody comes up with a better one.’ ***I can’t help feeling that such a position, though logically sound, would have left one feeling pretty unsatisfied, and that although atheism might have been logically tenable before Darwin, Darwin made it possible to be an intellectually fulfilled atheist.***”

<sup>13</sup> *Eagle Scout Faces Official Challenge Over His Lack of Faith; The New York Times*, November 3, 2002, Sunday, Late Edition – Final, SECTION: Section 1; Page 20; Column 1; National Desk]

***purposelessness of life. Without purpose to the universe, there is no [inherent] meaning, there are no [inherent] absolutes, and there is no [inherent] reason for existence.***<sup>14</sup> (emphasis and commentary added)

If we are occurrences and therefore lack inherent purpose, our purpose can then only be defined by our minds and the minds of others. This logically leads to atheism, agnosticism, Scientism and Secular Humanism. Secular Humanism was described in the Alabama case of *Smith v. Board of School Commissioners of Mobile County* where the court held it to be a religion:

“Dr. Kirk defines Secular Humanism as “.....a ***creed*** or world view which holds that we have no reason to believe in a creator, that the world is self existing, that there is no transcendent power at work in the world, that ***we should not turn to traditional religion for wisdom; rather that we should develop a new ethics*** and a new method of moral order ***founded upon the teachings of modern naturalism and physical science.***”<sup>15</sup>

If we believe we are merely occurrences, then “we have no reason to believe in a creator” and therefore need “not turn to traditional religion for wisdom.” Human reason and modern naturalism/materialism are all that’s left to provide a basis for finding meaning for our lives.

Some like Kenneth Miller argue for an “inbetween” view.<sup>16</sup> He argues that Materialism does leave some room for a theist because a world affected by the ultimate uncertainty of quantum physics allows for free will and a purely subjective spiritual realm that can be detected by our inner being but not from an observation of nature. However, his argument fails to explain how a process that operates without a mind can produce purpose, a concept key to religion. He also fails to show any objective basis for belief if one agrees that we are just occurrences and that there is no objective evidence to the contrary. C.S. Lewis explains the difficulty with the third “inbetween” – view of popular culture that he call’s “Life Force” or “creative evolution” as follows:

“People who hold this view say that the small variations by which life on this planet ‘evolved’ from the lowest forms to Man were not due to chance but were due to the ‘striving’ or ‘purposiveness’ of a Life Force. When people say this we must ask them whether by life force they mean something with a mind or not. If

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<sup>14</sup> Kenneth R. Miller, *Finding Darwin’s God: A Scientist’s Search for Common Ground Between God and Evolution*, 187 (Harper Collins, 1999); Miller refers to Naturalism as “scientific materialism” at 27. Miller tries to explain why the materialism that undergirds evolutionary biology need not conflict with theism as discussed in the quote. He fails, because he never explains how any materialistic process driven only by law and chance can produce purpose and why a materialistic explanation does not destroy the evidentiary basis for theistic belief. If the observed appearance of design is merely an illusion because it can be explained fully without resort to a mind or any form of intelligence, then the inference that supports theistic belief crumbles. Although Miller recognizes both of these problems as the central issues, he never reconciles them. See the text related to Note 15.

<sup>15</sup> *Smith v. Board of School Commissioners of Mobile County*, 655 F. Supp, 939, (SD Ala 1987, holding that Secular Humanism is a religion) *rev’d* on other grounds 827 F2d 684 (11th Cir 1987).

<sup>16</sup> See note 14.

they do, then a ‘mind bringing life into existence and leading it to perfection’ is really a God, and their view is thus identical with the Religious. If they do not, then what is the sense of saying that something without a mind ‘strives’ or has ‘purposes.’ This seems to me fatal to their view.”<sup>17</sup>

The stark contrast between the teleologist and the materialist is simply made by Lewis in his observation that:

“The first big division of humanity is into the majority, who believe in some kind of God or gods, and the minority who do not. On this point, Christianity lines up with the majority — lines up with ancient Greeks, and Romans, modern savages, Stoics, Platonists, Hindus, Mohammendans, etc., *against the modern Western European materialist.*”<sup>18</sup> (emphasis added)

### ***Government and Individual Freedom.***

Our views about government are dramatically affected by whether we are designs or occurrences. As explained by the Declaration of Independence, our government was founded on the proposition that we were created by a “Creator” with certain “unalienable rights” of “life, liberty and the pursuit of happiness.” Concepts of life and liberty include the freedom to believe, to speak, to assemble, and to own property. If our rights are not alienable, then they cannot be taken by government. Instead, the role of government is to protect them. Our country was founded because of an alleged taking of these unalienable rights by government.

If we are occurrences, we have no unalienable rights. We are just happenings. We are like boulders in a field with no relation to a creator. This idea justified the formation of a communist regime in Russia where individual rights were subordinated to the rights of the state.

The issue is one that has not gone away. In *Fed Ed*<sup>19</sup> Allen Quist worries about National Education Standards that seem to promote our eventual acceptance of the Universal Declaration of Human Rights under the authority of the United Nations. The listing of human rights is impressive, however the next to last Article subordinates all of our existing “unalienable rights” “endowed by their Creator” to the “purposes and principles of the United Nations” and to vague notions of “just requirements of morality, public order and the general welfare in a democratic society.” The subordination logically makes sense if we are just occurrences that have not been made by any higher power with unalienable rights. However, it does not if our **unalienable** rights derive prior to the formation of government.

### ***Ethics, Bioethics and Morality.***

Although the starting point for any system of ethics and morality has been much debated, it is difficult to imagine anything more foundational than our view as to whether we are designs

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<sup>17</sup> C.S. Lewis, *Mere Christianity: What One Must Believe to be a Christian*, p. 35 (Macmillan, 1952).

<sup>18</sup> Id, at 43.

<sup>19</sup> Allen Quist, *Fed Ed: The New Federal Curriculum and How It’s Enforced*, Chapters 9, 15 and Appendix B (Maple River Education Coalition, 2002)



or occurrences. If we are just occurrences, then, as the secular humanist Dr. Kirk claims, we have no reason to subscribe to traditional religion as a basis for our social systems. The alternative necessarily becomes human reason and science. Evolution then becomes the foundation for ethics. According to Michael Ruse that is now happening: “Evolution is promoted by its practitioners as more than mere science. Evolution is promulgated as an ideology, a secular religion – a full-fledged alternative to Christianity, *with meaning and morality*.”<sup>20</sup> Ernst Mayr, “one of the towering figures in the history of evolutionary biology,” notes with pride that “Darwin provided a scientific foundation for ethics....To borrow Darwin’s phrase, there is grandeur in this view of life. New modes of thinking have been, and are being, evolved. Almost every component in modern man’s belief system is somehow affected by Darwinian principles.”<sup>21</sup> Similarly, Michael Shermer explains that “Scientism is courageously proffering naturalistic answers that supplant supernaturalistic ones and in the process is providing spiritual sustenance for those whose needs are not being met by these ancient cultural traditions.”<sup>22</sup> All of these ideas logically follow if we are only occurrences. If life was not intended, then it has no inherent meaning. This creates an ethical vacuum to be filled by whatever can be rationally justified by human minds.

If one views life as having been designed and made for a purpose, then we are logically led to inquire as to what that purpose may be. In *Mere Christianity*,<sup>23</sup> C.S. Lewis argues that when we ask this question we intuitively realize that our minds are guided by a conscience that actually distinguishes between right and wrong. He claims that our notion of what is ethical is actually a part of the design and that recognition of that fact is in itself the most powerful evidence that we are in fact designs - the creations of a mind superior to our own. If a right and wrong actually exists, then it must have an author. Law and chance alone are incapable of value judgements. A Darwinist may argue that nature’s one value is survival, a selfish concept. However, Lewis argues that the natural law of right and wrong is the opposite of selfishness. He argues that the one trait that all humans do not admire is selfishness. According to Lewis and the Apostle Paul,<sup>24</sup> we are hostage to the law of human nature. The law is that we know what is right and wrong, but nevertheless we are bound to violate it.

“These then are the two points I wanted to make. First that human beings, all over the earth, have this curious idea that they ought to behave in a certain way, and cannot really get rid of it. Secondly, that they do not in fact behave in that way. They know the Law of nature, they break it. These two facts are the

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<sup>20</sup> Michael Ruse, “*How Evolution Became a Religion*,” *National Post On Line*: <http://www.nationalpost.com>, (May 13, 2000)

<sup>21</sup> Ernst Mayr, “*Darwin’s Influence on Modern Thought*,” *Scientific American*, p. 82-83, (July 2000)

<sup>22</sup> Michael Shermer, “*The Shamans of Scientism*,” *Scientific American*, p.35 (June 2002)

<sup>23</sup> C.S. Lewis, *Mere Christianity: What One Must Believe to be a Christian*, p.31- 35 (Macmillan, 1952)

<sup>24</sup> “So I find this law at work: When I want to do good, evil is right there with me. For in my inner being I delight in God’s law, but I see another law at work in the members of my body, waging war against the law of my mind and making me a prisoner of the law of sin at work within my members. What a wretched man I am! Who will rescue me from this body of death? Thanks be to God – through Jesus Christ our Lord! So then, I myself in my mind am a slave to God’s law, but in the sinful nature a slave to the law of sin.” New International Version, Disciples Study Bible, Romans 7:21-25, p. 1,427 (Holoman Bible Publishers, 1988).

foundations of all clear thinking about ourselves and the universe we live in.”<sup>25</sup>

Ethics and morality seem to be concerned with enforcing a concept of natural law, a concept of what is right and what is wrong, whether it be theistic or materialistic on the community as a whole. A theistic approach is reflected in a traditional foundational principle of ethics called deontology. Deontology concerns the origin and nature of human “duty” or “obligation.” It was established in the 16th and 17th century and articulated by Immanuel Kant and John Rawls.<sup>26</sup> According to medical ethicist Mark Kuczewski, PhD, “the oldest version of this approach might be Golden Rule ethics, i.e. ‘Do unto others as you would have others do unto you.’”<sup>27</sup> Of course, if the community is dominated by a materialistic view, the rights and duties of its members will likely vary from a community dominated by a Christian, Orthodox Jewish, Muslim or Hindu perspective.

Whether we are designs or occurrences is particularly important for bioethics. It touches issues like abortion, human sexuality and genetic engineering. If we are merely occurrences, like a random assemblage of boulders strewn in the field, we can choose to push them aside and do whatever our human reason permits. However, if we are designs that have been made for a purpose, we logically must first consider whether what we are doing with or to life violates that purpose. If we are designs, a fetus has a purpose and unalienable rights, just like the mother. Are we violating their purpose if we destroy the fetus? Is the mother violating her purpose if she destroys the life within her? If the mother and fetus are just occurrences like the boulders in the field, then the fetus and mother have no inherent purpose or inherent rights.

If life is designed for a purpose and if we conclude that a part of that purpose is that its physical aspect be finite – say not much longer than 100 years, then is it appropriate to develop genetic engineering techniques that will provide it with 200 years of longevity or even an infinite longevity? The Christian religion holds that the Creator designed life to be finite once he decided to provide it with free will.<sup>28</sup> What about shortening life to eliminate all the “problems” associated with old age? What about cloning? If life is designed, then it appears that human life has been designed so that each individual is unique. Does cloning violate this principle of design? If so, should we engage in it? Should we tinker with the design of humanity at all? Is it logical to tinker with a design when we may not know whether the tinkering is consistent or inconsistent with the goals of the designer?

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<sup>25</sup> C.S. Lewis, *Mere Christianity: What One Must Believe to be a Christian*, p. 21 (Macmillan, 1952)

<sup>26</sup> Mark Kuczewski, PhD, *Lecture 2 Methods of Bioethics: The Four Principles Approach, Casuistry, Communitarianism*, at <http://www-hsc.usc.edu/~mbernste/tae.methods.kuczewski.html> (Neiswanger Institute for Bioethics & Health Policy, 2002)

<sup>27</sup> Id.

<sup>28</sup> Genesis 3:22 “And the Lord God said, ‘The man has now become like one of us, knowing good and evil. He must not be allowed to reach out his hand and take also from the tree of life and eat, and live forever. So the Lord god banished him from the Garden of Eden to work the ground from which he had been taken. After he drove the man out, he placed on the east side of the Garden of Eden cherubim and a flaming sword flashing back and forth to guard the way to the tree of life.’” Query, should we take a run at the cherubim and their flaming swords? [New International Version, Disciples Study Bible, p. 10 (Holoman Bible Publishers, 1988)]

If life is merely an occurrence, won't theists unnecessarily complicate and obfuscate the process of developing ethical conclusions. However, if life is designed, shouldn't those who specialize in discerning the purpose of that design be key members of the team that helps us make "informed decisions" regarding the ethics of our culture?

A more exhaustive discussion of the ethical and moral consequences of choosing between design and occurrence may be found in Benjamin Wiker's recent book *Moral Darwinism: How We Became Hedonists*.<sup>29</sup>

### **Distinguishing between designs and occurrences – The Roles of Intuition and Formal Analysis.**

On 9/11 I was in a barber shop watching the north tower of the World Trade Center burn from an airplane crash. We sat around the tube thinking it was an accident. Then we saw the second tower explode from a second crash. Intuitively, the accidental hypothesis was immediately discarded. This event was designed! How do our conscious and subconscious minds informally distinguish between designs and occurrences and how does science formally accomplish that task? Coroners employ procedures that will lead to an "informed decision" about whether a death is an occurrence or a design. Similarly, arson investigators, archeologists, anthropologists, cryptographers, and scientists looking for alien intelligence in radio and light waves use both intuition and formal analysis to differentiate between designs and occurrences.

Formal design detection is exhaustively explored in *The Design Inference* by William Dembski, Ph.D.<sup>30</sup> A synopsis of the method is covered in *Intelligent Design, the Scientific Alternative to Evolution* in the Autumn, 2003 issue of this Journal.<sup>31</sup> The following covers the subject very briefly to aid understanding of the scientific and legal issues discussed in the balance of this article.

#### ***Analyzing Patterns for Design.***

Formal design detection proceeds on the assumption that any event can be explained by one of three causes: design, chance or necessity. It uses a forensics approach that seeks to find evidence that will rule design in and rule out chance and necessity. Thus, a pattern of events that warrants an inference of design must appear designed and it cannot be explained by a combination of natural processes and chance occurrences. If any element is missing, a design inference remains a speculation. The opposite is true as well. An evolutionary claim of no design remains a speculation unless it can assemble evidence that rules out apparent design and also demonstrates that law and chance are adequate to explain the pattern.

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<sup>29</sup> Benjamin Wiker, *Moral Darwinism: How We Became Hedonists*, (InterVarsity Press, 2002)

<sup>30</sup> William A. Dembski, "*The Design Inference*," p.47 (Cambridge University Press, 1998). The concepts are more rigorously articulated in William A. Dembski, *No Free Lunch: Why Specified Complexity Cannot be Purchased without Intelligence* (Rowman & Littlefield, p. 5 (2002). The other important work is Michael Behe's *Darwin's Black Box: The Biochemical Challenge to Evolution* (The Free Press 1996) and *Reply to My Critics: A Response to Reviews of Darwin's Black Box: The Biochemical Challenge to Evolution*, 16 *Biology and Philosophy* 685-709 (2001).

<sup>31</sup> William S. Harris, Ph.D., and John H. Calvert, J.D., "*Intelligent Design, the Scientific Alternative to Evolution*," *The National Catholic Bioethics Quarterly*," p. 542-549 (Autumn, 2003).

**Step 1 -- finding an apparent specification.** According to William Dembski, patterns which appear designed contain an apparent “specification.” Specifications reflect meaning, structure, function or purpose recognizable by human minds that is independent of the significance of each of the elements of the pattern. The sequence “DESIGN” carries a meaning that is independent of the significance of the letter D by itself. Only when D is used along with ESIGN, in that sequence, does this meaning come into being. In contrast, the Random Sequence [usg p[w [y]n qb4n[w;n tvq yq contains no recognizable meaning and no future perspective and in fact has none. However, the sequences of genetic symbols in DNA have both. DNA stores information for future use and therefore satisfies the requirements of step 1. But what about an apparent sculpture of the face of a human that appears in a photo of a landscape on Mars? The pattern, which I will call the “Martian Face,” looks like a specification, like the ones found on Mount Rushmore. Is it a design or an occurrence? To answer that question we must go to steps 2 and 3.



**Step 2 – ruling out necessity.** The second step seeks to determine whether a seemingly meaningful pattern can be explained by the operation of physical and chemical laws - gravity, the electromagnetic force, etc. – known natural processes that do not involve the activity of a mind. If so, then design may not be inferred. The perfect cubic shape of a salt crystal may look designed, but its regularity can be explained by the chemical and physical properties of sodium and chlorine ions which combine to produce it. To test the design hypothesis for the Martian Face against this criteria, scientists have collected additional data consisting of more photos of the area in question. These show that the pattern actually consists of mountains and valleys which cast shadows at certain times that produce a pattern that looks like the face of a man. Since the pattern can be explained by natural processes, the design inference fails the test provided by step two of the analysis. However, when we do formal analysis of DNA we find that no law regulates the sequence of genetic symbols that provide the “blueprint” of life. This was even hypothesized by Watson and Crick, because if the genetic symbols were regulated by law, they would not have the capacity to specify the infinite variety of life.<sup>32</sup> Hence, if the sequence is going to be explained by a natural process, it is left to chance. This takes us to step three.

**Step 3 – ruling out chance.** A difficult issue in rigorous design detection involves ruling out chance as an explanation of a pattern. Chance occurrences can produce apparently designed effects, as demonstrated by the Martian Face. With infinite time and opportunity anything is theoretically possible. However if an event has occurred within limited time and opportunity, one may calculate the odds. If the odds reflect a highly improbable event, then it is reasonable to rule out chance as the operative explanatory cause. In thinking about chance it is important to understand that as the complexity of a system increases, its probability decreases *exponentially*. For example, the odds of selecting a single “D” is one over 55 when randomly drawing from a set of 55 symbols consisting of upper and lower case letters of the alphabet, a period, a comma and a space, assuming replacement of the symbol after each draw. However, the odds of spelling the six letter word “DESIGN” using this process is about one over 27 billion ( $1/2.7 \times 10^{10}$ ).

<sup>32</sup>

James Watson, (the co-discover of DNA), *The Double Helix: A Personal Account of the Discovery of THE STRUCTURE OF DNA*, (Touchstone 1968). He reports at page 52-4: “So in building models we would postulate that the sugar-phosphate backbone was very regular, and the *order of bases of necessity very irregular. If the base sequences were always the same, all DNA molecules would be identical and there would not exist the variability that must distinguish one gene from another.*”

William Dembski argues convincingly that there is a theoretical statistical limit to improbability. Anything that is less likely than  $1/1 \times 10^{150}$  is essentially statistically impossible within our existing universe. He arrives at this number by multiplying the total number of elemental particles estimated to exist in the entire universe ( $1 \times 10^{80}$ ) times the number of transitions that each elemental particle can make in a second ( $1 \times 10^{45}$ ) times the age of the universe, assuming the universe is a billion times older than 20 billion years old ( $1 \times 10^{25}$  seconds) =  $1 \times 10^{150}$ .<sup>33</sup> This sounds like a pretty big number, however it is not large at all when contemplating very complex systems. For example, if instead of randomly spelling the six-letter word “DESIGN,” we were to calculate the statistical probability of generating the preceding sentence, we would reach statistical impossibility when we get to the 87th symbol. In contrast with this 87 character sequence, the human genome consists of a linear sequence of 3,000,000,000 characters. Hubert Yockey, a highly regarded information theorist, has calculated the amount of information content necessary in the minimum genome for life to arise and the probability of that occurring by chance as something less probable than  $10^{-186,000}$ .<sup>34</sup> Thus, according to the above analysis, it is reasonable to infer design for the origin of that specified message-bearing sequence that is not dictated by law.

***The historical character of origins science drives formal analysis of origins to a logical or forensics approach rather than one guided by experiment.*** It is critical to understand that origins science, and particularly evolutionary biology, is historical rather than experimental. It seeks to explain the cause of singular past events, not how a biological system works. The compilation of history differs from laboratory science. In a laboratory science all the conditions and variables are controlled and we can use experiments to repeatedly confirm conclusions. In historical sciences the unobserved event to be explained occurred at a single moment in the distant past and most of the evidence is missing. Because of the time involved in evolutionary processes and the complexity of life itself, experiments cannot be used to confirm conclusions.<sup>35</sup> Therefore, historical sciences rely on intuition, logic and forensic techniques - the techniques used by detectives, paleontologists, and anthropologists to develop and test hypotheses.<sup>36</sup> This method involves the collection of evidence that both rules in a hypothesis in question and also rules out competing hypotheses. It is necessarily subjective, because it allows imagination and intuition to connect the dots - to link one piece of evidence to another where intervening pieces are absent. Because all historical sciences are subjective, one never reaches an absolute explanation, only a “best current explanation.” Accordingly, we can never scientifically say that we are designs or occurrences. We can only say that a particular pattern is presently best

<sup>33</sup> William Dembski, Ph.D., *No Free Lunch: Why Specified Complexity Cannot be Purchased without Intelligence*, p. 21-22 (Rowman & Littlefield 2002)

<sup>34</sup> Hubert Yockey, *Calculating Evolution*, Vol. 3 No. 1, p. 28 (*Cosmic Pursuit*, 2003)

<sup>35</sup> This was acknowledged by Dr. Ernst Mayr: “.....Darwin introduced historicity into science. Evolutionary biology, in contrast with physics and chemistry, is a historical science – the evolutionist attempts to explain events and processes that have already taken place. **Laws and experiments are inappropriate techniques for the explication of such events and processes.** Instead **one constructs a historical narrative**, consisting of a tentative reconstruction of the particular scenario that led to the events one is trying to explain.” (emphasis added) [Ernst Mayr, “*Darwin’s Influence on Modern Thought*,” p. 80, (July 2000, *Scientific American*)].

<sup>36</sup> Carol Cleland, *Historical Science, Experimental Science and the Scientific Method*, Vol 29 No. 11, 987-990 (*Geology*, November 2001); Kenneth Miller, *Finding Darwin’s God*, (Cliff Street Books, 1999), pp. 22-23.

explained as a design or as an occurrence. The Martian Face is now best explained as an occurrence, while the hypothesized first cell is now best explained as a design.

In summary, a design inference is reasonable if the pattern reflects an apparent specification – function, structure or purpose – and cannot be adequately explained by chance and necessity. Before we leave this point, it is key to realize that one need not know the specific purpose of a design to reasonably infer that it is designed. We can reasonably conclude that a death is a homicide without knowing the reason for it. Similarly, we can know the purpose of an eye, but not the purpose of life itself. The latter is a question for religion and not a question for science, as discussed in Note 60.

### ***The Role of Intuition in Design Detection.***

“The most brilliant decisions tend to come from the gut,” says Thomas Stewart, in an illuminating article: *Think with your Gut*.<sup>37</sup> While he finds that argument not new, he finds that “it is now being backed by a growing body of research from economics, neurology, cognitive psychology, and other fields. What the science suggests is that intuition – or instinct, or hunch, or ‘learning without awareness,’ or whatever you want to call it – ***is a real form of knowledge.***”<sup>38</sup> If we are to make “informed decisions” about natural phenomena, should knowledge derived from intuition be considered?

Gary Klein, Ph.D., finds that 90% of the decisions we make are based on intuition.<sup>39</sup> He and others convincingly argue that all decision making starts with intuition and is an inherent and necessary part of it. In certain situations, intuition is not only valuable in the decision making process, it is the most reliable form of knowledge. This is the case in rapidly changing complex or chaotic situations like those that soldiers and fire fighters confront on battlefields and in burning buildings. However, many have also found it to produce the best results in static but complex decisions where it is impossible to know or understand all of the facts or variables.<sup>40</sup>

Science is finding that intuition is “simply pattern recognition taking place at a subconscious level.”<sup>41</sup> This was demonstrated in an experiment conducted by Antonio Damasio, the head of neurology at the University of Iowa Carver College of Medicine.<sup>42</sup> Damasio

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<sup>37</sup> Thomas A. Stewart, “*Think with Your Gut*,” *Business 2.0*, p. 99 (November 2002)

<sup>38</sup> *Id.*

<sup>39</sup> Gary Klein, *Intuition at Work: Why developing your gut instincts will make you better at what you do*, front flap (Doubleday 2003)

<sup>40</sup> A toy manufacturer explains it this way: ““We use gut instinct a little bit like scientific principle, where we’ve got a hypothesis – a spark that comes from gut instinct – and we’ll try to validate it with, teachers, children and parents. If there’s a big difference between our research and our instinct, it sends up a red flag. ***Many times we find the instinct correct***, but that in the research the, the vision didn’t come through well enough. Other companies might walk away. When we’ve got a great feeling about a product we don’t walk away.”” Thomas A. Stewart, *Think with Your Gut*, p. 102 (Business 2.0, November 2002)

<sup>41</sup> *Id.*, at 101.

<sup>42</sup> Antonio Damasio, *The Feeling of What Happens: Body and Emotion in the Making of Consciousness*, p. 301 (Harcourt 1999).

provided decks of cards to subjects who were hooked up to sensors to measure skin conductance responses (“SCRs) like those measured by lie detectors. The decks were rigged to produce either an overall loss or gain against a wager. “By the time they’d turned about 10 cards, subjects began showing SCRs” – physical reactions – if they were turning from a losing deck. “But not until they had turned, on average, 50 cards could they verbalize their ‘hunch’ that two decks were riskier. It took 30 more cards before they could explain why their hunch was right.....The strategy [in complex situations] is to look for patterns at every level, ..... Or rather, the idea is to allow patterns to surface and trust your gut to recognize them. ..In the realm of complexity, decisions come from the *informed gut*.”<sup>43</sup>

According to Damasio, emotions “get decision making started, presenting the conscious, logical mind with a short list of possibilities. Without at least a little intuition, then, the decision process never leaves the gate.”<sup>44</sup>

What triggered our subconscious intuition that the destruction of the North Tower of the World Trade Center was designed when a few minutes later we saw the South Tower destroyed in the same way? Subconscious assembly of “the short list of possibilities” would first exclude required flight patterns into the buildings, thereby ruling out necessity. The subconscious would next calculate the statistical probability of two airliners randomly hitting the two buildings and strike chance from the list. Figuring the actual improbability would likely take a couple of super computers and a bevy of mathematicians a couple of months to produce a hard number. Our minds can roughly calculate the odds in seconds. What is left on the short list is intentional destruction for some evil or deranged purpose. Of course, subsequent formal investigation confirmed our intuition. It provided us with an “*informed gut*” that the event was designed.

The idea that life is designed starts with intuition, just as intuition triggers a design inference for 9/11. Even the most ardent evolutionary biologist, Richard Dawkins, admits the intuition. “Biology is the study of complicated things *that give the appearance of having been designed for a purpose*.”<sup>45</sup> Others struggle to suppress the intuition due to their allegiance to materialism.<sup>46</sup> The intuition is reflected in the lexicon of biology which relies heavily on design terminology to describe natural phenomena. “Messenger RNA,” “Transcription,” the genetic “code,” “translation,” etc. Even the phrase “*natural selection*” uses design to explain its concept of no design. A natural process, lacking a mind, can “select” nothing. Natural processes, by themselves can only *sort*. *Natural selection* is an oxymoron. A more accurate phrase would be *natural sorting*. Science Philosopher Michael Ruse explains that design terminology is not only used, but is necessary because the system looks designed:

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<sup>43</sup> Id and Thomas A. Stewart, “*Think with Your Gut*,” *Business 2.0*, p. 101-103 (November 2002).

<sup>44</sup> Ibid, Stewart at 102

<sup>45</sup> Richard Dawkins, *The Blind Watchmaker: Why The Evidence of Evolution Reveals A Universe Without Design*” p. 1, (W.W. Norton & Company, 1996).

<sup>46</sup> “Biologists must constantly keep in mind that what they see was not designed, but rather evolved.” Francis Crick, “What Mad Pursuit: A Personal View of Scientific Discovery,” [1988], Penguin Books: London, 1990, reprint, p.138). Crick is the co-discoverer of the structure of DNA, Nobel laureate 1962, Professor at the Salk Institute, USA.

“Both history and present Darwinian evolutionary practice have shown us that this kind of design-type thinking is involved in the adaptationist paradigm. We treat organisms – *the parts at least* -- as if they were manufactured, as if they were designed, and then we try to work out their functions. End-directed thinking – teleological thinking – is appropriate in biology because, and only because, *organisms seem as if they were manufactured*, as if they had been created by an intelligence and put to work.”<sup>47</sup>

My interest in design arose from an intuition 24 years ago when I read an article about the “genetic code” that is embedded in DNA. That pattern perfectly matches the pattern of the Morse Code, designed by Samuel Morse, that has been stored in my memory since my service with the U.S. Army.

Research on intuition indicates without surprise that its accuracy increases with experience and knowledge. Gene Myers, an experienced biochemist and a lead scientist on the human genome project was interviewed by a reporter for the *San Francisco Chronicle* following a press conference announcing the mapping of the human genome. During the interview he said: “*What really astounds me is the architecture of life,.. It's like it was designed.*” The surprised reporter asked him if he really meant that: “*Designed? Doesn't that imply a designer, an intelligence, something more than the fortuitous bumping together of chemicals in the primordial slime?*” This is a pretty heavy question. Indeed the very question that this entire article is focused on. Are we designs or occurrences? Myers, must have realized its significance, because the reporter noted that “Myers *thought* before he replied.” Here is Myers’ response:

“**There's a huge intelligence there. I don't see that as being unscientific.** Others may, but not me.”<sup>48</sup>

If intuition can beat formal analysis in complex situations where much of the evidence is missing, why should we abandon it and believe in chemical and Darwinian evolution? Evolution is a counter-intuitive idea based on formal analysis that reflects a huge extrapolation, much imagination and a very incomplete body of evidence. Why shouldn't we just go along with the intuition of science experts like Gene Meyers, the suppressed intuitions of ardent evolutionary biologists, the intuitions of 90% of the population, and our own intuition which arises, not only from observations available to everyone else, but also our own personal knowledge of joy, sorrow, beauty, pleasure, pain, suffering, awe, wonder, right, wrong and what it is to be human? Do we really need an inadequate formal analysis to reach a rational conclusion that we are designs and not occurrences?

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<sup>47</sup> Michael Ruse, *Darwin and Design: Does evolution have a purpose?*, p. 268 (Harvard, 2003). Note only the parts are treated as designed. The organism as a whole is not. This seems to be the ultimate contradiction. What logical reason exists for saying that a piston is designed, but not the motor?

<sup>48</sup> Tom Abate, “*Human Genome Map Has Scientists Talking About the Divine. Surprisingly Low Number of Genes Raises Big Questions.*” [San Francisco Chronicle (February 19, 2001)]. The quote reflects an interview of Dr. Gene Myers, a lead scientist on the human genome project after his team announced the mapping of the human genome.



## Using Scientific Analysis to Test for Design

A distant observation of the Martian Face gives rise to an intuition that it may be designed. Similarly, many features of natural phenomena trigger intuitions of design. Formal analysis and testing tends to rebut the intuition for the Martian Face. So how well does our intuition about natural phenomena stand up under formal analysis?

Without going into detail, I believe it can be safely said that formal analysis of many apparently designed natural phenomena tend to confirm rather than to rebut the inference of design. Some of that analysis is very briefly summarized in *Intelligent Design, The Scientific Alternative to Evolution*.<sup>49</sup> According to William Harris, Ph.D., a research biochemist, the strength of the design inference increases in proportion to our increase in knowledge about the genome. This is reflected in Gene Myers' assessment of the "architecture" of life that is unfolding as the code is cracked.

The results of analysis that tend to confirm design include the following:

- \* Lack of natural explanation for the laws which appear to be designed to order certain aspects of the Universe.
- \* Lack of an adequate natural explanation for the "fine tuning" of a universe that is necessary for our existence.
- \* Lack of a natural explanation for the semantic character of biological information.
- \* Lack of natural explanation for the origin of the genetic code, the origin of the first cell and the origin of the lengthy set of genetic instructions necessary to sustain life in the most primitive cell. Chemical analysis shows that the sequence of message bearing symbols in DNA is not dictated by law and statistical calculations indicate that chance formation is not a scientifically reasonable hypothesis. If the weight of the evidence favors design for the origin of life itself, then Occam's razor would seem to cut off any Darwinian hypothesis as an explanation for all of the remainder of the diversity of life.
- \* The fossil record reflects long periods of stasis in biological complexity punctuated by sudden bursts of increased complexity, a pattern more consistent with technological development by design than the gradual increase in complexity postulated by Darwinian theory.
- \* Lack of an adequate natural explanation for many biological systems that appear to be "irreducibly complex."
- \* The lack of an adequate evolutionary simulation.
- \* The fact that much of the evidence that supports evolutionary theory is also consistent with the competing design hypothesis and therefore proves neither.

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<sup>49</sup> See Note 32, pp. 547-557.

In the case of the Martian Face, we have used further analysis to test the inference of design and have found natural explanations that show that it is not a face at all, but merely an illusion of design. However, in the case of the messages that we find in DNA, we have looked behind the messages and are not finding natural explanations, but rather deeper layers of design. Rigorous scientific analysis seems to be leading us toward confirmation of design rather than away from it.

### **The use of Methodological Naturalism in origins science prejudices the question, and effectively ordains that life is an occurrence and not a design.**

The pursuit of an informed, scientifically literate society may be a valid goal. However, a science policy that prejudices the most important characteristic of natural phenomena is inconsistent with that goal. That prejudgement occurs when methodological naturalism is applied to questions of origins.

In practice, methodological naturalism is synonymous with philosophical naturalism and materialism. Philosophical naturalism is “the *doctrine* that cause-and-effect laws (as of physics and chemistry) are adequate to account for all phenomena and that teleological<sup>50</sup> [design] conceptions of nature are invalid.”<sup>51</sup> Materialism also rejects design by allowing only material causes to explain natural phenomena.<sup>52</sup> Although it has been argued to the contrary, methodological naturalism and philosophical naturalism are synonymous, because a “method” that does not allow its fundamental assumption of no-design to be contradicted is a doctrine. The non-contradictory character of methodological naturalism is seldom disclosed<sup>53</sup> but commonly acknowledged.<sup>54</sup> Its nature as a doctrine is evident in the statement of John Rennie, the Chief

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<sup>50</sup> Teleology is “the study of the evidences of design or purpose in nature,” [Random House Webster’s Unabridged Dictionary (1999)].

<sup>51</sup> *Webster’s Third New International Dictionary of the English Language, Unabridged*, (1993)

<sup>52</sup> “Materialism...1.a: a doctrine, theory or principle according to which physical matter is the only reality and the reality through which all being and processes and phenomena can be explained.” (*Webster’s*) According to Richard Lewontin “[W]e have a prior commitment, a commitment to materialism. It is not that the methods and institutions of science somehow compel us to accept a material explanation of the phenomenal world, but, on the contrary, that **we are forced by our a priori adherence to material causes** to create an apparatus of investigation and a set of concepts that produce material explanations, no matter how counterintuitive, no matter how mystifying to the uninitiated. **Moreover, that materialism is absolute, for we cannot allow a Divine Foot in the door.**” (emphasis added) [Richard Lewontin, *Billions and Billions of Demons*, (*The New York Review*, January 9, 1997, p. 31)]

<sup>53</sup> See note 75. Robert Wright, *Three Scientists and Their Gods*, 70-71 (1988): “He [a computer scientist] is generally insensitive to the *unwritten rules* of scientific conduct, one of which is to scrupulously avoid even the faintest teleological overtones.” The AAAS resolution implements the “unwritten” rule without mentioning it. See the memorandum referenced in Note 57. Biology textbooks never mention or discuss the “Rule” even though it is used. For example, a popular 10th Grade Biology Textbook, *Biology, The Dynamics of Life*, (Glenco-McGraw Hill, 2000) does not discuss the naturalistic assumption anywhere in the over 1100 pages of text and the detailed glossary and index. In particular, the introductory chapter regarding the scientific method never mentions this exception to the method and the significant impact it has on explanations regarding the nature and origin of natural phenomena.

<sup>54</sup> **Richard Lewontin:** See note 52. **Paul Davies:** “Science *takes as its starting point the assumption that life* wasn’t made by a god or a supernatural being: it *happened unaided and spontaneously, as a natural process.*” [Davies, *The Fifth Miracle*, 28, (1999)]. Mano Singham: “*Members of [the “science elite”] have*

Editor of Scientific American, that “A central *tenet* of modern science is methodological naturalism.”<sup>55</sup> Any theoretical distinction is lost in practice where overt efforts are taken to officially suppress any contradiction of the doctrine.<sup>56</sup> The most recent evidence of suppression is found in a resolution adopted by the American Association for the Advancement of Science which urges a ban on any discussion of intelligent design in public schools.<sup>57</sup>

An implicit use of methodological naturalism and its prejudgement of the issue is reflected in National Science Education Benchmarks authored by the AAAS. Rather than leading students to examine the issue critically, they take for granted that the natural world is an occurrence and not a design. Its discussion of science literacy reflects this assumption:

“**Science literacy requires** understandings and habits of mind that enable citizens to grasp what those enterprises are up to, to make some sense of how the **natural and designed worlds** work, to think critically and independently, to recognize and weigh alternative explanations of events and design trade-offs, and to deal sensibly with problems that involve evidence, numbers, patterns, logical arguments, and uncertainties.”<sup>58</sup>

This discussion of science literacy uses a dichotomy to explain that the natural world lacks the attribute of having been designed for a purpose. The world is divided into two classes,

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*a fundamental naturalistic belief in the idea that each and every physical phenomenon must have a scientific explanation, with no arbitrariness allowed.* [Mano Singham, *The Science and Religion Wars*, 426, 428 (Phi Delta Kappan, February 2000) (emphasis added)] and “*if you are a scientist you must necessarily be a materialist and thus must reject any role for ID.*” [Mano Singham, *Are Scientists Materialists?* p. 2, (Unpublished essay, 12/4/01)]; Kenneth Miller: “It’s true that scientific materialism makes a considerable leap of faith. At its core is the belief that natural phenomena can be explained by material causes.” [Kenneth R. Miller, *Finding Darwin’s God: A Scientists Search for Common Ground Between God and Evolution*, 27 (Harper Collins, 1999)]. **Robert Shapiro:** “Similarly, **the existence of bacteria and other living beings**, all of which are much more complex than a watch, *implies the existence of a creator*, as only a higher being could design creatures so fit for their function. We will not take this escape route in our book, for **we are committed** to seeking an answer within the realm of science..... **We must look for another solution** if we wish to remain within science.” [Robert Shapiro, *Origins: A Skeptics Guide to the Origin of Life*, at 119 (1986)].

<sup>55</sup> John Rennie, Editor in Chief of Scientific American, *15 Answers to Creationist Nonsense*, p. 84 (Scientific American, July 2002). The use of the word “modern” in the phrase “modern science” reflects the implicit agreement that traditional science has not used this tenet. Furthermore there are many who presently practice that profession who do not agree with the tenet. The Supreme Court in its definition of scientific knowledge does not recognize this tenet. *Webster’s* does not recognize this tenet. The tenet was recently rejected by the Ohio State Board of education.

<sup>56</sup> William S. Harris and John H. Calvert, “*Intelligent Design: The Scientific Alternative to Evolution*,” *National Catholic Bioethics Quarterly* 3.3 (Autumn 2003) 537-538.

<sup>57</sup> See *Memorandum: Response to the Resolution of the American Association for the Advancement of Science that seeks to censor intelligent design, dated December 19, 2002* <http://www.intelligentdesignnetwork.org/ResponseToAAAS.htm> and the attached AAAS resolution

<sup>58</sup> Benchmarks for Science Literacy, – About Benchmarks, American Association for the Advancement of Science, <http://www.project2061.org/tools/benchol/bolframe.htm> (1993, New York: Oxford University Press).

the natural world and the designed world. The designed world is the domain of human technology and has been designed and made for a purpose. The natural world, on the other hand lacks the attribute of design. According to the NAS, the distinction between “natural objects and human-made objects” is that natural objects just “**occur**” while human made objects have been “**designed and made**” for a purpose. “Objects can be categorized into two groups, **natural** and **designed.**”<sup>59</sup> Thus, it is clear that the NAS and AAAS have prejudged the issue. Life is an occurrence, not a design. Under this formula, “informed decision making” must start with the ultimate question having been answered in advance.<sup>60</sup>

To effectively exclude design theory, one must also censor criticisms of evolutionary theory and its fundamental claim of no-design. Teachers who seek to teach evolution “honestly” are reassigned.<sup>61</sup> A bevy of censors recently turned out in force to oppose a statement placed in biology textbooks that would urge students to understand that evolution is a “theory” that should be “approached with an open mind, studied carefully, and critically considered.”<sup>62</sup>

This is not a case where we are excluding a falsified hypothesis that the earth is flat or a religious hypothesis that a literal interpretation of Genesis is true. In this case an inference of design that arises from both intuition and analysis of the data per the scientific method is *per se* disallowed without any objective consideration of the evidence because it conflicts with a philosophical notion that looks very much like religion itself.

The use of methodological naturalism in origins science is scientifically problematic for a number of reasons. It converts origins science into a dogmatic religious belief system rather than a theoretical enterprise where all of its statements are open to contradiction. As discussed in note 9 and elsewhere, its materialistic hypothesis that all of nature can be reduced to physical and material causes flies in the face of many non-physical aspects of the natural world, including minds and biological information and information processing systems which have a semantic

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<sup>59</sup> National Science Education Standards, Chapter 6 – Science Content Standards – Content Standards K-4 – Science and Technology,, <http://books.nap.edu/html/nses/html/index.html> (1995, National Academy of Sciences).

<sup>60</sup> According to the NAS “[w]hether there is a purpose to the universe or a purpose for human existence are not questions for science.” [*Teaching About Evolution and the Nature of Science*, p. 58 (The National Academy Press 1998)]. This statement is not true because by arguing that life is just an occurrence and not a design the NAS necessarily argues that life has no purpose. The statement would be both true and scientifically legitimate if it said: “The purpose of the universe and human existence, if any, is not a question for science.” This allows a legitimate scientific investigation of whether certain natural phenomena are designs or occurrences without addressing the question of the purpose of life itself. The reason science cannot address that question is because of an inherent lack of data. The data reflects the purpose of an eye, but not the purpose of life itself. That is the ultimate mystery that belongs to the realms of religion and philosophy.

<sup>61</sup> See Note 76.

<sup>62</sup> On March 28, 2002, the Cobb County, Georgia, Board of Education unanimously adopted a policy requiring the placement of the following sticker in textbooks that discuss the theory of evolution: “This textbook contains material on evolution. Evolution is a theory, not a fact, regarding the origin of living things. This material should be approached with an open mind, studied carefully, and critically considered.” Following a fire storm of opposition by science organizations, the ACLU filed a suit to enjoin the use of the sticker.

characteristic. It violates the scientific method by philosophically disallowing the very hypothesis that evolutionary biology seeks to rebut. This effectively exempts the no-design claim of evolution from any effective scientific test. Since testing of evolution cannot be performed experimentally, the only way to test its claim of no-design is with a forensics approach that requires one to find evidence that both rules out design and rules in natural sorting. Protecting evolution from the competition exempts it from a test that is necessary for it to be a legitimate scientific theory, rather than an untested speculation.

Evolution has become an answer ordained by the “central tenet of modern science.” When the “central tenet” banishes design from the realm of science, it also places it in a limbo where there are no qualified investigators to analyze and test its claims. It takes physicists, chemists, geologists, mathematicians, information theorists, biochemists, biologists and others to formally analyze and test an inference of design. Theologians and philosophers do not have the experience or training necessary for that job. Excluding scientists from the investigation effectively assigns the evidence of design to an intellectual black hole. Under this paradigm, the answer that is ordained – that we are occurrences and not designs – wholly lacks credibility. It is nothing more than a counter intuitive dogma. Instead of swapping lawyer jokes at parties we will shift to jokes about scientists who can’t be believed. According to a quote attributed to Thomas Huxley, “Science commits suicide when it adopts a creed.” In origins science, the central tenet is nothing more than a creed.

***Justifications for prejudging the question are scientifically inadequate.*** The use of methodological naturalism to censor design is supported by two hollow arguments. Design is religion and, in any event, not science.

The history of the debate reflects the fact that both design and no-design are valid scientific concepts. The modern theory of evolution arose as a response to the then prevailing scientific view that natural phenomena are the product of design. As detailed in Richard Dawkins internationally recognized tome, *The Blind Watchmaker: Why the Evidence of Evolution Reveals a Universe Without Design*, Darwinian theory was developed as a counter argument to the observed fact that living systems appear to be designed. Before Darwin “there was no alternative explanation for apparent design.”<sup>63</sup> Thus, Darwinian theory is essentially a scientific rebuttal of design theory. As Dawkins points out so explicitly, it is a theory that seeks to show that the apparent design in nature is actually just an illusion.<sup>64</sup>

Since Darwinian evolution seeks to promote “no-design” as a scientific concept, and since all scientific concepts are tentative and refutable, then the disagreement with the hypothesis of no design is scientific. It simply reflects the alternative. In other words, if it is scientific to argue against design, it necessarily is scientific to disagree and argue for it.

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<sup>63</sup> Richard Dawkins, *The Blind Watchmaker: Why The Evidence of Evolution Reveals A Universe Without Design*” p. 6, (W.W. Norton & Company, 1996).]

<sup>64</sup> “Natural Selection is the blind watchmaker, blind because it does not see ahead, does not plan consequences, ***has no purpose in view***. Yet the living results of natural selection ***overwhelmingly impress us with the appearance of design*** as if by a master watchmaker, impress us with the ***illusion of design*** and planning. The purpose of this book is to resolve this paradox to the satisfaction of the reader, and the purpose of this chapter is further to impress the reader with the power of the ***illusion of design***.” Richard Dawkins, *The Blind Watchmaker: Why The Evidence of Evolution Reveals A Universe Without Design*” p. 21, (W.W. Norton & Company, 1996).

Design theory also satisfies the Supreme Court’s definition of “scientific knowledge.” To qualify as scientific knowledge “an inference or assertion must have been derived by the scientific method.”<sup>65</sup> When the scientific method is used to respond to the question – *What is the origin of life and its diversity?* – the design inference and its related hypothesis veritably leap from the data. This is because the data reflects awesomely complex and improbable information processing systems, pregnant with meaning and messages, all of which have a forward-looking or goal directed perspective. The only things remotely similar to biological information processing systems in our common experience are information processing systems designed by human intellect. The inference does not pop up from some religious text. Biological systems operate via clocks that are much more sophisticated than the hypothetical mechanical clock found in the heath by William Paley.<sup>66</sup> Furthermore, significant progress that warrants continued investigation is being made in the testing and confirmation of the hypothesis through biochemistry, statistics and information theory.

Because design, at least as a counter argument to the hypothesis of no design, is science, then it necessarily is not “religion.” Unlike *creation science*,<sup>67</sup> it does not derive its authority from a religious text, but rather as an inference from the data per the scientific method. But, perhaps more importantly, the argument for design is science and not religion because it seeks acceptance as a legitimate hypothesis and not as a belief. Unlike methodological naturalism, the design hypothesis is not a statement that requires acceptance or belief. It does not require us to take for granted its postulate. The fundamental requirement of any “religion” for Establishment Clause purposes is that it be a belief system that provides an answer to “ultimate questions having to do with deep and imponderable matters.”<sup>68</sup> A religious postulate can’t be open to criticism, while a scientific one must be. Although design theory and evolution, as theories or hypotheses, address issues important to ultimate questions, they do not, *as theories*, seek to require acceptance or impose their explanations as doctrines, facts or beliefs. The Supreme

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<sup>65</sup> The Supreme Court has defined “scientific knowledge” as knowledge derived per the scientific method. *Daubert v. Merrill Dow Corporation Pharmaceuticals, Inc.*, 509 U.S. 579, 590 (1993). The Court points out that the focus should be “on principles and methodology, not on the conclusions that they generate.” Contrary to this focus, Methodological Naturalism dictates the conclusion before the process starts. It interferes with hypothesis generation and hypothesis testing that is required by the method.

<sup>66</sup> Karen Wright, *Times of our Lives: Whether they’re counting minutes, months or years, biological clocks help to keep our brains and bodies running on schedule*, (*Scientific American*, September 2002), p. 58-65. William Paley, in *Natural Theology*, American Tract Society, New York, pp 9-10, argued that if we can infer design when observing a human-made clock, we should be able to do the same when we observe the working of an eye. He did not realize at the time that a number of biological events are driven by molecular clocks. Not only do they keep track of time and trigger alarms, they also direct responses to the alarms.

<sup>67</sup> “Creation Science” is science which seeks to validate a literal interpretation of the Genesis, as articulated in statutes considered in *McLean v. Arkansas Board of Education*, 529 F.Supp 1255 (E.D. Ark 1982) and *Edwards v. Aguillard*, 482 U.S. 578, 107 S.Ct. 2573 (1987). That hypothesis arises from a religious text and not from an analysis of observed data per the scientific method.

<sup>68</sup> *Alvarado v. City of San Jose*, 94 F3d 1223, 1229 (9th Cir. 1996), where the court formulated the following definition of religion: “First, a religion addresses fundamental and ultimate questions having to do with deep and imponderable matters. Second, a religion is comprehensive in nature; **it consists of a belief-system as opposed to an isolated teaching**. Third, a religion often can be recognized by the presence of certain formal and external signs.”

Court has held that the implications of materialism alone do not make a religion even though those implications “coincide or harmonize with the tenets of some or all religions.”<sup>69</sup> Furthermore, a design inference does not seek to advance a particular religious belief system and does not have a “clergy,” a set of ethics and morals, religious texts or any of the other trappings of recognized religions. Design theory is consistent with many religions that conflict in material ways. The evidence of design is important not only to Christianity,<sup>70</sup> but also to Islam,<sup>70</sup> Judaism and Hinduism. The argument for design is science and not religion<sup>71</sup> for the same reasons that the evolutionary argument against it is science and not religion.

Perhaps in recognition of these theoretical difficulties, the exclusion of design from science shifts to an arsenal of seemingly half-hearted pragmatic arguments.

The central pragmatic argument against design is that its exclusion is necessary to keep religion out of science - to keep the “supernatural” at bay. This is reflected in Richard Lewontin’s admission that “it is not that the methods and institutions of science somehow compel us to accept a material explanation of the phenomenal world, ...that materialism is absolute for we cannot allow a Divine Foot in the door.”<sup>72</sup> One problem with this argument is that the evidence of design does not entail a supernatural cause. It only entails an intelligent cause, which may or may not be supernatural. Nature is filled with intelligent agents, including birds that build nests and beavers that build dams. SETI scientists are searching radio and light waves for intelligent causes. Should we call off their search because the intelligence they discover might be supernatural? It is not the job of science to censor or suppress evidence because of its religious implications or possibilities. If that were the case, we would censor and suppress Darwin’s theory of no-design. But more important, an effort to exclude the supernatural to avoid religion actually embraces religion - the religions that comprise non-theistic belief systems such as secular humanism, atheism, agnosticism and scientism. Thus, the doctrine effectively requires science to take sides in favor of one brand of religion over another. Hence, the effort to exclude religion from science by excluding the supernatural, actually brings religion into science.

The pragmatic argument is also made that a scientist cannot go into the laboratory and postulate supernatural interventions as explanations for observed phenomena. This argument improperly shifts the debate from the historical question being asked – *What is the origin of life*

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<sup>69</sup> *Edwards v. Aguillard*, 482 U.S. 578, 605 (1987); *Alvarado v. City of San Jose*, 94 F3d 1223, 1232 and *Fleischfresser v. Directors of School District 200*, 15 F3rd 680, 689 (7th Cir 1994).

<sup>70</sup> The web site of a very active and sophisticated Islamic Intelligent Design group may be found at <http://www.harunyahya.com>.

<sup>71</sup> For a number of good discussions about this issue see: Francis J. Beckwith, *Public Education, Religious Establishment and the Challenge of Intelligent Design*, 17 Notre Dame Journal of Law, Ethics and Public Policy 2, 461 (2003); David K. DeWolf, Stephen C. Meyer and Mark E. DeForrest, “*Teaching the Origins Controversy: Science or Religion or Speech*,” 2000 Utah Law Review 39 (February 9, 2001); Francis J. Beckwith, *Law, Darwinism and Public Education: The Establishment Clause and the Challenge of Intelligent Design*, p.94, and 92-106 (Rowman & Littlefield 2003); and John Calvert, J.D., and William S. Harris, Ph.D., *Teaching Origins Science in Public Schools: Memorandum and Opinion*, § 4.33 (Intelligent Design network 2001).

<sup>72</sup> Richard Lewontin, “*Billions and billions of demons*,” *The New York Review*, p. 31 (January 9, 1997)

*and its diversity?* – to other questions that are not being asked. We are not asking how a biological information processing system works, rather we are asking what caused it to come into existence millions or billions of years ago? Those are entirely different questions that require different scientific techniques and methods of testing. In a lab science one tests explanations with an experiment. Through observation and careful control of variables one can with assurance identify the cause and effect of presently observed events. That is not the case with singular unobserved events that occurred millions of years ago. In historical origins science, a forensics approach is used. If methodological naturalism is applied to the question presented in origins science, then the question need not be asked at all. Methodological naturalism prejudices and decrees the answer and does not generate one per the scientific method.

The seemingly lame justifications for scientific censorship of design lead one to wonder if the censorship is intended not to promote good science, but some other agenda. Without mentioning the naturalistic underpinning of its resolution, the AAAS claims that design should be censored because it lacks evidence. The claim of no evidence derives not from an unbiased evidentiary fact finding, but rather from the “central tenet.” Given the central tenet that life is not designed, then there can be no evidence of design. Hence, the substantial body of evidence that does exist is ignored. The AAAS also argues that an inference of design cannot be tested. Patterns in DNA can be tested for design in the same ways that SETI researchers test patterns in radio and light waves for design and that scientists have tested the Martian Face for design. In fact, design theory is actually necessary to adequately test evolutionary theory. Otherwise its claim of “no-design” will become a dogma rather than a theory. Others claim design theory has no predictive power or scientific utility. However, design predictions are implicitly used as biochemists seek to reverse engineer biological nano systems and machines.<sup>73</sup>

The solution to the origins debate is objectivity and intellectual diversity, not scientific prejudice. This requires strict adherence to a scientific method focused on allowing the weight of all relevant evidence lead to a “best current explanation,” rather than a particular philosophical or religious presupposition like methodological naturalism. A comprehensive approach would fully inform the patrons of science as to the state of our true scientific knowledge about the issue. Full information would then enable the “informed decisions” sought by the NAS and at the same time allow public schools to conduct the discussion in a religiously neutral manner. Interestingly, this is precisely the formula that is most consistent with Supreme Court decisions on the issue.

### **Should Government gerrymander the discussion of origins to exclude the scientific disagreement with Darwin?**

I sometimes wonder if there is any job less thankful and more stressful than that of being a member of a public school board. I have appeared before many<sup>74</sup> and they always seem to be

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<sup>73</sup> See note 47 and text that explains the necessity of design theory. William Harvey used it to hypothesize blood circulation in the human body based on the structure of veins and arteries. “The scientists who discovered the nature of the genetic code had coding analogy constantly in mind, as the vocabulary they used to describe their discoveries makes clear....If, instead, the problem had been treated as one of the chemistry of protein-RNA interactions, we might still be waiting for an answer.” John Maynard Smith, *“The Concept of Information in Biology”* [67 *Philosophy of Science* 177-194, at 183-184 (June 2000)].

<sup>74</sup> I have practiced law since 1968 in corporate finance and business litigation. In the last three years I have focused on Constitutionally appropriate methods of teaching origins science in public schools. This has led



caught between the proverbial rock and a hard place. Most admit little or no scientific knowledge or experience. When confronted with complex issues of philosophy, science and even mathematics, they do the natural and rational thing – rely on the advice of experts. The problem is that the science experts involved in the censorship of design are the censors. Although it is easy to characterize these experts as the proverbial fox that is asked to guard the hen house, in many cases the biology teachers and other science educators in the trenches are as uniformed as everyone else. It seems that no one except members of the science elite have ever heard of methodological naturalism.<sup>75</sup> Unfortunately, these boards are often advised that those seeking objectivity and critical analysis are in reality right-wing religious fundamentalists, akin to those that struck on 9/11, who have a hidden religious agenda to sneak Genesis into the classroom. Sound bites and ad hominem attacks rather than focused analysis dominate the discussion.

In the end government frequently winds up doing the bidding of the “science experts” by ignoring parent complaints and adopting an “Evolution Only” science curriculum that subtly implements methodological naturalism. This is easily accomplished simply by providing students with one of eleven or so standard textbooks which never mention design theory, other scientific criticisms of evolutionary theory or methodological naturalism. Teachers are not allowed to discuss any of these subjects because the ACLU has advised the Board that suit will be filed if the “D Word” is ever mentioned. Teachers who indicate a desire to “dilute” the thrust of evolutionary theory by teaching the subject honestly are reassigned.<sup>76</sup> All of these practices reflect official government action to suppress a perfectly valid scientific side of the origins debate that happens to harmonize with theistic religion. The question is whether such a policy is consistent with the Constitution.

The key question is not whether the state may *choose* to discuss with students the argument for design when it also discusses the argument against it. As discussed above, an inference of design is not religion. Furthermore, no cases have held that the design inference may not be discussed. To the contrary, the cases urge a comprehensive approach that allows the teaching of all scientific theories about origins. Accordingly, there is little doubt that a school district may decide to simply disagree with the experts and include the discussion in a public school science curriculum where the competing theory is explained. A number of persuasive

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to my appearance before a number of state and local school boards and involvement in Intelligent Design network, inc., an organization that seeks objectivity in origins science. My interest in the scientific issues derives from a bachelor’s degree in geology as well as continuing interest and experience in that science through a number of legal engagements, continuing study and travels around the world. A modified form of legal opinion that I co-authored with William S. Harris, Ph.D., a research biochemist, is reflected in *Teaching Origins Science in Public Schools: Memorandum and Opinion*, (Intelligent Design network 2001), which may be accessed at [www.IntelligentDesignNetwork.org/legalopinion.htm](http://www.IntelligentDesignNetwork.org/legalopinion.htm).

<sup>75</sup> See Note 53. It is an “unwritten rule” that will not be found in biology text books. Following a radio talk show I was confronted by a biology teacher who was moonlighting as a sound technician. She had never heard of the rule. Eyes glaze over when it is mentioned, but it does exist. Much has been written about it and an entire conference was devoted to the subject in 2002 in Kansas City.

<sup>76</sup> See *Intelligent Design, the Scientific Alternative to Evolution*, *supra.* at 535-8; the video, *Icons of Evolution, The Growing Scientific Controversy over Evolution*, (Coldwater Media, 2002), which details the case of Roger DeHart, a biology teacher who was reassigned, and *LeVake v. Independent School District*, 656 ,625 NW2nd 505 (Minn. App. 2001), *cert den.* 122 S.Ct. 814 (2002), where a biology teacher was reassigned for desiring to teach evolution “honestly.”

articles from legal scholars that are familiar with both the science and philosophical issues explain why this sort of discussion does not offend the First Amendment.<sup>77</sup>

The key question, is whether a school board in following the incorrect advice of the experts that official exclusion is necessary to comply with the Establishment Clause, actually violates it. The debate over origins is very much like that which has faced many schools in the past ten years over viewpoint discrimination under the Speech Clause. Thinking that the First amendment requires a strict separation of church and state rather than neutrality, many schools have *excluded* Christian speech in a number of public forums open to a variety of other kinds of the public discourse. In case after case, the Supreme Court,<sup>78</sup> and now even circuit courts, are recognizing that exclusion violates rather than achieves religious neutrality. In the same manner, public schools have started a discussion of origins but have officially excluded one of the views because it favors theistic religion. Is this exclusion, which favors non-theistic religion and disfavors theistic religion, consistent with or inconsistent with the obligation of the state to be neutral as between religion and nonreligion? That is the key question.

The two Supreme Court cases that deal with origins science and other First Amendment Jurisprudence strongly suggest that official suppression of the scientific alternative to evolution is constitutionally problematic. State activities which “touch upon”<sup>79</sup> religion must satisfy the requirements of both the Establishment Clause and Free Exercise Clause of the Constitution if they are to continue. “Religion” includes not only traditional theistic religions, but also non-theistic religions such as “Buddhism, Taoism, Ethical Culture, Secular Humanism and others.”<sup>80</sup> Under the Establishment Clause the activity must have a secular purpose *and* be religiously neutral.

Neutrality means that the primary effect of government action must not “prefer” or

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<sup>77</sup> See Note 71.

<sup>78</sup> *Widmar v. Vincent*, 454 U.S. 263 (1981); school may not exclude student religious group; *Westside Community Bd. Of Ed. v. Mergens*, 496 U.S. 226 (1990); exclusion of after hours student religious club was a violation of the Equal Access Act and that Act was not a violation of the Establishment Clause; *Lamb's Chapel v. Center Moriches Union Free School District*, 508 U.S. 384 (1993); holding that a school cannot censor after school discussions regarding religious family values; and *Rosenberger v. University of Virginia*, 515 U.S. 819 (1995); holding that a university may not refuse to fund a Christian publication if it funds other secular and nonreligious publications; *Good News Club, et al. v. Milford Central School*, 533 U.S. 98 (2001): “allowing [a religious] club to speak on school grounds would ensure neutrality, not threaten it.”

<sup>79</sup> *Gillette v. United States*, 401 U.S. 437, 449-50 (1971): “[T]he Establishment Clause stands at least for the proposition that when government activities **touch on the religious sphere**, they must be secular in purpose, evenhanded in operation, and neutral in primary impact.” *Allegheny County v. Greater Pittsburgh ACLU*, 492 U.S. 573, 592 (1989); ruling against a nativity scene at the entrance of a government office.

<sup>80</sup> *Welsh v. United States*, 398 U.S. 333, *concurring opinion*, note 8 (1970): “This Court has taken notice of the fact that recognized ‘religions’ exist that ‘do not teach what would generally be considered a belief in the existence of God,’ *Torcaso v. Watkins*, 367 U.S. 488, 495 n. 11, e. g., ‘Buddhism, Taoism, Ethical Culture, Secular Humanism and others.’ .... See also *Washington Ethical Society v. District of Columbia*, 101 U.S. App. D.C. 371, 249 F.2d 127 (1957); 2 *Encyclopedia of the Social Sciences* 293; J. Archer, *Faiths Men Live By* 120-138, 254-313 (2d ed. revised by Puritan 1958); Stokes & Pfeffer, *supra*, n. 3, at 560.” See also *Smith v. Board of School Commissioners of Mobile County*, 655 F. Supp. 939, (SD Ala 1987, holding that Secular Humanism is a religion) *rev'd on other grounds* 827 F.2d 684 (11th Cir 1987).

“disparage,”<sup>81</sup> “favor” or “disfavor,”<sup>82</sup> “promote” or “inhibit,”<sup>83</sup> “endorse”<sup>84</sup> or disapprove,”<sup>85</sup> or “discriminate”<sup>86</sup> in favor of or against religion.

Neutrality is required not only as between religion and religion, but as to “religion and nonreligion.”<sup>87</sup> Discrimination is not permitted with respect to traditional religion and their various sects, but also with respect to other forms of belief, including, atheism, agnosticism, Secular Humanism, secularism and other non theistic sects.<sup>88</sup> This has been held to require neutrality as between theistic and secular beliefs.<sup>89</sup> In this respect the Supreme Court has recognized that “secularism” may not be promoted by government over traditional religion<sup>90</sup> and that “the individual freedom of conscience protected by the First Amendment embraces the right

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<sup>81</sup> *Abington School Dist. v. Schempp*, 374 U.S. 203, 214-5 (1963).

<sup>82</sup> *Everson v. Board of Education of Ewing Tp.*, 330 U.S. 1, 18 (1947); “That Amendment requires the state to be neutral in its relations with groups of religious believers and non-believers; it does not require the state to be their adversary. State power is no more to be used so as to handicap religions, than it is to favor them. The fullest realization of true religious liberty requires that government neither engage in nor compel religious practices, *that it effect no favoritism* among sects or between religion and nonreligion, *and that it work deterrence of no religious belief.*”; *Epperson v. Arkansas*, 393 U.S. 97, 116 (1968): “The very cases cited by the Court as supporting its conclusion hold that the State must be neutral, *not favoring one religious or anti-religious view over another.*” (J. Black, Concurring); *Rosenberger v. Rector and Visitors of the University of Virginia*, 515 U.S. 819, 831 (1995): “By the very terms of the SAF prohibition, the University does not exclude religion as a subject matter, but selects for *disfavored* treatment those student journalistic efforts with religious editorial viewpoints.”

<sup>83</sup> *Lemon v. Kurtzman*, 403 U.S. 602, 613-14 (1971): “First, the statute must have a secular legislative purpose; second, its principal or primary effect must be one that neither advances nor *inhibits religion*...”

<sup>84</sup> *Allegheny County v. Greater Pittsburgh ACLU*, 492 U.S. 573, 593-4 (1989).

<sup>85</sup> *Lynch v. Donnelly*, 465 U.S. 668, 690 (1984) (O’CONNOR, J., concurring): “The purpose prong of the Lemon test asks whether government’s actual purpose is to endorse or *disapprove* of religion.”

<sup>86</sup> *Rosenberger v. Rector and Visitors of the University of Virginia*, 515 U.S. 819, 846, 115 S.Ct. 2510, 2525 (1995) (O’CONNOR, J., concurring): “The Religion Clauses prohibit the government from favoring religion, but they provide no warrant for *discriminating* against religion.”

<sup>87</sup> *Epperson v. Arkansas*, 393 U.S. 97, 104-5 (1968); In *Welsh v. United States*, 398 U.S. 333, 357-8 (1970), (J. Harlan, concurring), As discussed in Note 89, Justice Harlan makes clear that nonreligion includes secular beliefs that do not amount to formal organized religion, whether theistic or non-theistic. His conclusion is that the Establishment Clause prohibits discrimination or religious gerrymandering as to these kinds of secular beliefs and other kinds of formal religious beliefs.

<sup>88</sup> See Note 80.

<sup>89</sup> *Welsh v. United States*, 398 U.S. 333, 357-8 (1970) (J. Harlan, concurring): “However, having chosen to exempt, it cannot draw the line between theistic or non-theistic religious beliefs on the one hand and secular beliefs on the other. Any such distinctions are not, in my view, compatible with the Establishment Clause of the First Amendment. See my separate opinion in *Walz v. Tax Comm’n*, 397 U.S. 664, 694 (1970); *Epperson v. Arkansas*, 393 U.S. 97 (1968); *School District of Abington Township v. Schempp*, 374 U.S. 203, 305 (1963) (Goldberg, J., concurring); *Engel v. Vitale*, 370 U.S. 421 (1962); *Torcaso v. Watkins*, 367 U.S. 488, 495 (1961); *Fowler v. Rhode Island*, 345 U.S. 67 (1953).

<sup>90</sup> *Abington School Dist. v. Schempp*, 374 U.S. 203, 225 (1963). See Note 139

to select any religious faith or none at all.”<sup>91</sup>

The concept of neutrality effectively proscribes government from taking an official position on any form of **orthodoxy** affecting a variety of beliefs.<sup>92</sup>

The “neutrality” required by the Establishment Clause necessarily prohibits “**religious gerrymandering**.” A gerrymander is an attempt to divide a subject in a way that will necessarily exclude a particular viewpoint. One “ must survey meticulously the circumstances of governmental categories to eliminate, as it were, religious gerrymanders.”<sup>93</sup> Thus, government may not exempt Amish from the draft without also exempting atheists who share a similar conscientious aversion to war.<sup>94</sup> Nor may it exempt religious publications from a tax without also exempting nonreligious publications,<sup>95</sup> or draw a city ordinance in a way that excludes religious activities but not nonreligious ones.<sup>96</sup>

The key case relative to the suppression of scientific theories regarding origins is *Epperson v. Arkansas*.<sup>97</sup> A Tennessee statute censored the teaching of evolution without censoring all discussions of human origins. The court struck it down as one that was religiously motivated and not neutral as between “religion and nonreligion.” In this respect the Court said:

“Government in our democracy, state and nation, must be neutral in matters of

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<sup>91</sup> “At one time it was thought that this right merely proscribed the preference of one Christian sect over another, but would not require equal respect for the conscience of the infidel, the atheist, or the adherent of a non-Christian faith such as Islam or Judaism.<sup>36</sup> But when the underlying principle has been examined in the crucible of litigation, the Court has unambiguously concluded that the individual freedom of conscience protected by the First Amendment embraces the right to select any religious faith or none at all.” *Wallace v. Jaffree*, 472 U.S. 38, 54 (1985)

<sup>92</sup> “If there is any fixed star in our constitutional constellation, it is that **no official**, high or petty, **can prescribe what shall be orthodox** in politics, nationalism, religion, or other matters of opinion or force citizens to confess by word or act their faith therein.” *West Virginia Board of Education v. Barnette*, 319 U.S. 624, 642 (1943); *Board of Education v. Pico*, 457 U.S. 853, 879 (1982); *Keyishian v. Board of Regents*, 385 U.S. 589, 603 (1967)

<sup>93</sup> *Texas Monthly, Inc. v. Bullock*, 489 U.S.1, 16-17 (1989). “As Justice Harlan remarked: ‘The Court must survey meticulously the circumstances of governmental categories to eliminate, as it were, religious gerrymanders.’”

<sup>94</sup> The conscientious objector cases show that government may not gerrymander classes based on particular tenets of religious beliefs so that certain religious beliefs are favored while those holding other beliefs are not. Thus, government may not gerrymander exemptions from the draft based on whether a belief system is one which adheres to a God, no God or simply a moral conviction. *United States v. Seeger*, 380 U.S. 163 (1965), (conscientious objection on non-theistic religious grounds sustained) and *Welsh v. United States*, 398 U.S. 333 (1970), (conscientious objection on moral rather than any theistic or non-theistic religious ground sustained).

<sup>95</sup> See Note 94.

<sup>96</sup> *Church of Lukumi Babalu Aye v. City of Hialeah*, 508 U.S. 520 (1993); declaring invalid city ordinances narrowly tailored to proscribe ritual sacrifices of animals for religious purposes but not proscribing other nonreligious forms of animal sacrifice, such as fishing.

<sup>97</sup> *Epperson v. Arkansas*, 393 U.S. 97 (1968)

religious theory, doctrine, and practice. ***It may not be hostile to any religion*** or to the advocacy of no-religion; and it may not aid, or foster or promote one religion or religious theory against another or even against the militant opposite. ***The First Amendment mandates government neutrality*** between religion and religion, and ***between religion and nonreligion.***

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“.....the State may not adopt programs or practices in its public schools or colleges which ‘aid or oppose’ any religion. *Id.* at 225. This prohibition is absolute. ***It forbids*** alike the preference of a religious doctrine or ***the prohibition of theory which is deemed antagonistic to a particular dogma.***” (emphasis added)<sup>98</sup>

According to Justice Harlan in *Welsh v. United States*, *Epperson* is the classic example of a proscribed “religious gerrymander.”<sup>99</sup> The subject being gerrymandered is the discussion of scientific theories regarding the origin of life, a subject that unavoidably impacts both theistic and non-theistic beliefs. The Tennessee statute defined the discussion in an “underinclusive way so that the discussion would excise one of multiple theories of the origin of man.” Any logical application of the principles of *Epperson* necessarily forbids official suppression of the scientific disagreement with Darwin. If Darwin’s claim of no-design cannot be officially suppressed, then there would seem to be no rationale for officially suppressing the scientific disagreement.

The other Supreme Court origins case that often is incorrectly cited as banning design theory is *Edwards v. Aguillard*.<sup>100</sup> In *Edwards* a Louisiana statute censored evolution if “*creation science*” was not taught. As mentioned, *creation science* is science that seeks to validate a literal interpretation of Genesis. Unlike a logical inference of design, it does not derive its authority from an application of the scientific method, rather it arises from a religious text. The court declared the act unconstitutional because it would narrow the scientific discussion of origins, rather than expand it. As a result it had only a religious and not a secular purpose. In this respect the Court explained that the best way for a state to deal with origins is to teach it comprehensively:

“If the Louisiana Legislature's purpose was solely to maximize the comprehensiveness and effectiveness of science instruction, ***it would have encouraged the teaching of all scientific theories about the origins of humankind.*** <sup>8</sup> But under the Act's requirements, teachers ***who were once free to teach any and all facets of this subject*** are now unable to do so.<sup>101</sup> (emphasis

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<sup>98</sup> *Id.*, at 103-106.

<sup>99</sup> *Welsh v. United States*, 398 U.S. 333, 356-7 (1970), See note 15 of Justice Harlan’s concurring opinion..“The Establishment Clause case that comes most readily to mind as involving ‘underinclusion’ is *Epperson v. Arkansas*, 393 U.S. 97 (1968). There the State prohibited the teaching of evolutionist theory but “did not seek to excise from the curricula of its schools and universities all discussion of the origin of man.”

<sup>100</sup> *Edwards v. Aguillard*, 482 U.S. 578, 588-9 (1987). The case involved a “creation science” statute and not a scientific counter-argument to the “not designed” claim of Darwinian evolution.

<sup>101</sup> *Id.*

added).

Both *Epperson* and *Edwards* strongly suggest that official governmental suppression of design theory would be just as offensive to the Constitution as official suppression of evolution as a theory. Indeed, suppression of the counter-argument would elevate evolution to something akin to a non-theistic religious orthodoxy rather than as a scientific theory.

Other Supreme Court decisions in related areas support this conclusion. Although most of the Establishment Clause cases have proscribed state activities that promote theistic beliefs, a growing number are recognizing that the concept of neutrality is indeed a two-way street. Hence, government may not suppress or exclude religious speech while allowing nonreligious speech in forums open to a variety of public expression.<sup>102</sup> Nor may it outlaw ritual sacrifice of animals for religious purposes without outlawing killing for sporting and other nonreligious purposes.<sup>103</sup> These cases show that separation is achieved through neutrality rather than exclusion.

To show compliance with the Establishment Clause, a public school must also show a valid secular purpose to suppress the scientific counter-argument to Darwinian evolution. As discussed above, the purpose of methodological naturalism is to exclude the supernatural – to exclude God. That is a purpose that relates to religion. It is not secular. Furthermore, there seems to be no reasonable scientific payback from using an irrebuttable naturalistic assumption in origins science. It savages scientific credibility rather than enhances it.

Under the Free Exercise Clause, parents have a right to instill theistic religious beliefs in their children. An official state policy that seeks to imbue students with a contrary non-theistic belief in naturalism or materialism would seem to prohibit or conflict with the free exercise of those rights. As stated by the Court in *Planned Parenthood v. Casey*, “[a]t the heart of liberty is the right to define one’s own concept of existence, of meaning, of the universe, and of the mystery of human life. Beliefs about these matters could not define the attributes of personhood were they formed under compulsion of the State.”<sup>104</sup>

A statute that impinges on an individual’s free exercise of religion, may be permissible if it is of general application and is otherwise neutral as to religion.<sup>105</sup> Methodological naturalism obviously is neither. Since a compelling state interest to advance that doctrine does not seem to be evident, public school promotion of Naturalism may be viewed as violating the Free Exercise Clause as a “covert suppression of religious beliefs.” Covert suppression of free exercise rights were found in *Church of Lukumi Babalu Aye v. City of Hialeah*<sup>106</sup> where an ordinance forbid a

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<sup>102</sup> See Note 73.

<sup>103</sup> *Church of Lukumi Babalu Aye v. City of Hialeah*, 508 U.S. 520 (1993); declaring invalid city ordinances narrowly tailored to proscribe ritual sacrifices of animals for religious purposes but not proscribing other nonreligious forms of animal sacrifice, such as fishing.

<sup>104</sup> *Planned Parenthood v. Casey*, 505 U.S. 833, 851 (1992)

<sup>105</sup> *Employment Div., Ore. Dept. Of Human Res. v. Smith*, 494 U.S. 872, 879 (1990); holding that although it is constitutionally permissible to exempt sacramental peyote use from the operation of drug laws, it is not constitutionally required.

<sup>106</sup> *Id.*

practice that was important to a particular religion, without banning similar activities by other religions and nonreligious members of the culture.<sup>107</sup>

School officials have broad authority to regulate the curriculum in a school classroom. However, even that authority restricts public schools from the official censorship of viewpoints or the establishment of an official orthodoxy. In *Board of Education. v. Pico*,<sup>108</sup> officials were not permitted to remove books from a school library because they did not agree with the ideas expressed by the books in question. Opening a discussion of design by discussing Darwin's theory of no design without allowing a hearing of the scientific dissent would seem to be the kind of official viewpoint discrimination proscribed by *Pico* and *Rosenberger v. Rector*<sup>109</sup> under the Speech Clause. If the state cannot require students to salute the US flag, then why should it be permitted to imbue them with a naturalistic and materialistic belief that life is just an occurrence and not a design? According to the Court that outlawed the salute, "no official, high or petty, can prescribe what shall be orthodox in politics, nationalism, religion, or other matters of opinion or force citizens to confess by word or act their faith therein."<sup>110</sup>

All of these cases suggest that the only way for government to constitutionally satisfy its job of informing students about origins science is to do that comprehensively and not selectively. Since it is impractical to censor the discussion of origins in its entirety, that necessarily requires that both sides of the Darwinian controversy be explored without the use of religious or naturalistic assumptions.

The idea of inclusion rather than exclusion is also reflected in the advice of Congress in the Report that accompanied the No Child Left Behind Act<sup>111</sup> and Darwin's own advice. In the

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<sup>107</sup> *Id.* at 536. "The Free Exercise Clause, like the Establishment Clause, extends beyond facial discrimination. The Clause '*forbids subtle departures from neutrality*,' ... and '*covert suppression of particular religious beliefs*.' ... Official action that targets religious conduct for distinctive treatment cannot be shielded by mere compliance with the requirement of facial neutrality. ***The Free Exercise Clause protects against governmental hostility which is masked as well as overt.*** 'The Court must survey meticulously the circumstances of governmental categories to eliminate, as it were, religious gerrymanders.'"

<sup>108</sup> *Board of Education. v. Pico*, 457 U.S. 853, 867-8 (1982)

<sup>109</sup> *Rosenberger v. Rector and Visitors of University of Virginia*, 115 S.Ct. 2510, 2516-18 (1995): "Once it has opened a limited forum, however, the State must respect the lawful boundaries it has itself set. The state may not exclude speech where its distinction is not 'reasonable in light of the purpose served by the forum.' .... If the topic of debate is, for example, racism, then exclusion of several views on that problem is just as offensive to the First Amendment as exclusion of only one. It is as objectionable to exclude both a theistic and atheistic perspective on the debate as it is to exclude one, the other, or yet another political economic or social viewpoint." [*Rosenberger v. Rector and Visitors of University of Virginia*, 115 S.Ct. 2510, 2516-18 (1995)]. The "lawful boundaries" on a discussion of origins in a science class would seem to comprehend not only the claim of no-design, but scientific criticisms and disagreement, since that is an inherent aspect of the scientific method.

<sup>110</sup> *West Virginia Board of Education v. Barnette*, 319 U.S. 624, 642 (1943) (emphasis added)]

<sup>111</sup> Educators are explicitly alerted to the need to avoid gerrymandering the discussion of evolution in the report of the House-Senate Conferees that accompanied the enactment of the No Child Left Behind Act: "The Conferees recognize that a quality science education should prepare students to distinguish the data and testable theories of science from religious or philosophical claims that are made in the name of science. Where topics are taught that may generate controversy (such as biological evolution), the curriculum should help students to understand ***the full range of scientific views that exist, why such topics may***

*Conclusion* of the *Origin of the Species*, Darwin hoped for a future of “**young and rising naturalists, who [would] be able to view both sides of the question with impartiality.**” An “Evolution Only” paradigm conflicts with the advice of both Darwin and Congress. It contemplates showing young naturalists only the atheistic friendly side of the scientific debate.

One frequently hears the argument that any discussion of design will necessarily involve a discussion of the identity of the hypothetical designer. The simple and truthful answer to that question is that a scientific analysis of the data does not reveal the identity of a designer, if any. DNA does not bear a copyright notice or signature.

As a practical matter, it seems that public schools have no honest or ethical choice in the matter. If methodological naturalism is in fact used to censor design, then that practice must be fully and adequately disclosed to satisfy canons of scientific ethics that requires the disclosure of bias and how bias affects the selection of data and explanations given.<sup>112</sup> Any adequate disclosure of methodological naturalism will necessarily involve a discussion of design theory and the fact that it is supported by relevant evidence. A short drama called *The Rule*<sup>113</sup> explains the dilemma faced by a school board that would like to avoid a discussion of design, but can find no honest way to do so. A prejudice works only so long as it is hidden. Once its ugliness is revealed and acknowledged, embarrassment guarantees its demise.

## Conclusion

As patrons of science we and our children need to hear both sides of the origins controversy to engage in “informed decision making” about religion, government, ethics and morals. Information rather than indoctrination will solve the legal and scientific problems and lead to a more interesting and less contentious debate.

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*generate controversy, and how scientific discoveries can profoundly affect society.*” [No Child Left Behind Act of 2001, Conference Report to Accompany H.R. 1, page 703, (December 13, 2001, House Report No. 107-334)]

<sup>112</sup> The ethical requirement is discussed in the AAAS publication: *Science for All Americans, On-Line*, Chapter 1 at <http://www.project2061.org/tools/sfaaol/sfaatoc.htm>:

*THE SCIENTIFIC ENTERPRISE* <http://www.project2061.org/tools/sfaaol/sfaatoc.htm> : “When faced with a claim that something is true, scientists respond by asking what evidence supports it. **But scientific evidence can be biased** in how the data are interpreted, in the recording or reporting of the data, **or even in the choice of what data to consider in the first place.**”

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“Bias attributable to the investigator, the sample, the method, or the instrument may not be completely avoidable in every instance, but **scientists want to know the possible sources of bias and how bias is likely to influence evidence.** Scientists **want, and are expected,** to be as **alert to possible bias** in their own work **as in that of other scientists,** although such objectivity is not always achieved.” (emphasis added)

<sup>113</sup> Daniel Schwabauer and John H. Calvert, *The Rule* (Intelligent Design network, inc. 2002). A copy may be downloaded at <http://www.IntelligentDesignNetwork.org/TheRule.pdf>